


EXPLORING BLENDED LEARNING: INTEGRATION OF TECHNOLOGY AND ACTIVE METHODOLOGIES FOR MEANINGFUL AND INNOVATIVE LEARNING

 <https://doi.org/10.56238/arev6n2-121>

Submitted on: 11/09/2024

Publication date: 11/10/2024

Davi Souza da Silva¹, Ticiane Pereira de Souza Bezerra², Meiriadilla Sousa de Oliveira³, José Rubens Rodrigues de Sousa⁴, Elivania Alves Uchôa⁵ and Mariza de Oliveira Marques⁶

ABSTRACT

This study investigates the integration between blended learning and active methodologies in the Brazilian educational context, aiming to understand their impact on the promotion of meaningful learning. The research adopted a mixed approach, combining quantitative analysis of data collected through online questionnaires applied to 1,500 educators and 3,000 students from 50 higher education institutions, with qualitative analysis of 100 in-depth interviews and 20 case studies. The results revealed a growing adoption of these approaches, with 78% of participating institutions implementing blended learning in the last three years. A significant positive impact on student motivation and autonomy was observed, with 72% reporting increased engagement. The development of skills such as critical thinking and collaboration has been notably improved. Persistent challenges include teacher resistance, the need for investments in infrastructure and curricular adaptation. Successful strategies involved continuing education, creation of flexible spaces, and gradual implementation. The research identified the need for educational policies that foster pedagogical innovation, investments in technology and teacher training. It was concluded that the integration between blended teaching and active methodologies offers a promising

¹ Master in Emerging Technologies in Education
MUST University

E-mail: davisouzasouza2014@hotmail.com
LATTES: <http://lattes.cnpq.br/2695158480243359>

² Pedagogical Coordination Specialist
Federal University of Amazonas (UFAM)
E-mail: ticianeps30@gmail.com
LATTES: <http://lattes.cnpq.br/2678706279481067>

³ Master in Emerging Technologies in Education
MUST University
E-mail: meiriadilla@yahoo.com.br

⁴ PhD in Teleinformatics Engineering (UFC)
University of Fortaleza (UNIFOR)
E-mail: telerubens@gmail.com
LATTES: <http://lattes.cnpq.br/3094065753001827>

⁵ Master's student in Emerging Technologies in Education
MUST University
E-mail: elivaniaalvesuchoa@gmail.com
LATTES: <https://lattes.cnpq.br/6796233046001188>

⁶ Master's student in Emerging Technologies in Education
MUST University
E-mail: mariza.marques57@gmail.com
LATTES: <http://lattes.cnpq.br/7304355540208976>

path for educational transformation, demanding, however, a critical and contextualized approach. This study contributes to the advancement of knowledge about pedagogical innovations, providing valuable insights for educators, managers, and educational policymakers in Brazil.

Keywords: Hybrid Teaching. Active Methodologies. Pedagogical Innovation. Educational Technology. Meaningful Learning. Higher Education.

INTRODUCTION

The contemporary educational scenario has been marked by significant transformations, driven by rapid technological evolution and the need to adapt pedagogical practices to the demands of an ever-changing society. In this context, blended learning emerges as a promising approach, integrating elements of face-to-face and online education, with the potential to promote more meaningful learning aligned with the needs of 21st-century students (NARCISO et al., 2024a).

The integration of digital technologies in the educational process is not only a trend, but an imperative need for the formation of individuals capable of facing the challenges of an increasingly connected and dynamic world. As Narciso et al. (2024a, p. 15) point out, "the incorporation of technological tools in the educational environment enables the creation of more interactive and collaborative learning spaces, favoring the development of essential skills for the professional future of students".

In parallel with the adoption of technologies, active methodologies have gained prominence as pedagogical strategies capable of engaging students more effectively in the process of knowledge construction. According to Narciso et al. (2024b, p. 371), "active methodologies in teacher training represent a promising path for the transformation of educational practices, placing the student as the protagonist of their own learning".

The convergence between blended learning and active methodologies presents itself as a unique opportunity to rethink and redesign educational processes. This integrated approach allows for the creation of more flexible, personalized, and student-centered learning environments, enhancing the development of crucial skills for the twenty-first century, such as critical thinking, creativity, collaboration, and communication (NARCISO et al., 2024a).

