



## DIGITAL TECHNOLOGIES AND EDUCATION FOR PEACE: THE ROLE OF GEOTECHNOLOGIES AND GAMIFICATION IN SCHOOLS

### TECNOLOGIAS DIGITAIS E EDUCAÇÃO PARA A PAZ: O PAPEL DAS GEOTECHNOLOGIAS E DA GAMIFICAÇÃO NA ESCOLA

### TECNOLOGÍAS DIGITALES Y EDUCACIÓN PARA LA PAZ: EL PAPEL DE LAS GEOTECHNOLOGÍAS Y LA GAMIFICACIÓN EN LAS ESCUELAS



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#### ABSTRACT

This essay discusses the relevance of digital technologies, particularly geotechnologies and gamification, as didactic and pedagogical strategies aimed at promoting a culture of peace in basic education. It assumes that contemporary educational processes face the challenge of engaging with the languages and skills of the 21st century, requiring innovative practices that combine technology, critical thinking, and citizenship. Drawing on frameworks from learning psychology, educational sociology, and studies on educational technology, it argues that integrating technological tools into the school curriculum can reconfigure pedagogical practices, promote collaborative learning, and expand the emancipatory potential of education. The text also highlights that such resources, when guided by critical pedagogical intentions, foster the development of values such as solidarity, empathy, and respect for diversity. To this end, it emphasizes the need for ongoing teacher training, interdisciplinary approaches, and the strengthening of public policies that enable the qualified use of technologies in teaching. It is concluded that the combination of technological innovation and ethical commitment can transform schools into privileged spaces for building peace.

**Keywords:** Digital Technologies. Geotechnologies. Gamification. Culture of Peace.

#### RESUMO

Este ensaio tem como objetivo discutir a relevância das tecnologias digitais, em especial as geotecnologias e a gamificação, como estratégias didático-pedagógicas voltadas à promoção da cultura de paz na educação básica. Parte-se do pressuposto de que os processos educativos contemporâneos enfrentam o desafio de dialogar com as linguagens e competências do século XXI, exigindo práticas inovadoras que articulem tecnologia,

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criticidade e cidadania. Com base em referenciais da psicologia da aprendizagem, da sociologia da educação e dos estudos sobre tecnologia educacional, argumenta-se que a integração de ferramentas tecnológicas ao currículo escolar pode reconfigurar práticas pedagógicas, promover aprendizagens colaborativas e ampliar o potencial emancipador da educação. O texto evidencia ainda que tais recursos, quando orientados por intencionalidade pedagógica crítica, favorecem o desenvolvimento de valores como solidariedade, empatia e respeito à diversidade. Para tanto, ressalta-se a necessidade de formação continuada de professores, de abordagens interdisciplinares e do fortalecimento de políticas públicas que viabilizem o uso qualificado das tecnologias no ensino. Conclui-se que a combinação entre inovação tecnológica e compromisso ético pode transformar a escola em espaço privilegiado de construção da paz.

**Palavras-chave:** Tecnologias Digitais. Geotecnologias. Gamificação. Cultura de Paz.

## RESUMEN

Este ensayo analiza la relevancia de las tecnologías digitales, en particular las geotecnologías y la gamificación, como estrategias didácticas y pedagógicas para promover una cultura de paz en la educación básica. Se asume que los procesos educativos contemporáneos enfrentan el desafío de interactuar con los lenguajes y las habilidades del siglo XXI, lo que requiere prácticas innovadoras que combinen tecnología, pensamiento crítico y ciudadanía. Basándose en marcos de la psicología del aprendizaje, la sociología de la educación y los estudios sobre tecnología educativa, se argumenta que la integración de herramientas tecnológicas en el currículo escolar puede reconfigurar las prácticas pedagógicas, promover el aprendizaje colaborativo y ampliar el potencial emancipador de la educación. El texto también destaca que estos recursos, guiados por intenciones pedagógicas críticas, fomentan el desarrollo de valores como la solidaridad, la empatía y el respeto a la diversidad. Para ello, se enfatiza la necesidad de la formación docente continua, los enfoques interdisciplinarios y el fortalecimiento de políticas públicas que faciliten el uso cualificado de las tecnologías en la enseñanza. Se concluye que la combinación de innovación tecnológica y compromiso ético puede transformar las escuelas en espacios privilegiados para la construcción de paz.

**Palabras clave:** Tecnologías Digitales. Geotecnologías. Gamificación. Cultura de Paz.



## 1 INTRODUCTION

The incorporation of digital technologies has caused profound transformations in the forms of communication, in social relations and, above all, in the teaching-learning processes. The school, as a space for citizenship formation, is faced with the challenge of dialoguing with the languages, tools and skills of the twenty-first century, in order not only to transmit content, but also to promote values aimed at social justice, sustainability and a culture of peace.

In this scenario, geotechnologies and gamification stand out as didactic-pedagogical resources that, when used critically and intentionally, can contribute to the construction of more participatory, interdisciplinary and transformative educational practices.

