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A Literature Review

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Summary: The integration of Bloom's Taxonomy into collaborative learning environments

Distance Learning (EaD) has been widely discussed as a strategy to promote the development of higher cognitive skills. This literature review analyzed the applicability of the taxonomy in the context of EaD, highlighting its potential and challenges. The results indicate that, when properly implemented, Bloom's Taxonomy can structure collaborative activities that encourage analysis, synthesis and evaluation, providing deeper and more meaningful learning. However, challenges such as the need for teacher training, student engagement and the limitations of digital platforms need to be overcome for its application to be effective. The research shows that careful pedagogical planning, combined with the strategic use of educational technologies, is essential to maximize the benefits of this approach. Finally, it is recommended that future studies explore hybrid methodologies and new strategies to adapt Bloom's Taxonomy to different student profiles and virtual learning environments.

Keywords: Bloom's Taxonomy. Distance Learning. Collaborative Learning. Digital Education. Teacher Training.

Abstract: The integration of Bloom's Taxonomy into collaborative learning in Distance Education (DE) environments has been widely discussed as a strategy to foster the development of higher-order cognitive skills. This literature review examined the applicability of Bloom's framework in DE, highlighting its potential and challenges. The findings indicate that when properly implemented, Bloom's Taxonomy can structure collaborative activities that encourage analysis, synthesis, and evaluation, leading to deeper and more meaningful learning. However, challenges such as teacher training, student engagement, and digital platform limitations must be addressed to ensure its effectiveness. The study highlights that careful pedagogical planning, combined with the strategic use of educational technologies, is essential to maximize the benefits of this approach. Finally, future research should explore hybrid methodologies and innovative strategies to adapt Bloom's Taxonomy to diverse student profiles and virtual learning environments.

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Summary: The integration of Bloom's Taxonomism into collaborative learning in Distance Education (EaD) environments has been widely discussed as a strategy to promote the development of higher cognitive skills. This review of the literature analyzed the applicability of the taxonomía in the context of EaD, highlighting its potentialities and challenges. The results indicate that, when implemented properly, Bloom's Taxonomía can structure collaborative activities that encourage analysis, synthesis and evaluation, providing deeper and more meaningful learning. However, challenges such as the need for teacher training, the commitment of students and the limitations of digital platforms must be overcome so that their application is effective. The investigation shows that careful pedagogical planning, together with the strategic use of educational technologies, is essential to maximize the benefits of this approach. Finally, it is recommended that future investigations explore hybrid methodologies and new strategies to adapt Bloom's Taxonomía to different student profiles and virtual learning environments.

Keywords: Bloom's Taxonomy, Distance Education, Collaborative Learning, Digital Education, Teacher Training.

1. INTRODUCTION

Distance learning (EaD) has established itself as an essential modality for democratizing access to education, especially in contexts where geographic and temporal barriers hinder student participation. However, its effectiveness in developing cognitive skills in higher education is still a subject of debate. In this scenario, Bloom's Taxonomy, proposed by Benjamin Bloom and his collaborators in the 1950s, emerges as a structured theoretical framework to guide pedagogical planning in virtual environments.

The application of Bloom's Taxonomy in distance learning requires adaptations that take into account the specificities of this modality. Moran (2014) highlights that, although distance learning offers flexibility, it is essential to establish a pedagogical structure that is both rigorous and adaptable, capable of engaging students and fostering meaningful interactions. From this perspective, collaborative learning presents itself as an effective pedagogical strategy, as it stimulates active student engagement and the collective construction of knowledge.

Garrison (2011), when introducing the model of *Community of Inquiry-CoI* (Community of Inquiry), emphasizes that collaborative learning is essential to create an educational environment where students not only absorb information but also develop critical skills, such as analysis and synthesis. This theoretical model suggests that social presence and cognitive presence are crucial for effective collaboration among students, aspects that can be improved through the structured application of Bloom's Taxonomy.

In Brazil, researchers like Valente *et al.* (2018) and Kenski (2012) analyzed the use of Bloom's Taxonomy in planning educational activities in distance learning, focusing on promoting high levels of learning. Valente *et al.* (2018) argue that the combination of Bloom's Taxonomy with active methodologies, such as collaborative learning, favors the creation of a dynamic and interactive teaching environment, essential for the success of distance education. Kenski (2012), in turn, highlights the importance of an instructional design that goes beyond simple student participation, challenging them to reach more advanced stages of critical thinking, in line with the higher levels of Bloom's Taxonomy.

