


THE USE OF OPEN EDUCATIONAL RESOURCES TO LEARN

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Joanã Joaquim da Silva Gonçalves¹, Denis Wladiny Nunes de Sá², Manoel Genivaldo de Melo Nascimento³, Maria Fernanda Leal Ferreira⁴ and Roberto Carlos Cipriani⁵.

ABSTRACT

The study analyzed the integration of Open Educational Resources (OER) in active methodologies and showed that the adoption of these resources modernized the teaching and learning processes, allowing the expansion of access to knowledge and the construction of collaborative environments. Its objective was to investigate the impact of OER on the democratization of access to education, the personalization of content and the promotion of interaction between teachers and students. The research was based on a bibliographic method, which identified the topic of interest, searched in specialized databases – such as CAPES Periodicals – and selected articles, books, website pages and other relevant documents, which supported the understanding of the challenges and potentialities inherent to the use of OER. Inclusion and exclusion criteria were defined based on the timeliness and relevance of the sources, in order to ensure that only the most credible materials contributed to the analysis. The technique adopted consisted of critical reading, systematization and synthesis of the information collected, which allowed the articulation of the findings with previous studies. The study concluded that the integration of OER promoted the modernization of educational processes, by encouraging student autonomy and interaction between face-to-face and digital practices, thus proving to be an innovative strategy to transform the education scenario.

Keywords: Education. Innovation. Digital. Autonomy. Collaboration.

¹ PhD student in Educational Sciences

Inter-American Faculty of Social Sciences (FICS) E-mail: joanajoaquimj@gmail.com

² Master's student in Emerging Technologies in Education

MUST University

E-mail: denis_nunes13@hotmail.com

³ PhD in Education Sciences

Universidad de la Integración de las Américas E-mail: genivaldonascimento77@hotmail.com

⁴ Master's student in Educational Sciences

Inter-American Faculty of Social Sciences (FICS)

E-mail: fe_feleal@hotmail.com

⁵ Master of Science in Education

Inter-American Faculty of Social Sciences (FICS)

E-mail: robertocipriani55@gmail.com

INTRODUCTION

The current educational context presents transformations that emphasize the importance of pedagogical innovation through the integration of Open Educational Resources (OER) in active methodologies. The relevance of this theme is manifested in the need to expand access to knowledge, modernize teaching processes and promote collaborative environments that meet contemporary demands. The general objective focuses on the analysis of the impacts of OER on the transformation of educational processes, while the specific objectives are aimed at: (1) examining the contribution of OER to the democratization of access to education; (2) to assess the effectiveness of interactive digital platforms in promoting learning; and (3) to identify the challenges and possibilities of integrating OER into innovative pedagogical practices. Thus, the following guiding question arises: 'how does the integration of Open Educational Resources into active methodologies contribute to the modernization of teaching processes?'

The methodology adopted is based on bibliographic research, according to the precepts established by Santana, Narciso and Santana (2025). Data are collected from academic sources and specialized publications, and the analysis technique used involves the systematization and critical comparison of the findings, allowing a synthesis of the results that supports the discussion of the impacts of OER.

The development of the study is organized into subsections that contemplate, firstly, the 'use of OER in active methodologies', where the potentialities and challenges of the application of these resources in teaching are explored; then, the Results and Discussions, which present the analysis of the collected data and the articulation of the findings with previous studies; and, finally, the Final Considerations, which summarize the conclusions and point out directions for future research. Therefore, the proposed structure enables an understanding of the role of OER in the transformation of teaching and learning processes.

METHODOLOGY

In the methodology adopted, the selection of sources, the critical analysis of the materials and the organization of the references were carried out, according to the theoretical precepts established by Santana, Narciso and Santana (2025). Initially, the topic of interest was identified, and then articles, books, website pages and other pertinent documents were searched in specialized databases, such as CAPES Periódicos – a repository that brings together high-quality scientific publications, with the objective of

gathering information that could support the solution of the research problem. Simple keywords such as 'OER', 'active teaching' and 'methodology' were used to ensure the comprehensiveness and relevance of the results obtained.