The question that guides this study is to verify how the use of geotechnologies and gamification, in the context of basic education, can enhance the promotion of a culture of peace? The relevance of the research is justified by the need to rethink the integration between technology and pedagogy, overcoming merely instrumental approaches and moving towards methodologies capable of stimulating autonomy, empathy, cooperation and respect for diversity. In addition, by considering the centrality of the culture of peace in international education guidelines, this work contributes to bring school practice closer to global agendas that defend the formation of critical and socially engaged subjects.

This essay aims to analyze the relevance of digital technologies, especially geotechnologies and gamification, as didactic-pedagogical strategies aimed at promoting the culture of peace in basic education, highlighting their potentials, limits and conditions of effectiveness.

## 2 THEORETICAL FRAMEWORK

The discussion about the use of digital technologies in education requires the understanding that such resources are not neutral, but carry political and pedagogical intentions that can both reinforce inequalities and promote emancipation. For Freire (1996), educational practice should be understood as a political and ethical act, based on autonomy and freedom. In this sense, technologies, when mobilized in a critical way, can become mediations that enhance the teaching-learning process and favor the collective construction of knowledge.

Apple (2003) warns of the risk of a technocratic education, marked by managerial logic, which limits the emancipatory role of the school. The author highlights the importance of overcoming the instrumental view of technologies, understanding them as social practices that only acquire educational relevance when linked to a transformative intentionality.



In the specific field of geotechnologies, Correa et al. (2010) emphasize that their contribution lies not only in the access to tools such as GPS, GIS or geolocation applications, but above all in their contextualized pedagogical appropriation, which favors the critical reading of the territory. Projects such as *Geocaçadores* (Malta, 2013; Brito et al., 2014) demonstrate how the use of location-based resources can stimulate environmental education, the recognition of local landscapes and the formation of cartographic skills.

Gamification, in turn, emerges as a learning strategy that incorporates typical elements of games in educational contexts. Authors such as Werbach and Hunter (2012) and McGonigal (2011) highlight its potential to engage students in active and collaborative experiences, promoting motivation and participation. From the psychopedagogical point of view, Claparède (1954) and Vygotsky (1991) already indicated the value of play in the development of autonomy, imagination and cognitive and social skills, evidencing the relevance of playfulness for meaningful learning.

With regard to the culture of peace, UNESCO (1999) defines it as a set of values, attitudes and behaviors that reject violence and seek the resolution of conflicts through dialogue and cooperation. Integrating this perspective into the school curriculum implies working on diversity, solidarity, sustainability and human rights as central dimensions of the training process. In this context, digital technologies, especially geotechnologies and gamification, are powerful tools to promote a citizen, democratic education committed to social justice.

### 3 RESULTS AND DISCUSSIONS

#### 3.1 DIGITAL TECHNOLOGIES AND THE PARADIGM OF CRITICAL EDUCATION

The advancement of information and communication technologies (ICTs) has given rise to intense debates about the role of the school in the face of new forms of knowledge appropriation. Although widely available, technologies do not guarantee by themselves the improvement of teaching. As stated by Correa et al. (2010), it is essential to consider not only access to tools, but, above all, their critical and contextualized pedagogical appropriation.

Authors such as Freire (1996) and Apple (2003) draw attention to the risk of technological neutrality and the reproduction of inequalities through the uncritical use of ICTs. Instead, they argue that technology should be understood as social and cultural mediation, whose emancipatory power depends on the political intentionality of the educator and the collective construction of knowledge.

The analysis shows that the presence of digital technologies in the school, by itself, does not guarantee innovative educational practices. This finding corroborates Freire (1996),



when he states that education cannot be neutral, requiring a critical and transformative intentionality. Apple (2003) reinforces this perspective by warning of the risks of technocracy and the uncritical use of digital tools, which can reproduce inequalities instead of fighting them. In this sense, the results indicate that the effectiveness of technologies depends on the critical training of teachers and the ability to articulate ICTs to the pedagogical project in a contextualized way.

Thus, integrating geotechnologies and gamification into the school curriculum cannot be understood only as a methodological innovation, but as part of an epistemological change that recognizes the student as a historical subject and knowledge as a situated social construction.

### 3.2 GEOTECHNOLOGIES AND EDUCATION: A CRITICAL CARTOGRAPHY OF THE TERRITORY

Geotechnologies, which involve the use of tools such as GPS, geographic information systems (GIS), remote sensing, and geolocation applications, enable a critical reading of the territory, promoting the articulation between space, society, and the environment. When inserted in pedagogical practices, these technologies expand students' ability to understand territorial conflicts, environmental degradation, patterns of urban occupation and socio-spatial inequalities.

Projects such as *Geocaçadores* (Malta, 2013; Brito et al., 2014) demonstrate how the use of *geocaching*, a game based on the location of georeferenced points, can be effective in mobilizing students to recognize their landscapes, promoting environmental education and developing cartographic skills.

In addition, GeoTICs favor interdisciplinary approaches that articulate geographical, historical, scientific and cultural knowledge. Its application in the classroom can contribute to the formation of subjects capable of intervening consciously and critically in their territories, promoting sustainability and spatial justice.

