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EQUALITY IN THE CLASSROOM THROUGH GAMIFICATION AND ARTIFICIAL INTELLIGENCE

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Abstract

This project analyzes the impact of gamification and artificial intelligence (AI) on promoting educational equality. Thus, this paper includes a didactic proposal in the 3rd year ESO classroom at the IES Ramón y Cajal. The results suggest that different educational strategies, such as personalized and adaptive learning, enhance students' interest and motivation. Furthermore, this didactic proposal addresses diverse Sustainable Development Goals, thus developing educational access for everyone, while promoting a quality education. Among the main challenges are teacher training and access to technology. However, the advantages outweigh the limitations, revealing that using gamification and AI can change teaching towards an increasingly inclusive and productive teaching model.

Keywords: coeducation, equality, artificial Intelligence, gamification, inclusion.

Resumen

Este proyecto de Fin de Máster estudia los efectos de la implementación de la gamificación y la inteligencia artificial (IA) para la promoción de igualdad en el ámbito educativo. Así, este proyecto incluye una propuesta didáctica puesta en práctica en el aula de 3º ESO en el IES Ramón y Cajal. Los resultados obtenidos muestran que al hacer uso de diferentes metodologías como es el aprendizaje personalizado y adaptativo a cada estudiante incrementan su interés y su motivación. Además, se encuentra dirigida hacia diversos Objetivos de Desarrollo Sostenible (ODS) para promover la igualdad educativa y una educación de calidad. Entre los principales desafíos que presenta esta propuesta didáctica se encuentra la falta de familiarización de los docentes con las nuevas inteligencias artificiales en el aula. No obstante, existen más ventajas que puntos débiles, de manera que la introducción de los elementos de juego y la inteligencia artificial en el contexto educativo son una manera eficaz para promover una nueva forma de enseñanza más inclusiva y efectiva para los estudiantes.

Palabras clave: coeducación, igualdad, inteligencia artificial, gamificación, inclusión.

TABLE OF CONTENTS

1. Introduction	8
2. Justification	8
3. Methodology	9
4. Theoretical Framework	10
4.1. Concept of equality in the classroom	10
4.1.1. Importance of promoting equality in the educational setting	11
4.1.2. Challenges to achieving equality in the classroom	11
4.1.3. Strategies to promote equality in the classroom	12
4.1.4. Coeducation and its objectives	13
4.1.5. Benefits of equality in the educational setting	14
4.2. Gamification in the Classroom	15
4.2.1. Definition and Theoretical Foundations	15
4.2.2. Gamification and its evolution	15
4.2.3. Key Concepts	16
4.2.3.1. Self-Determination Theory, by Ryan and Deci	16
4.2.3.2. Constructivism and Zone of Proximal Development	16
4.2.3.3. Bandura's Social Learning Theory	17
4.2.3.4. Mindset Theory	17
4.2.3.5. Personalized and Adaptive Learning	18
4.2.4. Game Materials in the Classroom	18
4.2.4.1. Points and Badges	18
4.2.4.2. Leaderboards	19
4.2.4.3. Challenges and Quests	19
4.2.4.4. Levels and Progression	19

4.3. Implementation of Artificial Intelligence in the Classroom	20
4.3.2. Definition of the AI Concept within a Teaching Setting	20
4.3.3. Artificial Intelligence (AI) Theoretical Concepts	20
4.3.3.1. Learning Concepts of AI	20
4.3.4. Development of the AI	21
4.3.5. Types of AI Technologies for the Educative Setting	21
4.3.6. Applications of AI in Education	22
4.4. Equality, Gamification, and AI Technologies' Educative Connections	23
4.4.2. Interrelation Gamification – AI Technologies	23
4.4.3. Personalized and adaptative learning by game elements and AI-Powered Tools	24
5. Didactic Proposal	25
5.1. Description of the didactic proposal and context of the educational center	25
5.2. Didactic Proposal objectives	27
5.3. Methodology	27
5.4. Legal Framework of the Didactic Proposal	28
5.4.2. Stage Aims	29
5.4.3. Key Competences	30
5.4.4. Specific Competences	31
5.4.5. Assessment Criteria	32
5.4.6. Contents	36
5.5. Organization of the Didactic Proposal	38
5.6. Didactic Proposal sessions and activities	39
5.7. Resources Used	44
5.8. Classroom management	45

5.9. Evaluation and monitoring of the proposal	46
6. Results Obtained	46
6.1. Effects of equality in the classroom	46
6.2. Benefits of incorporating gamification and Artificial Intelligence	47
6.3. Potential limitations and areas for improvement	47
7. Conclusion	48
8. References	50
9. Annexes	54

1. Introduction

In a world that is increasingly dominated by digital technologies, education is undergoing a transformation process, with the introduction of different educational methodologies and technologies to promote equality in the educational field. Thus, this project presents an innovative didactic proposal from the point of view of equality and new technologies, entitled *Equality in the Classroom through Gamification and Artificial Intelligence*. This didactic proposal seeks to examine how gamification and artificial intelligence (AI) could establish a new methodology in the educational field to promote a new, more inclusive and effective way of teaching for students.

Educative equality is a priority area within UNESCO's Sustainable Development Goals (SDGs), especially Goal number four (SDG 4), which aim at ensuring that all people have access to quality inclusive and equitable education. Despite efforts made in various education systems, existing inequalities persist regarding access to learning opportunities tailored for every student's unique needs. Also, there are high disparities between students from different socio-economic backgrounds, causing them not to access information technologies easily as their counterparts; hence, leading some students with poor performance records remaining behind academically while others progress well thanks to high-tech resources available only for privileged few who can afford it. In this sense, combining gamification with artificial intelligence seems like a good strategy to improve the learning experience and bridge the gap of inequality in class.

2. Justification

The application of recreational elements in teaching environments has been shown to be an effective tool to motivate students and promote real learning. By integrating different intrinsic game elements in the classroom, such as rewards, challenges, or leaderboards, gamification can actively engage students in their education, encouraging cooperation, imagination, and critical analysis.

Additionally, Artificial intelligence (AI) technologies have become essential tools for the introduction of new methodologies in the educational context. These AI tools can analyze large

amounts of information, personalize it, and offer immediate feedback so that teaching is adapted to the learning needs of each student. In addition to promoting self-directed education, artificial intelligence can also identify difficulties within the system, since by providing specific solutions it promotes educational diversification and equality in the classroom.

In this way, this study aims to examine the effect of gamification and artificial intelligence in promoting educational equity through a pedagogical strategy implemented in the 3º ESO classroom of IES Ramón y Cajal. To achieve this, the following objectives are established:

The main objective of this study is to examine how the combination of gamification resources and artificial intelligence technologies can enhance equity in the teaching-learning process, fostering a more inclusive and stimulating educational environment.

As for the specific objectives pursued by the work, three can be distinguished, which are more focused on the subject matter and the implementation of the didactic proposal in the classroom. The first objective is to analyze how gamification affects the involvement and interest of students in the classroom. It also seeks to investigate how artificial intelligence technology affects individualized education and the dismantling of educational obstacles. Finally, this thesis examines the extent to which new techniques integrate the Sustainable Development Goals into the teaching and learning process.

3. Methodology

A theoretical framework divided into four key blocks is presented in this project. The first section of this project seeks to analyze educational equality, emphasizing the main challenges regarding equality and strategies for ensuring educational inclusion. The second section shows the concept of gamification and its possible effects on the educational context. The third block deals with artificial intelligence technologies (AI) and their applications for new methodologies in the educational setting. Finally, in the last section, a link between the three components is established, concerning how gamification as well as AI make an effort together to improve equality inside the classroom.

After the theoretical framework, a six-session didactic proposal has been designed and developed, seeking to integrate both gamification and artificial intelligence into the classroom in an innovative way. In this way, the proposed activities range from play dynamics, such as

escape rooms and AI image Pictionary, to the use of diverse AI tools towards personalized and adaptive learning. Hence, every session follows the guidelines of educational equality, promoting inclusion and equal access to learning resources.

Finally, this study presents an analysis of the results obtained after the implementation of such a didactic proposal. The advantages and challenges of the implementation are evaluated. Moreover, it evaluates the effect of gamification and AI on students' motivation and academic performance. This research aims to provide a comprehensive overview of how these methodologies can be used to revolutionize education while making an inclusive classroom environment.

4. Theoretical Framework

4.1. Concept of equality in the classroom

The equality of opportunity in education is defined as a principle for ensuring that all students have the same educational opportunities to learn and succeed academically, regardless of their origins, abilities, or personal issues (Reardon, 2020). Thus, he adds that this concept is based on the idea that all students should be treated fairly and equally without discrimination or prejudice (Reardon, 2020). According to Kite and Clark (2022), equality in the classroom means that all students have the same amount of educational opportunities and resources, including the equal right to access the material used in the classroom, and to participate in extracurricular activities (Kite & Clark, 2022).

However, the concepts of equity and equality are not equal terms, being pertinent to differentiate one from the other. According to Banks (2016), the term equality in the classroom focuses on treating each student in the same way, while the concept of equity aims to offer each student everything necessary for his or her academic performance to be successful. Nevertheless, Gorski (2016) states that the fact that all students have the same materials and the same starting points to reach academic success does not consider the individual difficulties and limitations of each student. Likewise, he also states that the concept of equity guarantees individual and specific resources for each student, to obtain a similar academic performance for all students (Gorski, 2016).

From Darling-Hammond's perspective (2017), educational equity is also concerned with removing all types of barriers that may prevent full access to education for all students. Thus, these barriers can be economic, cultural, physical, or social, depending on the context. Hence, Subirats (2017) adds that educational equality cannot be achieved without considering the student's specific needs. In other words, a student whose family has few resources may need financial assistance to access the educational material used in the classroom, which is one of the objectives of educational equity.

4.1.1. Importance of promoting equality in the educative setting

Equality in the educational setting means creating an environment where all students feel included and treated equally in the teaching and learning process. Thus, Johnson (2018) establishes that when students are treated fairly, they feel more valued, severely affecting their motivation, which is key to their academic performance. Additionally, he argues that equality in the classroom is a means to end the differences in academic performance between students of different cultures or abilities, an aspect of great importance in societies and areas where students have diverse social, cultural, and economic backgrounds (Johnson, 2018).

It is worth mentioning that Nieto (2015) highlights that equality in the classroom not only focuses on the individual benefit of each student but also seeks to develop the social cohesion of the student body, to promote respect and collaboration for the same goal in the classroom.

4.1.2. Challenges to achieving equality in the classroom

Despite the strong desire to promote equity in the classroom, Johnson (2018) notes that several challenges remain in education today in successfully promoting equity. One of the challenges that remain is the wide variety of needs and abilities that students have. In this way, Tomlinson (2014) shows that some students may have some kind of difficulties such as physical disabilities, learning difficulties, or even economic problems, being this diversity the one that can make the process in which the educator offers the same level of aids and supports to all students difficult due to the great diversity.

Another challenge that prevails is the continuation of orientations, biases, and prejudices that significantly impact the expectations that teachers create about students and the evaluations they make about them. As Gorski (2016) points out, these previously mentioned biases can be present in different ways, either through the creation of higher or lower expectations for certain students in the classroom or through the interpretation of the behavior of these students in a very different way, depending on the group of students. Thus, it shows that teachers can focus on students with a higher production level in an English class, reinforcing proficiency stereotypes.