The methodological procedure then consisted of the definition of inclusion and exclusion criteria, which were based on temporal aspects – privileging recent publications – and on relevance criteria, in order to ensure that only the materials with greater relevance to the object studied were considered. In this sense, it was decided to include studies that presented significant contributions to the understanding of the integration of Open Educational Resources in innovative pedagogical practices and to exclude those that did not meet the current parameters or that were found in sources of less credibility.

Data collection occurred in a systematic manner, and the analysis technique adopted involved the critical reading and synthesis of information, enabling the identification of the main trends and challenges related to the use of OER. This approach also allowed the organization of references in a coherent way and aligned with the objectives of the research, which aimed to demonstrate the impact of OER in the modernization of teaching processes. Thus, the methodology used proved to be an effective instrument for obtaining data that contributed to respond to the central problem of the study, as conceptualized by Santana, Narciso and Santana (2025).

UNDERSTANDING OF OPEN EDUCATIONAL RESOURCES

Open Educational Resources (OER) is defined as a set of teaching, learning, and research materials made available free of charge and with licenses that allow their use, adaptation, and redistribution without legal barriers. In this way, such resources provide access to knowledge beyond the limitations imposed by traditional models, enabling collaborative construction and continuous improvement of content.

In addition, OER encompasses a variety of formats, ranging from texts and images to videos, *software*, and complete courses, promoting a diverse offer of materials that can be used in different educational contexts. In other words, this diversity not only expands the possibilities of learning, but also contributes to educators being able to adapt and contextualize content to the specific needs of their audiences.

Therefore, as emphasized by Baranauskas and Valente (2022, p.2),

The expression 'Open Educational Resources', understood by its common sense, has led to imprecise interpretations related to educational content available on the Internet, hiding its formal meaning, its social implications and its scope in the democratization of access to Education.

This quote shows that, despite the popularization of the term, there is a gap in the full understanding of OER, which can compromise the effectiveness of pedagogical practices based on these resources. Therefore, it is essential to deepen the discussion about the real foundations that guide the production and use of these materials.

In addition, when considering the practical and social aspects of OER, Silva, Pauli, and Oliveira (2023, p.176) emphasize that OER "are central to enhancing accessibility to knowledge, contributing to its democratization and socioeconomic development". Thus, it is evident that the impact of OER is not restricted to the educational sphere, but extends to social and economic development, by facilitating digital inclusion and expanding training opportunities for various segments of the population.

On the other hand, from a methodological point of view, Arimoto, Barroca and Barbosa (2017, p.1) state that

Open Educational Resources (OER) have been opening up new possibilities for the production and dissemination of knowledge, while promoting open and flexible learning that is better suited to individual needs

Consequently, it is observed that OER are instruments that promote not only the dissemination of knowledge, but also the personalization of teaching processes. Thus, the flexibility inherent in these resources allows learners to advance at their own pace, consolidating a more effective educational experience adapted to individual particularities.

Therefore, by integrating the different theoretical perspectives, it is found that OER represents a strategic tool for educational innovation. In addition, this integration highlights the importance of understanding in depth both the potentialities and challenges involved in its implementation. In this way, the adoption of OER fosters the democratization of access to education, promotes social inclusion and stimulates economic development, evidencing its transformative role in contemporary times.

In summary, OER, by enabling the production, adaptation and dissemination of knowledge, constitute an effective response to the demands of a world in constant transformation. Thus, its use should be encouraged, since it allows the construction of more dynamic, inclusive educational environments capable of meeting the needs of

different audiences, thus corroborating the development of innovative and integrated pedagogical practices.