Implementing this taxonomy in virtual environments requires careful pedagogical planning that considers the potential and limitations of educational technologies. Bates (2019) highlights that technology, when used strategically, can boost collaborative learning and the development of cognitive skills.

higher education. However, he warns that the simple use of digital resources does not guarantee effective learning; educators need to deeply understand both Bloom's Taxonomy and the dynamics of collaborative learning to structure activities that enhance student engagement.

Given this scenario, this article presents a literature review with the objective of analyzing the applicability of Bloom's Taxonomy in collaborative learning activities in distance education. The research seeks to identify challenges and best practices, offering a critical view on how this taxonomy can be integrated into virtual environments in order to maximize the educational potential of distance education.

2. METHODOLOGY

This review was conducted based on methodological guidelines established in the scientific literature, ensuring rigor and transparency in the investigation on the application of Bloom's Taxonomy in collaborative learning environments in Distance Education (EaD). The methodological process involved the definition of inclusion and exclusion criteria, as well as the synthesis of the collected data, aiming to ensure the quality and relevance of the studies analyzed.

To ensure that the selected studies were relevant and methodologically robust, the following inclusion criteria were established:

- **Publication Period**: Studies published between 2013 and 2023 were considered, covering a decade of recent research, in order to capture contemporary trends and advances in the field.
- **Publication Type**: Peer-reviewed articles that presented empirical results, whether quantitative or qualitative, were included.
- **Language**: Studies published in Portuguese, English or Spanish were selected, expanding the geographic and cultural scope of the review.
- **Thematic Focus**: Priority was given to studies that specifically addressed the application of Bloom's Taxonomy in collaborative learning contexts in distance education.

The search for relevant studies was carried out systematically. Key terms such as “Bloom’s Taxonomy”, “collaborative learning”, “Distance Learning” and “educational technologies” were used, combined by Boolean operators to refine the results and increase the accuracy of the search.

The databases consulted included: *Scopus*, *Web of Science*, *ERIC* and *Google*

Scholar. In addition, a manual search was carried out in high-impact journals in the area, such as *Journal of Educational Technology & Society* and the *Brazilian Journal of Education*.

The selection of studies followed a step-by-step process:

1. Initial Screening: Reading titles and abstracts to identify potentially relevant studies. relevant.

2. Complete Reading: Full analysis of the texts to confirm their suitability to the inclusion criteria.

3. Quality Assessment: Application of critical assessment instruments for determine the validity and reliability of the selected studies.

The extracted data were organized and synthesized to meet the objectives of the review. The adoption of this structured methodology provides a solid basis for future discussions, allowing not only the identification of good practices, but also the analysis of the challenges faced in the implementation of Bloom's Taxonomy in distance education. Thus, the findings of this review contribute to the improvement of pedagogical practices and to the development of strategies that integrate collaborative learning and the effective use of educational technologies in distance education.

3. LITERATURE REVIEW

Widely recognized in the field of education, Bloom's Taxonomy organizes educational objectives into a hierarchy of increasing complexity, assisting both in structuring teaching and in assessing learning. Proposed by Bloom *et al.* (2001), this classification establishes six cognitive levels, representing different stages of learning and development of critical thinking.

The first level, Knowledge (Remember), refers to the ability to retrieve previously acquired information, covering facts, concepts and procedures. This level involves memorizing and recalling specific data, such as identifying historical dates, defining technical terms or reciting mathematical formulas.

The second level, Comprehension (Understanding), relates to the ability to interpret, reformulate and explain information in a coherent manner, demonstrating significant assimilation of the content. At this stage, learners demonstrate understanding by rewriting concepts in their own words, summarizing texts or describing processes in detail.

The third level, Application (Apply), is characterized by the use of acquired knowledge in new contexts, allowing students to employ rules, methods and concepts

in problem-solving and performing practical tasks. Examples of this phase include applying mathematical principles to new calculations or conducting scientific experiments based on previously studied theories.