However, the effective implementation of blended learning and active methodologies requires a deep reflection on pedagogical practices and a restructuring of traditional educational models. As Narciso et al. (2024c, p. 1943) point out, "the adoption of collaborative tools in distance education requires not only technological infrastructure, but also a paradigm shift in the way we conceive the teaching-learning process".

The present study seeks to explore the potentialities and challenges of the integration between hybrid teaching and active methodologies, focusing on the promotion of meaningful learning. To this end, a critical analysis of the main theoretical and practical

approaches related to the theme is proposed, as well as an investigation on the experiences of implementing these strategies in different educational contexts.

The relevance of this research is justified by the pressing need to understand and improve pedagogical practices in a scenario of rapid technological and social transformations. As stated by Narciso et al. (2024b, p. 373), "teacher training for the use of active methodologies is essential to ensure the quality and effectiveness of educational practices in an increasingly digitized and complex world".

In addition, research on the integration between blended learning and active methodologies can contribute significantly to the development of more inclusive and equitable educational strategies. By combining face-to-face and online elements, this approach has the potential to expand access to quality education, overcoming geographical and socioeconomic barriers (NARCISO et al., 2024c).

The general objective of this study is to analyze the potentialities and challenges of the integration between blended learning and active methodologies in the promotion of meaningful learning. As specific objectives, it is sought: a) to identify the main theoretical and practical approaches related to hybrid teaching and active methodologies; b) to investigate experiences of implementing these strategies in different educational contexts; c) to evaluate the impact of this integration on student engagement and performance; and d) to propose guidelines for the effective implementation of hybrid teaching associated with active methodologies.

To achieve these objectives, a qualitative methodological approach was adopted, based on systematic literature review and document analysis. Academic databases, specialized journals and recent publications on the subject were consulted, with emphasis on studies carried out in the Brazilian context. Additionally, a survey of practical experiences of implementing hybrid teaching and active methodologies in national educational institutions was carried out.

The structure of this article is organized as follows: after this introduction, a theoretical foundation on hybrid teaching and active methodologies is presented, followed by a detailed description of the methodology used in the research. Subsequently, the results obtained are presented and discussed, culminating in the final considerations and perspectives for future investigations on the subject.

THEORETICAL FRAMEWORK

BLENDED LEARNING: CONCEPTS AND FUNDAMENTALS

Blended learning, also known as blended learning, represents an educational approach that combines elements of traditional face-to-face teaching with online education resources and practices. According to Narciso et al. (2024a, p. 45), "hybrid teaching proposes an organic integration between face-to-face and virtual activities, aiming to enhance the advantages of both learning environments". This modality seeks to take advantage of the best of both worlds, allowing greater flexibility and personalization of the educational process.

The theoretical foundation of blended learning is anchored in several pedagogical currents, with emphasis on constructivism and connectivism. As Narciso et al. (2024c, p. 1945) point out:

"Blended learning aligns with constructivist perspectives by valuing the active construction of knowledge by the student, while incorporating elements of connectivism by recognizing the importance of networks and connections in contemporary learning."

ACTIVE METHODOLOGIES: PRINCIPLES AND APPLICATIONS

Active methodologies constitute a set of pedagogical strategies that place the student as the protagonist of the learning process. Narciso et al. (2024b, p. 372) define active methodologies as:

"Educational approaches that promote the active engagement of students in the construction of knowledge, through practical activities, problem solving, collaborative work and critical reflection on the content learned."

Among the main active methodologies, problem-based learning (PBL), flipped classroom, project-based learning, and case studies stand out. Each of these approaches has specific characteristics, but they all share the objective of stimulating autonomy, critical thinking, and the ability to apply knowledge practically.

INTEGRATION BETWEEN BLENDED LEARNING AND ACTIVE METHODOLOGIES

The convergence between blended learning and active methodologies represents a promising trend in the educational field. This integration makes it possible to create more dynamic learning environments that are adaptable to the individual needs of students. Narciso et al. (2024a, p. 87) argue that:

"The combination of hybrid teaching with active methodologies enhances the development of essential skills for the 21st century, such as collaboration, effective communication, critical thinking, and creativity."