Furthermore, Au (2009) states that occasionally both the policies and practices of various institutions prolong inequality in the classroom, with standardized tests being an example of this. This statement shows that these tests do not consider the different styles and forms of learning, nor the cultural background of each student, which creates performance gaps in the academic field. Thus, Au (2009) suggests that changes in the system are greatly required so that these types of inequalities are considered.

4.1.3. Strategies to promote equality in the classroom

To address these issues, effective strategies are needed to promote a more equitable educational environment. To ensure that all students have an equal opportunity to succeed, educators must adopt inclusive practices that acknowledge and address the varied needs of their students. According to Banks (2015), equality in the classroom consists of providing tailored assistance that considers each student's particular situation instead of considering them all similarly. Thus, teachers assist in the reduction of inequalities and the advancement of a more equitable educational environment for all students. Therefore, Banks (2015) establishes that they can promote equality by implementing different strategies in the classroom, such as confronting prejudices, promoting cultural awareness, and implementing differentiated instruction.

Teachers can use diverse strategies to create equity in the classroom, as differentiated instruction, which is one of the most frequent ways to promote it. As Tomlinson describes (2014), this model keeps teachers using different resources and approaches—differentiated teaching, individualized activities, and fluid assessments—responsive to the diverse needs and support of everyone.

Additionally, students can feel more valued and integrated through the creation of an atmosphere in which empathy and respect are key for equality. For it, Banks (2016) states that equality and diversity are key aspects in the classroom, considering it highly relevant for teachers to be trained in this to put it into practice in their classrooms. For example, teachers can be trained in professional development programs about equality, whose purpose is to provide teachers with the skills, techniques, and knowledge required to promote a classroom where all students feel included (Banks 2016).

Culturally responsive teaching is another approach that recognizes and considers students' cultural backgrounds in shaping the curriculum and the teaching process, allowing students to see themselves in their education and affirm their experiences (Gay, 2010).

Another approach to encourage equal opportunities in the classroom is through collaborative learning, students from different walks of life work together and help each other. Johnson & Johnson (1999) further state that this method not only promotes equality but also fosters social skills and increases understanding of one another (Johnson & Johnson, 1999).

4.1.4. Coeducation and its objectives

According to Subirats (2018), coeducation is an education where men and women are united, which is essential for achieving equality in education. Thus, respect and empathy are successfully promoted among students where coeducation is carried out, thus ending the gender stereotypes defined in the classroom.

To implement coeducation in the classroom, Subirats (2018) proposes in chapter five of his book, *Coeducation, a commitment to freedom*, a series of objectives that coeducation pursues. One of the main objectives is the promotion of equality between men and women, so that coeducation offers equal opportunities, both in quality and in educational support. Thus, Smith (2019) adds that traditional gender roles would be overthrown, promoting an inclusive society.

The second objective that coeducation seeks is the development of social skills, since through an education between men and women united, both the social and interpersonal skills of each student are enhanced (Subirats, 2018). Through this objective, the points of view and opinions of others are valued and respected by the students.

Additionally, Subirats (2018) establishes that another objective that coeducation pursues is the cooperation and collaboration of students in the classroom. For example, in an environment where coeducation is carried out, students feel more motivated to carry out group activities and tasks, thus promoting collaborative work. Smith (2019) adds that through this objective the student is encouraged to develop more complete skills, training students for the collaborative trends that exist in most current jobs.

The last of the main objectives of coeducation for Subirats (2018) is the development of academic performance, establishing that classrooms with coeducational environments significantly influence the academic performance of both boys and girls. Smith (2019) argues that when students are presented with different methods and styles for learning, they become more adaptable to all types of learning, becoming more comprehensively trained to improve academic performance.

4.1.5. Benefits of promoting equality in the educative setting

Promoting equality in the classroom has a series of advantages, not only for students but also for teachers. Johnson (2018) states that equality in the classroom improves self-esteem and motivation, thus influencing their academic performance. Additionally, he also expresses that as a result of these benefits, other benefits arise, such as the reduction of anxiety and stress by feeling more valued and motivated (Johnson, 2018).

Regarding the benefits of equality for teachers, Nieto (2015) expresses that stimulating equality in the classroom makes classroom management easier since the relationships with each student would be improved, thus creating a more favorable and beneficial learning environment. Thus, the differences in opportunities between students are reduced, offering all students the same educational opportunities (Nieto, 2015).

Furthermore, Johnson (2018) argues that schools that focus on implementing equality in the classroom drastically reduce students' behavioral problems, as they feel more valued and motivated to learn. Thus, the learning process is more enjoyable and productive for students and teachers.

4.2. Gamification in the classroom

4.2.1. Definition and Theoretical Foundations

Gamification is a way to promote equality in the classroom by fostering a welcoming environment that can motivate all students to participate. Werbach and Hunter (2012) suggest that teachers can engage students from diverse backgrounds and ability levels by using game elements, such as individualized challenges. Each student can thus learn in a way that is both effective and unique to them, and that is adapted to both his/her interests and particular needs. The teaching-learning process becomes more dynamic and effective when gamification is used to customize each student's learning.

Gamification means the use of various resources and tools to build games in a classroom, aiming at the motivation and the interest of the person (Pelling, 2003). According to Deterding et al (2011), gamification is “the use of game elements in non-game contexts to motivate and engage users”.

Gamification in the educational context requires introducing game elements into the learning process to make learning more entertaining and positive for students. Thus, Deterding et al (2011) add that by implementing different materials and elements such as leaderboards, challenges, points, or badges, teachers could create a more interactive and productive classroom environment, encouraging students to participate more actively and become more interested in learning.

4.2.2. Gamification and its evolution

The concept of "gamification" was introduced by Nick Pelling in 2003 and has changed over the years. Nevertheless, the idea of including game materials to foster motivation and interest is not new. A specific case of the implementation of game materials is the time of the Boy Scout movement in 1908 (Baden-Powell, 1908), where instruments like badges were used

as a means of distinguishing accomplishments, which is an example of putting gamification into action.

In the 21st century, the rapid progress of both digital technology and online platforms has drastically expanded the scope of gamification and its application in various sectors. Thus, Kapp (2012) states that educational institutions and different modern companies have incorporated gamification as a strategy to develop their employees' learning outcomes, while also enhancing customer loyalty in these companies. In education, Kapp (2012) argues that the use of gamification has experienced an accelerated boom through the introduction of new digital educational platforms for learning.

4.2.3. Key Concepts

4.2.3.1. Self-Determination Theory, by Ryan and Deci

Self-determination theory was developed by Ryan and Deci (2000). Thus, individuals can be motivated by two different variables, intrinsic and extrinsic. Additionally, they add that intrinsic motivation comes from within each person, such as personal satisfaction, while extrinsic motivation arises from external rewards and prizes such as academic grades or recognition after having achieved success in an activity (Ryan and Deci, 2000). Hence, gamification can be employed through both intrinsic and extrinsic motivation to create a greater interest in the individual.

4.2.3.2. Theories of Constructivism, by Piaget and Zone of Proximal Development, by Vygotsky

The constructivism theory developed by Jean Piaget (1954) emphasizes the individual and experiences that lead to active learning and construction of knowledge. Piagian theory is applicable in this context, where gamification takes relevance, as it provides students with interactive learning experiences that stimulate exploration inside the classroom (Piaget, 1954). As Piaget (1954) points out, students acquire knowledge through interaction with their surroundings, so activities carried out through gamification are a tool that can offer the necessary incentives for this construction of knowledge. Furthermore, as Vygotsky established

in his book *Thought and Language* (1934), knowledge is constructed by the individual not only through social interaction but also through the use of language. In this way, he adds that learning is not an individual process but must occur in a social context where individuals can interact with others who are more apt to communicate (Vygotsky, 1934). Thus, knowledge can be constructed and transmitted in a collaborative process.

Piaget's constructivism theory is aligned with the theory developed by Vygotsky in 1978, the zone of Proximal Development (ZPD), related to gamification. The ZPD refers to a set of activities that each student can perform with aid or guidance, but without being carried out autonomously. Thus, Vygotsky (1978) argues that gamification serves as a "scaffold" for student learning through the ZPD, in such a way that activities appropriate to the students' abilities are provided to develop their skills (Vygotsky, 1978).

4.2.3.3. Bandura's Social Learning Theory

The Social Learning Theory developed by Albert Bandura in 1977 focuses on learning based on observation and imitation (Bandura, 1977). Thus, gamification is a tool that facilitates social learning, in such a way that interaction and collaborative work between students is developed. Additionally, Bandura states that the individual learns through observing the behavior of others and the result of their behavior (Bandura, 1977). An example of this is team or group activities in the classroom, which foster peer learning and collaboration, greatly developing the learning social scope.

4.2.3.4. Dweck' Mindset Theory

In 2006, Carol Dweck created the mindset theory which offered a different outlook on student motivation in gamified environments. Furthermore, Dweck (2006) suggests that she can be said to differentiate between fixed mindset and growth mindset. Thus, she establishes that students with a growth mindset believe that their abilities can be developed through effort and perseverance, while students with a fixed mindset believe that their abilities are invariable (Dweck, 2006). In this way, gamification is a tool for the development of a growth mindset, offering continuous feedback to the student, in such a way that perseverance is promoted

through activities. Additionally, Dweck (2006) adds that the student is helped to see failures as new opportunities for learning and growth to improve their skills.

4.2.3.5. Personalized Learning and Adaptive Learning

Gee's (2003) personalized learning is another gamification theory that describes how it creates unique learning for each student. Gee (2003) gamifies the classroom by setting a precedent of personalized learning through a game metaphor in order for students to have personalized learning (experiment, actions and results) and respond to their own interests in a classroom environment. Furthermore, we have technologies for facilitating adaptive learning supporting both the variations and the tasks difficulties based on the performance of the student which implies a higher level of gamification environments in the class to be personalized (Gee, 2003).

4.2.4. **Game Materials in the classroom**

4.2.4.1. Points and Badges

One of the materials or game elements used for gamification in the classroom are points as rewards, which according to Kapp (2012) can be given to students as positive reinforcement for completing tasks or participating in class. Thus, these points serve the teacher to provide active feedback to the students, recognizing their efforts to achieve the expected objectives. In addition, Kapp (2012) suggests that points as positive reinforcements can be used in various ways since they can also be accumulated instead of being awarded, to unlock rewards and thus show an interest in the student's progress (Kapp, 2012).

Another game element used for gamification in the classroom is badges. As Anderson et al. (2010) point out, badges can be awarded to students for achieving a series of accomplishments, such as completing a task or maintaining good behavior. They also add that badges visibly represent the student's achievements, establishing that using badges as positive reinforcements develops both their self-esteem and their interest and effort to achieve more goals (Anderson et al, 2010).

Leaderboards are a game element to incorporate gamification that keeps a record of students concerning their performance or their score in the classroom. Thus, Landers and Landers (2014) propose that when the highest results of the leaderboard are shown, interest and motivation will be awakened in the students to obtain a better position at the table. However, they add that it must be considered that the students at the bottom of the leaderboard do not become demotivated so various tables can be used that recognize different types of achievements, to promote an inclusive and positive environment (Landers and Landers, 2014).