At the fourth level, Analysis (Analyze), the focus is on breaking down complex information into smaller parts, promoting the identification of underlying patterns, relationships, and structures. This stage requires critical thinking to distinguish between sound and flawed arguments, identify implicit assumptions, and compare different perspectives on the same phenomenon.

The fifth level, Synthesis (Create), corresponds to the ability to reorganize diverse elements to generate new ideas or concepts, resulting in the formulation of innovative solutions. At this level, learners are challenged to develop strategic plans, develop new projects and produce argumentative texts based on multiple sources of knowledge.

Finally, the sixth level, Evaluation (Evaluate), represents the most advanced stage of the cognitive hierarchy, requiring critical judgment based on pre-established criteria. Students who reach this level are able to justify their opinions, compare different approaches and make decisions based on evidence, demonstrating a deep mastery of knowledge and analytical reflection.

Bloom's Taxonomy, therefore, constitutes an essential reference for the formulation of effective pedagogical strategies, promoting progressive learning aligned with the contemporary demands of education. Its application in didactic planning enables educators to encourage students' cognitive development, from the initial acquisition of knowledge to the capacity for critical evaluation and innovative creation.

3.1 Application of Bloom's Taxonomy in Distance Learning

Since its inception in 1956, Bloom's Taxonomy has been a central reference in structuring educational objectives, organizing them in a hierarchy that ranges from basic knowledge to critical evaluation. With the advancement of digital technologies, its applicability in Distance Learning (EaD) has become the object of analysis and adaptation to meet the contemporary demands of virtual education.

Bloom *et al.*(2001) revised the original taxonomy, incorporating cognitive and metacognitive dimensions, making it more flexible and appropriate to the context of distance learning. The authors argue that, in digital environments, it is possible to develop higher cognitive skills, such as analysis and synthesis, as long as the activities are carefully planned and aligned with educational objectives. However, Garrison (2011) points out that the absence of

face-to-face interactions in distance learning may limit the achievement of the higher levels of the taxonomy unless appropriate pedagogical strategies are implemented.

In the Brazilian context, Valente *et al.*(2018) highlight the importance of Bloom's Taxonomy in organizing content and defining stages in the teaching-learning process in distance education. The authors emphasize that, by structuring activities based on this taxonomy, educators can favor students' cognitive progression, ensuring not only the acquisition of knowledge, but also the development of critical and reflective skills. However, they warn that the application of higher levels of the taxonomy, such as synthesis and evaluation, can be challenging in predominantly asynchronous environments.

Recent studies have investigated the effectiveness of Bloom's Taxonomy categories in implementing collaborative learning in distance education, especially considering the challenges imposed by the absence of physical contact between teachers and students.

Meroto *et al.*(2024), analyzed

developed strategies to implement collaborative learning in virtual environments, using Bloom's Taxonomy to structure activities aimed at developing higher cognitive skills. The authors highlight that, although virtual collaboration may face challenges due to the lack of face-to-face interaction, the appropriate use of the taxonomy's categories can mitigate such difficulties, promoting greater student engagement.

The study “Bloom’s Taxonomy and its Applicability in Collaborative Learning in Distance Education” (Santos *et al.*, 2023), examines how different categories of the taxonomy can be applied to plan collaborative activities in distance learning. The authors emphasize that, despite the limitations of the virtual environment, such as the absence of physical contact, the strategic use of the levels of analysis, evaluation, and creation can facilitate both the monitoring and evaluation of student performance, promoting more meaningful learning.

Furthermore, the study “Integration of Collaborative Learning with the Use of Digital Technologies and Bloom’s Taxonomy” (Andrade *et al.*, 2023) investigates how the combination of digital technologies and the Bloom's Taxonomy framework can overcome the barriers of the lack of physical interaction in distance learning. The authors suggest that activities planned at the higher levels of the taxonomy, such as synthesis and evaluation, when integrated with collaborative digital tools, can improve the assessment and monitoring of student performance in virtual environments.

The studies analyzed indicate that, although the absence of physical contact in distance learning

presents challenges for assessing and monitoring student performance, the careful application of the higher categories of Bloom's Taxonomy, combined with the strategic use of digital technologies, can promote effective collaborative learning and more accurate monitoring of student progress. In this sense, the integration of digital technologies that enable synchronous and asynchronous interactions becomes essential to overcome such challenges.