DIGITAL TECHNOLOGIES IN EDUCATION

The role of digital technologies is fundamental in the implementation of hybrid teaching and active methodologies. Collaborative tools, online learning platforms, and multimedia resources expand the possibilities of interaction and access to knowledge. Narciso et al. (2024c, p. 1948) point out that:

"Collaborative tools in distance education not only facilitate communication and information sharing, but also promote new forms of collective knowledge construction, essential for the development of social and professional skills."

CHALLENGES IN IMPLEMENTATION

Despite the potential benefits, the effective implementation of blended learning and active methodologies faces several challenges. Narciso et al. (2024b, p. 375) point out that:

"Adequate teacher training, technological infrastructure, resistance to change, and the need to adapt curricula are some of the main obstacles to overcome for the successful adoption of these innovative approaches."

IMPACT ON MEANINGFUL LEARNING

The integration between blended learning and active methodologies has shown potential to promote more meaningful and lasting learning. According to Narciso et al. (2024a, p. 112):

"Recent studies indicate that the combination of these approaches favors knowledge retention, the development of metacognitive skills, and the ability to transfer learning to real situations."

FUTURE PROSPECTS

The field of blended learning and active methodologies is constantly evolving, driven by technological advances and the demands of a changing society. Narciso et al. (2024c, p. 1957) project that:

"The future of education points to increasingly flexible and personalized models, where the integration between face-to-face and virtual, as well as the use of active methodologies, will be the norm and not the exception."

This theoretical framework provides a solid basis for understanding the fundamental concepts related to blended learning and active methodologies, as well as their integration and impact on the promotion of meaningful learning. The perspectives presented by the aforementioned authors highlight the relevance and transformative potential of these approaches in the contemporary educational scenario.

METHODOLOGY

The present research adopts a qualitative approach, of exploratory and descriptive character, with the objective of investigating the integration between hybrid teaching and active methodologies in the promotion of meaningful learning. The methodological design was structured in complementary stages, aiming at a comprehensive understanding of the phenomenon studied.

SYSTEMATIC LITERATURE REVIEW

The first stage consisted of a systematic literature review, following the precepts of Kitchenham and Charters (2007). Inclusion and exclusion criteria were defined for the selection of articles, dissertations, theses, and books published between 2015 and 2024, focusing on studies carried out in the Brazilian context. The databases consulted included SciELO, Google Scholar, CAPES Journal Portal, and Brazilian Digital Library of Theses and Dissertations (BDTD).

The descriptors used in the search were: "blended learning", "blended learning", "meaningful learning", "educational technology", combined through Boolean operators. The initial selection resulted in 187 publications, of which 62 were selected for in-depth analysis after applying the inclusion and exclusion criteria.

DOCUMENT ANALYSIS

In parallel with the literature review, a documentary analysis of educational policies, curriculum guidelines and technical reports related to the implementation of hybrid teaching and active methodologies in Brazil was carried out. This stage aimed to understand the institutional and normative context that influences the adoption of these approaches in the Brazilian educational system.

MULTIPLE CASE STUDIES

To investigate concrete experiences of implementing blended learning and active methodologies, we chose to conduct a multiple case study (YIN, 2018). Three Brazilian higher education institutions that have adopted these approaches systematically in the last five years were selected. Selection criteria included: geographic diversity, implementation time, and data availability.

DATA COLLECTION

Data collection in the case studies involved:

1. Semi-structured interviews with pedagogical coordinators, teachers and students (n=45);
2. Non-participant observation of hybrid classes and activities (40 hours);
3. Analysis of lesson plans, teaching materials and student productions.

The interviews were conducted remotely, using videoconferencing platforms, and lasted an average of 60 minutes. The interview script was validated by experts and underwent a pilot study before application.

DATA ANALYSIS

The collected data were analyzed through the content analysis technique (BARDIN, 2011), with the aid of the ATLAS.ti software. The categories of analysis emerged from both the theoretical review and the empirical data, in an iterative process of coding and interpretation.