4.2.4.3. Challenges and Quests

Challenges and missions are two game elements that draw the student's attention, focusing on completing a series of tasks or activities in the classroom. Thus, Nicholson (2015) argues that challenges and missions serve as tools to develop problem-solving skills, since through activities that require reflection, the student's critical thinking is developed (Nicholson, 2015).

Additionally, Gee (2003) suggests that missions include a series of linked activities so that students have to complete them to achieve a final objective, being an example of gamification in the classroom. Thus, while students complete each challenge collaboratively, the student's active participation and perseverance are improved (Gee, 2003).

4.2.4.4. Levels and Progression

Levels and progression systems are two other essential game elements in the classroom learning environment through gamification, in a way that gives students freedom to progress through a series of different levels concerning their performance (Gee, 2003). Hence, Nicholson (2015) adds that as students advance through the levels, they encounter levels that require greater effort to achieve, improving their skills and knowledge.

Progression systems can include additional materials such as experience points (XP) or skill trees, in a way that provides students with guidance and options about how to improve

their skills (Kapp, 2012). In this way, Kapp (2012) adds that through directed learning through these game materials, both their autonomy and intrinsic motivation are developed.

4.3. Implementation of Artificial Intelligence in the Classroom

4.3.1. Definition of the AI Concept within a Teaching Setting

AI covers the use of available approaches in the creation of machine learning, artificial vision, or even natural language processing tools pertinent to education (Luckin et al., 2016). Thus, it is possible to create AI-based applications to perform a range of functions already within the education systems, such as the development of intelligent computer-aided tutorial systems, or the use of decision-making aids in the classroom (Luckin et al., 2016). Also, Holmes (2019) argues that AI does not only look forward to the mechanization of present processes with intelligent systems but rather to the improvement of classroom learning environments for more productive and effective lessons in today's world.

4.3.2. Artificial Intelligence (AI) Theoretical Concepts

4.3.2.1. Learning Concepts of AI

Social interactions and observational learning are important components of Albert Bandura's 1977 social learning theory. Bandura (1977) adds that AI, which enables social learning, can assist shared work and inter-peer interaction. Thus, AI tools allow students to group work where they can teach each other (Bandura 1977).

Jean Piaget's (1954) theory based on the students' construction of knowledge through their interaction with their surroundings. Accordingly, Pane (2014) argues that the implementation of AI facilitates constructivism theory by providing interactive simulations that allow students to learn through discovery. This can be evidenced by AI simulations, which allow students to do virtual experiments and observe their own results, facilitating in this way the process of practical learning (Piaget, 1954).

AI possibilities in education have existed for years but have become increasingly strong with the advances in technology (Woolf, 2009). Hence, as explained by Woolf (2019), the first educational AI software applications were developed in the 1970s and 1980s, which evolved into IT or Intelligent Tutoring Systems in pedagogical techniques that most personalize the learning experience of every student to the learning style and needs of the learner.

In the 1990s and 2000s, more sophisticated AI technologies, such as machine learning or natural language processing, emerged that, according to Kulkarni (2013), allow more flexibility in the use of AI in education. Moreover, Kulkarni (2013) elaborates that several scholars have investigated the prospects of the use of these AI technologies in automatic scoring, the analysis of student information, and other data related to the student's progress in learning.

The emergence of innovative AI tools such as big data and digital learning platforms did not occur until the 2010s, which according to Woolf (2009) significantly accelerated the process of implementing AI in classrooms. Holmes (2019) argues that the incorporation of these AI tools in the educational field is an advantage for the establishment of online learning spaces and an improvement in administrative processes (Holmes, 2019).

4.3.4. Types of AI Technologies for the Educative Setting

By increasing student engagement, enhancing assessment, and customizing instruction, artificial intelligence (AI) tools in education enhance learning. Machine Learning (ML) enables AI to analyze student performance, identify learning needs, and offer personalized learning recommendations (Baker & Inventado, 2014). This allows for a more adaptive educational experience based on student progress. Furthermore, Natural Language Processing (NLP) technologies facilitate AI-driven communication, enabling tools like chatbots and automated grading systems to assist students in real time (Jurafsky & Martin, 2020). AI-powered platforms, such as Grammarly and IBM Watson, help with grading and text correction (Burstein, 2013; Winkler & Sollner, 2018). Moreover, Intelligent Tutoring Systems (ITS) are tools developed by AI that offer personalized feedback to each student, adapting to their

specific needs after carrying out a prior analysis of their data (VanLehn, 2011; Kulkarni, 2013). Thus, these AI-driven systems enhance learning by offering tailored guidance.

Adaptive Learning Platforms (ALP) use AI to create learning opportunities for each student, taking into account their abilities, interests, and performance (Pane, 2014). AI-powered systems like DreamBox Learning and Smart Sparrow develop adequate student content based on their ability and pace, ensuring that they get similar content tailored to their level while keeping interest to learn (VanLehn, 2011). In this way, Pane (2014) states that adaptive learning platforms improve students' performance, especially regarding their reading skills. Also, it is worth mentioning that automated grading and assessment tools streamline evaluation processes, reducing teachers' workload while providing quick feedback (Dede, 2016). Some AI platforms, such as Gradescope and Turnitin, can grade assignments automatically, detect plagiarism, and provide additional information to the teacher about the student's performance on the assignment (Patchan et al., 2016). Thus, they can offer feedback of a quality comparable to the level of human grading.

In short, these AI tools collectively enhance education by personalizing learning, improving assessment, and fostering greater student engagement.

4.3.5. Applications of AI in Education

The different technological applications driven by AI have in common the desire to develop and improve the experience of the educational environment for the teacher and the student (Dede, 2016). An example of technology included in AI is Systems AI, which is responsible for carrying out data analysis such as the history of student performance and participation, predicting results that may occur in the future, and implementing different strategies (Dede, 2016).

AI tools are also essential to help teachers with classroom management. Thus, Holmes et al. (2019) state that AI can significantly help teachers track student behavior, consider their attendance or even manage resources and materials for classroom activities, which is a great advantage for teachers to focus more on instructional tasks.

According to Zhang et al. (2020), AI is a great tool that provides teachers with personalized training suggestions for the classroom. Thus, these intelligent tools analyze teachers' performance based on data, to provide aspects and recommendations for their performance improvement (Zhang et al, 2020).

4.4. Equality, Gamification, and AI Technologies' Educative Connections

Educational equality can be promoted by the introduction of different tools in the classroom, such as game elements, gamification, and AI-driven technologies. Baker and Inventado (2014) explain that teachers can use both to create an inclusive environment for students, regardless of their cultural differences, abilities, or situations and particularities.

4.4.1. Gamification - AI tools Interrelations

Using game elements, or gamification, and AI-powered tools are more present by the teachers in the classrooms, as they facilitate teachers' development of their students' knowledge. Zhang (2020) adds that AI tools can offer activity suggestions in relation to each student's academic performance. Nevertheless, incorporating gamification into the classroom has several benefits for both the teacher and the student, since employing leaderboards can inspire them (Kapp, 2012).

Another interrelation between AI tools and gamification is that AI makes use of data collected from student analytics to create personalized suggestions based on each student's needs, abilities, and interests (Baker & Inventado, 2014). Hence, Nicholson (2015) adds that by implementing gamification elements, such as points or badges in activities, the creation of the learning process is facilitated, making it more attractive and welcoming for the student. An example of the relationship between AI and gamification in the classroom can be seen through the implementation of an adaptive learning platform developed by AI tools, which analyzes in detail the performance of each student in the classroom to adapt the activities concerning their performance and abilities (Baker & Inventado, 2014). In addition, gamification in the classroom rewards and recognizes the student's progress after completing the activities, increasing student motivation.

AI technological tools can offer instant feedback to teachers about each student's performance, which is a great advantage for promoting effective learning in the classroom (Kapp, 2012). Furthermore, Landers and Landers (2014) add that the implementation of game elements means that the information provided by AI about each student can be improved, and this information is rewarding for both the teacher and the student since feedback is provided immediately. Thus, Kapp (2012) establishes that AI tools and gamification are related in such a way that AI can instantly evaluate each student through possible suggestions to improve their performance, while game elements such as leaderboards increase the student's desire to complete the activities, creating healthy competition among students to help improve each other's performance (Kapp, 2012).

Hammari et al. (2014) show that implementing gamification in the classroom significantly improves student motivation so that their learning process becomes more interactive and productive, thus increasing their engagement. Thereby, Baker and Inventado (2014) argue that incorporating AI with gamification can lead to a greater development of student engagement, such that AI tools can offer teachers activities tailored to the student's specific interests and capabilities (Baker & Inventado, 2014).

4.4.2. Personalized and adaptative learning by game elements and AI-Powered Tools

AI-based tools recognize each learner's learning style, providing personalized feedback to students based on their interests (Holmes et al., 2019). Moreover, Gee (2003) asserts that the gamification components can be used to design choice-adaptive learning experiences that support multiple cognitive styles and preferences. In this way, adaptive learning platforms provide a focused activity level to what a student can handle, considering their specific abilities and interests, so that these activities are gamified to increase their motivation (Luckin et al., 2016).

The differences in the students' performance in the educational field are becoming increasingly noticeable. Thus, Holmes (2014) proposes that the use of artificial intelligence by teachers can be essential to end these performance differences in the classroom (Holmes et al., 2014). Thereby, Holmes et al., (2014) add that these artificial tools can offer teachers suggestions on personalized instruction for each student through an analysis of their academic

performance carried out by AI-powered tools, offering each student learning adapted to their performance (Holmes et al., 2014). Nevertheless, Gee (2003) adds that gamification elements help to create an inclusive environment in the educational setting, being more accessible and entertaining for everyone (Gee, 2003). This can be evidenced by the presence of AI, which can provide teachers with personalized learning tools that include game elements, offering targeted support to students with low financial resources to access traditional educational materials (Pane et al., 2014).

It is worth mentioning that Artificial Intelligence (AI) and game elements can facilitate both the social and emotional learning of each student by providing platforms for both cooperation and interaction (Zhang et al., 2020). Consequently, whereas artificial intelligence devices facilitate groups in the collaboration process, the integration of gaming elements enables the work of students to be carried out through teamwork and with the help of their peers (Zhang et al., 2020). Hence, Durlak et al. (2011) state that this hybrid model rids off the deficiency in the student in terms of competence in both capability of being social and experiencing emotions (Durlak et al., 2011).

5. Didactic Proposal

5.1. Description of the didactic proposal and context of the educative center.

The educational proposal to be developed is called *Equality in the classroom through gamification and artificial intelligence*. However, it is worth mentioning that before developing the educational proposal, it is important to describe in detail the educational center in which it will be implemented, showing the main characteristics of the I.E.S. Ramón y Cajal, as well as the context of the group of students on which said educational proposal will be implemented.

Regarding the context of the educational center in which the educational proposal will be implemented, the I.E.S. Ramón y Cajal is located in the city of Valladolid, specifically in Delicias, a neighborhood of about 28 thousand inhabitants of Valladolid. The fact that the Delicias neighborhood is currently one of the neighborhoods with the highest population in the city of Valladolid means that this educational center has a wide range of students from different parts of the Valladolid area. In addition, the I.E.S. Ramón y Cajal offers classes from the first to the fourth year of compulsory secondary education (E.S.O.), with a bilingual section, which

means that these courses use foreign language I (English) in different subjects. However, this center also has classes for the first and second year of high school (BCH), with the traditional humanities, sciences, and social sciences high schools, but also the research and excellence in languages high school, known as BIE. In addition, they also have Basic Formative Cycles, Intermediate Medium Formative Cycles, and Advanced Formative Cycles in health, personal image, and chemistry.