Furthermore, integrating Bloom's Taxonomy with active methodologies, such as problem-based learning, has proven to be an effective approach to stimulate student engagement at more advanced cognitive levels. Structuring activities that encourage collaboration and real-world problem-solving enables the development of higher-level skills in the taxonomy, making learning more meaningful and applied, even in virtual contexts.

Therefore, the application of Bloom's Taxonomy in distance learning requires adaptations that consider the specificities of the virtual environment. The adoption of pedagogical strategies that promote meaningful interaction and the effective use of educational technologies are fundamental elements to enhance the cognitive development of students in distance learning contexts.

3.2. Collaborative Learning in Distance Education

Collaborative learning is an essential pedagogical approach for the development of social and cognitive skills, especially in the context of Distance Learning (EaD). Peer interaction in educational environments not only favors the collective construction of knowledge, but also strengthens students' intrinsic motivation and engagement. By participating in collaborative activities, students are challenged to confront different perspectives, resolve cognitive conflicts, and deepen their understanding of content, promoting more meaningful and reflective learning.

However, the implementation of collaborative learning in distance education presents specific challenges, such as the absence of face-to-face interactions and the dependence on technologies that enable effective communication and cooperation. To better understand the dynamics of this teaching model, Garrison, Anderson and Archer (2000) introduced the Community of Inquiry model (*Community of Inquiry - CoI*), a theoretical framework that explains meaningful learning in technology-mediated environments.

This model highlights the relevance of collaboration between participants in the teaching-learning process and establishes three fundamental elements for the construction of the

knowledge in virtual environments (Garrison; Anderson; Archer, 2000):

a) Cognitive Presence – Refers to the students' ability to construct and validate meanings through critical reflection and collaborative discourse. This component is directly related to the development of critical thinking, enabling students to deepen their understanding of content, perform analyses, synthesize information and prepare well-founded assessments.

b) Social Presence – Represents the degree of interpersonal involvement between participants in the educational community, promoting a sense of belonging and an environment of genuine interaction. This aspect is essential for student engagement, facilitating the exchange of ideas and the collective construction of knowledge in a collaborative space.

c) Teaching Presence – This concerns the role of the teacher or tutor in mediating the learning process, acting in the organization and conduction of interactions and in the management of the virtual environment. The teaching presence is fundamental to structure didactic activities, provide *feedback* continuous and ensure that educational objectives are achieved effectively.

The interrelationship between these three elements is essential for creating a dynamic and participatory learning environment, promoting an enriching educational experience in technology-mediated contexts. The balance between cognitive, social and teaching presences enables a more effective pedagogical approach, encouraging students to interact, reflect critically and actively co-construct knowledge.

In the context of distance education, the CoI model has been widely adopted as a reference theoretical framework to guide pedagogical practices that promote interaction among students, even in the absence of face-to-face contact. The adoption of methodologies that strengthen interaction and engagement is crucial to creating a more engaging and meaningful learning environment.

Furthermore, this model has been used to support the *design* instructional courses *online*, favoring the implementation of active methodologies that enhance student collaboration and engagement. Strategies such as project-based learning, structured discussion forums, collaborative activities and the use of interactive technologies emerge as fundamental resources to strengthen social and cognitive presence in the virtual environment. In this way, the CoI model contributes to more effective teaching, promoting not only the assimilation of knowledge, but also the development of critical, reflective and collaborative skills in students.

Brazilian researchers have also explored the topic, highlighting its relevance

for the construction of knowledge and the development of advanced cognitive skills. Kenski (2012) emphasizes that, although collaboration is an essential element for learning in virtual environments, its effectiveness depends on a *design* well-structured instructional system. The author argues that, in the absence of clear guidelines and well-defined educational objectives, interactions between students can become superficial, limiting the achievement of deeper levels of learning.

In this sense, Kenski (2012) reinforces the importance of pedagogical planning that integrates technological tools strategically, going beyond resources that merely enable communication. For collaborative learning to reach its full potential, it is essential that these tools promote meaningful and cognitively challenging interactions, encouraging students' active participation in problem-solving, critical thinking, and the collective construction of knowledge. In this way, the adoption of structured methodologies and the appropriate use of technology can transform distance learning into a dynamic, engaging, and intellectually stimulating environment.