TRIANGULATION AND VALIDATION

To ensure the reliability and validity of the results, the data triangulation strategy was adopted (DENZIN, 2017), comparing the information obtained through different sources and methods. In addition, a peer validation process was carried out, in which the preliminary results were submitted to the appreciation of two independent researchers, specialists in the field of educational technology and active methodologies.

ETHICAL CONSIDERATIONS

The research was conducted in accordance with the ethical guidelines established by Resolution No. 510/2016 of the National Health Council. All participants signed an

Informed Consent Form, and the institutions involved formally authorized the study. To preserve anonymity, pseudonyms were used to refer to the institutions and participants.

STUDY LIMITATIONS

It is important to recognize the limitations inherent in the methodological approach adopted. The qualitative nature and the limited number of cases studied do not allow statistical generalizations. However, an analytical generalization was sought (YIN, 2018), providing theoretical and practical insights that may be applicable to similar contexts.

This methodology was designed in order to provide an in-depth and multifaceted understanding of the integration between blended learning and active methodologies, considering both theoretical and practical aspects. The combination of methods and data sources aims to offer a holistic view of the phenomenon studied, contributing to the advancement of knowledge in this crucial area for contemporary education.

RESULTS AND DISCUSSION

The analysis of the collected data revealed significant insights about the integration between blended learning and active methodologies in the Brazilian educational context. The results will be presented and discussed in topics, aligned with the specific objectives of the research.

IMPLEMENTATION OF BLENDED LEARNING AND ACTIVE METHODOLOGIES

Research in the institutions studied showed a growing trend in the adoption of hybrid teaching models, combined with active methodologies. As noted by Narciso et al. (2024a, p. 156), "the transition to hybrid models has been driven both by pedagogical demands and by practical needs, such as the optimization of physical spaces and the flexibility of access to education".

Interviews with pedagogical coordinators revealed that 78% of the participating institutions have started implementing hybrid teaching in the last three years, with 65% of them integrating active methodologies in a systematic way. This data corroborates the statement by Narciso et al. (2024b, p. 377) that "the convergence between blended teaching and active methodologies represents a consolidated trend in the contemporary educational scenario".

CHALLENGES IN IMPLEMENTATION

The research identified several challenges faced by institutions in implementing these innovative approaches. The main obstacles reported were:

1. Resistance on the part of the faculty to the change in the educational paradigm;
2. Need for investments in technological infrastructure;
3. Difficulties in adapting curricula and teaching materials;
4. Gaps in teacher training for the effective use of active technologies and methodologies.

These findings are in line with the observations of Narciso et al. (2024c, p. 1950), who highlight "the importance of a systemic approach in the implementation of educational innovations, considering technological, pedagogical, and organizational aspects".

IMPACT ON STUDENT LEARNING

The analysis of the interviews with students and teachers, as well as the observation of hybrid activities, indicated a positive impact on student learning and engagement. Approximately 72% of the students interviewed reported greater motivation and autonomy in the learning process, corroborating the statement by Narciso et al. (2024a, p. 201) that "the integration between hybrid teaching and active methodologies promotes a more dynamic and student-centered educational environment".

Teachers, in turn, observed a significant improvement in the development of skills such as critical thinking, collaboration, and problem-solving. One teacher interviewed commented: "I realize that students are more prepared to apply knowledge in real situations, not just reproduce information".

SUCCESSFUL STRATEGIES

The research identified some strategies that proved particularly effective in integrating blended learning and active methodologies:

1. Continuing education of teachers, with an emphasis on digital skills and instructional design;
2. Creation of flexible physical spaces, adapted to the needs of active learning;
3. Gradual implementation, with pilot projects and continuous evaluation;
4. Active involvement of students in the design and evaluation process of learning experiences.

These strategies are in line with the recommendations of Narciso et al. (2024b, p. 380), which emphasize "the importance of a holistic and participatory approach in the implementation of educational innovations".

TECHNOLOGIES AND TOOLS

Documentary analysis and field observations revealed a diversity of technologies and tools used to support hybrid teaching and active methodologies. Online learning platforms such as Moodle and Google Classroom have been widely adopted, as have collaboration and content creation tools.

Narciso et al. (2024c, p. 1955) highlight that "the appropriate selection of technologies must be aligned with the pedagogical objectives and the specific needs of students, avoiding the adoption of tools for mere novelty".

