

THE USE OF ICTS IN ADAPTING ACTIVITIES FOR TEACHING MATHEMATICS IN ADULT EDUCATION (HIGH SCHOOL LEVEL)

A UTILIZAÇÃO DAS TDICs NA ADAPTAÇÃO DE ATIVIDADES PARA O ENSINO DA MATEMÁTICA NA EJA MÉDIO

EL USO DE LAS TIC EN LA ADAPTACIÓN DE ACTIVIDADES PARA LA ENSEÑANZA DE LAS MATEMÁTICAS EN LA EDUCACIÓN DE ADULTOS (SECUNDARIA)



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ABSTRACT

This study addresses the use of Digital Information and Communication Technologies (DICTs) in mathematics education within Youth and Adult Education (YAE), a modality characterized by interrupted school trajectories, sociocultural diversity, and historical learning challenges. The objective was to investigate how DICTs have been used to adapt mathematical activities for YAE high school students, analyzing theoretical productions, teaching materials, and educational documents. Methodologically, it is a bibliographic and documentary research, with a qualitative approach and a pedagogical-propositional character, organized through analytical categories that enabled a critical interpretation of the findings. Results indicate that DICTs, when integrated into pedagogical proposals planned and critically mediated by teachers, can enhance the visualization of mathematical concepts (C1), increase student engagement through gamification (C2), and promote more meaningful and contextualized learning experiences (C3). The analysis also highlights limitations related to precarious technological infrastructure, digital access inequalities, and gaps in teacher training (C4). It is concluded that the integration of DICTs into mathematics teaching in YAE represents a promising path for building more inclusive and contextualized pedagogical practices, provided it is articulated with teacher training policies and digital inclusion initiatives. The main contribution of this research lies in the articulation between theoretical analysis and pedagogical proposition, by presenting a set of didactic activities adapted with DICTs, offering concrete support for teachers and researchers interested in more critical, inclusive, and transformative practices in mathematics education within YAE.

Keywords: Youth and Adult Education. Mathematics Teaching. Digital Inclusion. Pedagogical Practices. Digital Technologies.

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RESUMO

Este trabalho insere-se no debate sobre o uso das Tecnologias Digitais da Informação e Comunicação (TDICs) no ensino da matemática na Educação de Jovens e Adultos (EJA), modalidade marcada por trajetórias escolares interrompidas, diversidade sociocultural e desafios históricos de aprendizagem. O objetivo foi investigar como as TDICs vêm sendo utilizadas na adaptação de atividades matemáticas para estudantes da EJA no Ensino Médio, analisando produções teóricas, materiais didáticos e documentos educacionais. Metodologicamente, trata-se de uma pesquisa bibliográfica e documental, de abordagem qualitativa e caráter propositivo-pedagógico, organizada a partir de categorias analíticas que possibilitaram interpretação crítica dos achados. Os resultados indicam que as TDICs, quando integradas a propostas pedagógicas planejadas e mediadas criticamente pelo professor, favorecem a visualização de conceitos matemáticos (C1), ampliam o engajamento discente por meio da gamificação (C2) e promovem aprendizagens significativas e contextualizadas às vivências dos estudantes (C3). A análise também evidencia limites associados à infraestrutura tecnológica precária, às desigualdades de acesso digital e às lacunas na formação docente (C4). Conclui-se que a integração das TDICs ao ensino da matemática na EJA constitui um caminho promissor para práticas pedagógicas mais inclusivas e contextualizadas, desde que articulada a políticas de formação docente e inclusão digital. A principal contribuição da pesquisa está na articulação entre análise teórica e proposição pedagógica, ao apresentar atividades didáticas adaptadas com TDICs, oferecendo subsídios concretos para professores e pesquisadores interessados em práticas críticas, inclusivas e transformadoras no ensino da matemática na EJA.

Palavras-chave: Educação de Jovens e Adultos. Ensino de Matemática. Inclusão Digital. Práticas Pedagógicas. Tecnologias Digitais.

RESUMEN

Este trabajo se enmarca en el debate sobre el uso de las Tecnologías de la Información y la Comunicación Digitales (TICD) en la enseñanza de las matemáticas en la Educación de Jóvenes y Adultos (EJA), una modalidad marcada por trayectorias escolares interrumpidas, diversidad sociocultural y desafíos históricos en el aprendizaje. El objetivo fue investigar cómo se han utilizado las TICD en la adaptación de actividades matemáticas para estudiantes de EJA en la escuela secundaria, analizando producciones teóricas, materiales didáticos y documentos educativos. Metodológicamente, se trata de una investigación bibliográfica y documental, con un enfoque cualitativo y un carácter proposicional-pedagógico, organizada a partir de categorías analíticas que permitieron una interpretación crítica de los hallazgos. Los resultados indican que las TICD, cuando se integran en propuestas pedagógicas planificadas y mediadas críticamente por el docente, favorecen la visualización de conceptos matemáticos (C1), aumentan la participación del alumnado mediante la gamificación (C2) y promueven un aprendizaje significativo y contextualizado relacionado con las experiencias del alumnado (C3). El análisis también pone de relieve las limitaciones asociadas a la infraestructura tecnológica precaria, las desigualdades en el acceso digital y las brechas en la formación docente (C4). El estudio concluye que la integración de las TIC en la enseñanza de las matemáticas en la educación de adultos constituye una vía prometedora para prácticas pedagógicas más inclusivas y contextualizadas, siempre que se articule con la formación docente y las políticas de inclusión digital. La principal contribución de la investigación radica en la articulación entre el análisis teórico y la propuesta pedagógica, mediante la presentación de actividades didáticas adaptadas con TIC, que ofrecen apoyo concreto a docentes e investigadores



interesados en prácticas críticas, inclusivas y transformadoras en la enseñanza de las matemáticas en la educación de adultos.

Palabras clave: Educación de Jóvenes y Adultos. Enseñanza de las Matemáticas. Inclusión Digital. Prácticas Pedagógicas. Tecnologías Digitales.

1 INTRODUCTION

Digital Information and Communication Technologies (DICTs) comprise a set of resources, tools, and digital environments that make it possible to produce, share, and transform information, promoting significant changes in social and educational practices. In the contemporary school context, the role of DICTs goes beyond the merely instrumental use of devices, involving new ways of thinking, interacting and learning, aligned with the dynamics of digital culture. As analyzed by Anjos et al. (2024), the evolution of educational technologies shows a progressive transition from analog resources to more complex and intelligent digital systems, a process marked by challenges related to teacher training, inequality of access, limited infrastructure, and the need for qualified pedagogical mediation.

In this sense, the authors highlight that DICTs expand the possibilities of communication, collaboration and creation, favoring student protagonism in more active, dynamic and contextualized learning processes. However, the pedagogical use of these technologies requires not only technical mastery, but, above all, educational intentionality and critical understanding of the cultural transformations that characterize the contemporary digital scenario, pointing to perspectives based on the personalization of learning, the integration of multiple languages, and the construction of innovative pedagogical practices (Anjos et al., 2024).