Concerning the main characteristics of the center, it should be noted that it is a public center with more than 1400 students in the center, adding 90 teachers and 9 non-teaching staff members, according to the PEC of the educational center. In addition, it has a range of students of different ages and origins, with an intake of between 300 and 400 students per year, distributed across different levels and educational cycles, such as compulsory secondary education (ESO), Bachillerato (BCH), Professional Degree (FP) and Intermediate (CFGM) and Advanced (CFGS) Formative Cycles. As for the facilities available to the teaching staff at the center, the teaching staff rooms are very spacious, so that teachers can meet to complete different tasks, such as preparing each of their classes, correcting students' exams or even meeting with other teachers, with these rooms having technological tools. In addition, there are meeting rooms where tutorials and department meetings are mainly held, so there is technology to support the teacher. The educational center has a quality library, thus offering different materials to students and teachers, examples of which are the classroom materials and pedagogical tools that teachers can use. It is important to highlight that the I.E.S. Ramón y Cajal has computer rooms, which allow teachers to implement technology in their subjects, reinforcing quality in terms of the design of activities to improve student's learning process. Thus, the educational center promotes an education of equality, in which all students can have the same opportunities and educational tools concerning digital competence in the classroom, since students may have economic differences or few resources to afford digital tools.

As for the context of the classroom group in which the didactic proposal will be applied, it is in the 3rd year of ESO. This course has a group of 18 students, of which 11 are male and 7 are female, being an ideal group in relation to gender equality in the classroom. Focusing on the students, it is a group that has a very good relationship and creates a very positive and pleasant atmosphere in the classroom. However, the group has already established circles of friends, meaning that the boys always get together to do the activities, and the same happens with the girls. In addition, the English teachers have carried out a project that involves the different grades of ESO in relation to English-speaking countries, being selected Australia,

New Zealand, United Kingdom, USA, Scotland or Ireland. Thus, 3rd ESO students have been assigned to carry out group work concerning the topic of the United Kingdom, which will be of great help for cooperative work in equality. In this way, this work should be presented by 3rd ESO to the students of 4th ESO, serving this collaborative work as an aid for the students of the following year, since the students of 4th ESO will make a trip to Salisbury and London.

5.2. Didactic proposal objectives

This teaching proposal called *Equality in the classroom through gamification and artificial intelligence* has been designed to be applied in a 3rd-year ESO classroom. It has a series of objectives that seek to be achieved after its application. The objectives set are the following:

- Promote respect and equality between students of a classroom through the use several different kinds of gamification activities focusing on tolerance and collaboration.
- Personalizing learning and teaching strategies according to students' individualized needs through the use of AI-based learning systems that develop customized content and feedback.
- Orally and writing skills development in English within an inclusive learning environment that pack elements of gamification and AI.
- Evaluating various situations that affect gamification through artificial intelligence for learning, inclusion, and equity inside the classroom.

5.3. Methodology

The methodology followed for this teaching proposal in each of the 6 sessions has been based on the task-based approach model, considering the students' interests in the activities. In this way, a greater motivation has been awakened in the students to be able to complete as a group each of the activities proposed in the sessions of this teaching proposal, offering them

all the content, material, and support they need for the completion of each task, such as structures or terms related to AI or gamification present in each session. Thus, the active participation of the students is promoted, since their interest can be enhanced by knowing each activity and feeling involved in all of them.

Additionally, collaborative work is also present in the sessions of this teaching proposal called *Equality in the classroom through gamification and artificial intelligence*, so that in the activities configured in each of the 6 sessions there are activities that must be carried out as a group on most occasions. In this way, teamwork will be promoted, making all students collaborate with their classmates to achieve the final objective of each activity. In addition, it is worth mentioning that the project outcome of session 6 is the group presentation of a comic about an AI robot that helps students solve a challenge or a problem, encouraging students to work collaboratively, while in session 5 where preparation of the comic is carried out, teamwork is also present.

5.4. Legal Framework of the Didactic Proposal

With regards to the legal framework on which this didactic proposal titled *Equality in the classroom through gamification and artificial intelligence* has been based, it has been based mainly on the Ley Orgánica 2/2006 of May 3 (LOE), which has been modified by the Ley Orgánica 3/2020 of December 29 (LOMLOE), as well as the Real Decreto 217/2022 of March 29, which establishes the organization and minimum teachings of Compulsory Secondary Education. At the community level in Castilla y León, it is based on Decreto 39/2022 of September 29, which sets out the organization and curriculum of Compulsory Secondary Education (ESO) in the community of Castilla y León.

At the curricular level, this learning situation has been focused on the eight key competencies present in the Decreto 39/2022, highlighting the different sessions in the Plurilingual Competence (CP), Competence in Linguistic Communication (CCL), Personal, Social and Learning to Learn Competence (CPSAA), Civic Competence (CC), and Competence in cultural awareness and Expression (CCEC) (Magallanes et al., 2024).

5.4.1. Stage Aims

Concerning the stage objectives of this teaching proposal, 6 stage aims have been established that 3rd ESO students in Ethical Values must have achieved at the end of the implementation of the teaching proposal “Equality in the classroom through gamification and artificial intelligence” in their classroom. It is worth mentioning that for establishing the different stage objectives in this teaching proposal, Real Decreto 217/2022 has been taken into account, which establishes the organization and minimum teachings of Compulsory Secondary Education (ESO).

The first of the stage objectives that have been set is a) “Responsibly assume their duties, know and exercise their rights while respecting other people, practice tolerance, cooperation and solidarity between people and groups, exercise dialogue by strengthening human rights as common values of a plural society and prepare for the exercise of democratic citizenship” (BOE: p. 8). This stage objective is of great relevance in the configuration of the didactic proposal since the promotion of respect and equality in the classroom is essential to work positively and in groups. Secondly, stage objective b) “Develop and consolidate habits of discipline, study and individual and teamwork as a necessary condition for an effective completion of learning tasks and as a means of personal development” (BOE: p. 8). This stage objective was related to the didactic proposal to be implemented in the classroom since the scheduled sessions have activities that require discipline to be able to complete them. The third stage objective is c) “Value and respect the difference between the sexes and the equality of rights and opportunities between them. Reject stereotypes that imply discrimination between men and women” (BOE: p. 9). This stage objective is important in the didactic proposal, since both before, during, and after the activities developed in the classroom, it is considered vital to respect classmates and promote equality in the classroom. Fourthly, objective d) “Strengthen their emotional capacities in all areas of their personality and in their relationships with other people, as well as reject violence, prejudices of any kind, sexist behavior and peacefully resolve conflicts” (BOE: p. 9). This objective, like the objective of stage c), is highly relevant, since equality and respect must be promoted in the classroom to create a positive and welcoming learning environment. Fifthly, the objective of stage i) “Understand and express themselves in one or more foreign languages in an appropriate manner” BOE: p. 9). This objective is fundamental for students since the teaching proposal is in English and the activities designed

in each session must be carried out using English as a foreign language. Lastly, the objective of stage j) “Know, value and respect the basic aspects of their own culture and history and those of other people, as well as the artistic and cultural heritage” (BOE: p. 9). This objective is related to the didactic proposal since students will have to reflect on how AI is used in different countries and contexts, or how AI can be related to the SDGs in other cultures.

5.4.2. Key Competences

Regarding specific competences, these are defined as the different skills that students must develop to achieve the objectives set by Decree 217/2022 of March 29. (BOE: Art 7, p.8). In this way, article 11 of Decree 217/2022 shows the key competences classified from a) to h), with six selected for the configuration of this teaching proposal:

a) Competence in linguistic communication, which is present in each of the six sessions of the teaching proposal, since students must express themselves with their classmates using English as a foreign language.

b) Multilingual competence, which is also directly related to all sessions, since a large part of the scheduled activities are group activities, and they must communicate with their classmates in English.

d) Digital competence, which is present through the creation of a Kahoot by students, thus developing their digital competence by using computers and digital programs.

e) Personal, social, and learning-to-learn competence, a competence that is present in the sessions of this proposal, since the activities of each of these are aimed at a final reflection on equality to the SDGs, especially 3, 4, 10, and 13.

f) Citizenship competence is a competence that is found in the different sessions through the presence of the SDGs, providing students with activities close to real life, which leads them to the final reflection of each session on how to help others.

g) Entrepreneurial competence is a competence that is directly related to the implementation of equality through AI and the inclusion of the SDGs. The activities scheduled in the sessions make students aware of the problems that exist in today's world and reflect on how they can help change the current situation by creating solutions in groups. An example of

this is the final product, based on a comic presentation in which the protagonist is an AI robot that appears in the classroom and helps students solve a problem related to SDGs 3, 4, 10, or 12.

5.4.3. Specific Competences

Regarding the specific competences, these are defined as the different skills that students must develop and enhance based on the activities scheduled in the sessions of the teaching proposal. To consider the specific competences present in this proposal, Decreto 39/2022 of September 29 has been used, being specifically used for the key competences of the 3rd year of ESO. In this way, these key competences are present in the BOCYL, being classified from one to six (BOCYL: p. 426-428). The key competences that have been selected for the configuration of this teaching proposal are 1, 2, 3, 4, and 6, which are directly related to the didactic proposal, and the reason for their selection will be expressed below:

The first specific competence selected for the teaching proposal is 1), which is based on oral and written comprehension. This competence is considered fundamental in the scheduled sessions, since students will have to complete activities where both the comprehension of written texts and oral comprehension are essential to reach the session where the final product will be carried out. Thus, students in groups will have to share ideas to create written texts, just as they will have to understand the activity where they will have to answer questions about a Kahoot created by them. The second specific competence selected is 2), based on oral and written expression. As previously mentioned, this competence is directly related to the previous competence. The activities scheduled in the sessions of this teaching proposal require the understanding of oral instructions and written texts, to then be able to write their written texts and present them aloud to the rest of their classmates, such as writing and presenting their comic. Thirdly, specific competence 3) has been selected, based on communicative interaction. This competence is key to the configuration of the activities, since many of them require that they be done in a group, so the students will have to work collaboratively towards the same objective, completing the activities proposed for each of the six sessions. In this way, the group activities encourage teamwork from the first session, being key for session six where the final product will be carried out as a group, through a presentation. Additionally, specific competence 4) has been established, which focuses on linguistic

mediation, so that students will have to help each other to understand all the messages given in the classroom. This competence can be seen in the realization of the Kahoot, where they will have to explain concepts to each other to share ideas, or in the last activity of session 6, where they will have to mediate between the participants of each group to choose the most striking characteristic of their AI robot. Finally, competence 6) based on diversity and interculturality has been selected. This competence is present in encouraging students to reflect on the different cultures's way of life, including sustainable values related to SDGs 3, 4, 10 or 13 in the vignettes of their comics.

