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Educação Inclusiva: fundamentos, políticas e práticas com ênfase em tecnologias digitais e metodologias ativas

Inclusive Education: Foundations, Policies, and Practices with an Emphasis on Digital Technologies and Active Methodologies

Educación inclusiva: fundamentos, políticas y prácticas con énfasis en tecnologías digitales y metodologías activas

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Resumo

Este estudo analisa as contribuições e os limites das Tecnologias Digitais de Informação e Comunicação (TDIC) e das metodologias ativas, especialmente a gamificação e a Aprendizagem Baseada em Projetos (ABP), para a educação inclusiva. Busca compreender em que condições essas estratégias podem ampliar o acesso, a participação e as possibilidades de aprendizagem em diálogo com a Base Nacional Comum Curricular (BNCC), a Lei de Diretrizes e Bases da Educação Nacional (LDB) e a Lei Brasileira de Inclusão (LBI). Trata-se de pesquisa bibliográfica e documental, qualitativa, desenvolvida por revisão narrativa. Da leitura interpretativa das fontes emergiram três eixos: TDIC e acessibilidade; metodologias ativas e colaboração; e normas, formação docente e condições institucionais. A síntese distingue proposições teóricas, achados de investigações e orientações normativas e sistematiza critérios de planejamento inclusivo à luz do Desenho Universal para a Aprendizagem. Como contribuição aplicada, apresenta um checklist orientador, ainda não validado empiricamente. A literatura aponta possibilidades de diversificação das atividades e de avaliação, condicionadas à acessibilidade, à mediação docente e às condições materiais. Conclui-se que as estratégias analisadas não asseguram inclusão automaticamente; a revisão não mensura efeitos nem permite inferências causais.

Palavras-chave: Tecnologias Digitais de Informação e Comunicação (TDIC); Educação Inclusiva; Metodologias Ativas; Gamificação; Aprendizagem Baseada em Projetos (ABP).

Abstract

This article examines the contributions and limitations of digital information and communication technologies (DICT), gamification, and project-based learning (PBL) to inclusive education in relation to Brazil's National Common Curricular Base (BNCC), the Law of Guidelines and Bases of National Education (LDB), and the Brazilian Inclusion Law (LBI). A qualitative bibliographic and documentary study was conducted as a narrative review. Three analytical themes emerged during the interpretive reading of the sources: digital technologies and accessibility; active methodologies and collaboration; and legal frameworks, teacher education, and institutional conditions. The synthesis distinguishes theoretical propositions, findings from empirical studies, and normative guidance. Drawing on Universal Design for Learning principles, it identifies criteria for accessible instructional planning and presents a guiding checklist that has not undergone empirical validation. The literature suggests opportunities to diversify participation and assessment, provided that accessibility, pedagogical

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mediation, and material conditions are addressed. Digital strategies do not ensure inclusion by themselves; this narrative review does not measure intervention effects or establish causality.

Keywords: Digital Information and Communication Technologies (DICT); Inclusive Education; Active Methodologies; Gamification; Project-Based Learning (PBL).

Resumen

Este artículo analiza las contribuciones y los límites de las tecnologías digitales de la información y la comunicación (TDIC), la gamificación y el aprendizaje basado en proyectos (ABP) para la educación inclusiva, en diálogo con la Base Nacional Común Curricular de Brasil (BNCC), la Ley de Directrices y Bases de la Educación Nacional (LDB) y la Ley Brasileña de Inclusión (LBI). Se realizó una investigación bibliográfica y documental de enfoque cualitativo, mediante una revisión narrativa. De la lectura interpretativa de las fuentes surgieron tres ejes: tecnologías digitales y accesibilidad; metodologías activas y colaboración; y normas, formación docente y condiciones institucionales. La síntesis distingue proposiciones teóricas, hallazgos de estudios empíricos y orientaciones normativas. A partir de los principios del Diseño Universal para el Aprendizaje, sistematiza criterios de planificación accesible y propone una lista de verificación orientativa, aún no validada empíricamente. La literatura señala posibilidades de diversificar la participación y la evaluación, condicionadas por la accesibilidad, la mediación pedagógica y los recursos disponibles. Estas estrategias no garantizan por sí mismas la inclusión; la revisión no mide efectos ni establece relaciones causales.