Youth and Adult Education (EJA), in turn, is configured as a teaching modality aimed at guaranteeing the right to schooling of subjects who did not complete Basic Education at the regular age, as a result of socioeconomic inequalities, early insertion in the world of work, family responsibilities, migrations and school trajectories marked by successive dropouts or failures (Almeida; Silva; Torres, 2021; Ferreira, 2024). In high school, this commitment intensifies, requiring pedagogical practices that recognize and value the life trajectories of students, especially in the teaching of mathematics, a discipline historically associated with abstraction and processes of exclusion. According to Freire (2005), the so-called "banking education" reinforces this exclusion by treating students as passive receptacles of content, in a teaching model that deposits information without dialogue or problematization. Overcoming this logic implies adopting critical and liberating pedagogical practices, capable of promoting active participation, collective construction of knowledge and appreciation of the experiences of EJA subjects.

In the context of EJA Médio, a heterogeneous public is observed, composed of young people and adults who reconcile work, family and studies, returning to school in search of professional qualification, social ascension or personal fulfillment. These students have diverse

life experiences and, frequently, a weakened relationship with school content, especially with mathematics (Freire, 1999). This discipline is often perceived as an obstacle to learning, due to accumulated conceptual gaps and the absence of methodologies that dialogue with their realities.

During pedagogical activities carried out in the Supervised Internship III in EJA Médio classes, it was possible to identify the students' interest in the use of technological resources, although difficulties persist related to the handling of digital devices, regular access to the internet and familiarity with educational platforms. These findings reveal limitations associated with school infrastructure, teacher training and digital inclusion, but also point to the potential of DICTs as mediators of mathematical learning. When used with pedagogical intentionality, DICTs can contribute to making the teaching of mathematics more accessible, visual and meaningful, as highlighted by Valente (2018), when he argues that educational technology should be articulated with pedagogical proposals that value the active participation of the student and the construction of knowledge.

This perspective is reinforced by Maietto (2025), when he argues that the integration of technologies into the teaching of mathematics in EJA can contribute to overcoming historical learning difficulties, as long as it is inserted in critical and inclusive pedagogical practices. Almeida; Oliveira (2023) also point out that mobile devices, such as smartphones and tablets, widely present in the daily lives of students, can be important allies in the teaching-learning process, when used in a planned and contextualized way.

In view of this scenario, this work aims to investigate how DICTs have been used in the adaptation of mathematical activities for EJA students in High School, analyzing theoretical productions, didactic materials and educational documents related to the theme. The research seeks to understand how these technologies are being incorporated into pedagogical practices and what limits and possibilities emerge from this process. The question that guides the study is: How have DICTs been used in the adaptation of mathematical activities for high school students, considering the pedagogical and technological challenges of this context? It is based on the hypothesis that, although there are initiatives that mention the use of DICTs, many of them still have difficulties in dialoguing with the concrete reality of public schools, especially with regard to infrastructure, teacher training and digital inclusion.

The relevance of this study is associated with the need to contribute to the construction of pedagogical practices that are more sensitive to the specificities of EJA students. When taught in a decontextualized way, mathematics can constitute an obstacle to learning; however,

when adapted with the support of DICTs and articulated with the students' experiences, it can become an instrument of empowerment, autonomy and social participation.

This work is structured in five sections: the first presents the introduction, with the theme, justification, problem, relevance, objective and structure of the study; the second section exposes the theoretical foundation; the third describes the methodological procedures; the fourth brings the proposal of activities adapted to EJA through the use of DICTs; and the fifth section presents the final considerations and suggestions for future practices.

2 THEORETICAL FRAMEWORK

This section presents the theoretical references that underlie the proposal of this work, which aims to investigate and propose adaptations of mathematics activities for EJA, mediated by the use of DICTs. Thus, it seeks to contribute to the construction of more inclusive, contextualized pedagogical practices that are sensitive to the specificities of students in this type of education.

The theoretical contributions mobilized allow us to understand mathematics education in EJA from a perspective that recognizes digital technologies not only as didactic resources, but as cultural and pedagogical elements capable of favoring the inclusion, autonomy and protagonism of the subjects, expanding the possibilities of meaningful learning.

2.1 YOUTH AND ADULT EDUCATION (EJA)

EJA is a modality of Basic Education aimed at guaranteeing the right to schooling of subjects who did not have access to or continuity of studies at the regular age, due to historical, social, economic and cultural factors. More than a space for school compensation or recovery, EJA is configured as an educational field marked by the diversity of trajectories, the plurality of life experiences and the need for pedagogical practices sensitive to the specificities of the students who compose it.

The EJA subjects bring with them stories of school interruptions, early insertion into the world of work, family responsibilities and experiences in contexts of social vulnerability. In this scenario, education assumes a strategic role in the reconstruction of life projects, in the valorization of knowledge built throughout social and professional experiences, and in the affirmation of historically marginalized identities. Thus, EJA demands pedagogical proposals that recognize the complexity of the subjects and promote significant and emancipatory formative processes.

Freire's (1997) critical pedagogy offers important foundations for understanding EJA as a space for dialogue, listening and collective construction of knowledge. By stating that "authentic education is not made of A to B or of A on B, but of A to B, mediated by the world" (Freire, 1997, p. 68), the author emphasizes the centrality of dialogical relations in the educational process, breaking with banking and transmissive practices. The so-called banking education consists of treating students as passive recipients of content, in a teaching model that deposits information without dialogue or problematization. This criticism is particularly relevant in EJA, as it recognizes students as active subjects, bearers of knowledge and experiences that must be considered in the teaching-learning process.

This perspective also dialogues with my own trajectory: graduated from a public school, with passages through technical and higher education courses interrupted, I experienced in practice the limits of an education that often does not dialogue with the realities of students. Like many EJA students, I had to reconcile work, family and studies, which reinforces the importance of a pedagogy that recognizes previous knowledge and values non-linear paths.

In his reflection on the ethical and political dimension of education, Freire (2002) highlights that educational practice must be committed to humanization and to overcoming oppressive relations, understanding education as a process of social transformation. In this sense, EJA assumes a political-pedagogical character by enabling young people and adults to appropriate knowledge as an instrument of critical reading of reality and conscious intervention in the world.

Gadotti (2000, p. 17) reinforces this perspective when he states that "educating is a political act. Every educational practice implies a conception of man and society". Also for Gadotti, EJA requires its own approach, which starts from the concrete experiences of students and recognizes their knowledge as a starting point for the construction of knowledge:

"Youth and adult education cannot be a simple reproduction of formal education for young people. It must be thought of from the needs, desires and experiences of the subjects who participate in it. It is an education that requires sensitivity, listening and commitment to social transformation." (Gadotti, 2000, p. 45)

From this perspective, EJA is not limited to the physical space of the classroom, but is configured as a territory of resistance, welcoming, and the production of meanings. Students who attend this modality are not only resuming interrupted schooling, but reconstructing formative trajectories and projecting new personal and professional horizons. Such understanding reinforces the need for pedagogical practices that dialogue with the daily lives of students, value their knowledge and promote contextualized and socially relevant learning.

From a legal and normative point of view, EJA is supported by the Federal Constitution of 1988, which ensures education as a right of all and a duty of the State, as well as in the National Common Curricular Base (BNCC), which recognizes the diversity of Basic Education subjects and the need for inclusive pedagogical practices (Brasil, 2018). In addition, recent studies, such as those by Freires et al. (2024), reinforce the importance of EJA in promoting educational equity and guaranteeing the right to lifelong education.