5.4.4. Assessment Criteria

Once the specific competences have been established, it is of great relevance to mention the evaluation criteria that have been established regarding the activities programmed in the different sessions of the teaching proposal. To establish the evaluation criteria for the 3rd year of Compulsory Secondary Education, Decreto 39/2022 of September 29 has been used, so eight evaluation criteria have been selected (BOCYL: p. 426). The different evaluation criteria established for the programmed activities will be expressed below.

The first assessment criteria set for the session activities have been selected concerning the specific competence 1), related to oral and written comprehension. Thus, criteria 1.1. and 1.2 have been selected, with the following statements being examples: 1.1.1.: The student distinguishes between false and true statements, picking up at least four red or green cards depending on their answers; 1.1.2.: The student understands both the cards with terms and the cards with definitions, extracting at least two key ideas from them; 1.1.3.: The student understands the questions in the personality test without difficulty, answering the questions without the teacher's help; 1.1.4.: The student understands the answers provided by the AI tool, selecting three important ideas from the story provided by said tool; 1.1.5.: The student understands the parts of a comic, differentiating between vignettes and dialogues; 1.2.1.: The student compares at least two AI tools mentioned, orally distinguishing the way in which they can help reduce inequalities (SDG 10). Secondly, use has been made of specific competence 2), related to oral and written expression, from which the evaluation criteria 2.1., 2.2., and 2.4. have been selected, with the following statements being examples: 2.1.2.: The student understands the term related to the SDGs that he or she has been given in the spin wheel,

knowing how to introduce the said term into his or her story in a coherent way; 2.1.3: The student presents aloud his or her drawing about the story created as a group, describing at least two elements of it, such as the characters or the events that occur, using the English language; 2.2.1.: The student writes at least three sentences about how he or she uses each AI tool noted on his or her list, explaining aloud how he or she uses it and what it is used for; 2.2.2.: The student creates a short script in a group, including the contents established in said activity through at least four coherent sentences, using the English language fluently; 2.4.1.: The student writes at least two sentences in any of the three booths distributed around the class, expressing his or her opinion using terms related to AI in English; 2.4.2.: Describes in a clear and detailed manner the image related to the AI tool provided, giving at least 3 instructions to their partners, and recognizing them to be represented in a drawing; 2.4.3.: The student expresses out loud to the rest of his or her classmates a main characteristic of his or her robot to include it in the image created by AI. Concerning specific competence 3), based on communicative interaction, the evaluation criterion 3.1. has been established, with the following statements being examples: 3.1.1.: The student actively participates with his/her group, working as a team to solve the Escape Room clues, and providing a minimum of two solutions; 3.1.2.: The student cooperates with his/her group, suggesting 1 question to be included in the Kahoot; 3.1.3.: The student works collaboratively during the Kahoot activity, respecting the word of his/her classmates, and offering solutions to the questions proposed by the rest of the group; 3.1.4.: The student works with his/her group of classmates to create the AI robot, contributing at least one idea of his/her own about the robot's characteristics; 3.1.5.: The student draws the story created with his/her group, actively making suggestions on how to draw the story using English as a foreign language; 3.1.6: The student cooperates with his/her group to create the comic story, proposing a minimum of two ideas to include in the story; 3.1.7.: The student listens carefully to what their group members present, respecting their turn to speak and explaining an idea about the comic they created. With regards to specific competence 4), based on communicative interaction, evaluation criterion 4.2. has been established, an example of which is the following statement: 4.2.1.: The student interacts with their classmates to choose the most striking characteristic of the robot in their comic, explaining it out loud to the rest of their classmates. Lastly, based on competence 6), related to diversity and interculturality, evaluation criterion 6.1. has been established, an example of which is the following statement: 6.1.1.: The student reflects a respectful and empathetic attitude, including at least one sustainable value in the comic strips, this being related to SDGs 3, 4, 10 or 13.

Having established these evaluation criteria based on specific competences, the teacher can evaluate more effectively and specifically regarding the objectives pursued by each activity programmed in the sessions of the didactic proposal. Adding all the evaluation criteria previously expressed, there are a total of 22, which will be listed concerning the session to which they correspond:

Session 1
1.1.1.: The student distinguishes between false statements and true statements, raising at least four red or green cards depending on their answers.
2.2.1.: The student writes at least three sentences about how they use each AI tool on their list, explaining aloud how they use it and for what.
3.1.1.: The student actively participates with their group, working as a team to scramble the clues in the Escape Room, and providing two solutions.
2.4.1.: The student writes at least two sentences in any of the three booths distributed throughout the class, expressing his/her opinion using terms related to AI in English.
Session 2
1.2.1.: The student compares at least two AI tools mentioned, distinguishing orally the way in which they can help reduce inequalities (SDG 10).
3.1.2.: The student cooperates with his/her group, suggesting 1 question to be included in the Kahoot.
3.1.2.: The student works collaboratively during the Kahoot activity, respecting the word of his classmates, and offering solutions to the questions proposed by the rest of the group.
2.4.2.:The student describes in a clear and detailed manner the image related to the AI tool provided, giving at least 3 instructions to their partners, and recognizing them to be represented in a drawing.
2.4.1.: The student writes at least two sentences in any of the three booths distributed throughout the class, expressing their opinion using terms related to AI in English.

Session 3
1.1.3.: The student understands the questions of the personality test without difficulty, answering the questions without the help of the teacher.
3.1.3.: The student works with his/her classmates on the creation of the AI robot, providing at least one idea of his own about the robot's characteristics.
1.1.2.: The student understands both the term cards and the definition cards, extracting at least two key ideas from them.
2.4.1.: The student writes at least two sentences in any of the three booths distributed throughout the class, expressing their opinion using terms related to AI in English.
Session 4
1.1.4.: The student captures the answers provided by the AI tool, selecting a minimum of three important ideas from the story provided by the AI tool.
2.1.2.: The student understands the term related to the SDGs that has been assigned in the spin wheel, knowing how to introduce this term in his/her history in a coherent way.
3.1.4.: The student draws the story created with his or her group, actively making suggestions on how to make the drawing using English as a foreign language.
2.1.3: The student exposes aloud his drawing on the story created in a group, describing at least two elements of it, such as the characters or the events that occur, using the English language.
2.4.1.: The student writes at least two sentences in any of the three booths distributed throughout the class, expressing their opinion using terms related to AI in English.
Session 5
1.1.5.: The student understands the parts of a comic, differentiating between what are the panels and the dialogues.
3.1.5.: The student cooperates with his or her group in the creation of the comic book story, proposing a minimum of two ideas to include in the story.

2.2.2.: The student makes a brief group script, including the contents established in this activity through at least four coherent sentences, using the English language fluently.
6.1.1.: The student reflects a respectful and empathetic attitude, including at least one sustainable value in the comic strips, which is related to SDGs 3, 4, 10 or 13.
2.4.1.: The student writes at least two sentences in any of the three booths distributed throughout the class, expressing their opinion using terms related to AI in English.
Session 6
1.1.5.: The student understands the parts of a comic, differentiating between what are the panels and the dialogues.
6.1.1.: The student reflects a respectful and empathetic attitude, including at least one sustainable value in the comic strips, which is related to SDGs 3, 4, 10 or 13.
3.1.6.: The student listens carefully to what his classmates present, respecting his turn to speak and exposing an idea of the comic created.
2.4.3.: The student expresses to the rest of his classmates the main feature of his robot to include it in the image created by AI.
4.2.1.: The student interacts with his classmates to choose the most striking feature of the robot from his comic, exposing to the rest of his or her classmates.

5.4.5. Contents

Concerning the contents implemented in the 3rd year of Compulsory Secondary Education, there are sections (A), based on communication, (B), related to multilingualism, and finally (C), which is based on interculturality. In this way, a series of contents have been established and extracted from each of the three previously mentioned sections: (A), (B), (C), making use of Decree 39/2022 of 29 December, which sets out the organization and curriculum of Compulsory Secondary Education (ESO) in the community of Castilla y León (BOCYL: pp. 49289-49291). Hence, the subject contents will be explained in detail concerning the contents, in addition to the transversal contents and the contents that are worked on in the sessions of the didactic proposal. As for the content section (A), based on communication, three of the contents

have been established, specifically contents 1, 6 and 11. Each of these contents selected for the configuration of this didactic proposal expresses the following:

- 1: Commonly used strategies for planning, executing, monitoring and repairing the understanding, production and co-production of oral, written and multimodal texts.
- 6: Commonly used vocabulary of interest to students regarding personal identification, interpersonal relationships, places and environments, climate and natural environment, ecology and sustainability, and information and communication technologies.
- 11: Commonly used conversational conventions and strategies to start, and maintain, and end communication.

Regarding content section (B), related to multilingualism as established by Decree 39/2022 of December 29, contents 1 and 3 have been established. Thus, each of these contents establishes the following:

- 1: Strategies and techniques to respond effectively and with increasing levels of fluency, adequacy and correctness to a specific communicative need.
- 3: Commonly used strategies and tools for self-assessment, co-assessment and individual and cooperative assessment.

Finally, concerning the content section (C), based on interculturality, content 1 has been used, which expresses the following according to Decree 39/2022:

- 1: The foreign language as a means of interpersonal communication and as a tool for social participation and personal enrichment.

With regards to the syntactic-discursive structures of English as a foreign language according to Decree 39/2022 of September 29, three elements have been established, specifically elements 1, 2 and 10, which are present throughout the activities of the sessions configured in the didactic proposal (BOCYL: pp. 412 & 413). Thus, element 1 is called "Greeting and saying goodbye, introducing and introducing oneself: Be and have (got)". Furthermore, element 2 is "Describing people, objects and places: Sequencing the description: first, second, then, later, etc." Finally, element 10 is "Describing current situations and common actions: Present simple/present continuous." Concerning the transversal elements that have been selected for the configuration of the different sessions of the teaching proposal, use has been made of Decreto 39/ 2022 of September 29, which establishes the organization and

curriculum of Compulsory Secondary Education (ESO) in the community of Castille and Leon, and Real Decreto 217/2022 of March 29, which establishes the organization and minimum teachings of Compulsory Secondary Education. Thus, the cross-curricular content extracted from Decreto 217/2022 for the design of the configuration of the didactic proposal is based on “Emotional and values education, gender equality, health education, education for sustainability and responsible consumption, mutual respect and cooperation among equals” (BOE: Article 6.5. , p. 8). In addition, another cross-curricular content extracted from Real Decreto 217/2022 is related to “the values that support freedom, justice, equality, peace, democracy, plurality, respect for human rights and the State of law, and the rejection of terrorism and any type of violence” (BOCYL: Article 10.3., p. 11). Both cross-curricular contents are directly related to the Sustainable Development Goals (SDG), including activities that work on different SDGs, relating them to the implementation of artificial intelligence (AI) and gamification. The different SDGs that are worked on throughout the six sessions of this educational proposal are SDG 3, SDG 4, SDG 10 and SDG 13, these being related to health and well-being, quality education, reduction of inequalities and climate action, respectively.