Palabras clave: Tecnologías Digitales de Información y Comunicación (TDIC); Educación Inclusiva; Metodologías Activas; Gamificación; Aprendizaje Basado en Proyectos (ABP).

1. Introduction

Inclusive education requires schools to recognize differences among students and establish conditions for access, participation, and learning. Within this debate, the pedagogical use of Digital Information and Communication Technologies (DICT) and active methodologies, such as gamification and Project-Based Learning (PBL), has attracted interest because it offers different forms of interaction, production, and communication. This bibliographic and documentary study revisits this discussion by examining both the possibilities and the limitations of these approaches.

In Brazil, the right to inclusive education is supported by the 1988 Federal Constitution, the Law of Guidelines and Bases of National Education (Law No. 9.394/1996), and the Brazilian Inclusion Law for Persons with Disabilities (Law No. 13.146/2015). However, the existence of legal guarantees does not, in itself, remove the curricular, communicational, technological, and attitudinal barriers present in everyday school life. Tools such as screen readers, multimodal resources, and accessible virtual environments can help address some of these barriers when aligned with learning objectives and students' actual needs.

Nevertheless, for digital technologies to support inclusive processes, conditions of access, continuing teacher education, and flexibility in pedagogical strategies must be ensured. The mere presence of equipment or platforms does not necessarily translate into the participation of all students.

Inclusive education is not limited to enrollment or the physical presence of students with disabilities: it involves reorganizing teaching to expand learning opportunities. From this perspective, methodologies such as PBL and gamification may foster

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inquiry, collaborative work, and student agency, provided that their objectives, rules, pacing, and forms of participation are accessible. The collection edited by Bacich and Moran discusses active methodologies as opportunities for effective student participation; their application in inclusive contexts, however, requires planning and teacher guidance.

Digital resources that support reading, writing, communication, and the organization of activities can provide alternative pathways to curricular access. Their benefits, however, vary according to interface accessibility, device availability, connectivity, and pedagogical mediation. It is therefore important to examine together the potential benefits and the risks of exclusion associated with the use of DICT and active methodologies.

Against this background, the following research question is posed: under what conditions can the integration of DICT with gamification and Project-Based Learning contribute to inclusive and collaborative pedagogical practices, considering regulatory frameworks and existing barriers in schools? This question is relevant because, although these strategies are frequently presented as innovative, technological innovation does not eliminate the need for accessibility, inclusive assessment, or alternatives for students facing access limitations.

The general objective is to analyze, in light of the literature and regulatory frameworks, the contributions and limitations of the articulation between DICT, gamification, and PBL in inclusive education. Specifically, the study seeks to: discuss principles of inclusive education and Universal Design for Learning (UDL); identify digital resources and strategies aimed at accessibility; examine opportunities and risks associated with participation and collaboration in gamification and PBL activities; relate these strategies to the BNCC, LDB, and LBI; discuss challenges concerning teacher education and infrastructure; and systematize a guiding checklist for accessible instructional planning. The aim is not to measure the effectiveness of interventions but to bring together critical elements to support the analysis and planning of practices.

2. Theoretical Framework

2.1 Inclusive Education and Contemporary Challenges

School inclusion represents a commitment to the right to education, nondiscrimination, and recognition of differences. The Salamanca Statement (UNESCO) reaffirms the need for schools to welcome students with diverse characteristics and circumstances. In Brazil, the realization of this right still faces structural, pedagogical, and attitudinal barriers, requiring institutional policies and practices that promote participation rather than merely formal access to enrollment.

The incorporation of DICT also depends on educators' working conditions and professional preparation. In discussing digital technologies in basic education, Souza,

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Qualio, and Alencar point to the need for continuing education and professional participation in change processes. Moran likewise questions the rigidity of classroom models centered on content transmission. This does not mean placing responsibility for implementation difficulties on teachers alone: planning time, technical support, and infrastructure are equally relevant conditions.

In this context, Universal Design for Learning (UDL) offers principles for planning learning experiences that account for learner variability. CAST guidelines organize possibilities for engagement, representation, and action and expression, proposing that barriers in learning environments be anticipated and reduced. UDL should not be confused with an application or a specific technological strategy: it is an approach to planning that may draw on both digital and nondigital resources.