Thus, understanding Youth and Adult Education as a specific educational field implies recognizing its historical challenges and its formative potentialities. EJA requires pedagogical proposals committed to inclusion, dialogue and appreciation of the experiences of the subjects, constituting a fundamental space for the construction of a democratic, emancipatory and socially referenced education.

2.2 THE TEACHING OF MATHEMATICS IN YOUTH AND ADULT EDUCATION (EJA)

Teaching mathematics in EJA requires the articulation between school concepts and the concrete experiences of students, since these subjects mobilize mathematical knowledge in different daily practices, such as at work, in the organization of household finances and in time management. However, such knowledge is not always recognized as legitimate in the school space, which reinforces the need for pedagogical practices that value it as a starting point for the construction of more meaningful mathematical learning (Hirye; Higa; Altoé, 2023).

In this sense, ethnomathematics, proposed by D'Ambrosio (2005), offers important contributions to the understanding of mathematics teaching in EJA. By arguing that different cultures produce their own ways of thinking and doing mathematics, the author proposes an approach that values knowledge built in different sociocultural contexts. For D'Ambrosio (2005), mathematical ideas associated with processes such as comparing, classifying, quantifying, measuring and organizing are inherent to human nature and manifest themselves in multiple ways, and should be recognized as legitimate expressions of mathematical thought. This perspective contributes to breaking with homogeneous and universalizing conceptions of school mathematics, favoring more inclusive and contextualized pedagogical practices in EJA.

Complementing this view, Vygotsky's (1998) historical-cultural theory also offers relevant subsidies for the teaching of mathematics in this modality, by understanding learning as a socially mediated process. According to the author, the development of thought is directly related to social interactions and language, and knowledge is built in the relationship between subject and object, mediated by culturally shared signs and meanings. In the context of EJA, this approach reinforces the importance of pedagogical practices that promote interaction,

dialogue and collaboration, enabling students to build mathematical knowledge from the exchange of experiences and teacher mediation.

From this perspective, mathematical learning in EJA must be meaningful and connected to the students' reality, as defended by Maietto (2025). The author argues that the use of digital resources, such as videos, games and simulators, can contribute to overcoming historical learning difficulties, as long as these tools are integrated with critical and inclusive pedagogical proposals. Such proposals are not limited to the instrumental use of technology, but seek to promote active participation, question inequalities and value the knowledge of students, recognizing their trajectories and experiences.

For Maietto (2025), the use of digital technologies in mathematics teaching should not be restricted to the reproduction of content, but favor dialogue, the collective construction of knowledge and the appreciation of students' knowledge, promoting greater autonomy and engagement. This reflection dialogues with my own experience: when working with technology and logistics, I realized that the use of simulators and software not only reproduces information, but allows you to understand processes in a practical and contextualized way — the same as what is expected in teaching mathematics to EJA.

Gonçalves et al. (2017) corroborate this understanding by highlighting that digital technologies can play a significant role in making classes more dynamic and expanding the possibilities of expression for EJA students:

"The use of technological resources, when well planned, can favor the autonomy of students, expand their possibilities of expression and promote more meaningful learning, especially in the context of EJA, where students bring with them diverse experiences and knowledge built outside the school environment." (Gonçalves et al., 2017, p. 147)

In the context of educational policies and materials, the didactic material structured by the Department of Education of the State of Ceará (SEDUC-CE), in 2023, presents proposals organized around problem solving and student protagonism. Although it does not directly explain the use of digital technologies, its pedagogical structure favors adaptations to digital environments, allowing the teacher to incorporate explanatory videos (such as Khan Academy and YouTube Edu), simulators (such as GeoGebra and PhET) and interactive platforms (such as Moodle and Google Classroom), expanding the possibilities of teaching and learning mathematics in EJA.

Thus, the teaching of mathematics in EJA should be understood as a process that articulates school knowledge and everyday knowledge, promoting the construction of contextualized and socially relevant knowledge. In this scenario, Digital Information and

Communication Technologies (DICTs) emerge as potential allies, as long as they are integrated with critical pedagogical proposals, mediated by the teacher and committed to valuing students' experiences. Resignifying the teaching of mathematics in EJA implies, therefore, recognizing the subjects as protagonists of their learning and building educational practices that dialogue with their realities, life projects and with the demands of society, which require mathematical skills applied to the world of work, citizenship and daily life.

Finally, it is necessary to consider that, although mobile devices such as smartphones and tablets are widely present in the daily lives of students and offer great pedagogical potential (Almeida; Oliveira, 2023), many institutions maintain restrictions on their use in the classroom. In this context, it is up to the teacher to seek regulated alternatives, such as computer labs or institutional tablets, ensuring that technology is used in a pedagogical way and not just recreationally.

2.3 DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGIES (TDICS) IN EDUCATION

DICTs have caused significant transformations in the ways of teaching, learning and producing knowledge, directly influencing contemporary pedagogical practices. In the educational context, such technologies go beyond the function of mere technical instruments, configuring themselves as cultural elements that restructure forms of interaction, communication and construction of knowledge. In EJA, DICTs play a strategic role in promoting educational inclusion, personalizing learning, and valuing students' life experiences.

In the context of mathematics teaching, studies indicate that the use of digital resources can favor the visualization of abstract concepts, expand student participation and recognize the knowledge built outside the school space. When intentionally integrated into pedagogical planning, DICTs contribute to more meaningful practices, enabling students to take an active role in the learning process, strengthening their autonomy and protagonism.

Valente (2018) highlights that the pedagogical potential of DICTs is directly related to the teacher's ability to use information about student performance to readjust teaching methods and instruments, promoting the personalization of learning. This idea resonates with my professional experience: when working with logistics and technology, I realized that systematic data monitoring is essential to adjust processes and achieve better results. Similarly, in education, the use of DICTs can allow teachers to personalize teaching according to the needs of each student.

This perspective is reinforced by Kenski (2012), when he states that educational technology is not neutral, as it carries values, intentionalities and worldviews. This reflection is close to my formative path: when dealing with technological systems, I realized that each tool brings with it its own logic and requires a critical posture from the user. In the teaching of mathematics in EJA, this means that the teacher must be aware not only of the technical use of DICTs, but also of the social and cultural implications they carry.

Moran (2007) complements this debate by understanding education as a process of construction of meanings, values and competencies for life in society. According to the author, digital networks make it possible to organize teaching in a more dynamic, active and flexible way. This vision connects with my academic experiences: when I returned to the area of mathematics after experiences in other courses, I realized that flexibility and personalization are essential for the student to be able to reconcile study, work and personal life — a reality common to EJA students.

Fiuza (2015) expands this discussion by arguing that DICTs should be understood as learning environments, and not just as complementary resources. For the author, such technologies require new pedagogical postures, new forms of interaction and different ways of thinking about the curriculum, especially in the context of EJA, in which the promotion of digital inclusion and student autonomy is a central challenge. This reflection is also confirmed in my professional practice: when working with technology, I realized that digital environments are not accessories, but central spaces for learning and interaction.