5.5. Organization of the Didactic Proposal

The didactic proposal titled *Equality in the classroom through gamification and artificial intelligence* consists of a six-session learning situation, so that in the last session the project outcome of the didactic unit will be carried out. For the design of the learning situation present in this didactic proposal, Decreto 39/2022 of September 29 has been used to adapt the learning situation to the students. Hence, their tastes and interests have been considered, thus being "stimulating, meaningful and inclusive" activities (BOCYL: Article 14., p 13). In this way, in sessions one to five, the content will be worked on throughout the learning situation, while in session six they will have to make a final presentation in groups called "Comic about an AI robot in the classroom". There, students will have to present the comic they have created since session 5, including a story in which there is an AI robot in the classroom, whose function is to help the students solve a problem related to the cross-curricular contents worked on each session

5.6. Didactic Proposal sessions and activities.

As stated in the previous section, this teaching proposal consists of six sessions configured so that each last 50 minutes, the duration of a high school lesson. In the sixth session, the final product will be carried out, which will consist of the presentation of a comic about an AI robot that appears in the classroom and solves a problem related to SDGs 3, 4, 10 or 13, worked on throughout the sessions of the teaching proposal. All sessions will be held in the classroom, except for session 2, which will be held in the computer room. In addition, each session consists of a minimum of three activities and a maximum of five activities.

Session one consists of four activities covering the 50 minutes of the lesson, which will link AI and gamification with equality, through SDG 4 (Quality Education). Thus, the session will begin with an introductory activity in which the teacher will activate the students' prior knowledge about gamification and artificial intelligence, introducing the question "Do you know what the terms gamification and artificial intelligence are?" After that, the teacher will briefly explain the two key concepts that will be worked on in the first session, which are AI and gamification. This activity will last about 6 minutes. After that, 3 reinforcement activities will be carried out. The first reinforcement activity is called "True or False?", in which the teacher will distribute a green and a red card to each student, reading some statements related to gamification and AI related to ODS 4. In this way, each student must raise the green card if they think the statement is true, or the red card if they think the statement is false. This activity will last 10 minutes. The second reinforcement activity is called "What AIs are most present in our lives?", in which the teacher begins by presenting to the students the AI tools most present in our daily lives, such as virtual assistants (Siri or Alexa), AI based on content recommendations (Netflix, YouTube or Spotify) or AI tools that translate texts (Google Translate). After this, students will have to make a list in pairs of the AIs mentioned that are most present in their lives. Thus, they have to write a sentence with each of them concerning how they use it and what for, relating it to how AI contributes specifically to quality education (SDG 4). Finally, each group will share some of the AIs they have listed. This activity will last 10 minutes. The third reinforcement activity is entitled "AI Escape Room", which will cover 20 minutes of the lesson. This activity will be carried out in groups of 4 students, having one

envelope per group pasted on the blackboard. Each envelope contains 5 clues related to AI and gamification tools, which each group has to decipher. For each clue that each group guesses, the teacher will give them a letter, so that when they decipher the 5 clues, they must order the hidden word “robot”. It is worth mentioning that each clue is related to an AI tool that helps promote inclusive and quality education (SDG 4). The last activity of session 1 is a closing activity and will last 4 minutes. For this activity, the teacher will post a yellow card, a red card, and a green card around the classroom, so that each card will contain a different question, such as "What surprised you the most about this class?", "How do you think AI can improve your learning?", or "What was your favorite moment of today's activity?". Students will then choose a booth and write the relevant answer related to the lesson on the sheets in that booth.

Session two will consist of four activities that will last 50 minutes of the lesson. The session will begin with an 8-minute introduction, in which the teacher will refresh the students' knowledge of the AI tools most present in the previous session, using cards with images of AI, such as Siri, Alexa, or Google Maps. Thus, while the teacher shows the AI tool cards, he will present SDG 10 (Inequalities Reduction), thus connecting each AI with said SDG. After that, the following three activities are two reinforcement activities. The first reinforcement activity will consist of creating a Kahoot as a group. To do this, two large groups of students will be formed, creating each group questions to include in their Kahoot concerning the previously mentioned SDG 10, and the answers will contain options related to the AI tools. This activity should be carried out in the computer room if possible, since students need to use computers with Internet access to be able to enter the AI tool “Kahoot”. Reinforcement activity 1 will last 13 minutes. The second reinforcement activity will consist of answering the questions in the Kahoot created by each group of classmates, called the “Kahoot AI Challenge”. In this way, group 1 will start by doing the Kahoot designed by group 2, and when it is finished, group 2 will be the one to do the Kahoot created by group 1. To do this, they will be provided with whiteboards (one per group), so they will have to work collaboratively and share ideas to write down the final answer to each question on the board. This activity will last 14 minutes of the lesson. The third reinforcement activity, “AI Tool Image Pictionary”, must be done in groups of 2 students. Thus, this activity will consist of the teacher providing an image of an AI tool to one of the students in each group, so that he/she must give instructions to his/her partner to draw that image on a sheet of paper. The partner must listen carefully to the instructions given by his/her classmate, since he/she will only be able to draw the image based on the instructions he/she receives. At the end of the activity, each group will present their drawing on the AI tool

to their classmates, sharing all the drawings. This activity will last 10 minutes. Finally, the closing activity will last 5 minutes, in which the teacher will post a yellow card, a red card, and a green card around the classroom, so that each card will contain a different question, such as "What surprised you the most about this class?", "How do you think AI can improve your learning?", or "What was your favorite moment of today's activity?". Students will then choose a booth and write the relevant answer related to the lesson on the sheets in that booth.

For session three, the teacher will begin by providing each student with a personality test, which will contain questions related to SDG 4 (Quality education), SDG 10 (Reduced inequalities), and SDG 13 (Climate action). Before they fill it out, the teacher will explain that this form is a personality test, as depending on their answers, the results will show what kind of person they are concerning the fight for the climate, education, or equal opportunities. This introductory activity will last 10 minutes. After that, the next two activities will be reinforcement activities. The first reinforcement activity is called "Creating our sustainable AI robot". In this activity, students will be grouped into groups of 4, having to choose an SDG to work on, among SDG 4, 10, or 13. Thus, the teacher will distribute a card to each group, which contains a brief description of each SDG and an image to help clarify it. Once they have chosen the SDG they are going to work on in this activity, the participants of each group will have to collaborate to create their sustainable robot, which will have to contain the following characteristics: name of the robot, physical and mental appearance, the main function of the robot, and how it uses AI to work with the SDG chosen by the group. In addition, equality will be relevant in this specific activity, since the groups must include characteristics in the appearance of the robot that are both masculine and feminine, thus promoting gender equality in the classroom. To conclude the activity, each group will present the creation of their robot to their classmates, explaining its main characteristics. This activity will last 15 minutes. The second reinforcement activity, "Grouping AI and gamification terms with their definitions", is an activity that will last 20 minutes. Thus, for this activity, students will be grouped into groups of 4 people. To carry out this activity, the teacher will stick a paper envelope on the board (one for each group of students). Each envelope will contain different terms related to AI tools, such as "Google Translate, or Grammarly", present in each group's envelope. These terms must be connected to their definitions, which will be on two tables that the teacher will put together to put all the definitions. Once the activity begins, each group will have to go to their envelope and take out a single AI term, and they will go to the main table of definitions. Once they have connected them, they will go to the teacher's table to wait for confirmation that the concept-

definition relationship is correct. If the connection is correct, the group can go to their envelope and take out the next AI term to connect it to its definition. When the 15 minutes of activity are over, each group will present to their classmates the terms they have managed to connect to their definitions, reading them. Finally, the closing activity will last 5 minutes, in which the teacher will post a yellow card, a red card, and a green card around the classroom, so that each card will contain a different question, such as "What surprised you the most about this class?", "How do you think AI can improve your learning?", or "What was your favorite moment of today's activity?". Students will then choose a booth and write the relevant answer related to the lesson on the sheets in that booth.

Regarding session four, the teacher will begin the lesson by briefly explaining the SDG of this session, SDG 2 (Zero Hunger), showing that food waste and lack of access to quality food in different contexts are real problems. After that, the activity will continue by forming groups of 4. The activity "Generating an AI Story" will consist of students using the AI tool "ChatGPT" to ask them to generate several stories for the creation of a comic, based on SDG 2 (Zero Hunger) for the creation of it. Once "Chat GPT" has generated stories about it, students have to analyze the story about a comic that the AI tool has generated, thinking also about different characters and events that may occur in the story. At the end of the activity, each group will have analyzed the structuring of a comic and be aware of how SDG 2 can be included in a story for a comic, using AI. This introductory activity will last 10 minutes: 5 minutes to explain SDG 2 (Zero Hunger), and another 5 minutes for them to generate stories using AI. Then, there will be three reinforcement activities. The first reinforcement activity, "Spin Wheel Story", will last 15 minutes, carried out in groups of 4. This activity will consist of students writing a story as a group. To do this, each group will have to go to the teacher's table and spin an online spin wheel generated by the teacher, whose roulette wheel includes terms related to AI, gamification, and equality. Once each group has spun the spin wheel, they will have to write a story including the term that came up on the spin wheel, so that the story they create must deal with the topic of SDG 2, and how AI can help solve this global problem. The second reinforcement activity, "Drawing our AI Story", will last 10 minutes. In this activity, the groups formed for the previous activity will be maintained, since students will have to draw the story they have previously created. Thus, they will have to draw the main character of their story and include a brief text describing what this character does in each scene. The third reinforcement activity is called "Presenting our AI Story", in which the students, as a group, will have to present to their classmates the drawing they have made about the story they have previously

written. In this way, they will describe the main character and how he tries to solve the problem related to SDG 2. This activity will last 10 minutes. Finally, the closing activity will last 5 minutes, in which the teacher will post a yellow card, a red card, and a green card around the classroom, so that each card will contain a different question, such as "What surprised you the most about this class?", "How do you think AI can improve your learning?", or "What was your favorite moment of today's activity?". Students will then choose a booth and write the relevant answer related to the lesson on the sheets in that booth.

With regards to session 5, the teacher will start with an introductory activity that will last about 10 minutes. In this activity, the teacher will present different examples of comics in English, so students will analyze aspects such as the frames, the dialogues, or the way of narration in the comics. To do this, the teacher will provide the students with cards with examples of comics in English. Afterwards, two reinforcement activities will be carried out. The first reinforcement activity, "Creating our AI Robot comic", will be carried out in groups of 4, with each group developing the story for their comic. The teacher will distribute to the groups a card with the contents that must be included in the story: an AI robot that appears in the classroom, a problem related to SDGs 3, 4, 10 or 13 that the robot helps the students solve, and a creative ending to the story about what happens to the robot after solving the problem. This activity will last 15 minutes. The second reinforcement activity is called "Drawing our Robot AI comic", in which the groups will draw the story they have created. Thus, students will include vignettes and dialogues, creating their comic about the AI robot. Finally, the closing activity will last 5 minutes, in which the teacher will post a yellow card, a red card, and a green card around the classroom, so that each card will contain a different question, such as "What surprised you the most about this class?", "How do you think AI can improve your learning?", or "What was your favorite moment of today's activity?". Students will then choose a booth and write the relevant answer related to the lesson on the sheets in that booth.

Finally, in session six, the last session of the teaching proposal, the teacher begins with a reinforcement activity, allowing students to finish their projects of developing and drawing their group comics. This activity will last 20 minutes. After that, each group of students will go in front of the class and present their comic and their drawings to the rest of their classmates, mentioning the most important parts. While the students present their group comic, each group will have a 1- to 5-star questionnaire, evaluating each group that presents their comic as a peer evaluation. This activity of the project outcome will last about 25 minutes. Finally, as a closing activity of the session, the teacher will have an online page developed by AI on the computer.