Recent studies corroborate these perspectives. Soeira (2010) conducted qualitative research through a case study with students in a specialization course in distance learning, highlighting the importance of tutor mediation in discussion forums for the construction of collaborative learning in the context of distance learning. The research showed that, in the absence of effective mediation, interactions tend to be superficial, limiting the collaborative potential of the virtual environment.

Another essential aspect is the choice and appropriate use of digital resources in promoting collaborative learning in distance learning. Numerous studies show that tools such as forums, *wikis* and videoconferencing platforms are often used to facilitate interaction and collaboration among students. However, these studies also highlight that the simple use of these technologies does not guarantee effective collaboration; there must be pedagogical intentionality and structured planning to integrate them coherently with educational objectives.

For example, Santos (2008) analyzed the process of collaboration in education *online* and concluded that interaction mediated by information and communication technologies, such as forums and *chats*, requires careful pedagogical planning to promote the collective construction of knowledge. The study emphasizes that, without adequate mediation and clear objectives, interactions can remain superficial, not reaching the expected collaborative potential.

Furthermore, Inuzuka's (2008) study on the educational use of *wiki* highlights that, for this tool to be effective in the educational context, it is essential that the educational institution adopts an appropriate pedagogical methodology. The author emphasizes that the simple introduction of

Technology is not enough; pedagogical support is needed to promote collaboration and co-authorship among students.

Therefore, collaborative learning in distance learning requires a careful approach that takes into account the challenges of the modality. The implementation of a*design*Adequate instructional design, combined with the strategic use of technologies and qualified mediation by tutors, are key elements to foster meaningful interactions and promote the development of cognitive and social skills in students. In this way, distance learning can become a dynamic, participatory environment that is conducive to the construction of collective knowledge.

3.3. Integration of Bloom's Taxonomy into Collaborative Learning in Distance Education

The integration of Bloom's Taxonomy into collaborative learning activities in distance education has emerged as a promising pedagogical approach, aiming to structure the teaching-learning process in a way that promotes cognitive development at all hierarchical levels proposed by Bloom. The combination of Bloom's Taxonomy with collaborative methodologies in virtual environments enhances the collective construction of knowledge, facilitating students' progression from basic understanding to critical evaluation.

Recent studies corroborate this perspective. Santos*et al.*(2024) analyze how the integration of these approaches promotes a more adaptive and immersive education, facilitating students' cognitive progression. Likewise, Conceição*et al.*(2024) investigate the contributions of Bloom's Taxonomy and collaborative learning in the reformulation of High School, emphasizing the importance of active methodologies in promoting higher cognitive levels. Both studies show that the fusion between Bloom's Taxonomy and collaborative learning constitutes an effective strategy to facilitate student progression.

However, effective implementation of Bloom's Taxonomy in collaborative contexts requires meticulous pedagogical planning. Garrison (2011) highlights that, for collaboration to be truly effective, it is essential that students are engaged in tasks that demand advanced cognitive skills, such as solving complex problems and developing innovative projects. Therefore, instructional design must be carefully crafted to align collaborative activities with educational objectives corresponding to the higher levels of the taxonomy.

The combination of Bloom's Taxonomy with collaborative learning not only facilitates knowledge acquisition, but also develops critical and

reflective in students. Furthermore, the synergy between these approaches favors more meaningful and lasting learning, especially when mediated by digital technologies that foster interaction and cooperation among participants.

However, the implementation of this integration is not without its challenges. As pointed out by Bloom et al. (2001), one of the main obstacles is to ensure the active and equitable participation of all students in collaborative activities, especially in virtual environments, where interaction occurs in a way mediated by technologies. To overcome these difficulties, it is essential that educators take an active role in mediating interactions, ensuring that the proposed activities are aligned with the educational objectives outlined by Bloom's Taxonomy.

In summary, the integration of Bloom's Taxonomy into collaborative learning in distance education represents a robust pedagogical strategy capable of enriching the educational process and fostering the development of higher cognitive skills in students. For this integration to be successful, careful planning, the strategic use of educational technologies and effective teacher mediation are essential, ensuring that collaborative activities are challenging, inclusive and aligned with the proposed educational objectives.