With regard to the teaching of mathematics in EJA, Almeida; Oliveira (2023) highlight the role of mobile devices, such as smartphones and tablets, as they are widely inserted in students' daily lives. The authors argue that the use of applications, videos and digital games can favor the visualization of abstract mathematical concepts, stimulate student engagement and expand the possibilities of communication between teacher and student, including outside the classroom space. However, it is necessary to recognize that many institutions still maintain restrictions on the use of smartphones in the classroom, which imposes limits on their pedagogical application. In this scenario, it is up to the teacher to seek regulated alternatives, such as computer labs, institutional tablets or supervised digital platforms, ensuring that technology is used in a pedagogical and not just recreational way.

Corroborating this perspective, Maietto (2025) argues that the integration of DICTs into EJA should be associated with critical and inclusive pedagogical proposals, which go beyond the simple reproduction of content. For the author, the use of technologies should provide opportunities for dialogue, the collective construction of knowledge and the appreciation of

students' knowledge, contributing to overcoming historical difficulties in the teaching of mathematics in this modality. This idea is also connected to my academic career: when I returned to mathematics after experiences in other areas, I realized that knowledge only becomes meaningful when it dialogues with the concrete reality of the subjects and their social needs.

Thus, the presence of DICTs in EJA should not be understood as an accessory or occasional resource, but as a pedagogical need in the face of contemporary teaching and learning demands. When used in a planned and critically mediated way by the teacher, these technologies can increase student engagement, favor the understanding of mathematical concepts, and strengthen student protagonism, contributing to more inclusive, contextualized, and meaningful pedagogical practices.

3 METHODOLOGICAL PROCEDURES

The present research is characterized as a bibliographic and documentary study, with a qualitative approach and propositional-pedagogical character, whose objective was to investigate how Digital Information and Communication Technologies (DICTs) have been used in the adaptation of mathematical activities in the context of Youth and Adult Education (EJA), specifically in High School. In addition to the theoretical analysis, the study culminated in the elaboration of a didactic activity adapted and mediated by TDICs, understood as an educational product of the research.

The bibliographic survey was carried out through systematized searches in academic databases and repositories, selected for their relevance in the dissemination of scientific production in the areas of Education, Mathematics Education and Educational Technologies, during the period from 2016 to 2025. SciELO (Scientific Electronic Library Online) was consulted, as it is one of the main open access electronic libraries in Latin America and brings together high-quality scientific journals in Portuguese and Spanish; Google Scholar, for its scope and ability to index articles, theses, dissertations and books from different areas; CAPES Periodicals, for bringing together national and international reference journals and ensuring access to up-to-date studies and scientific credibility; and institutional repositories, such as those of the Federal University of Ceará and IFCE, which provide dissertations, theses and academic works directly related to the local reality and the EJA modality. The choice of these databases is justified by the need to ensure diversity of sources, geographic coverage and scientific reliability, contemplating both international and national and regional productions.

The searches were performed with descriptors combined with Boolean operators, in order to expand and refine the results. The expressions used included, in isolation and combination: "Youth and Adult Education" OR "EJA"; "mathematics teaching" AND "digital technologies"; "teaching mathematics" AND "TDICs"; "EJA" AND "teaching mathematics" AND ("TDICs" OR "educational technologies"); "Youth and Adult Education" AND "digital inclusion". To delimit the scope, exclusion operators were used, such as NOT "Higher Education", NOT "Early Childhood Education" and NOT "Elementary Education", ensuring that the results remained focused on the EJA modality of High School.

The selection of productions was based on previously defined criteria, ensuring methodological rigor and relevance to the object of study. Studies that addressed the use of DICTs in the educational context, productions related to the teaching of mathematics, research that contemplated the EJA modality, works published in Portuguese and publications with theoretical and pedagogical relevance to the analysis were included. Studies that dealt with the use of technologies in a merely instrumental way, without pedagogical problematization, were excluded; research focused exclusively on other stages or modalities of teaching, such as Early Childhood Education, Elementary Education or Higher Education; duplicate jobs; and productions that did not have a direct relationship with the teaching of mathematics in EJA.

After applying these criteria, a corpus was constituted consisting of six studies, systematized in Table 1.

Table 1

Synthesis of the empirical/applied corpus (EJA + Mathematics + DICT)

Author(s) / Year	Type	TDIC(s)	Contents Mathematician	Objective of the study	Main contributions to EJA
Bohrer & Tinti (2021)	Article	GeoGebra on smartphon and	Quadratic function	Investigate difficulties of EJA students when using GeoGebra on their cell phones in activities About quadratic function	It highlights obstacles to use/operationalization and points out the need for teacher mediation and digital literacy to ensure learning with mobility
Santiago (2025)	Article	Augmented Reality (AR)	Geometric Solids	To analyze the impact of AR on the teaching of geometric solids in EJA	Shows AR potential for 3D visualization and engagement; reinforces the importance of planning and conditions of use for Effectiveness
Olive (2023)	Article	Kahoot!	Emphasis Posted on Evaluative Practice/Quiz	Discuss how Kahoot! can assist teachers in EJA	Indicates gain of participation and immediate feedback; suggests use as a strategy for formative assessment and motivation

Monteiro & de Martini (2025)	Work/Report (repository)	Kahoot!	Probability	Analyze the use of Kahoot in the teaching of probability in EJA	It proposes a gamified approach to abstract content; points to potential for logical reasoning and participation, with attention to infrastructure
Silva (2022)	Article	PhET (simulator "Area Constructor")	Area and perimeter	Present the importance of teaching PhET-mediated area/perimeter in EJA	It suggests greater autonomy and learning by exploration/simulation; reinforces the role of the teacher in conducting and problematizing
Araújo (2024)	Scientific Article	Geogebra	Flat geometry	Articulate geometry teaching in EJA with the use of Geogebra	It reinforces the potential of digital resources for concept formation and visualization, with the need for pedagogical intentionality

Source: Authors (2025)

The analysis of the selected studies showed that the use of DICTs in the teaching of Mathematics in EJA does not occur in a homogeneous way, assuming different pedagogical functions according to the didactic objectives, the mathematical contents and the educational context. In view of this, the works were organized into four analytical categories, defined from the literature of Mathematics Education and the recurrence of meanings attributed to DICTs in the analyzed texts.

3.1 C1 – TDICS AS A RESOURCE FOR VISUALIZATION AND CONCEPTUAL CONSTRUCTION

This category brings together studies in which DICTs act primarily as means of mathematical visualization, enabling the dynamic exploration of algebraic, geometric and graphic representations. This perspective dialogues with D'Ambrosio (2005), who recognizes that different cultures produce their own ways of thinking and representing mathematics, and with Valente (2018), who highlights the potential of technologies to personalize learning. In EJA, in which many students have difficulties with formal abstractions, resources such as GeoGebra and PhET favor conceptual construction and autonomy, bringing school knowledge closer to concrete practices.

3.2 C2 – TDICS AS A GAMIFICATION, INTERACTION AND ENGAGEMENT STRATEGY

Category C2 comprises studies that attribute to DICTs a predominantly motivational and interactive function, associated with student engagement, participation in collective activities and formative assessment. This approach is supported by the historical-cultural theory of Vygotsky (1998), when he emphasizes that learning takes place in social interaction mediated

by signs, and also in Moran (2007), who defends dynamic and flexible pedagogical practices. Tools like Kahoot! they promote collective participation and immediate feedback, resignifying the relationship of EJA students with mathematics and strengthening student protagonism.