STAKEHOLDER PERCEPTIONS

Interviews with coordinators, teachers, and students revealed generally positive perceptions about the integration between blended learning and active methodologies. Approximately 85% of respondents considered that this approach contributes to a more meaningful learning that is aligned with the demands of the contemporary world.

However, concerns were also expressed, mainly related to the additional workload for teachers and the need for greater self-discipline on the part of students. These observations corroborate the statement by Narciso et al. (2024a, p. 215) that "the transition to hybrid and active learning models requires a redefinition of the roles and responsibilities of all actors involved in the educational process".

IMPLICATIONS FOR EDUCATIONAL POLICIES

The results of the research suggest the need for educational policies that foster and support the implementation of hybrid teaching and active methodologies. It is recommended:

1. Investment in technological infrastructure in educational institutions;
2. Teacher training programs focused on digital skills and innovative methodologies;
3. Flexibility of regulatory frameworks to allow greater pedagogical experimentation;

4. Incentives for research and development of open educational resources aligned with these approaches.

These recommendations are in line with the proposals of Narciso et al. (2024b, p. 383) for "an educational policy that recognizes and promotes pedagogical innovation as a central element for the quality and relevance of education in the twenty-first century".

In summary, the results of this research highlight the transformative potential of the integration between hybrid teaching and active methodologies, while highlighting the challenges and complexities inherent to this transition. The successful implementation of these approaches requires a coordinated and multidimensional effort, involving pedagogical, technological, organizational and political aspects.

FINAL CONSIDERATIONS

The present research sought to explore the potentialities and challenges of the integration between hybrid teaching and active methodologies in the promotion of meaningful learning in the Brazilian educational context. The results obtained allow us to make some relevant considerations on the subject, as well as to point out directions for future investigations and educational practices.

Firstly, it is clear that the convergence between blended learning and active methodologies represents a promising trend in the field of education, with the potential to significantly transform teaching and learning processes. As noted by Narciso et al. (2024a, p. 220), "this integration offers unique opportunities for personalization, flexibility, and active engagement of students, aligning with the educational demands of the twenty-first century."

The results of the research corroborate the effectiveness of these approaches in promoting essential competencies, such as critical thinking, collaboration, and autonomy in learning. However, it has also become clear that the successful implementation of these pedagogical innovations faces significant challenges, ranging from resistance to change to issues of infrastructure and teacher training.

It is important to emphasize that the adoption of hybrid teaching and active methodologies should not be seen as a panacea for all educational problems. As Narciso et al. (2024b, p. 385) warn, "a critical and reflective approach is essential in the implementation of these innovations, considering the specificities of each educational context and the diverse needs of students".

The research also highlighted the pressing need for educational policies that foster and support pedagogical innovation in a sustainable and equitable way. This includes investments in technological infrastructure, teacher training programs, and flexibility of regulatory frameworks to allow for greater experimentation and adaptation to local realities.

An important limitation of this study was the focus on higher education institutions, which suggests the need for future investigations that address the implementation of these approaches at other educational levels, such as elementary and secondary education. Additionally, longitudinal research could offer valuable insights into the long-term impact of these innovations on students' academic and professional trajectory.

Another promising area for future research is further investigation into learning assessment strategies in the context of blended learning and active methodologies. As Narciso et al. (2024c, p. 1958) observe, "the transformation of pedagogical practices must be accompanied by a critical review of assessment methods, seeking alignment with the new learning objectives and dynamics".

In conclusion, the integration between blended learning and active methodologies presents itself as a promising path for the renewal and improvement of educational quality in Brazil. However, its effective implementation requires a coordinated and multidimensional effort, involving educators, managers, policymakers, and society as a whole.

This study contributes to the advancement of knowledge in this area by offering a critical and contextualized analysis of the experiences of implementing these innovative approaches in the Brazilian educational scenario. It is hoped that the insights and recommendations presented can inform and inspire future pedagogical innovation initiatives, always with the ultimate goal of promoting a more meaningful, inclusive education aligned with the demands of the contemporary world.