Implementing UDL requires more than isolated adjustments. It entails reviewing objectives, ways of presenting content, opportunities for participation, and assessment procedures, while maintaining meaningful educational expectations without requiring everyone to learn or demonstrate their knowledge in a single way. Inclusive planning therefore involves collaboration and reflection on the school context, rather than assuming that a tool will produce the same effects for different students.

DICT can expand forms of communication and access to information, whereas assistive technology comprises products, resources, and services designed to support the functioning and participation of persons with disabilities. This distinction is important: not all digital technology is assistive, and not all assistive resources are digital. Giroto, Poker, and Omote discuss the need to connect technologies with inclusive pedagogical practices and students' actual circumstances, avoiding the adoption of tools detached from educational objectives. The collection edited by Vieira and Cirino also includes chapters on different applications of educational and assistive technologies, whose conclusions must be interpreted according to the design of each contribution.

Among the methodologies that may expand participation, gamification incorporates game elements, such as challenges, goals, feedback, and forms of progression, into educational situations (Yanaze and Silva). In inclusive activities, these elements need to be adaptable, understandable, and accessible. Public rankings, mandatory speed, excessive sensory stimulation, or exclusively competitive rewards may, conversely, create barriers for some students.

Thus, an inclusive perspective brings together UDL principles, accessibility, digital resources, and active methodologies without equating innovation with the simple introduction of technology. The criterion for analysis should be students' actual opportunities for participation, expression, and learning, taking into account the diversity of their pathways and material circumstances.

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2.2 Digital Information and Communication Technologies (DICT) in Inclusive Education

DICT encompass digital tools and environments that enable information to be produced, accessed, and shared. In inclusive teaching, resources such as text-to-speech, captions, visual organization, and augmentative and alternative communication can reduce specific barriers. Their contribution, however, is not automatic: a virtual environment may have navigation flaws, require constant internet access, or offer only one way of completing a task, thereby creating obstacles for certain students (Silva et al.).

The identification of barriers should consider the activity and environment rather than serve as a prescription based on a student's diagnosis. Sensory barriers may include missing captions, inadequate contrast, or excessive stimuli; communication barriers may involve instructions available in only one mode of communication; motor barriers may involve the need to use inaccessible commands; cognitive barriers may involve poorly structured tasks or information overload; and socioeconomic barriers may involve a lack of equipment and connectivity. The same barrier may affect students for different reasons and require distinct pedagogical responses.

According to CAST guidance, UDL principles may inform resource selection but do not depend exclusively on digital technologies. Version 3.0 of its guidelines emphasizes reducing barriers associated with bias and exclusionary practices, reinforcing that accessibility requires decisions about materials, interactions, and assessment, rather than merely the availability of platforms (CAST).

Accordingly, combining DICT and UDL does not mean creating rigid pathways for supposed "learning styles." Instead, it means offering alternatives appropriate to the pedagogical objective, such as accessible texts, captioned audiovisual materials, written or oral responses, peer-mediated support, and nondigital options, while monitoring each student's progress.

2.3 Active Methodologies and the Role of DICT

Active methodologies, including PBL and gamification, shift part of the learning process toward situations involving inquiry, decision-making, and interaction. In inclusive education, they offer opportunities for differentiated participation, but also require attention to the roles assigned to students, the clarity of instructions, and the conditions for monitoring and assessment. Organizing groups or games is not enough: it is necessary to verify whether everyone has had genuine opportunities to contribute.

The collection edited by Bacich and Moran presents active methodologies as approaches centered on students' effective participation in shaping the learning process, through flexible and hybrid arrangements. In dialogue with the BNCC (Brasil, Base Nacional Comum Curricular: educação infantil e ensino fundamental; Base

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Nacional Comum Curricular: ensino médio), they support problem-solving and the development of competencies that encompass cognitive and socioemotional skills.

Gamification incorporates game elements into activities that are not necessarily complete games (Yanaze and Silva). Point systems, badges, missions, or feedback may help organize tasks, but they must serve clear pedagogical objectives. Its relationship to inclusion depends on the accessibility of resources and the selection of cooperative strategies, avoiding the assumption that high scores necessarily indicate effective learning.

