

**AXIOMS TO TRANSFORM THE PERFORMANCE OF NEABI IN FEDERAL
INSTITUTES IN THE NORTHEAST WITH THE USE OF DIGITAL
TECHNOLOGIES: A SYSTEMATIC LITERATURE REVIEW**

**AXIOMAS PARA TRANSFORMAR A ATUAÇÃO DOS NEABI NOS INSTITUTOS
FEDERAIS DO NORDESTE COM O USO DAS TECNOLOGIAS DIGITAIS: UMA
REVISÃO SISTEMÁTICA DA LITERATURA**

**AXIOMAS PARA TRANSFORMAR EL DESEMPEÑO DE LA NEABI EN LOS
INSTITUTOS FEDERALES DEL NORESTE CON EL USO DE TECNOLOGÍAS
DIGITALES: UNA REVISIÓN SISTEMÁTICA DE LA LITERATURA**

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ABSTRACT

This article proposes a systematic review of the literature on Digital Information and Communication Technologies in educational contexts, specifically in the work of Centers for Afro-Brazilian and Indigenous Studies at Federal Institutes in the Northeast. Using parameters and guidelines based on the PRISMA Group, papers were selected from the Scielo bibliographic databases and the Capes repository to verify the research conducted. To this end, a bibliographic review was conducted, as well as analysis and reflection on the research findings from 2020 to 2025. The findings suggest that this is a field of study that can be increasingly expanded to utilize educational technologies to promote education based on the appreciation of Afro-Brazilian and Indigenous cultures within the NEABIs' field of action.

Keywords: NEABI. Federal Institutes. Antiracist Education. Educational Technologies.

RESUMO

O presente artigo se propõe a realizar uma revisão sistemática da literatura acerca da Tecnologias Digitais da Informação e Comunicação em contextos educacionais, mais precisamente na atuação dos Núcleos de Estudos Afro-brasileiros e Indígenas em Institutos Federais do Nordeste. Por meio de parâmetros e orientações baseados no PRISMA Group, trabalhos foram selecionados nas bases bibliográficas Scielo e repositório da Capes com o objetivo de verificar as pesquisas desenvolvidas. Para tal, foi realizada uma revisão

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bibliográfica, bem como análise e reflexão sobre os resultados de pesquisa encontrados entre os anos de 2020 a 2025. Os resultados encontrados levam a reflexão de que é um campo de estudo que pode ser cada vez mais ampliado a fim de utilizar as tecnologias educacionais de forma a promover uma educação pautada na valorização das culturas afro-brasileiras e indígenas no campo de ação dos NEABIs.

Palavras-chave: NEABI. Institutos Federais. Educação Antirracista. Tecnologias Educacionais.

RESUMEN

Este artículo propone una revisión sistemática de la literatura sobre Tecnologías Digitales de la Información y la Comunicación en contextos educativos, específicamente en el trabajo de los Centros de Estudios Afrobrasileños e Indígenas de los Institutos Federales del Nordeste. Utilizando parámetros y directrices basados en el Grupo PRISMA, se seleccionaron artículos de las bases de datos bibliográficas de Scielo y del repositorio de Capes para verificar la investigación realizada. Para ello, se realizó una revisión bibliográfica, así como un análisis y reflexión sobre los hallazgos de la investigación entre 2020 y 2025. Los hallazgos sugieren que este es un campo de estudio que puede ampliarse cada vez más para utilizar las tecnologías educativas con el fin de promover una educación basada en la valoración de las culturas afrobrasileñas e indígenas dentro del ámbito de acción de los NEABI.

Palabras clave: NEABI. Institutos Federales. Educación Antirracista. Tecnologías Educativas.



1 INTRODUCTION

The Federal Institutes (IFs) emerged in Brazil in 2008, created by Law No. 11,892, of December 29, 2008, sanctioned by then President Luiz Inácio Lula da Silva, with the purpose of expanding professional and technological education, providing qualified and accessible training for the population. The creation of this institutional network aims to meet significant demands of the expanded labor market and promoting regional development by integrating teaching, research and extension. Over time, this need to value cultures and reflection on ethnic-racial issues in the country became evident, leading to the implementation of the Afro-Brazilian and Indigenous Studies Centers (NEABIs).