### 3.3 ICTS AS TOOLS FOR EMPOWERMENT AND SOCIAL TRANSFORMATION IN THE CULTURE OF PEACE

The culture of peace, according to the United Nations Educational, Scientific and Cultural Organization - UNESCO (1999), goes beyond the mere absence of violence. It is a set of values, attitudes, and behaviors that reject violence and seek to prevent conflicts through dialogue and cooperation. In the educational context, this requires the promotion of



school environments based on collaborative practices, mutual respect and the appreciation of diversity.

Its main pillars include: respect for cultural, ethnic and gender diversity; education in human rights and global citizenship; sustainable development and socio-environmental responsibility; democratic participation and social inclusion; promotion of justice, equity and solidarity.

These principles must be transversalized in school curricula and daily pedagogical practices, making the school an effective space for social transformation. By incorporating these values, the educational process forms conscious, ethical subjects committed to the construction of a more just and peaceful world.

Information and Communication Technologies (ICTs), when mobilized with critical pedagogical intentionality, become powerful tools in the promotion of a culture of peace. Far from being neutral, ICTs act as cultural and social mediators capable of fostering transformative educational practices.

Among its main contributions, the following stand out: the creation of collaborative learning environments, which favor listening, dialogue and the collective construction of knowledge; and the possibility of simulating and solving complex situations through digital games, promoting empathy, cooperation, and critical reflection.

They can also be useful to map local problems, give visibility to invisible realities and encourage community engagement; and contribute to the strengthening of digital citizenship, with practices based on respect, ethics and the fight against hate speech.

Thus, ICTs not only update the means of teaching, but also expand the school's capacity to form critical, supportive subjects and protagonists in the construction of peace. Integrating these technologies with sensitivity and ethical commitment strengthens the mission of education as a practice of freedom and non-violent coexistence in a plural society.

### 3.4 GAMIFICATION AS A PEDAGOGICAL STRATEGY FOR THE CULTURE OF PEACE

Gamification refers to the incorporation of typical game elements, such as challenges, rewards, scores, and feedback, into educational contexts. More than a motivational resource, it is an approach that, when well planned, can favor the construction of active, collaborative, and meaningful learning experiences (Werbach & Hunter, 2012; McGonigal, 2011).

From the psychopedagogical point of view, authors such as Claparède (1954) and Vygotsky (1991) have already indicated the value of play in the development of autonomy, imagination and cognitive and social skills of students. Through playfulness, it is possible to



create learning situations in which students face real challenges, cooperate with each other, and reflect on their actions — central dimensions of peace education.

Gamification applied to topics such as sustainability and human rights can contribute to the construction of values such as solidarity, empathy, respect for diversity, and collective responsibility. In addition, by favoring project-based learning, problem-solving, and the active participation of students, it contributes to the formation of critical citizens committed to social transformation.

### 3.5 PEDAGOGICAL IMPLICATIONS AND CHALLENGES OF TEACHING PRACTICE

Although the pedagogical possibilities of using technologies are broad, their implementation requires overcoming several obstacles. The first of them is teacher training. Many teachers have not yet been prepared to work with digital resources, or do not feel safe to integrate technologies autonomously and creatively into their practices.

Another challenge is institutional resistance to innovation. Curricular rigidity, lack of infrastructure and overload of teaching work hinder pedagogical experimentation and interdisciplinarity. As Apple (2003) points out, the technocratic logic of management education often makes critical and emancipatory practices unfeasible.

Thus, it is necessary to invest in the continuing education of teachers, promote a culture of collaboration among education professionals, and ensure public policies that expand access and qualified use of technologies in schools. Education for citizenship, sustainability and peace cannot be delegated to individual spontaneity, but must be assumed as a collective commitment of the school and the State.

## 4 CONCLUSION

The analysis developed in this essay allowed us to show that the use of digital technologies, especially geotechnologies and gamification, constitutes a promising strategy for the promotion of a culture of peace in basic education. However, the results pointed out that such resources are not neutral and demand critical pedagogical intentionality, avoiding merely instrumental or technocratic approaches.

Geotechnologies have proven to be effective in expanding the critical reading of the territory, stimulating the recognition of socio-environmental dynamics and strengthening the engagement of students in practices aimed at sustainability and spatial justice. Gamification, in turn, revealed the potential to mobilize students in playful, collaborative, and meaningful learning experiences, contributing to the formation of cognitive and socio-emotional skills essential to democratic coexistence.



The culture of peace emerged as a transversal axis, reaffirming that education must go beyond the transmission of content, assuming an ethical commitment to the construction of critical, supportive and responsible subjects. In this sense, the effectiveness of the practices analyzed depends on investment in continuing education of teachers, public policies that guarantee adequate technological infrastructure and the consolidation of interdisciplinary curricula.

It is concluded that the integration between technological innovation and social commitment can transform the school into a privileged space for dialogue, cooperation and respect for diversity. By aligning pedagogy, technology, and a culture of peace, the way is paved for a more democratic, inclusive, and emancipatory education.

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