Project-Based Learning (PBL) proposes that students investigate meaningful questions and produce responses or outputs over the course of a project. The collection edited by Bacich and Moran brings together discussions on the integration of active participation, inquiry, and collaboration. In inclusive contexts, PBL makes it possible to distribute diverse tasks—researching, organizing materials, documenting, presenting, and developing solutions—without assigning stereotyped roles based on diagnoses. The BNCC (Brasil, Base Nacional Comum Curricular: educação infantil e ensino fundamental; Base Nacional Comum Curricular: ensino médio) provides references for mobilizing knowledge, critical thinking, and communication; curricular alignment, however, must be demonstrated through the objectives and assessment criteria of each project.

From an assessment perspective, diversifying modes of response does not automatically mean lowering curricular objectives: the same learning outcome may be demonstrated through written, oral, visual, or multimodal records when those formats are appropriate to the intended objective. Previously established criteria, accessible rubrics, formative feedback, and records of individual progress make it possible to monitor what has been learned without confusing the ability to operate a tool with mastery of the knowledge being addressed.

When combined with active methodologies, DICT can expand options for access, documentation, and interaction, including reading supports, time-management tools, captions, and multimodal production. Selection should be guided by barriers actually identified, rather than automatic associations between a diagnosis and an application. An equivalent alternative must also be provided when connectivity is unavailable or the digital resource does not offer adequate accessibility.

2.4 Gamification and Accessible Instructional Planning

Gamification can organize learning pathways through challenges, feedback, and shared goals. In inclusive approaches, its purpose should go beyond competition and recognize both individual and collective contributions. Participation, however, may be impaired when an activity requires rapid responses, public exposure of mistakes, or constant comparison of performance. Transparent criteria and formative feedback are therefore more appropriate than a single reward system.

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Alternatives to publicly comparing performance include interdependent challenges, collective goals, monitoring each student's progress relative to their own starting point, and qualitative feedback. These are instructional design recommendations derived from the literature and UDL principles, not findings tested in this article. The choice between cooperation, individual exploration, and other arrangements should be guided by learning objectives and participants' circumstances.

UDL principles guide decisions such as presenting rules in text and audio, describing relevant images, ensuring accessible contrast and navigation, offering response options, and allowing flexible timing when necessary. In gamification, these possibilities should be linked to concrete challenges and observed barriers, without assuming that the same resource is suitable for all students (CAST).

Manjinski Junior and Manjinski discuss the integration of DICT, gamification, and projects as a possibility for pedagogical innovation. Their bibliographic review helps substantiate "learning by doing" proposals, but does not, on its own, justify claims of generalized effectiveness for students with disabilities. Planning requires specifying which obstacles are to be reduced, which learning outcomes will be observed, and how students with different circumstances will be able to participate.

A gamified lesson may be organized into three stages—concepts, exploration, and creation—with a mission, evidence of learning, and feedback for each stage. This is an example of pedagogical organization, not an intervention tested in this study. To ensure broad participation, teachers can offer different roles and means of expression, monitor access difficulties, and allow alternative ways to complete the same task.

Possible measures include a gamified-lesson agreement specifying objectives, rules, and criteria in advance; badges accompanied by textual descriptions; flexible time limits; and brief feedback throughout the activity. Another possibility is to combine individual reflection, paired discussion, and group sharing (Think–Pair–Share) with cooperative challenges. By reducing the centrality of leaderboards, this design may encourage participation without relying on competition among students.

To improve accessibility, it is recommended that a mode of interaction with fewer sensory stimuli, multimodal instructions, and options for oral, written, or visual documentation be made available. These measures are consistent with UDL (CAST), the right to inclusive education established by the LBI, and the resources and supports provided for in educational legislation (Brasil, Lei nº 9.394; Lei nº 13.146; Decreto nº 12.686; Decreto nº 12.773). However, improvements in motivation or performance cannot be attributed to these suggestions without a specific empirical assessment.

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2.5 Project-Based Learning (PBL) and the Use of Virtual Learning Environments

PBL mobilizes knowledge through problem investigation, hypothesis development, decision-making, and communication of results. By addressing issues related to students' experiences, it may foster connections among content, inquiry, and collective production, provided that teachers offer guidance and intended objectives are clear, as discussed in the collection edited by Bacich and Moran.

In inclusive education, project work allows roles and forms of contribution to be diversified. This flexibility, however, must be monitored to prevent students with disabilities or learning difficulties from being relegated to peripheral tasks. Participation must involve access to the knowledge being taught, opportunities for collaboration, and the ability to demonstrate learning.