The NEABI of the Federal Institute of Education, Science and Technology was established in 2003 as part of the guidelines of Law No. 11,645, of March 10, 2008, in which it plays an institutional role linked to the development of actions directed to teaching, research and extension, valuing black histories, identities and cultures, African, Afro-descendant and traditional native peoples, including indigenous ethnicities. This working and study group aims at training for the construction of knowledge, in addition, it focuses on the promotion of equality and the protection of the rights of people and ethnic minority groups, the NEABIs contribute hard to the construction of a more inclusive and liberal educational environment in the cultural diversities that enrich Brazilian society.

According to the Internal Regulations of the NEABIs of the Federal Institute of Education, Science and Technology of Rio Grande do Norte, In the Federal Institutes, the NEABIs have an organizational structure that generally includes a coordinator, a technical team and representatives of the academic community. This organization allows for participatory management, ensuring that actions are implemented. In addition, the centers usually work in partnership with other sectors of the institution, such as pedagogical coordinators and research groups.

Reflecting on the concept and purpose of NEABI, in its various structures and in the most varied contexts, they may demand the use of technologies as an engine of educational innovation in their actions, covering teachers, technicians, students and representatives of society.

According to Schuartz and Sarmiento (2020, p. 2) "the transformations that new technologies bring to education, there is no way not to question the role of the teacher in this digital universe. It is understood, however, that it does not lose its central role, but that new possibilities are added to teaching." The authors explore how Digital Information and

Communication Technologies (DICT) can transform teaching and learning in the past in this century, making it possible to teach a class in a much more dynamic, interactive and collaborative way than in the past. According to Almeida (2014), educational technology should not be seen only as an auxiliary resource in the teaching-learning process, but as a tool capable of transforming pedagogical practice and promoting more meaningful and collaborative learning. It is necessary to promote a cultural change in schools, with teachers and administrators reviewing their conceptions about teaching, curriculum and evaluation. In addition, it presents examples of innovative projects that seek to promote student autonomy, collaboration and the creative use of DICT, offering reflections and questions to guide decision-making on technological integration in the educational context.

Sancho & Hernández (2006) addresses the integration of DICT in the educational environment and development, highlighting the urgent need to rethink traditional pedagogical practices. The authors argue that, although the introduction of computers and other technologies in schools is an important step, this isolated action does not ensure significant improvements in learning, as regulation is lacking. Technology should be used to create learning environments that encourage problem-solving, allowing students to become more active and engaged in their own learning process Jonassen, (2006). They argue that it is essential to promote a cultural change in educational institutions, where teachers and managers revisit their conceptions about teaching, curriculum and evaluation.

According to Machado and Santos (2024), the accelerated evolution of technology has provided a variety of innovative tools and resources, which have been integrated into the school environment, online platforms, and the entire educational process. The authors point out that we are experiencing a true revolution in education, driven by questions that might not have occurred so quickly if it weren't for the pandemic. In this scenario, Soares and Kirkorian (2023) emphasize the need for innovation and monitoring technological and conceptual changes in education, overcoming traditional teaching models for the emergence of new ideas and pedagogical practices, however, this transformation should not be radical to the point of disregarding principles already consolidated in teaching and learning. However, it is necessary to reduce the distance between the school and the contemporary reality to overcome the institution's difficulty in keeping up with the technological and scientific development of society, which negatively impacts the social sciences and technological development.

In this context, NEABIs can use these aspects of technology for their performance in order to preserve and value Afro-Brazilian and indigenous cultures in educational environments, the object of research in the proposed article.

2 EDUCATIONAL TECHNOLOGIES

The increasing integration of technology in education has profoundly and entirely transformed teaching and learning methods. Therefore, the need to prepare students for an increasingly digital world requires a certain critical understanding of the potential and challenges of educational technology in Brazil. In this context, NEABIs play a strategic role by consolidating themselves as spaces that promote research and the development of innovative practices, integrating technological resources and contributing to the appreciation of socio-historical, cultural and pedagogical aspects of Afro-Brazilian populations. (Botelho, 2014, p. 159)

In contrast to the 'banking education' criticized by Freire (2005) where knowledge is passively deposited in students, technology offers tools for more dynamic and interactive learning, fostering the exchange of ideas and the joint construction of knowledge, but Machado and Kampff (2017) inquire that the way technologies are employed will be a decisive factor for the qualification of teaching and learning processes, which are developed in various spaces and times, considering the individual rhythm of each one.