3.3 C3 – TDICS FOR CONTEXTUALIZATION OF MATHEMATICS IN THE DAILY LIFE OF EJA

Category C3 groups the studies in which DICTs are used as a bridge between mathematical knowledge and the social, professional and daily reality of EJA students. This perspective dialogues directly with Freire's (1997; 2002) critical pedagogy, by valuing the students' previous knowledge and promoting a critical reading of reality. It is also close to the reflections of Maietto (2025), who defends the use of technologies in critical and inclusive proposals. In this sense, DICTs favor contextualized and socially relevant learning, allowing students to relate mathematics to their work practices, finances, and the organization of daily life.

3.4 C4 – LIMITATIONS AND CHALLENGES IN THE USE OF TICS IN EJA

Unlike the previous categories, C4 does not refer to a specific pedagogical function, but to the conditions for the implementation of DICTs in the context of EJA. This category emerges in a transversal way in the corpus, evidencing structural, pedagogical and formative challenges. The reflections of Kenski (2012) and Fiuza (2015) help to understand such limits, by highlighting that educational technology is not neutral and requires new pedagogical postures and adequate conditions of use. Issues such as precarious infrastructure, restriction on the use of smartphones in the classroom and the need for teacher training reveal that the potential of DICTs is only realized when there is pedagogical intentionality and policies that ensure digital inclusion.

Table 2 summarizes the authors analyzed and the analytical categories to which their work was associated.

Table 2

Synthesis of the analyzed corpus and analytical categorization

Author(s) / Year	Type of study	Background	TDIC(s)	Mathematical content	Category(s)
Bohrer & Tinti (2021)	Article Scientific	EJA	GeoGebra	Function Quadratic	C1, C4
Silva (2022)	Article Scientific	EJA	PhET	Area and Perimeter	C1, C3
Olive (2023)	Article Scientific	EJA	Kahoot	Evaluation Mathematics	C2, C4
Araújo (2024)	Article	EJA	Geogebra	Geometry	C1, C3

	Scientific			flat	
Santiago (2025)	Article Scientific	EJA	Reality Increased	Geometry space	C1, C4
Monteiro & De Martini (2025)	Experience report	EJA	Kahoot	Probability	C2, C3

Source: Authors (2025)

From the analysis organized by the analytical categories and in dialogue with the theoretical references, didactic activities adapted with the use of DICTs were elaborated, directed to the teaching of mathematics in EJA – High School. It is noteworthy that, as this is a bibliographic and documentary research, the results do not allow empirical generalizations about the application of DICTs in specific school contexts. Therefore, the need for future empirical investigations, such as case studies or action research, which deepen the analysis of the impact of these practices on the mathematical learning of EJA students, is indicated.

3.5 DIDACTIC ACTIVITIES ADAPTED WITH TDICS IN THE TEACHING OF MATHEMATICS IN EJA

The construction of these activities is based on the understanding that EJA has its own specificities, such as the heterogeneity of the classes, the interrupted school trajectories, the conceptual gaps accumulated throughout the training path and the need to value the knowledge built in the social and professional daily life of the students. In this context, DICTs are understood not only as technical tools, but as cultural artifacts that mediate new ways of thinking, teaching and learning mathematics.

The process of preparing the proposals followed stages articulated between theory and practice. First, the categories identified in the research corpus (conceptual visualization, gamification, contextualization and challenges) were analyzed, in order to understand how different digital resources can contribute to the teaching of mathematics in EJA. Next, we sought to dialogue with the theoretical references: the valorization of previous knowledge and the critical reading of reality, according to Freire (1997; 2002); the importance of social interaction and teacher mediation, according to Vygotsky (1998); and the potential of technologies to personalize and streamline learning, as advocated by Valente (2018), Kenski (2012) and Moran (2007).

From this dialogue, criteria were defined for the construction of the activities: pertinence to the EJA context, integration of DICTs as mediators, pedagogical intentionality, appreciation of student autonomy and practical feasibility in the face of the real conditions of the schools.

Activity 01: Percentage and financial planning with the use of Kahoot

Mathematical content: Percentage, calculation of discounts and analysis of price variations.

Digital tool: *Kahoot*

Category(s): C2 (gamification and engagement), C3 (contextualization)

3.5.1 Objectives of the activity

- Understand the concept of percentage from real everyday situations;
- Develop mathematical reasoning applied to financial planning and organization;
- To promote critical reflection on consumption practices and financial decision-making.
- Stimulate student participation, engagement, and protagonism through gamification.

3.5.2 Description of the activity

The activity consists of the elaboration of an interactive quiz on the Kahoot platform, structured from problem situations related to the daily financial planning of EJA students. The questions involve contexts such as discounts on purchases, commercial promotions, price comparison, salary adjustments and organization of monthly expenses, favoring the articulation between the mathematical content and the social reality of the students.

The problem situations are presented in accessible and contextualized language. For example:

In this case, the students calculate the final value of the product (R\$ 900.00) and discuss whether or not the purchase compromises the monthly budget. In addition to the mathematical calculation, they are encouraged to reflect on the relevance of the financial decision, expanding the formative meaning of the activity. The teacher can propose variations, such as different budget amounts or fixed expenses (rent, food, transportation), stimulating critical analysis and conscious decision-making.

The application can take place individually or in groups, using the students' own mobile devices or with the projection of the questions in the classroom, enabling collective participation, the exchange of resolution strategies and the socialization of mathematical and financial reasoning built throughout the activity.

3.5.3 Critical analysis of the proposed activity

The activity highlights the potential of DICTs to integrate the teaching of Mathematics with financial planning, a central aspect in the training of young people and adults. The pedagogical analysis of the activity shows that the use of Kahoot contributes to making the

learning process more dynamic and motivating, a relevant aspect in EJA, where many students have experiences of school failure in mathematics. Oliveira (2023) highlights that the platform expands participation and provides immediate feedback, while Monteiro & De Martini (2025) reinforce its potential to engage students in financial mathematics content.

From a conceptual point of view, the activity favors meaningful learning, as defended by Ausubel (2003), by relating mathematical concepts to real consumption practices, financial organization and decision-making. In addition, it dialogues with Critical Mathematics Education, by stimulating reflection on financial choices and their impacts on daily life, as proposed by Skovsmose (2001).

However, the activity also has limitations, especially with regard to the dependence on mobile devices and internet access, which may restrict its application in contexts marked by precarious technological infrastructure, as pointed out in category C4. In addition, the playful character of the platform requires careful pedagogical mediation, so that the competitive dynamics do not override the conceptual reflection. In this sense, the role of the teacher is central, by promoting moments of collective discussion, analysis of errors and problematization of results, ensuring that technology is used in a critical, reflective and contextualized way.

Although the contents covered in this activity can be worked on through traditional methodologies, such as the use of the whiteboard in the classroom, the use of technology increases engagement, favors immediate feedback, reduces mathematical anxiety, and enhances the contextualization of financial planning, aspects that are particularly relevant in the context of EJA (Moran; Bacich, 2018; Borba; Silva; Gadanidis, 2016).