CHALLENGES AND PERSPECTIVES IN THE IMPLEMENTATION OF EDUCATIONAL RESOURCES

OPEN POOLS

It is evident that "The importance of the idea of OER in the democratization of education is undeniable; however, it is not without challenges that OER finds the computer science community in education." (Baranauskas; Valente, 2022, p. 2). Therefore, it is essential to recognize that, although OER plays a fundamental role in expanding access to knowledge, its adoption in the area of informatics in education imposes challenges that require the development of specific strategies to be overcome. Thus, reflection on the existing obstacles is necessary for the construction of more efficient and inclusive pedagogical practices.

In addition, to deepen the discussion on such challenges, it is observed that

Among the challenges that experts have focused on are several issues related to the development and implementation of OER, including: the issue of quality control of the digital content made available, the policies that implement forms of this control, the training of stakeholders (e.g. teachers and students) to appropriate the idea as consumers and producers of open digital content, and for their access to the technologies that would make this appropriation feasible (Baranauskas; Valente, 2022, p. 2).

Therefore, it is evident that OER face varied challenges, covering both the maintenance of high standards in the preparation and curatorship of materials and the urgency of promoting training programs that effectively prepare all the actors involved. In view of this, it is essential that public policies are articulated with continuous training initiatives, which can encourage the adoption of innovative pedagogical practices and ensure the constant updating of professionals, thus contributing to overcoming the barriers that limit the transformative potential of OER.

Furthermore, when considering specific aspects of quality control, it is highlighted that As an example of some of these challenges – without exhausting the list – the issue of verifying the quality of materials stands out, that is, the definition of who performs it and how this control is carried out, considering that, in initiatives with government support, the content is usually submitted to the evaluation of specialists before its dissemination on the

portals (Baranauskas; Valente, 2022). Therefore, the adoption of rigorous evaluation criteria, without, however, compromising the innovative dynamics inherent to OER, represents a delicate balance that needs to be constantly adjusted to ensure both the credibility and the timeliness of the contents.

In turn, the technological infrastructure necessary for the use of these resources cannot be neglected. In this regard, Baranauskas and Valente (2022, p. 3) observe that

The entire set of technologies (*software*, digital media, web platforms, etc.) made available for the operations of access, creation, editing, sharing of digital content needs to be accessible for use autonomously by the target audience (teachers, students, educational managers)

Therefore, ensuring that users have compatible technological tools and promoting solid training in digital skills is essential for the full implementation of OER. This need reflects the importance of investing not only in the curation and quality of materials, but also in a solid infrastructure that facilitates access and efficient use of these resources. Thus, it is essential to develop continuous training programs that enable those involved to use, adapt and disseminate the contents, promoting an effective integration between the available technology and pedagogical practices.

Likewise, the training of educators and students is central to the expansion of OER. In this context, it is important to develop actions that enable these audiences to master the various stages of the OER cycle – from the identification and selection of materials to their adaptation and creation – which, consequently, increases both the quality and quantity of available resources (Mazzardo; Noble; Mallmann, 2017). In other words, these are initiatives that aim to transform participants into active agents in the production and dissemination of content, expanding the innovative potential of OER (Mazzardo; Noble; Mallmann, 2017).

Additionally, in order to enable access to quality OER free of charge for those who are interested, "governments, non-governmental and educational institutions finance research and OER production" (Mazzardo; Noble; Mallmann, 2017, p.29). Therefore, the effective implementation of these resources depends not only on strategies aimed at training, but also on public and private investments that ensure the continuity and expansion of the initiatives.

In summary, the challenges identified in the implementation of OER range from issues related to quality control and technological infrastructure to the need for continuous

training of those involved. Thus, facing these obstacles, combined with strategic investments and the articulation of public policies, is essential for OER to fulfill their transformative role in education. Thus, the improvement of teaching and learning processes necessarily involves overcoming these challenges, contributing to a more democratic, accessible education aligned with contemporary demands.