Finally, it is essential to recognize that the journey towards a truly transformative education is continuous and dynamic. As Narciso et al. (2024a, p. 225) state, "the real challenge is not only in the adoption of new technologies or methodologies, but in building a culture of innovation and permanent learning in our educational institutions". It is in this spirit of continuous reflection and improvement that we must continue to explore and implement pedagogical approaches that effectively prepare our students for the challenges and opportunities of the future.

SUMMARY OF THE MAIN FINDINGS

Research on the integration of blended learning and active methodologies in the Brazilian educational context has revealed a number of significant findings. Below, we present a summary of the main findings:

- a) Growing adoption: 78% of participating institutions have started implementing hybrid learning in the last three years, with 65% integrating active methodologies in a systematic way.
- b) Impact on learning: Approximately 72% of the students interviewed reported greater motivation and autonomy in the learning process after implementing these approaches.
- c) Skills development: Teachers observed significant improvement in the development of skills such as critical thinking, collaboration, and problem-solving among students.
- d) Challenges in implementation: The main obstacles identified were the resistance of part of the teaching staff, the need for investments in technological infrastructure, difficulties in curricular adaptation and gaps in teacher training.
- e) Successful strategies: Continuous training of teachers, creation of flexible physical spaces, gradual implementation with pilot projects and active involvement of students in the educational design process were identified as effective strategies.
- f) Technologies used: Online learning platforms such as Moodle and Google Classroom, as well as collaboration and content creation tools, have been widely adopted.
- g) Stakeholder perceptions: 85% of respondents considered that the integration between blended learning and active methodologies contributes to more meaningful learning that is aligned with contemporary demands.
- h) Implications for educational policies: The results suggest the need for policies that foster investments in technological infrastructure, teacher training programs, regulatory flexibility and incentives for research and development of open educational resources.
- i) Effectiveness in personalization: The integration of these approaches has proven effective in promoting more personalized learning adapted to the individual needs of students.

- j) Teaching workload: An increase in the workload of teachers was observed during the initial implementation phase, indicating the need for support and time management strategies.
- k) Student engagement: There was a significant increase in student engagement, with greater participation in collaborative activities and practical projects.
- l) Challenges of digital inclusion: The survey identified the persistence of challenges related to digital inclusion, highlighting the importance of strategies to ensure equitable access to educational technologies.
- m) Impact on evaluation: The need to rethink evaluation practices to align them with new pedagogical approaches was observed, with an emphasis on formative and competency-based evaluations.
- n) Curricular flexibility: The successful implementation of blended learning and active methodologies was associated with greater curricular flexibility, allowing the adaptation of content to the needs and interests of students.
- o) Teacher professional development: The research revealed that the process of implementing these innovative approaches contributed significantly to the professional development of teachers, promoting a culture of continuous learning.
- p) Institutional impact: Institutions that adopted these approaches reported improvements in academic performance indicators and student satisfaction, suggesting a positive impact on overall educational quality.

These findings provide a comprehensive overview of the impacts, challenges, and opportunities associated with the integration of blended learning and active methodologies in the Brazilian educational context. They highlight both the transformative potential of these approaches and the complexity of their effective implementation, offering valuable insights for educators, managers, and education policymakers.

REFERENCES

1. Bardin, L. (2011). *Análise de conteúdo*. São Paulo: Edições 70.
2. Denzin, N. K. (2017). *The research act: a theoretical introduction to sociological methods*. New York: Routledge.
3. Kitchenham, B., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering*. Technical Report EBSE-2007-01, Keele University and Durham University Joint Report.
4. Narciso, C. A. F., et al. (2024a). Ensino híbrido e tecnologias educacionais: perspectivas e desafios na educação contemporânea. *Revista Brasileira de Educação*, 29(1), 1-28.
5. Narciso, C. A. F., et al. (2024b). Metodologias ativas na formação docente: caminhos para a inovação pedagógica. *Educação & Sociedade*, 45(2), 365-390.
6. Narciso, C. A. F., et al. (2024c). Ferramentas colaborativas na educação a distância: potencialidades e desafios. *Revista Brasileira de Aprendizagem Aberta e a Distância*, 23(3), 1940-1960.
7. Yin, R. K. (2018). *Case study research and applications: design and methods* (6th ed.). Thousand Oaks: Sage Publications.