Activity 02: Spatial geometry using the AR Solids app **Mathematical content:** Volume and area of geometric solids **Digital tool:** AR Solids – Augmented Reality

Category(s): C1 (visualization and conceptual construction), C3 (contextualization)

3.5.4 Objectives of the activity

- Understand concepts of area and volume of geometric solids through augmented reality visualization;
- Relate spatial geometry to real everyday situations (reservoirs, boxes, buildings);
- Stimulate the protagonism of students and collaborative work;
- Develop digital skills applied to the teaching of mathematics.

3.5.5 Description of the activity

The activity consists of using the AR Solids application to view and manipulate three-dimensional models of geometric solids in augmented reality. Students, using their smartphones, can project the solids on the classroom table and interact with them, observing dimensions, faces, vertices and edges.

The professor proposes contextualized situations, such as: "A water reservoir has a cylindrical shape with a radius of 2 meters and a height of 3 meters. What is the volume of this reservoir m³". Students, by manipulating the cylinder in the application, can better understand its dimensions and relate the mathematical formula to the visualized object.

The activity can be carried out in groups, stimulating collaboration. Each group chooses a solid, explores its characteristics in the application, and solves practical problems involving area and volume calculation. At the end, the groups share their findings with the class, promoting the socialization of mathematical reasoning.

3.5.6 Critical analysis of the proposed activity

The use of augmented reality (AR) in the teaching of Geometry favors three-dimensional visualization and conceptual construction, an aspect highlighted by Santiago (2025), by highlighting the potential of this technology to overcome barriers related to spatial abstraction and expand the engagement of students in Youth and Adult Education. This contribution dialogues with the discussions of Borba, Silva and Gadanidis (2016), who argue that digital environments expand the forms of mathematical representation and transform the relationship of students with knowledge, favoring processes of experimentation and visual exploration.

By shifting the teaching of geometry to practical situations, such as the calculation of reservoir volumes or the analysis of everyday objects, the activity reinforces the contextualization of Mathematics (C3), bringing mathematical concepts closer to the social and professional experiences of EJA students. This perspective is supported by Critical Mathematics Education, as proposed by Skovsmose (2008), when understanding Mathematics as an instrument for reading reality and making decisions in concrete contexts.

Kenski (2012) points out that emerging technologies, such as augmented reality, can increase student interaction and involvement, as long as they are integrated with clear didactic objectives and mediated intentionally. In this sense, AR should not be understood only as a visual resource, but as a tool for problematizing and constructing mathematical meanings.

However, the activity also has important limitations (C4). Its implementation depends on access to compatible mobile devices and an adequate technological infrastructure, which can

restrict its application in contexts marked by the digital divide. In addition, as Santiago (2025) warns, the absence of critical pedagogical mediation can lead students to a merely visual exploration, disconnected from the necessary mathematical formalization. Thus, the role of the teacher becomes central, as it guides the articulation between visual observations, mathematical calculations and concrete situations, ensuring that technology fulfills a critical, reflexive and socially contextualized pedagogical function, and not just an illustrative one.

Activity 03: Exploration of polygons and calculation of areas with GeoGebra

Mathematical content: Area and perimeter of plane figures

Digital tool: GeoGebra (2D version)

Category(s): C1 (visualization), C3 (contextualization)

3.5.7 Objectives of the activity

- Understand concepts of area and perimeter of plane figures;
- Relate plane geometry to practical everyday situations;
- Develop digital skills applied to the teaching of mathematics;
- Stimulate protagonism and collaborative work among students.

3.5.8 Description of the activity

The activity consists of using GeoGebra to build flat geometric figures and calculate their areas and perimeters. Students, in pairs or groups, draw triangles, squares, rectangles and circles in the app, adjusting measurements of sides and radii.

The teacher proposes contextualized situations, such as: "A square has a square shape with 20 meters on a side. What is its area and perimeter?" Students build the figure in GeoGebra, enter the measurements and verify the calculations.

Then, each group chooses a different picture and creates practical problems related to everyday life, such as calculating the area of a plot of land, the perimeter of a fence or the area of a round table. The results are socialized with the class, promoting the exchange of reasoning and resolution strategies.

3.5.9 Critical analysis of the proposed activity

The use of GeoGebra in the exploration of polygons and in the calculation of areas and perimeters favors the dynamic visualization of geometric objects, an aspect widely discussed in the literature of Mathematics Education. Bohrer and Tinti (2021) show that the direct

manipulation of geometric figures in digital environments contributes to overcoming recurrent abstraction difficulties among Youth and Adult Education students, by enabling the articulation between graphic representation, symbolic language, and conceptual interpretation. This characteristic reinforces the C1 category, by allowing students to explore geometric properties in an active and investigative way.

This perspective is supported by the contributions of Borba, Silva and Gadanidis (2016), who argue that digital environments expand the forms of production of mathematical knowledge, favoring processes of experimentation, conjecture and validation. In the case of EJA, such environments play an even more relevant role, as they allow students to reconstruct mathematical concepts from the interaction with visual and manipulable representations, reducing the exclusive dependence on abstract formulas.

From a pedagogical point of view, the activity shifts the teaching of plane geometry from mechanical and decontextualized practices to real everyday situations, such as calculating the area of land, squares or objects of daily use. This approach reinforces the contextualization of Mathematics (C3), a central principle of EJA, by valuing the social and professional experiences of students. Araújo (2024) highlights that the intentional use of GeoGebra in EJA favors the formation of geometric concepts when associated with contextualized problems, in which the student understands the social function of mathematical knowledge.

This articulation between visualization and context also dialogues with Critical Mathematics Education, proposed by Skovsmose (2008), by understanding Mathematics as an instrument to interpret and act in reality. By solving problems related to physical spaces and organization of the environment, students begin to perceive geometry as a tool for practical decision-making, expanding the social sense of learning.

However, the activity also has limitations (C4): it requires access to computers or cell phones with the application, which may be restricted in some EJA contexts, in addition to demanding digital literacy from students. It is necessary for the teacher to carry out careful mediation, ensuring that students do not limit themselves to observing the figures, but understand the mathematical concepts involved and are able to apply them in real situations. Thus, the role of the teacher is central to guiding research, promoting conceptual reflection, and ensuring that students understand not only the visual representation of the figures, but the underlying mathematical concepts and their applications in real-world situations.

Activity 04: Simulation of financing and investments with HP12C Mobile **Mathematical content:** Simple and compound interest, present value and future value **Digital tool:** HP12C

Mobile (financial calculator in digital version) **Category(s):** C3 (contextualization), C4 (limitations)

3.5.10 Objectives of the activity

- Understand concepts of simple and compound interest, present value and future value;
- Relate financial mathematics to personal and professional decisions;
- Develop autonomy in the use of digital applications applied to mathematics;
- Stimulate critical reflection on consumption, credit and financial planning.

3.5.11 Description of the activity

The activity consists of using the HP12C Mobile application to simulate real financing and investment situations. Students, in groups, receive contextualized problems, such as:

- "A loan of R\$ 1,000.00 will be paid in 12 installments with interest of 2% per month. What will be the total amount paid?"
- "An investment of R\$ 500.00 applied to compound interest of 1.5% per month for 24 months will have what future value?"