3.3. Challenges and Opportunities in Applying Bloom's Taxonomy

The implementation of Bloom's Taxonomy in collaborative learning contexts in Distance Education (DE) presents both challenges and opportunities. The virtual environment offers new possibilities for the development of higher cognitive skills, but it also imposes barriers that need to be overcome to ensure the effectiveness of the approach. According to Bates (2019), technology-mediated learning requires educators to adopt innovative strategies that combine interactive digital resources with active pedagogical methodologies, allowing students to develop skills such as critical analysis, synthesis and evaluation.

One of the main challenges identified in the literature concerns student engagement at higher cognitive levels of Bloom's Taxonomy. Moran (2014) highlights that, although distance learning provides flexibility and expanded access to education, the absence of face-to-face interaction can hinder the development of skills associated with critical thinking and problem-solving. In this sense, strategies such as the design of challenge-based activities, project-based learning and gamification have been proposed as solutions to stimulate collaboration and active student participation.

Another relevant obstacle is the need for teacher training for the effective use of Bloom's Taxonomy in virtual environments. As pointed out by Valente *et al.*(2018), many educators still find it difficult to adapt traditional pedagogical strategies to digital contexts. Inadequate use of educational technologies can result in superficial learning experiences, limiting students' progression to higher levels of the taxonomy. To mitigate this problem, it is essential to offer continuing education programs aimed at developing teaching skills in the use of active methodologies and digital tools.

On the other hand, distance learning also offers significant opportunities for the application of Bloom's Taxonomy in collaborative environments. Several authors indicate that the use of adaptive educational platforms, which adjust content and challenges based on student performance, contributes to progressive learning and the development of student autonomy. In addition, the application of Artificial Intelligence (AI) technologies has proven to be an effective strategy for monitoring student engagement and suggesting activities aligned with the different levels of Bloom's Taxonomy.

In this sense, Paula (2021) highlights that adaptive platforms promote the personalization of teaching, favoring not only student autonomy but also increasing efficiency in the teaching-learning process. According to the author, by allowing dynamic adjustments in content according to student progress, these platforms encourage more targeted and efficient learning.

Additionally, Hey (2024) explores how Artificial Intelligence has the potential to transform Bloom's Taxonomy, expanding the applicability of cognitive domains and reshaping the way students interact with knowledge. The research suggests that AI can facilitate students' transition through the different levels of the taxonomy, assisting in the analysis of individual performance and recommending activities that favor critical thinking and problem-solving.

Thus, the literature shows that the integration between adaptive platforms and Artificial Intelligence in the educational context can boost the personalization of teaching, promote student autonomy and ensure that educational activities are aligned with the cognitive skills established by Bloom's Taxonomy.

Given this scenario, it becomes clear that the integration of Bloom's Taxonomy into collaborative distance learning requires not only careful pedagogical planning, but also the strategic use of digital technologies to enhance learning. Overcoming the challenges identified requires the adoption of innovative approaches and the training of teachers to explore the potential of the virtual environment, ensuring that students can achieve

higher levels of learning and critical thinking.

4. DISCUSSION

The analysis of the reviewed studies reveals that the application of Bloom's Taxonomy in Distance Learning (EaD) contexts, especially when associated with collaborative practices, can be highly effective in developing higher cognitive skills. However, the implementation of this approach faces significant challenges that need to be considered to ensure its effectiveness.

One of the main challenges identified is the need for adequate teacher training for the effective use of educational technologies. Many teachers still lack the necessary skills to fully integrate Information and Communication Technologies (ICT) into their pedagogical practices, limiting the effectiveness of Bloom's Taxonomy in virtual environments. Cardoso, Almeida, and Silveira (2021), for example, analyzed continuing education initiatives in Brazil and concluded that, although these initiatives contribute to the construction of knowledge about ICT, there are still significant challenges in training teachers for the effective use of these technologies. Furthermore, Junqueira and Cecílio (2009) highlight that the training offered to teachers is often not sufficient to prepare them to integrate ICT effectively into their pedagogical practices, resulting in limited or inadequate use of these tools. In this context, continuing education therefore becomes essential to enable educators to use technological tools in a way that promotes meaningful interactions and stimulates critical thinking among students.