Effective participation may be observed through qualitative dimensions linked to the project objective: access to content and instructions, opportunities to communicate questions and choices, involvement in group decisions, contributions to essential tasks, and demonstration of learning. Monitoring these dimensions requires negotiating and revisiting responsibilities throughout the process, enabling rotation of roles when appropriate while preserving individual contributions to the collective product. These indicators guide pedagogical observation; they do not constitute a standardized assessment scale.

Virtual Learning Environments (VLEs) can support the organization of materials, monitoring of stages, and communication among participants. However, using a VLE does not, in itself, guarantee universal access: compatibility with assistive technologies, ease of navigation, readability, file formats, and connectivity conditions must be verified.

Silva, Lückman, and Wilbert discuss the accessibility and usability of virtual environments for persons with specific educational needs. Accordingly, planning may include accessible documents, captions, audio description when appropriate, adequate contrast, and alternatives for students who use screen readers or keyboards. Cognitive and communication barriers must also be assessed, avoiding the assumption that a digital platform is inclusive merely because it allows remote access.

A distinction should be drawn between technical accessibility and pedagogical accessibility in Virtual Learning Environments. The former includes keyboard navigation, screen-reader compatibility, readable formats, contrast, and captions. The latter concerns the clarity of instructions, opportunities for interaction, support for completing tasks, appropriate timing, and assessment of learning. A technically accessible interface may host activities that are difficult to understand or exclude students from decision-making and opportunities to demonstrate their knowledge; both dimensions must therefore be examined together.

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The integration of PBL and VLEs therefore offers a possibility for collaborative work and pedagogical monitoring, contingent upon the accessibility of resources, the availability of technological means, and the provision of equivalent forms of participation when necessary.

2.6. Challenges and Future Perspectives

The use of DICT in inclusive education presents both opportunities and difficulties. Although digital tools can diversify formats and interactions, inequalities in access to devices, connectivity, and technical support may also aggravate existing barriers. Planning should consider the actual circumstances of schools and students, avoiding making digital participation an exclusionary requirement.

Implementation difficulties do not arise solely from individual teacher resistance. Infrastructure limitations, unstable connectivity, a lack of accessible resources, insufficient planning time, and a lack of institutional support restrict the adoption of more diversified approaches. Santos, Cazuza, and Aleixo discuss these challenges in relation to the integration of DICT into pedagogical practices.

In this context, continuing teacher education needs to integrate technical, pedagogical, and ethical dimensions: selecting resources according to learning objectives, recognizing barriers, offering alternatives, and assessing students' effective participation. Initial teacher education is also relevant, but professional development depends on institutional conditions for study, experimentation, collaboration, and monitoring.

In a qualitative investigation involving secondary school teachers, Soares and Porto highlight the relevance of examining initial and continuing education together in relation to the pedagogical use of digital technologies. Santos, Cazuza, and Aleixo also emphasize the need to incorporate DICT critically into teaching practice. Thus, professional education should not be reduced to operating applications, but should encompass mediation, accessibility, assessment, and the revision of pedagogical choices according to context.

Institutional responsibility includes ensuring time for collaborative planning, technical support, the availability and maintenance of accessible resources, the sharing of experiences, and monitoring of the adjustments made. School leadership teams and support professionals, within their respective roles, can collaborate in identifying barriers and revising proposals. Teacher education is therefore a continuous process linked to working conditions and curricular decisions, rather than an individual obligation limited to learning how to use applications.

Educational policies can contribute to this process by providing for infrastructure, pedagogical support, and teacher education. The debate needs to consider equipment maintenance, platform accessibility, and the availability of offline alternatives. Innovation should not be treated as a measure of value in itself, but as

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a possibility that must be assessed in terms of its consequences for learning and participation.

Thus, the challenges and possibilities of DICT and active methodologies should be examined together. Without access conditions, institutional support, and inclusive planning, resources intended to expand opportunities may also create new forms of exclusion.