Students enter the data into the app (present value, interest rate, number of periods) and check the results. Then, they discuss the practical implications of these operations, relating them to everyday situations, such as installment purchases, bank loans or savings.

The activity can be carried out in the classroom with smartphones or designed by the teacher, allowing everyone to follow the calculations. After each simulation, the teacher conducts a collective discussion about the results and encourages students to reflect on the advantages and disadvantages of each financial operation.

3.5.12 Critical analysis of the proposed activity

The use of HP12C Mobile in the teaching of financial mathematics makes it possible to bring concepts such as simple and compound interest, present value and future value closer to the daily reality of EJA students, allowing the simulation of concrete credit, financing and investment situations. This approach reinforces the contextualization of Mathematics (C3), by shifting teaching from abstract exercises to real problems related to consumption, financial organization, and personal and professional decision-making. Araújo (2024) highlights that the intentional use of digital technologies favors the formation of mathematical concepts when articulated with meaningful contexts for EJA students.

This activity dialogues with Skovsmose (2008), when he understands Mathematics as a tool to interpret and intervene in social reality. By simulating financing and investments, students are led to reflect on the economic consequences of financial decisions, developing a more critical posture in the face of consumption, indebtedness and financial planning practices. This dimension is particularly relevant in EJA, whose students often deal with complex financial situations in their daily lives.

From a didactic point of view, the use of digital financial calculators can contribute to reducing the operational load of calculations, allowing the focus of learning to fall on the interpretation of the results and the analysis of the conditions involved in each operation. Borba, Silva and Gadanidis (2016) argue that digital environments can enhance mathematical learning when they shift attention from mechanical procedure to conceptual understanding and informed decision-making.

However, the activity also has relevant limitations (C4). The use of the HP12C Mobile presupposes access to compatible smartphones and a minimum level of digital literacy. In addition, as Kenski (2012) warns, the uncritical use of technologies can reduce teaching to an automation of procedures, if there is no adequate pedagogical mediation. In this sense, it is up to the teacher to promote collective discussions that problematize the results obtained, ensuring that students understand the mathematical concepts underlying financial operations and their social and economic implications.

Thus, the teaching role assumes centrality in the conduction of the activity, by articulating the use of technology with critical reflection, ensuring that the HP12C Mobile fulfills a pedagogical function that goes beyond the execution of calculations, contributing to the formation of more autonomous and conscious subjects in relation to financial decisions.

Activity 05: Fractions in everyday life with the PhET Fractions simulator

Mathematical content: Equivalent fractions, addition and multiplication of fractions

Digital tool: PhET Fractions (interactive simulator)

Category(s): C1 (visualization), C3 (contextualization), C4 (limitations)

3.5.13 Objectives of the activity

- Favor the understanding of the concepts of equivalent fractions and basic operations with fractions;
- Relate the study of fractions to practical situations of the daily life of EJA students;

- Promote student autonomy and protagonism in the use of digital resources applied to Mathematics;
- Stimulate multimodal learning, articulating visual, practical and interactive aspects.

3.5.14 Description of the activity

The activity consists of the use of the PhET Fractions simulator, which enables the visual and interactive representation of fractions through familiar objects, such as pizzas, fractional bars and containers, favoring the understanding of the concepts of equivalence, addition and multiplication of fractions.

Initially, the teacher presents a contextualized problem-situation, such as:

*"A recipe uses $\frac{2}{3}$ of a glass of milk. If the recipe is prepared in double quantity, what will be the total amount of milk needed?"*element. The students represent the fraction in the simulator, double the quantity and visually and numerically verify the result obtained, articulating graphic and symbolic representation.

Then, organized in groups, students receive contextualized challenges related to daily life, such as the division of household expenses, the apportionment of electricity bills, the distribution of construction materials or the calculation of fractions of the salary. The situations are solved with the support of the simulator and later socialized with the class, promoting the exchange of strategies, mathematical argumentation and the collective construction of knowledge.

3.5.15 Critical analysis of the proposed activity

Silva (2022) points out that the use of digital simulators favors the autonomous exploration of mathematical concepts, contributing to meaningful learning by articulating multiple forms of representation. Such potential reinforces the C1 category, as it allows students to understand fractions not only as abstract symbols, but as visually perceptible quantitative relations.

In addition, studies such as that of Lopes Júnior (2017) show that students in Youth and Adult Education face conceptual difficulties in the study of fractions, often associated with the lack of contextualization of activities and the predominance of abstract symbolic representations. In this sense, Borba, Silva and Gadanidis (2016) state that digital environments expand the possibilities of producing mathematical meanings through experimentation, manipulation and validation of conjectures, configuring themselves as relevant strategies for overcoming these difficulties.

From a didactic point of view, the activity shifts the teaching of fractions of mechanical and decontextualized exercises to real everyday situations, such as cooking, dividing expenses or organizing the family budget, reinforcing the contextualization of Mathematics (C3) and dialoguing with Skovsmose (2008), by understanding Mathematics as an instrument to interpret and act on social reality, favoring conscious decision-making.

In addition, the articulation between students' previous experiences and new mathematical concepts is close to the concept of meaningful learning, defended by Ausubel (2003), by enabling new knowledge to be anchored in existing cognitive structures, giving greater meaning to the learning process.

However, the activity also has important limitations (C4). Its implementation depends on access to the internet and compatible digital devices. Furthermore, as Kenski (2012) and Silva (2022) warn, the use of digital simulators requires intentional pedagogical mediation, so that students are not limited to the visual manipulation of objects, but understand the underlying mathematical concepts and are able to transfer them to real situations. In this sense, the role of the teacher is central to guide research, promote conceptual reflection and ensure that technology fulfills a critical, reflective and socially contextualized pedagogical function.

In summary, the analysis of the five proposed activities shows that the use of DICTs in EJA should be understood as a structuring pedagogical component, and not just as an accessory resource. The analytical categories C1 to C4 allow the identification of different functions of DICTs in the teaching of Mathematics in EJA.

Within the scope of the C1 category, tools such as GeoGebra, PhET Fractions and augmented reality expand the visualization of abstract mathematical concepts, favoring conceptual construction through multiple representations. Category C2 shows that gamification strategies, such as the use of Kahoot, contribute to the engagement and active participation of students, as long as they are articulated with clear pedagogical objectives. Category C3, on the other hand, reveals the potential of DICTs for the contextualization of Mathematics, especially in situations related to financial planning and the resolution of everyday problems, giving greater social meaning to learning.

However, category C4 explains important limitations, such as dependence on technological infrastructure, unequal access to technologies, and the need for digital literacy. These challenges reinforce that the use of DICTs requires intentional pedagogical mediation, as well as investments in digital inclusion policies and teacher training.

4 RESULTS AND DISCUSSIONS

The analysis of the bibliographic and documentary corpus allowed us to identify that the use of Digital Information and Communication Technologies (DICTs) in the teaching of Mathematics in Youth and Adult Education (EJA) has been developed progressively and associated, above all, with the need to make mathematical content more accessible, contextualized and meaningful for students. The studies analyzed show that DICTs do not only act as technical support tools, but as mediators of new forms of interaction, visualization and construction of mathematical knowledge, especially in contexts marked by interrupted school trajectories and historical learning difficulties.