Technologies are even more present in aiding education, based on the fact that nowadays there are more of these tools to help professionals and students in development, such as Virtual Learning Environments (VLE), multimedia resources and assistive technology, playing a fundamental role in the modernization of education.

According to Lemos (2019), VLEs provide a wide range of resources, from simple document distribution to complex online questionnaire systems, in addition to providing conditions for continuous interaction between users, both synchronously (real-time communication) and asynchronously (communication at different times). This characteristic, based on connectivity between participants, ensures quick access to information and interpersonal communication, regardless of time and place, which favors the development of collaborative projects and the coordination of activities, helping them to reach higher levels of learning with adequate support. And this impact of these tools is visible in the lives of students, who benefit from more dynamic and interactive learning, and teachers, who find support for planning and evaluating classes. Another important point fully addressed by

Sancho (2006) is the impact of technologies on inclusive education. The author points out that technologies can be used to adapt teaching materials to the needs of students with disabilities, providing more accessible and egalitarian learning. In addition, the implementation of racial projects in educational institutions is essential to promote inclusion and the appreciation of cultural diversity.

Sancho (2006) argues that technology has the power to democratize access to information and knowledge. The argument about the power of technology to democratize access to information and knowledge echoes the ideals of Freire (2005), who always sought an education that would enable everyone to achieve knowledge and transform their realities. By offering varied resources, such as online teaching platforms and multimedia materials, multifunctional programs, technologies can meet the different needs of students, promoting a more inclusive education, emphasizing that the diversity of formats and languages allows students with different learning styles to find more effective ways to engage with content. This scenario dialogues with Lev Vygotsky's theory of the Zone of Proximal Development (ZPD), which highlights the importance of mediation and social interaction in the learning process. Adaptive platforms, interactive software, and online collaborative environments exemplify resources that can expand ZPD, making learning more accessible and equitable for others.

In addition, the use of digital technologies favors collaborative learning, another central principle in Vygotsky's theory. Virtual learning environments facilitate interaction between students, promoting the exchange of knowledge and experiences. This collaboration not only enriches the learning process, but also strengthens students' social and cognitive skills, and can generate more visibility for resources that meet this need.

Alves (2019) reinforces this idea by analyzing how technologies can contribute to an inclusive and student-centered pedagogy. The author highlights that the conscious use of digital resources favors the construction of knowledge, especially in contexts of diversity and social vulnerability. By exploring technological possibilities in a critical and creative way, educators can promote pedagogical practices that respect the pace, interests, and specific needs of students. In this process, the role of the teacher is essential: it is up to him to identify the Zone of Proximal Development (ZPD) of his students and select digital resources that act as *andamia* — that is, temporary supports that help students overcome cognitive challenges until they are able to perform certain tasks autonomously. More than the simple insertion of technologies in the classroom, it is a reconfiguration of the pedagogical space, in which digital mediation is aligned with collaborative and inclusive teaching strategies.

Sancho (2006) also discusses the role of the educator in this new context. The need to train teachers to integrate technology in a critical way reflects the role of the educator as a mediator in the learning process, according to Vygotsky's theory (1984, p. 62), helping students to navigate and internalize knowledge through new tools. For the author, teachers need to be trained not only to use technologies, but also to integrate them critically into their pedagogical practices. This implies rethinking methodologies and constantly evaluating the impact of technological tools on student learning.

Despite the opportunities offered by technology, Sancho (2006) warns of the challenges that still need to be faced, such as inequality in access to digital tools and the need for continuous training for educators. Despite the opportunities offered, Juana Sancho's caution regarding the challenges of technology in education echoes the concerns of Postman (1995) who warned of the need to critically analyze how new technologies shape our thought processes and the very nature of learning. She argues that the effective implementation of technology in education must be accompanied by public policies that guarantee equitable access and technical support in educational institutions

Technologies end up being allies in this process, allowing different voices and experiences to be integrated into the school environment, contributing to a more equitable and representative education, presenting a critical analysis of the adoption of educational technologies, based on concepts developed by influential authors such as Paulo Freire, Lev Vygotsky and Neil Postman. The profound and entire transformation of teaching and learning methods by technology, mentioned at the beginning of the text, can be analyzed in the light of Postman's (1995) reflections on how digital technologies inevitably alter culture and social processes, including education.