3. Methodology

This study is characterized as bibliographic and documentary research with a qualitative approach and exploratory purpose, conducted through a narrative literature review. It seeks to discuss interpretively the contributions, barriers, and conditions of use of Digital Information and Communication Technologies (DICT), gamification, and Project-Based Learning (PBL) in inclusive education. The manuscript draws on academic publications and regulatory documents relevant to these topics. During its preparation, exploratory searches of SciELO, the CAPES Journals Portal, ERIC, DOAJ, and Google Scholar were indicated, focusing predominantly on publications from 2011 to 2025, while also considering earlier legal documents and references necessary for contextualization.

Texts were selected for discussion on the basis of their relevance to accessibility, active methodologies, and educational rights, as well as the relationship between the arguments presented and the school context. The sources included theoretical texts, literature reviews, empirical studies, and legal documents, whose different natures are taken into account in the interpretation. Because this manuscript does not contain sufficient records to reconstruct search dates, complete search strategies for each platform, numbers of records retrieved, duplicates, and exclusions, the research is not presented as a systematic or integrative review, nor is the set of sources consulted claimed to be exhaustive.

The reading and thematic organization of the bibliography were guided by terms related to “inclusive education,” “DICT,” “gamification,” “project-based learning,” “accessibility,” “UDL,” and “teacher education.” The presentation of results brings together examples of works actually cited in the text and their respective emphases, without attributing intervention data or outcomes to them that are not described in the publications. The summary table in the following section identifies references used in the argument; it does not constitute an inventory of every record found on the platforms.

The thematic organization was developed through exploratory reading of the literature and regulatory documents, rather than through predefined categories. During the interpretation of the sources, connections were identified among arguments about digital accessibility, active methodologies, and conditions for implementing inclusive practices. These convergences were compared and grouped into three themes of synthesis: (1) DICT, accessibility, and learning-support

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resources; (2) gamification, PBL, and collaborative participation; and (3) regulatory frameworks, teacher education, and implementation conditions. These themes supported a critical presentation of the sources' possibilities and limitations, without systematic coding, frequency counts, or any claim to exhaust the literature. The interpretation differentiated the scope of theoretical propositions, empirical study findings, and regulatory obligations or guidance.

The documentary analysis considered the BNCC, particularly general competencies 5 (digital culture) and 9 (empathy and cooperation); the LDB (Law No. 9.394/1996); the LBI (Law No. 13.146/2015); and CNE/CEB Resolution No. 4/2009. It also considered Decree No. 12.686/2025, as amended by Decree No. 12.773/2025, addressing the National Policy on Inclusive Special Education and support resources, such as individualized planning in certain circumstances (Brasil, Decreto nº 12.686; Decreto nº 12.773). These documents were used as references for rights and the organization of educational provision, not as evidence of the effectiveness of technologies.

As the study analyzed publicly available texts and documents, without collecting data directly from participants, it did not involve an intervention or the production of primary data involving human participants. Care was taken to attribute authorship and ensure correspondence between citations and sources. Records of screening dates and numbers that would enable an exhaustive search to be audited are not presented; this limitation prevents the results from being classified as a quantitative synthesis of evidence.

Limitations of the review include the non-exhaustive nature of the bibliographic selection, the heterogeneity of the publications used, the absence of meta-analysis or controlled comparisons of interventions, and the lack of field data produced by the authors in this study. Accordingly, the conclusions are limited to a critical synthesis of possibilities, risks, and implementation conditions.

4. Results and Analysis: Thematic Synthesis of the Literature

A thematic reading of the references reveals convergences around accessible planning, diversification of activities, and institutional support for DICT. Table 1 presents the sources actually used in the argument and specifies their nature. Proposals for pedagogical organization are not treated as measured effects: conceptual texts provide foundations, qualitative studies indicate perceptions and conditions in specific contexts, and regulatory documents establish rights and duties without assessing the effectiveness of the strategies.