Thus, he will ask each group to say the most important characteristic of the AI robot in their comic (either physical or mental). As each group presents the characteristics of their robot, the teacher will include them on the AI-powered page, which will create an image of a robot that has all the characteristics proposed by each group in the class, thus creating an AI robot together.

5.7. Resources used.

Different materials are needed in relation to the activities scheduled in the six sessions to apply the didactic proposal in the classroom. Thus, this section will show the materials required by the educational institution and the teacher.

As for the educational center, a classroom will be necessary to teach the didactic proposal to the students. Thus, there will be enough space to complete the activities. Within the classroom, tables and chairs are required for each student to complete the tasks, and these materials can be moved when the activities are carried out in groups. It is important to mention that for the didactic proposal, a whiteboard is necessary for the teacher to write pertinent clarifications to the students. Furthermore, a screen with a projector and a computer is needed to show the relevant content of the activities related to the sessions. As for the materials outside the classroom, a computer room is needed to create Kahoot. In addition, for this activity, they need access to the internet, since the Kahoot digital application requires access to the internet to use it.

Regarding the materials that students must bring to class, they will not have to buy or have any materials, considering educational equality. Thus, the teacher will be in charge of the educational materials. In this way, the teacher must bring cards with statements about equality, AI, and gamification, in addition to green and red cards for the activity of session 1, “True or False”. Additionally, he/she must use images of AI tools so that students can list the most present AIs in their lives. Regarding the Escape Room activity concerning AI and gamification, it is relevant to provide students with paper envelopes (one envelope for each group), and cards with clues about the AI tools, which will be placed in the paper envelopes. Additionally, for this activity, it is essential to use cards with letters of the word “robot”, so that when each group deciphers the clue, the teacher will provide them with a card with a letter to complete the entire

word. Furthermore, the teacher will bring green, red, and yellow cards for the *Personal reflection through the booths activity*, so that the students can go to each of the areas where the cards are located and answer the questions on each one. Also, there will be whiteboards (one per group) for the activity where the Kahoot questions must be answered. It is worth mentioning that students will be provided with cards with terms related to AI, gamification, and the SDGs worked on in the different sessions, so that they can relate the terms with their definitions as a group. As for the personality test activity, the teacher will offer them cards containing questions related to SDGs 4, 10, and 13, using cards that include brief descriptions of these SDGs with images. Regarding the story they have to create, the teacher will have an online spin wheel containing terms related to the SDGs worked on in the previous sessions. Concerning the activities where students learn what a comic is and create one, the teacher will provide them with a sheet with an image of a comic (one per group), so that they can distinguish the different elements. Finally, for the final activity of the last session, the teacher will use a page developed by AI to create an image of an AI robot based on the main characteristics of the robots present in the comics of each group.

5.8. Classroom management

As previously expressed, in this 3rd ESO classroom, there are 18 students, where specific activities of the didactic proposal will be carried out individually, but there are others in which they will have to work in groups. Thus, the teacher, who will be in charge of grouping the students in the different activities, will take into account both the relationships of the students and the level of English of each student, trying to ensure that the work groups are balanced in terms of level. Through the grouping of students by the teacher, the activities will be carried out more productively, resulting a more effective work by the students than if the groups were selected randomly, without taking into account any factor in the classroom. For these group activities, there will be groups of two in some of them, but in most of them, there will be groups of four students. Additionally, it should be noted that the teacher will consider the issue of equality. Therefore, the grouping of students in the activities will be taken into account by mixing males and females in each group. In this way, it will be proposed that in one activity, the girls will lead each group, and in the next one, the boys will lead the activity, finding a balance in gender equality in the educational environment, and promoting tolerance and respect through the activities presented in this didactic proposal.

5.9. Evaluation and monitoring of the didactic proposal.

Regarding the evaluation of the activities designed for each of the 6 sessions of this didactic proposal, a monitoring process through self-evaluation boards at the end of each session will be conducted, in which the students will evaluate themselves concerning whether they have achieved the achievement indicators of the first 5 session activities (see annex 10). In addition, the teacher will use an evaluation rubric in the different sessions, considering the activities that have been developed. In this way, the teacher will use three different rubrics: a rubric for written tasks, a rubric for oral presentations, and a rubric for dialogues and debates (see annexes 12, 13, and 14). Also, it is worth mentioning that the rubric for oral presentations will be employed in session 6, where the final product will be carried out, consisting of the student's evaluation based on grammar, vocabulary, pronunciation, fluency, attitude, and participation. Finally, at the end of each presentation of the comic about the AI robot, each group of students will be provided with a peer evaluation questionnaire, so that they will evaluate their peers based on task completion, ability to make oneself understood, appropriate use of terminology, pronunciation, fluency, and attitude and participation. Thus, each group of students must agree at the end of each group presentation, filling out the questionnaire about each group that has presented concerning the previously mentioned aspects, giving a 1 to 5-star rating depending on the group's performance (see annex 11). By adding the self-assessment targets to monitor the student's learning process, the evaluation rubric that the teacher will use, and the 5-star questionnaire that will function as a peer evaluation, the formative evaluation of this teaching proposal is generated.

6. **Results Obtained**

6.1. Effects of equality in the classroom

It has been analyzed that educational equality within this classroom by introducing gamification and game elements in the activities of this proposal. Likewise, the hypothesis that the use of these innovative tools within a classroom helps students to participate more actively was confirmed. There was more group cohesion as they worked in groups where everyone could contribute and collaborate according to their abilities. In addition, personalized content

provided by AI helped those with learning difficulties to progress at their own pace, avoiding frustration, thus creating a more inclusive educational environment.

6.2. Benefits of incorporating gamification and artificial intelligence

The results obtained show that gamification has led to a significant increase in both their motivation and active involvement. Game dynamics such as escape rooms, interactive challenges, or reward systems have made it possible for students to become much more interested in their learning processes. In addition, the AI used to shape teaching has allowed the adaptation of content tailored to individual students with instant feedback. Therefore, the understanding of what was being studied has been improved.

Furthermore, it has been noted that these methodologies have helped to incorporate the teaching of ethical values through the promotion of teamwork, reflective decision-making, and critical thinking. By addressing global issues within the framework of the SDGs, students have fostered a better sense of citizenship, realizing how important equal education is for all.

6.3. Potential limitations and areas for improvement

Nevertheless, the application of the didactic proposal in the classroom entails certain limitations and difficulties, and these aspects need to be improved for the future. Among these difficulties is the lack of familiarity of students with the tools driven by AI. This aspect drew attention in the classroom at first, even though there was no problem in using the AI tools, being able to apply the didactic proposal by carrying out activities that require both terms related to AI, as well as AI-driven tools, to be able to complete some of the proposed activities. In this way, offering training and specific help to students is considered relevant. However, the teaching staff should pay attention to this issue, as this lack of familiarity is a consequence of a lack of specific training in the use of these new technological tools. Thus, different strategies are recommended, such as the realization of courses through education unions, or even individual training for the improvement of educational methodologies.

Another challenge is the uneven availability of technological resources. Not all students had appropriate devices to access digital platforms, which caused some difficulties in implementing

certain activities. To mitigate this problem, alternative strategies such as working in pairs or groups were necessary, thus ensuring that all students could benefit from the proposal.

Additionally, some students refused to complete the activities of this proposal concerning the game elements and artificial intelligence because the students are not suited for this type of innovative educational strategy. However, once they were explained what gamification and AI tools consisted of, their involvement increased in each of the activities, learning while enjoying the process of the activities configured in the sessions. It is worth mentioning that the students appreciated the educational strategy, being considered by them as an innovative and interactive way of teaching, with all students learning positively and creating an inclusive classroom environment.

Lastly, it is worth mentioning that the didactic proposal has achieved satisfactory results due to the technological resources in the classrooms. Nonetheless, implementing AI tools and gamification in the classroom depends on various factors, such as the availability of updated devices, a reliable wireless connection, and stable technical support. Thus, if any educational center lacks these features, it would significantly limit the implementation of this educational proposal. For instance, an educational center in an urban area could easily adopt this proposal in the classroom. However, an educational center in a rural area with a lack of technological devices and limited connectivity may require adaptations to the proposal, such as analog gamification or occasional Internet access by sharing devices. Therefore, an explanation of the resources available to each type of educational center, the limitations it faces regarding this proposal, and possible solutions for adaptation will be presented in a table (see annex 15).

7. Conclusion

The present paper has examined the intersection between educational equality, gamification, and artificial intelligence, indicating how the application of these tools may contribute to a more inclusive and motivating learning environment. Additionally, throughout this study, it has been established that gamification and artificial intelligence not only increase student motivation and attendance but also can encourage collaborative and autonomous learning.

Furthermore, artificial intelligence has emerged as a powerful tool and an aid for teachers, as they can personalize the students' learning experience by adapting content to the unique needs of each student while delivering real-time feedback. Thus, with data analysis and identifying patterns, AI enables the early identification of difficulties and more effective pedagogy strategies, which are tailored to meet the diverse needs of its students.

The teaching proposal *Equality in the Classroom through Gamification and Artificial Intelligence* includes six sessions integrating gamification and artificial intelligence, which have proven to be significantly effective in the positive influence of such methodologies over teaching. The activities presented have successfully promoted inclusion and accessibility of educational content and thus decreased barriers that traditionally impeded the learning of certain students.

Results obtained showed that using a mix of gaming principles and artificial intelligence in the classroom not only strengthens academic performance but also belongingness and confidence in oneself. Indeed, there is more witnessed independent learning that has remained lean towards a more dynamic student-centered approach.

Nevertheless, the application of this didactic proposal in the classroom exposed different challenges, such as the need for teacher training in technology usage and adequate resources for equality in technology access. These are some of the challenges that need to be overcome to ensure effective and sustainable implementation of these strategies in education.

Thus, the combination of gamification and artificial intelligence would be a great opportunity to rethink education with a more equitable, personalized, and engaging approach. Although there are still barriers to be overcome, the benefits shown seem to be worth pursuing to further investigate and refine these ways of proceeding. Indeed, one of the hallmarks of education in the future will be inclusion and innovation, which is what this study has helped to demonstrate, at least in part, as far as the gamification and IA potentialities concerning achieving that goal.

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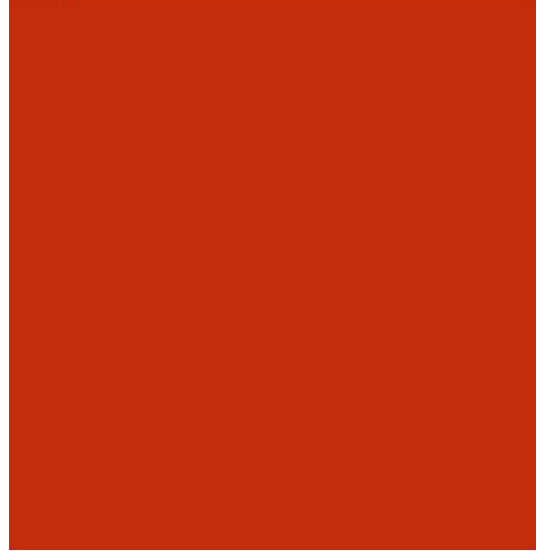
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ANNEX 1: MATERIAL FOR SESSION 1—ACTIVITY 1



"AI can help students by giving them extra practice problems to improve their skills."