3 METHODOLOGY

To understand the research was carried out qualitatively based on a bibliographic review of scientific articles that talk about NEABIs in the federal institutes and the impacts of technologies, the collection of these data took place with the following criteria using the repositories of CAPES and Scielo.

According to Denzin and Lincoln (1994, 2000), qualitative research encompasses an interpretative and naturalistic position in the world. This means that researchers in this field of study carry out their investigations in their natural contexts, seeking to

understand or interpret phenomena in terms of the meanings that people attribute to them.

For the selection and filtering of the articles, the following terms were used: "TERM 01" and "TERM 02". In addition, the Portuguese terms "TERM 03" and "TERM 04" were used. The research results were limited to articles published in scientific journals, between the years 2020 and 2024, in English and Portuguese. In addition, inclusion and exclusion factors were used, as shown in Table 1.

Table 1

Inclusion and exclusion criteria

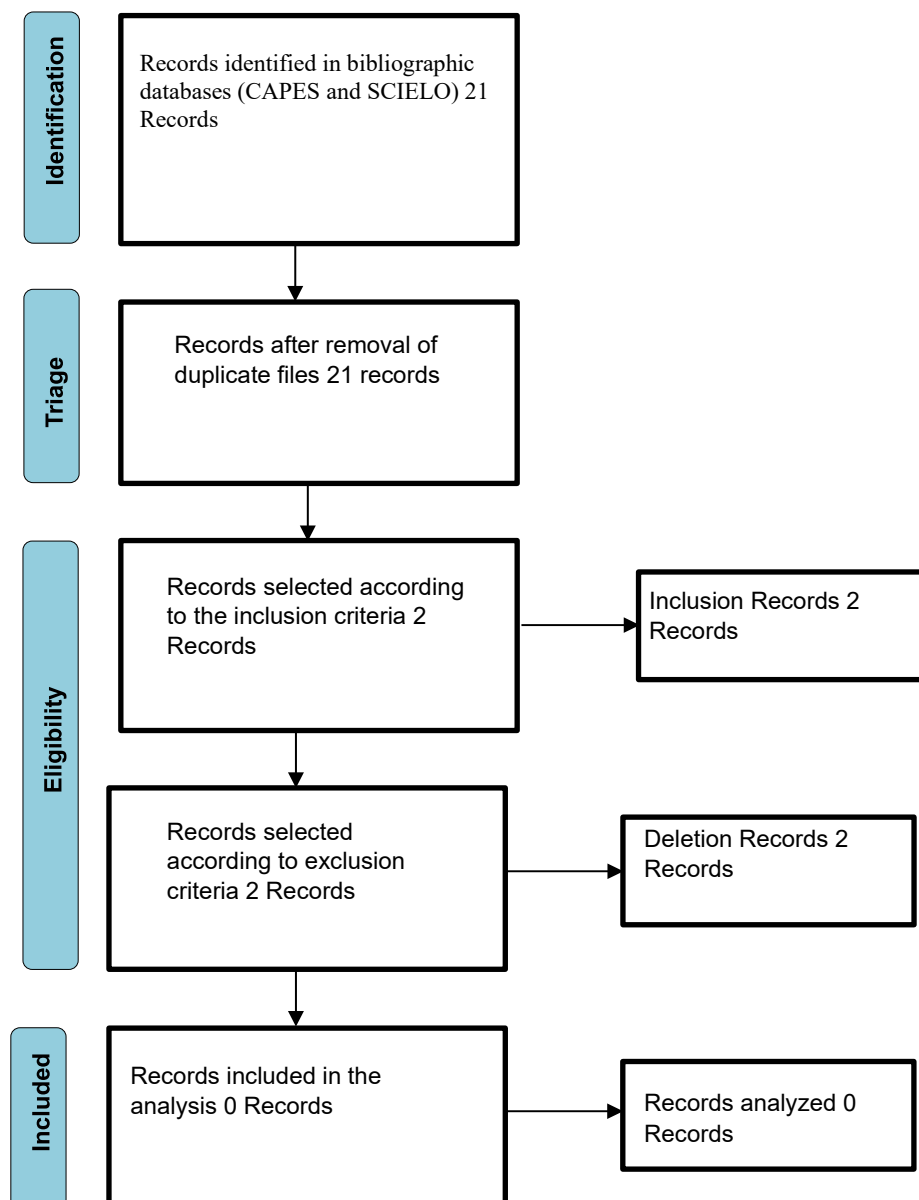
Inclusion factors	Exclusion factors
- Articles and full papers; - Documents dated between 2020 and 2025; - Documents in Portuguese or English - Documents that are complete and available in full (not just abstracts or fragmented parts). - Studies that directly address or cite NEABIs (Afro-Brazilian and Indigenous Studies Centers), their practices, impacts, or related policies. - Articles published in recognized scientific journals, especially focusing on education, diversity, inclusion, and ethnic-racial studies.	- Publications prior to 2020. - Documents with less than 4 pages, disregarding cover, summary and references. - Papers that are not available in full (abstract or introduction only). - Repeated works on different platforms or repositories (same title, authors, and content). - Non-peer-reviewed articles, published only in blogs, opinion journals, or non-academic portals. - Works without clear identification of authorship and institution of origin. - Documents with excessively technical language, outside the scope of the area of interest of the research. - Materials that do not directly deal with the object of study of the research (e.g., inclusive educational technologies). - Sources that do not present a clear theoretical foundation or explicit methodology. - Publications that mentioned the (NEABIs) in Universities