Furthermore, the variability in the level of student engagement in distance learning environments represents another obstacle. The absence of face-to-face interactions can result in feelings of isolation, negatively affecting students' motivation and active participation. In this context, collaborative learning emerges as a potentially effective strategy to mitigate these effects, promoting a sense of community and belonging. However, as pointed out by Garrison (2011), the effectiveness of this approach depends on careful pedagogical design that encourages students' active participation and engagement in tasks that require advanced cognitive skills.

The limitations imposed by distance learning platforms also deserve attention. Many of these platforms do not offer adequate support for activities that involve the upper levels of Bloom's Taxonomy, such as analysis, synthesis and evaluation. The lack of functionalities that facilitate quality synchronous and asynchronous interactions can restrict the

depth of discussions and effective collaboration among students. Therefore, it is crucial that educational institutions invest in technological platforms that support a wide range of interactive activities and that are intuitive for both teachers and students.

The lack of synchronous interactions, in particular, can make it difficult to fully apply the higher levels of Bloom's Taxonomy. Real-time interactions allow for deeper discussions, immediate clarification of doubts, and instant feedback, which are essential elements for the development of complex cognitive skills. To overcome this limitation, it is recommended to implement regular synchronous sessions, complemented by well-structured asynchronous activities, creating a hybrid learning environment that maximizes the benefits of both formats.

In summary, although the integration of Bloom's Taxonomy into collaborative distance learning contexts presents significant potential for improving students' cognitive skills, its successful implementation requires overcoming challenges related to teacher training, student engagement, and technological infrastructure. Innovative pedagogical approaches, combined with investments in technology and continuous professional development, are essential to maximize the benefits of this educational strategy.

5. CONCLUSION

This systematic review showed that the integration of Bloom's Taxonomy into collaborative learning in Distance Learning (DE) environments represents a promising pedagogical strategy to promote the development of higher cognitive skills. However, the effective application of this model requires a structured approach, considering not only the challenges inherent to DE, but also the potential offered by educational technologies. The need to adapt the principles of the taxonomy to the virtual context reinforces the importance of careful pedagogical planning and teacher training to ensure that educational objectives are fully achieved.

The studies analyzed demonstrated that, when properly implemented, Bloom's Taxonomy can guide the construction of collaborative activities that go beyond the mere transmission of knowledge, encouraging the development of critical thinking, intellectual autonomy and the ability to solve complex problems. Interactions between students, when mediated by well-designed collaborative strategies, allow the construction

knowledge and encourage students to progress through the higher levels of the taxonomy, such as analysis, synthesis and evaluation. However, for this approach to be effective, it is essential that teachers are trained not only in the use of digital tools, but also in the design of pedagogical practices that encourage active student participation.

Despite the clear benefits, the literature review also revealed significant challenges that need to be overcome in order to successfully integrate Bloom's Taxonomy into collaborative distance learning. One of the main obstacles is the variability in student engagement, which can be influenced by factors such as the absence of synchronous interactions and the lack of adequate support throughout the learning process. In addition, the need for robust instructional design and active teacher mediation are essential aspects to ensure that collaborative activities result in meaningful and equitable learning for all students. Without an adequate pedagogical framework, there is a risk that collaborative learning will become just a superficial interaction, with no real impact on the cognitive progression of participants.

Given this scenario, it becomes clear that the application of Bloom's Taxonomy in collaborative distance education requires not only technological innovation, but also an in-depth reflection on the educational practices adopted in this context. The future of distance education will depend, to a large extent, on the ability of educators to integrate solid theoretical models with innovative pedagogical strategies, promoting a dynamic and inclusive learning environment. In addition, it is essential that new research be conducted to explore methodologies that increase the effectiveness of this approach, considering different learning formats and student profiles.

To expand the positive impact of Bloom's Taxonomy on distance learning, it is recommended that future research analyze the effectiveness of hybrid strategies that combine synchronous and asynchronous activities in a balanced manner. It is also necessary to further adapt these practices to meet the needs of different audiences, ensuring that students with different levels of familiarity with technology and different learning styles can fully benefit from the collaborative approach. In this way, it will be possible to consolidate distance learning as an increasingly effective, interactive modality that is aligned with the demands of the 21st century.

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