✓ (True: AI can create additional practice problems based on a student's progress and needs.)

"AI only helps students who are struggling with their studies."

✗ (False: AI helps all students by personalizing lessons to suit their individual needs, whether they need extra help or advanced content.)

ANNEX 2: MATERIAL FOR SESSION 1—ACTIVITY 2



ANNEX 3: MATERIAL FOR SESSION 1—ACTIVITY 3 (AI ESCAPE ROOM)



S M A R T P H O N E

CLUE N°1: "I help you find the fastest way home. What am I?"

CLUE N°2: "I help people translate languages in real-time. What am I?"

CLUE N° 3: "I'm a personal assistant that can help you set alarms, answer questions, and control devices in your house. What am I?"

CLUE N° 4: "I mimic human behavior and actions. What am I?"

CLUE N°5: "I recommend movies or series based on your previous choices. What am I?"

**ANNEX 4: MATERIAL FOR SESSION 1—ACTIVITY 4 (PERSONAL REFLECTION
THROUGH BOOTHS)**

**How do you think AI can
improve your learning?**

**What was your favorite
moment from today's lesson?**

**What surprised you most about
this class?**

ANNEX 5: MATERIAL FOR SESSION 2—ACTIVITY 2 (FACING AI KAHOOT)



**ANNEX 6: MATERIAL FOR SESSION 2—ACTIVITY 3 (GROUPING AI AND
GAMIFICATION TERMS AND CONCEPTS)**



- Definition: "Apps that show you routes and the best way to get to your destination."

Term: Translation Apps (Google Translate)

- **Term: Map apps (Google Maps, Waze).**

Definition: "Application that translate text or speech from one language to another in real time."

Term: Text correction tools (Grammarly)

Definition: "Application that help correct grammatical and writing errors."

Term: AI video games

Definition: "Video games in which the characters or elements of the game are controlled by artificial intelligence."

Term: Music platforms (Spotify, YouTube)

Definition: "Apps that play music, often suggesting songs based on your tastes."

ANNEX 7: MATERIAL FOR SESSION 3—ACTIVITY 1 (PERSONALITY TEST ABOUT SUSTAINABLE ROBOTS)

1. How do you usually move around your city?

- A) 🚲 I use a bike, walk, or take public transport.
- B) 🚗 I share rides when possible.
- C) ✈️ I often fly or drive alone.
- D) 🌍 I don't think about my transport's environmental impact.

2. Do you think AI can help fight climate change?

- A) 🌱 Yes! It can plant trees and reduce emissions.
- B) 🧠 Maybe, if used wisely.
- C) 🚗 I don't see how AI and climate are connected.
- D) 🤖 I think AI is only for tech, not the environment.

3. How often do you try to reduce waste (plastic, paper, food, etc.)?

- A) ♻️ Always! I recycle and avoid single-use plastics.
- B) ✅ Sometimes, but not consistently.
- C) 🍌 Rarely, I don't think it makes a big difference.
- D) 🗑️ Never, I don't really care about waste.

4. If a new AI-powered app helps track your carbon footprint, would you use it?

- A) 📱 Yes! It would help me make better choices.
- B) 😐 Maybe, if it's easy to use.
- C) ❌ No, I don't think I need it.
- D) 🌐 I don't believe in climate change issues.

5. How do you access educational resources?

- A) 💻 I use online platforms, apps, and digital tools.
- B) 📖 I prefer books but sometimes use online resources.
- C) 🎓 I mostly rely on school-provided materials.
- D) ❌ I struggle to find good educational resources.

6. If AI could improve education, what should it do?

- A) 📱 Create free, personalized learning apps.
- B) 🎓 Help teachers manage students' progress.
- C) 🏠 Make classrooms more interactive.
- D) 🤖 I don't think AI is necessary in education.

7. How important do you think it is to make education accessible to everyone?

- A) 🌐 Extremely important! Education should be free and inclusive.
- B) ✅ It's important, but we need realistic solutions.
- C) 😐 Somewhat important, but there are bigger issues.
- D) ❌ Not a priority, education is already accessible.

8. Do you think everyone has equal opportunities in education?

- A) 🌐 No, and we should work to fix that.
- B) 😐 Somewhat, but there's still inequality.
- C) 🏠 It depends on the country.
- D) ❌ Yes, I think opportunities are already equal.

9. How do you react when someone faces discrimination?

- A) 🗣️ I speak up and try to educate others.
- B) 🤝 I support the person but avoid confrontation.
- C) 😐 I stay silent unless it affects me directly.
- D) ❌ It's not my problem.

10. Would you support AI tools that help break language barriers (e.g., live translation apps)?

- A) 🌐 Absolutely! Language should not be a barrier.
- B) 🤖 Maybe, if they work well.
- C) ❌ I don't think it's necessary.
- D) ❌ No, people should just learn the language

ANNEX 8: MATERIAL FOR SESSION 3—ACTIVITY 2 (CREATING AN AI ROBOT)

Possible ideas for creating the AI Robot:

-  **SDG 13: A robot that helps reduce climate change.**
-  **SDG 4: A robot that facilitates access to education.**
-  **SDG 10: A robot that promotes equity and reduces inequalities.**

You will have to answer the following questions to create your robot:

- 1. What is your robot's name?**
- 2. What does it look like?**
- 3. What is its main function?**
- 4. How does it use AI?**
- 5. How does it help solve the ODS challenge?**

**ANNEX 9: MATERIAL FOR SESSION 4—ACTIVITY 2 (CREATING AN AI ROBOT
COMIC THROUGH A SPIN WHEEL)**



ANNEX 10: EXAMPLE OF A SELF-ASSESSMENT RUBRIC

Achievement Indicator	I Did It!	Almost There	Not Yet	Comments / Evidence
1.2.1. AI & Inequality I compared at least two AI tools and explained orally how each one can help reduce inequalities (SDG 10).	☐	☐	☐	
3.1.2. Teamwork & Kahoot I worked with my group and suggested one question for our Kahoot quiz.	☐	☐	☐	
2.4.2. Image Description I clearly described the image related to the AI tool, gave 3+ instructions to my partners, and identified them in a drawing.	☐	☐	☐	
2.4.1. Written Opinion I wrote at least two sentences in English in the classroom booths, using AI-related vocabulary to express my opinion.	☐	☐	☐	

ANNEX 11: EXAMPLE OF PEER EVALUATION QUESTIONNAIRE FOR SESSION 6

Instructions: After each group presents, your group must agree on a rating for each of the following aspects.

Use the 1 to 5 stars scale, where:

- ★ = Poor
- ★★ = Fair
- ★★★ = Good
- ★★★★ = Very Good
- ★★★★★ = Excellent

Presenting Group Name/Number: _____

Criteria	★	★★	★★★	★★★★	★★★★★
1. Task Completion Did the group complete all parts of the task clearly and accurately?	☐	☐	☐	☐	☐
2. Clarity of Expression Could you understand their message and ideas?	☐	☐	☐	☐	☐
3. Terminology Use Did they use AI-related vocabulary correctly and appropriately?	☐	☐	☐	☐	☐
4. Pronunciation Was their pronunciation clear and understandable?	☐	☐	☐	☐	☐
5. Fluency Did they speak smoothly and with natural flow?	☐	☐	☐	☐	☐
6. Attitude & Participation Did everyone in the group participate and show a positive attitude?	☐	☐	☐	☐	☐

Additional Comments (Optional):

ANNEX 12: *EXAMPLE OF A RUBRIC FOR DIALOGUES AND DEBATES*

STUDENT: _____

Criteria	Very Good (2)	Good (1.5)	Sufficient (1)	Poor (0.5)	Very Poor (0)
Confidence in Defending Their Point of View	☐	☐	☐	☐	☐
Structure of Argumentation	☐	☐	☐	☐	☐
Use of Theoretical Support	☐	☐	☐	☐	☐
Respect for Other Interventions	☐	☐	☐	☐	☐
Initiative, Creativity, and Proactivity	☐	☐	☐	☐	☐

ANNEX 13: *EXAMPLE OF A RUBRIC FOR WRITTEN ACTIVITIES*

STUDENT: _____

Criteria	Very Good (2)	Good (1.5)	Sufficient (1)	Poor (0.5)	Very Poor (0)
Clarity of Expression	☐	☐	☐	☐	☐
Expository Structure	☐	☐	☐	☐	☐
Appropriate Content	☐	☐	☐	☐	☐
Relevance of Reflection (Addressing the issue/problem)	☐	☐	☐	☐	☐
Attitude, Curiosity, and Critical Thinking	☐	☐	☐	☐	☐

ANNEX 14: *EXAMPLE OF A RUBRIC FOR ORAL PRESENTATIONS*

STUDENT: _____

Criteria	Very Good (2)	Good (1.5)	Sufficient (1)	Poor (0.5)	Very Poor (0)
Confidence While Presenting	☐	☐	☐	☐	☐
Knowledge of the Presentation	☐	☐	☐	☐	☐
Relevant Information in the Presentation	☐	☐	☐	☐	☐
Aesthetic Elements of the Presentation	☐	☐	☐	☐	☐
Interaction During (and After) the Presentation	☐	☐	☐	☐	☐

ANNEX 15: LIMITATIONS FOR AI AND GAMIFICATION IN EDUCATION AND POSSIBLE ADAPTATIONS FOR IMPROVEMENT IN DIFFERENT EDUCATIONAL CENTERS

Educational Scenario	Available Resources	Specific Limitations	Possible Solutions/Adaptations
Well-equipped urban center	Digital classrooms, good connectivity, access to computers or tablets, teachers with basic ICT training.	Although resources exist, there may be superficial use of AI due to lack of specific training, and a dependency on digital tools without critical thinking.	Offer specific training in AI and gamification in education. Promote critical and ethical use of digital tools. Encourage collaborative projects that integrate these technologies.
Rural center with limited resources	Weak or intermittent connectivity, scarce technological equipment, students with less exposure to technology.	Limited capacity to apply AI based on digital platforms or to carry out gamified activities. Less access to digital tools and platforms.	Adapt gamification to analog formats: cards, boards, physical badges, cooperative games on paper. Use offline AI resources when possible (e.g., downloaded software).
Center with high sociocultural diversity	Medium level of resources, students with different levels of linguistic and academic competence.	Immediate barriers, difficulties in understanding instructions, and digital gaps among students.	Select AI tools with multilingual options. Use gamification to encourage group work and inclusion. Incorporate multisensory materials and activities to facilitate understanding.
Center with a significant socioeconomic gap	Equipped classrooms, but students without technology outside of school.	Impossibility of continuity and digital activities outside of school. Risk of digital divide.	Ensure that all technological implementation is done within the center. Use printed formats. Include loan resources (libraries, banks of devices). Develop basic digital skills as part of the curriculum.
Center with poorly trained ICT/AI teachers	Equipment available but underutilized. Resistance to technological change.	Low use of available technology. Activities poorly motivating or outdated.	Promote internal training on AI and gamification. Peer support (expert teacher as mentor). Include simple digital tools and progress towards more complex ones. Establish a digital center plan.