Source: Prepared by the authors (2025).

The survey was conducted between February 20 and April 30, 2025. Based on the established criteria, the research resulted in 21 results and the following diagram represents the selection of articles according to the methodology followed.

Figure 1

Systematic Review of the Literature



Source: adapted from PRISMA Group (2015).

Table 2

Articles included in RSL

Records analyzed No	Authors	Year	Document Title
1	Scimago Institutions	2024	Ethnic-racial relations in technical vocational education at the secondary level: an integrative review
2	Érica Fernandes Dias	2020	Evaluation of affirmative action public policies: the implementation of NEABI's - Afro-Brazilian and Indigenous Studies Centers - at IFCE and the transformations in ethnic-racial relations. <i>In</i> : evaluation of public policies of affirmative action: the implementation of NEABI's - centers of Afro-Brazilian and indigenous studies - at IFCE and the transformations in ethnic-racial relations

Source: prepared by the authors (2025).

4 DISCUSSION AND RESULTS

In recent years, the integration of technology in education has proven to be a crucial factor in improving the quality of teaching and advancing pedagogical methodologies. In this context, the Afro-Brazilian and Indigenous Studies Centers (NEABIs) of the Federal Institutes (IFs) emerge as important spaces for the promotion of diversity, inclusion, and critical reflection on racial and ethnic issues. The connection between NEABIs and educational technology has become an area of growing interest, especially when considering the impacts of this relationship on the teaching-learning process. This article aims to present a discussion of the research carried out by our research group on the role of NEABIs in FIs, how they emerged, how they work, and how advances in educational technology connect with the work done by these centers. To support this investigation, our research was based on published scientific articles that address the educational context in the Federal Institutes, with analysis focused on the use of digital technologies to strengthen the implementation of NEABIs, as

well as based on the literature educational technology that can be considered **critical** and **reflective**, aligning with the ideas that technologies, when well integrated, can transform education in a significant way, but must be analyzed and applied based on a **critical pedagogy**, which takes into account the social, cultural and educational needs of the context in question. To this end, an analysis is made based on the main authors who support Sancho's work, such as Paulo Freire, Lev Vygotsky and Neil Postman, and their influence on the educational context of federal institutions.

Initially, our research group started the study from the review of articles and scientific publications that address the implementation of NEABIs in federal educational institutions. The literature revealed that these centers emerged as a response to the need to ensure the presence and appreciation of Afro-Brazilian and indigenous cultures in the school and vocational curriculum, especially after the enactment of Law 10.639/2003, which made the teaching of Afro-Brazilian history and culture mandatory in schools. The NEABIs, then, began to consolidate themselves as strategic spaces within the IFs to promote activities that involve ethnic and cultural discussions, as well as affirmative actions aimed at the inclusion of black and indigenous students.