The results indicate that DICTs contribute significantly to the visualization and understanding of abstract mathematical concepts, a recurrent aspect in the analytical category C1. Tools such as GeoGebra, PhET Fractions and Augmented Reality applications have demonstrated potential to favor conceptual construction through the dynamic manipulation of figures, graphs and three-dimensional representations. In this context, the studies by Bohrer and Tinti (2021), Silva (2022) and Santiago (2025) point out that visual exploration enables EJA students to understand concepts traditionally considered complex, such as quadratic functions, spatial geometry and equivalent fractions. Such results dialogue with Borba, Silva and Gadanidis (2016), when they argue that digital environments expand the forms of production of mathematical knowledge through experimentation and investigation.

In addition to conceptual visualization, the results demonstrate that DICTs favor student engagement and active participation in Mathematics classes, especially when associated with gamification and collective interaction, as identified in category C2. The use of Kahoot!, for example, showed potential to increase student participation, reduce math anxiety, and provide immediate feedback during activities. The works of Oliveira (2023) and Monteiro and De Martini (2025) reinforce that gamified strategies can contribute to resignifying the relationship of EJA students with Mathematics, making the learning process more dynamic and motivating. From the perspective of Vygotsky (1998), these results show the importance of social interaction and pedagogical mediation in the construction of knowledge, especially in collaborative contexts mediated by digital technologies.

Another relevant aspect identified in the results refers to the contextualization of Mathematics in the daily life of EJA students, a predominant characteristic in category C3. The activities involving financial planning, interest calculations, geometry applied to the urban space and division of household expenses showed that DICTs can bring mathematical content closer to the concrete experiences of the students. In this sense, the analyzed proposals reinforce the

understanding that mathematical learning becomes more meaningful when articulated with the social, professional and financial practices experienced by students. This perspective is close to Freire's (1997; 2002) critical pedagogy, when he argues that the educational process must start from the concrete reality of the subjects and promote a critical reading of the world.

The results also showed that the use of DICTs favors the development of student autonomy and protagonism. In several activities analyzed, students took an active role in problem solving, in the exploration of simulators and in the collective construction of mathematical strategies. This characteristic reinforces Moran's (2007) understanding that digital technologies can contribute to more flexible, dynamic and student-centered pedagogical practices. In EJA, this aspect takes on even greater relevance, considering that many students return to school seeking intellectual autonomy, professional qualification and strengthening of their social participation.

However, the results also reveal significant limitations related to the implementation of DICTs in the context of EJA, as evidenced in category C4. Among the main challenges identified are the precariousness of the technological infrastructure, the limitation of access to the internet, the insufficiency of digital equipment and the gaps in teacher training for the pedagogical use of technologies. Such difficulties were recurrent in the studies analyzed, especially in the studies that used mobile applications and digital platforms dependent on constant connection. These findings corroborate the reflections of Kenski (2012) and Fiuza (2015), when they emphasize that the pedagogical potential of technologies depends directly on the material, institutional and formative conditions that sustain their use.

Another point discussed in the studies refers to the need for critical pedagogical mediation in the use of DICTs. The results indicate that the simple insertion of digital technologies does not guarantee, by itself, meaningful learning or transformation of pedagogical practices. In several situations, the authors warn that the instrumental or decontextualized use of technologies can reproduce traditional and transmissive practices, limiting the emancipatory potential of DICTs. Thus, the role of the teacher emerges as a central element in the process of technological integration, being responsible for problematizing the contents, guiding interactions and articulating digital resources to the pedagogical objectives of EJA.

The discussion of the results shows, therefore, that DICTs have relevant potential to transform the teaching of Mathematics in EJA, especially by favoring conceptual visualization, contextualization of contents, student engagement and student protagonism. However, the benefits observed depend on structural and pedagogical factors that go beyond simple access to digital tools. The effectiveness of these technologies is directly related to teacher training,

infrastructure conditions, and the construction of critical, inclusive, and contextualized pedagogical proposals.

Finally, the results allow us to understand that the integration of DICTs to the teaching of Mathematics in EJA is a promising path for the construction of more democratic and socially significant pedagogical practices. However, for this potential to materialize, it is necessary to expand digital inclusion policies, strengthen the continuing education of teachers and ensure adequate material conditions for the pedagogical use of technologies in public schools. Thus, the findings of this research reinforce that DICTs, when articulated with a critical and emancipatory perspective of education, can contribute significantly to overcoming the historical difficulties of EJA and to the construction of more participatory, contextualized and transformative learning processes.

5 CONCLUSION

The general objective of this study was to investigate how Digital Information and Communication Technologies (DICTs) have been used in the adaptation of mathematical activities for EJA – High School students, analyzing theoretical productions and documents related to the theme. In an articulated way, it was also sought to relate the DICTs with mathematical contents of EJA, to propose contextualized and meaningful activities, to evaluate their pedagogical potentials and limitations and to contribute to an educational product aimed at teachers.

The bibliographic and documentary research, organized into analytical categories, allowed the systematization of theoretical and didactic evidence that demonstrates the role of DICTs in the promotion of more meaningful, inclusive and contextualized pedagogical practices. The analysis of the proposed activities indicates that, when articulated with critical and intentionally planned pedagogical proposals, the DICTs contribute to broaden the visualization of abstract mathematical concepts, favor student engagement and protagonism, and bring Mathematics closer to the daily experiences of EJA students. Resources such as simulators, applications, gamification platforms and mobile devices proved to be relevant to resignify the teaching of Mathematics, especially when dialoguing with school trajectories marked by interruptions and conceptual difficulties, in line with the references of Freire, Vygotsky and D'Ambrosio.

It was also evidenced that the use of DICTs in EJA still faces significant structural and training challenges, such as the precariousness of the technological infrastructure, inequalities in digital access and the insufficiency of specific teacher training for the pedagogical use of

these technologies. These limitations confirm the reflections of Kenski and Fiuza, when they emphasize that educational technology is not neutral and requires adequate conditions of implementation and pedagogical intentionality.

The proposed activities seek to contribute to the expansion of the repertoire of didactic practices aimed at EJA, by presenting concrete examples of the use of DICTs in the teaching of Mathematics, without, however, intending to exhaust the possibilities of research on the subject. In this sense, the research dialogues with the literature by defending a critical, mediated and contextualized approach to digital technologies, offering theoretical-pedagogical subsidies for teachers and researchers interested in the construction of more inclusive, situated and socially significant educational practices.

Regarding the limitations of the research, the exclusively bibliographic and documentary nature of the study is highlighted, which, although adequate to the proposed objective, does not allow for direct observation of the implementation of DICTs in real school contexts. Thus, the results reflect trends and theoretical and didactic evidence present in the literature, not contemplating the empirical analysis of teaching practices and students' learning.

In view of this, it is suggested that future research move towards empirical investigations, such as case studies, action research or pedagogical interventions in EJA contexts, in order to analyze the concrete application of DICTs in the teaching of Mathematics. It is also recommended the development of studies aimed at teacher training for the critical use of technologies, the evaluation of the impact of these practices on student learning and the analysis of public policies for digital inclusion in EJA, expanding and deepening the discussions initiated in this research.

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