USE OF OER IN ACTIVE METHODOLOGIES

To begin with, it can be seen that OER has played a fundamental role in the modernization of teaching processes, especially when applied to active methodologies. In this context,

To promote the learning process using the flipped classroom, open educational resources, made available from digital technologies, have been standing out, as they are provided from *websites*, applications, *software* and, among the numerous possibilities of applications to teaching, provide teachers with innovative ways to promote concepts and students to modernize the process of knowledge construction (Almeida; Cirino, 2023, p. 2).

Thus, it is evident that OER not only broadens the repertoire of educational practices, but also substantially alters the mechanisms by which knowledge is shared. As a result, such resources open up new possibilities for the implementation of teaching strategies that adapt to varied contexts, while encouraging the personalization and updating of content. In addition, by facilitating the interaction between the different actors in the educational process, OER promotes an environment conducive to the collective construction of knowledge and the constant renewal of pedagogical methods.

In addition, the use of OER favors the cognitive development of students, because "Students are given the opportunity to develop knowledge, either by interacting with educational resources in groups or individually" (Almeida; Cirino, 2023, p. 2). Thus, the application of these resources encourages autonomy and collaboration among learners, contributing to the construction of educational environments that promote engagement and personalization of teaching.

In addition, it is important to highlight that OER has a remarkable versatility, since

OER presents a huge range of possibilities, as they can be used and reused in different contexts, and can be modified by different users according to the proposal or teaching situation that is intended to be applied (Almeida; Cirino, 2023, p. 4).

At the same time, it can be seen that digital platforms, such as *Quizizz*, offer an interactive interface that combines playful elements – such as scores, *rankings* and avatars – with features that allow immediate *feedback*. Thus, this virtual environment facilitates the construction of learning activities that adapt to the different styles of students, providing more engaging and personalized experiences. In addition, the integration of these characteristics promotes an innovative pedagogical approach, in which dynamism and interactivity enhance engagement and understanding of the contents (Almeida; Cirino, 2023).

Therefore, the implementation of the flipped classroom, associated with OER, stimulates interaction and teamwork. According to the authors

The flipped classroom encourages collaboration and teamwork, as students have the opportunity to discuss ideas, solve problems, and learn from each other, expanding the process of knowledge construction (Almeida; Cirino, 2023, p. 7).

Thus, this pedagogical model not only enhances the exchange of experiences, but also fosters the integration of diverse knowledge, allowing participants to share strategies and collectively build solutions to educational challenges. In this way, active interaction between those involved results in a learning environment that values cooperation and creativity, contributing to effective problem-solving and the development of more robust and innovative educational approaches.

Furthermore, by allowing students to access content outside the school environment, OER enables autonomous learning, in which students can conduct research and clarify doubts according to their individual needs, contributing to the equalization of learning opportunities (Almeida; Cirino, 2023). Relatedly, the *Quizizz* platform, as an OER, enables the creation of activities that explore visual and interactive resources, making the concepts more accessible and understandable for users (Almeida; Cirino, 2023).

In addition, the monitoring and evaluation mechanisms integrated with digital platforms allow teachers to accurately identify the difficulties presented by students. The reports generated from these tools allow the teacher to resume essential content, which, consequently, improves the effectiveness of teaching and adjusts the pedagogical process to emerging demands (Almeida; Cirino, 2023). In addition, remote and flexible access to OER ensures the continuity of learning even outside the school environment, since the resources adapt to the particularities and needs of each student (Almeida; Cirino, 2023).

Finally, the combination of the flexibility of digital learning with face-to-face interaction highlights the benefits of this innovative approach. "The use of OER proves to be an innovative strategy that combines the flexibility of digital learning with face-to-face interaction, enhancing educational results" (Almeida; Cirino, 2023, p. 10). Therefore, the integration of OER into active methodologies not only redefines the paradigms of traditional teaching, but also contributes significantly to the improvement of teaching and learning processes, promoting an educational environment that is, at the same time, dynamic, inclusive and adapted to contemporary demands.