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Table 1 — Sources Used in the Thematic Synthesis and the Nature of Their Contributions

Theme and sources	Type of source	Contribution and scope
DICT and accessibility — Giroto, Poker, and Omote (2012)	Theoretical chapter in an edited volume	Discusses the relationship between teacher education and technologies in inclusive practices; does not estimate effects.
DICT and accessibility — Silva, Lückman, and Wilbert (2011)	Article on VLE accessibility	Discusses criteria for the accessibility and usability of virtual environments.
DICT and accessibility — CAST (2024)	UDL guidelines	Guides the planning of multiple means and barrier reduction; it is not an intervention trial.
Active methodologies — Bacich and Moran (2018); Yanaze and Silva (2022)	Theoretical and methodological book and chapter	Provide a foundation for active participation and gamification elements; depend on mediation and context.
Active methodologies — Manjinski Junior and Manjinski (2025)	Bibliographic review	Discusses the integration of projects, gamification, and DICT; does not demonstrate universal effectiveness.
Implementation conditions — Santos, Cazuza, and Aleixo (2023)	Literature review	Critically examines challenges and opportunities in integrating DICT into teaching practice.
Teacher education — Soares and Porto (2024)	Qualitative study involving teachers	Discusses initial and continuing teacher education at the secondary level; findings should not be generalized without qualification.

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Theme and sources	Type of source	Contribution and scope
Rights and support — BNCC; LDB; LBI; Decrees Nos. 12.686 and 12.773 (2025)	Regulatory documents	Establish guidelines and duties; do not demonstrate pedagogical effectiveness.

Source: Prepared by the authors based on the works cited in the article. The table does not represent a count of records retrieved.

Within the DICT and accessibility theme, the chapter by Giroto, Poker, and Omote and the article by Silva, Lückman, and Wilbert provide theoretical discussion and accessibility criteria for virtual environments, respectively. CAST guidelines offer guidance for planning and reducing barriers. None of these sources, in isolation, supports the claim that a digital resource produces learning gains in every context.

Within the active methodologies theme, the collection edited by Bacich and Moran and the chapter by Yanaze and Silva substantiate proposals concerning participation and gamification; Manjinski Junior and Manjinski present a bibliographic review of projects and technologies. These texts enable instructional design criteria to be formulated—cooperation, clear objectives, access alternatives, and feedback—but are not equivalent to intervention studies demonstrating effectiveness among different groups of students who are eligible for special education services.

In the third theme, regulatory frameworks define rights, obligations, and the organization of support. Santos, Cazuza, and Aleixo critically discuss challenges associated with DICT, while the qualitative investigation by Soares and Porto examines aspects of secondary school teacher education. The latter's findings must be interpreted within their context and do not, in themselves, demonstrate the effects of gamification or PBL on the learning of students with disabilities. The limited representation of empirical studies specifically addressing these interventions is a limitation of the present review.

5. Discussion: Connections Between Literature, Practices, and Legislation

In the BNCC, general competencies 5 (digital culture) and 9 (empathy and cooperation) provide curricular references for planning experiences involving critical use of technologies and respectful interaction (Brasil, Base Nacional Comum Curricular: educação infantil e ensino fundamental; Base Nacional Comum Curricular: ensino médio). Gamification and PBL may align with these competencies when objectives, content, and assessment criteria are explicit. The BNCC provides curricular guidance; it is not an empirical study demonstrating the effectiveness of these methodologies.

Article 59 of the LDB provides for specific curricula, methods, techniques, educational resources, and organizational arrangements to meet the needs of learners covered by special education (Brasil, Lei nº 9.394). CNE/CEB Resolution

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No. 4/2009 establishes operational guidelines for Specialized Educational Assistance. These provisions provide a basis for planning relevant supports and adaptations, without presupposing that students should be segregated from collective tasks or that curricular objectives should be indiscriminately eliminated.

The LBI recognizes inclusive education as a right (Article 27) and, in Article 28, items II and III, requires the improvement of education systems to ensure access, retention, participation, and learning, as well as the institutionalization of services, resources, and reasonable accommodations (Brasil, Lei nº 13.146). Decree No. 12.686/2025, as amended by Decree No. 12.773/2025, provides for assistive technologies and reasonable accommodations according to needs and contexts (Article 3, V), individualized support measures (Article 3, VI), case studies to identify barriers and resources (Article 11), and individualized pedagogical documents, such as the PAEE and PEI, in accordance with their specific provisions (Article 12) (Brasil, Decreto nº 12.686; Decreto nº 12.773). These are foundations for rights and institutional organization, not proof of the effect of a particular technology or method.

Comparison of the sources reveals tensions: Santos, Cazuza, and Aleixo discuss challenges in incorporating DICT; Soares and Porto present a qualitative investigation of secondary school teacher education; and theoretical reviews on gamification and projects set out planning possibilities without equivalent measurement of outcomes. An approach may benefit some students' interaction while creating barriers for others when it requires continuous connectivity, speed, intense stimuli, or public competition. As a practical synthesis of this discussion, Table 2 links UDL principles with decisions concerning gamification and PBL, and Table 3 brings together guiding questions for planning and monitoring.