The research also revealed that the relationship between technology and NEABIs is a two-way street: while technologies can enhance the pedagogical actions of these centers, the cultural practices and the diversity of experiences of Afro-Brazilian and indigenous peoples also offer a wealth of content that can enrich the digital learning environment for those who aim to implement technology in actions. Therefore, the implementation of technologies in the NEABIs of the FIs must be thought of strategically, so that these tools contribute to the construction of a fairer, more democratic and inclusive education, in line with the principles of racial equity and valuing cultures.

One of the two articles we found and analyzed "Ethnic-racial relations in technical vocational education at the secondary level: an integrative review" The article by Santos, Neta and Santos (2024) presents an integrative review on ethnic-racial relations in the context of technical vocational education at the secondary level in Brazil. Based on the analysis of 11 studies selected from more than 11 thousand titles found in databases such as SciELO, CAPES Journals and Google Scholar, the authors highlight the main challenges faced by educational institutions in promoting racial equity. The research highlights that, despite the existence of Laws No. 10,639/2003 and No. 11,645/2008, which determine the inclusion of Afro-Brazilian and indigenous history and culture in the school curriculum, their

implementation in pedagogical practices is still limited and faces resistance. In addition, structural racism manifests itself recurrently in the daily relationships between students and teachers, negatively influencing the educational experience of black and indigenous young people. The work of the Afro-Brazilian and Indigenous Studies Centers (NEABIs), although relevant, is still punctual in many institutions, which limits their transformative potential. The survey also points out the importance of teacher training focused on diversity and respect for differences, with an emphasis on valuing racial identity and promoting a fairer and more inclusive education. Finally, the study suggests the need to strengthen affirmative policies, such as the Quota Law, and expand pedagogical experiences committed to the anti-racist struggle, especially with regard to the training of black women in technical education.

The other article "Evaluation of public policies of affirmative action: the implementation of NEABI's - centers of Afro-Brazilian and indigenous studies - at IFCE and the transformations in ethnic-racial relations. *In*: evaluation of public policies of affirmative action: the implementation of NEABI's - centers of Afro-Brazilian and indigenous studies - at IFCE and the transformations in ethnic-racial relations", has as supervision the implementation of NEABI's in the Federal Institute of Education, Science and Technology of Ceará (IFCE), we evaluate the transformations in ethnic-racial relations in the academic environment of this article. The analysis of the data revealed that the NEABI's at IFCE provided a space for appreciation and recognition of Afro-Brazilian and indigenous cultures. Reporting on the strengthening of their ethnic identity and increased engagement in related cultural and academic activities. Likewise, professors noticed an increase in the discussion about diversity and inclusion, although some mentioned resistance from segments that do not understand the need for these actions.

Affirmative action in Brazil, including the creation of NEABI's, seeks to correct historical inequalities and promote the inclusion of marginalized ethnic groups (Santos, Matos, and Eugênio, 2019). Law No. 10,639/2003, which makes the teaching of Afro-Brazilian and indigenous history and culture mandatory, is fundamental in this context (BRASIL, 2003). However, the full institutionalization of this law in school curricula still faces challenges as mentioned in the article. (Souza and Silva, 2021).

Finally, the results of the research indicate that, although the NEABIs in the IFs already show significant advances, one of the articles is based on strengthening inclusion and containing many challenges to be faced, such as the training of teachers, the adequacy of technological infrastructures in the various units of the IFs and the need for more public

policies that integrate technology into the curriculum of basic and higher education. Based on the findings of the research, we propose that the articulation between NEABIs and educational technology be considered as a priority in future pedagogical actions of FIs, since it has the potential to transform educational practices and contribute significantly to the formation of a more inclusive and egalitarian society.

5 CONCLUSION

We conclude this research and see that NEABIs have a fundamental role in valuing culture and valuing Afro-Brazilian and indigenous histories in the Federal Institutes of Rio Grande do Norte. In this context, technologies can play a fundamental role in the actions of the center in order to further enhance the actions developed by those involved. The article proposed to carry out a Systematic Review of the Literature that, in its results, reports some challenges such as the need to train the academic professional, improving technologies and the formulation of public policies that guarantee access to DICTs in the IFs. It also demonstrates that it is a field of study that still needs to be studied and needs to be expanded in its space for discussion. Therefore, this research highlights the importance of how information and communication technologies can serve as an engine of innovation for study centers. We conclude that this integration can contribute significantly to a more inclusive and representative education.

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