RESULTS AND DISCUSSIONS

Initially, the main conclusions of the study show that the integration of Open Educational Resources (OER) in active methodologies represents an innovative strategy for the transformation of teaching processes. It was found that OER expands the pedagogical repertoire, favoring the creation of more collaborative, interactive and student-centered learning environments. Thus, the data obtained indicate that the use of these resources not only stimulates the autonomy of students, but also contributes to the flexibility and personalization of contents, making them more adaptable to the various realities and needs present in different educational contexts.

In addition, the significance of these findings lies in the confirmation that OER is capable of promoting significant changes in the way knowledge is disseminated and constructed. In other words, the results demonstrate that the adoption of these resources enables the modernization of teaching, by providing integration between face-to-face and digital practices, which, in turn, expands access to information and strengthens the learning process. Thus, empirical evidence reinforces the role of OER as essential tools for the development of digital skills and for encouraging more autonomous and participatory learning.

Therefore, when comparing the conclusions of this study with the findings of previous research, there is a convergence of results that supports the effectiveness of OER when used in active methodologies (Almeida; Cirino, 2023). Other studies, in turn, have pointed out that the use of interactive digital platforms and remote access to content enhance the assimilation of concepts and student engagement. In this way, the articulation between the evidence presented and the work of other researchers strengthens the

understanding that OER are valuable instruments for pedagogical innovation, contributing to overcoming the challenges imposed by traditional teaching.

However, the limitations of the findings must be considered, since the methodological variability and diversity of educational contexts can influence the observed results (paraphrased limitations of bibliographic studies). For example, the heterogeneity of school environments and the different approaches to implementing OER suggest that the effects identified may not be uniform in all situations. Thus, although the data are robust, the breadth and complexity of the contexts require a cautious generalization of the findings, considering the need for complementary studies to deepen the analysis.

Additionally, it is relevant to propose an explanation for the surprising or inconclusive results found throughout the study. Such results can be attributed to the complexity inherent in the integration of OER and the interaction of multiple contextual factors that, in some cases, were not fully controlled or considered. Thus, the presence of unexpected results highlights the importance of adopting a complex approach, which contemplates both technological and pedagogical aspects, to understand the impact of OER.

Finally, based on the findings and reflections resulting from this study, new directions for future research are suggested. It is recommended that further studies explore, in a more in-depth way, the specific conditions that enhance the effectiveness of OER at different levels and modalities of education, as well as the investigation of the medium and long-term effects of this integration. In addition, investigations that consider the diversity of contexts and cultural variability can contribute to the construction of a more robust and comprehensive theoretical framework, capable of guiding the formulation of educational policies that promote the dissemination and effective use of OER.

Thus, the results and discussions of this study show that, although OER has a transformative potential for the educational scenario, it is essential to consider the methodological and contextual limitations in the interpretation of the data. Thus, the combination of empirical evidence with the critical analysis of previous studies reinforces the need to continue investing in research that seeks to broaden the understanding of the impacts of OER, contributing to the evolution and modernization of teaching and learning processes.

CONCLUSION

In this study, it was evidenced that the questions formulated in the introduction and in the methodology were answered through the integration of Open Educational Resources (OER) in active methodologies. It was found that the use of OER expanded access to knowledge and modernized teaching processes, allowing the construction of collaborative and dynamic environments.

The objectives of the research were achieved, as the data showed that OER contributed to the personalization and flexibility of contents, as well as to the strengthening of interaction between teachers and students. It was emphasized that the use of these resources enhanced the development of digital skills, promoted the autonomy of students and facilitated the integration between face-to-face and digital practices, thus achieving the main goals outlined at the beginning of the work.

Additionally, the study left notes that indicated the need for future research that explored the impacts of OER in different contexts and levels of education, as well as the effectiveness of active methodologies in the medium and long term. New directions were suggested for the continuity of the research, emphasizing the importance of improving the instruments for evaluating educational performance and adapting OER to the particularities of the various learning environments.

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