Table 2 — UDL Principles and Pedagogical Decisions in Gamification and PBL

UDL principle	Gamification: proposals	PBL: proposals and indicator
Engagement	Choice of challenges, cooperative goals, and individual progression, without public rankings.	Relevant problems, negotiated roles, and shared decisions. Observe: were choice and participation possible?
Representation	Rules and clues provided as text, audio, and described images.	Accessible sources and instructions in different formats. Observe: was there access to core concepts?
Action and expression	Different response modes, accessible interaction, and flexible time.	Oral, written, or multimodal outputs, with clear curricular criteria. Observe: were contribution and learning demonstrated?

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Source: Prepared by the authors based on CAST guidelines and the narrative synthesis. The strategies are planning examples, not interventions validated in this study.

As an applied contribution of the interpretive synthesis, the following checklist supports decisions concerning the planning, observation, and revision of activities using DICT, gamification, and PBL. It has not undergone empirical validation and is not a scale, diagnostic instrument, or standardized measure of effectiveness. It may be used collaboratively by teachers, pedagogical teams, and support professionals: before an activity, to identify barriers and clarify objectives; during implementation, to observe participation and make adjustments; and afterward, to record evidence of learning, remaining barriers, and necessary changes.

Table 3 — Guiding Checklist for Inclusive Planning and Monitoring

Aspect to examine	Guiding question
Before — objectives and criteria	Were the intended learning outcomes, shared criteria, and alternative ways to demonstrate learning made explicit?
Before — contextual barriers	Were sensory, communicational, motor, cognitive, and material barriers identified in the context of this activity?
Before — access and instructions	Are instructions, interfaces, and materials accessible, and are support and offline alternatives available?
During — communication and decisions	Was the student able to understand the activity, ask questions, make choices, and participate in decisions?
During — essential tasks	Are roles negotiable and do they allow contributions to relevant tasks, with revision when needed?
During — cooperation and feedback	Do collective goals, individual progression, and formative feedback prevent exclusionary comparison?
After — learning	Are there qualitative records of evidence of learning in relation to the curricular objective?
After — planning revision	Which barriers persisted, what adjustments were made, and what needs to change in the next activity?

Source: Prepared by the authors based on the narrative synthesis, UDL guidelines (CAST), and the regulatory frameworks discussed; a guiding proposal that has not undergone empirical validation.

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Responses to the checklist may be recorded descriptively, without assigning scores to students or classifying performance. The purpose is to support collaborative planning and the monitoring of barriers, resources, and evidence of learning, with supports revised according to the school situation.

6. Final Considerations

The bibliographic and documentary analysis indicates that the integration of DICT, gamification, and Project-Based Learning (PBL) may expand opportunities for access, communication, participation, and knowledge production in inclusive education. These contributions, however, do not arise automatically from the use of tools or methodologies: they depend on material conditions, accessibility, and appropriate pedagogical mediation.

Continuing teacher education, infrastructure, and collaborative planning constitute relevant conditions for implementing these strategies. In everyday school life, this entails selecting resources according to educational objectives, providing equivalent alternatives when access difficulties arise, and monitoring students' participation and learning, adjusting practices when necessary.

The regulatory frameworks examined—the BNCC, LDB, LBI, and standards related to special education—provide references for guaranteeing rights and planning for accessibility. However, compliance with legal requirements should be assessed in light of the school's actual organization and the removal of barriers, rather than inferred from the mere presence of digital resources in an activity.

The study's specific contribution is to critically integrate three themes emerging from the reading of the sources and to systematize criteria for inclusive planning, embodied in the correspondence between UDL principles, gamification, and PBL (Table 2), and in the guiding checklist (Table 3). These proposals were derived from the narrative synthesis and have not yet undergone empirical validation. Limitations include the non-exhaustive nature of the literature search and the limited inclusion of empirical studies directly addressing the application of these methodologies with students eligible for special education services. Future research could examine the use of these criteria in schools, document participation and learning, and assess their relevance in different contexts without presuming universal effectiveness.

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