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Article

Teaching with (Con)Meaning: Active Methodologies and Pedagogical Innovation in Teacher Education

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ABSTRACT
This article analyzes the role of active methodologies in higher education, with an emphasis on pedagogical innovation and teacher education. That is, it systematically examines how these methodologies are conceptualized and implemented in initial teacher education programs, specifically within the context of Portuguese higher education. The research stems from the need to reconfigure educational practices in higher education institutions, promoting meaningful learning, student autonomy, and the training of reflective teachers. The theoretical review includes classic authors such as Dewey, Piaget, and Freire, as well as contemporary contributions, highlighting the integration of digital technologies and collaborative strategies. Methodologically, the research adopts a qualitative approach, based on document analysis and the development of a teaching proposal, which is realized through the planning of six lessons grounded in active methodologies, applicable to the training of teachers for the 1st and 2nd cycles of basic education. It is concluded that such methodologies constitute a path toward a more participatory, critical, and transformative higher education, capable of responding to the training needs identified in the Portuguese context.
Keywords: active methodologies; higher education; pedagogical innovation; teacher training; teacher education; meaningful learning.

RESUMO
O presente artigo analisa o papel das metodologias ativas no Ensino Superior, com ênfase na inovação pedagógica e na formação de professores. Isto é, examina, de forma sistemática, como estas metodologias são conceptualizadas e implementadas em cursos de formação inicial de professores, especificamente no contexto do Ensino Superior Português. A investigação parte da necessidade de reconfigurar as práticas educativas em instituições de Ensino Superior, promovendo aprendizagens significativas, autonomia discente e formação de docentes reflexivos. A revisão teórica inclui autores clássicos como Dewey, Piaget e Freire, além de contributos contemporâneos, destacando a integração de tecnologias digitais e estratégias colaborativas. Metodologicamente, a investigação adota uma abordagem qualitativa, baseada na análise documental e construção de uma proposta didática, que se concretiza, na planificação de seis aulas fundamentadas em metodologias ativas, aplicáveis à formação de professores dos 1.º e 2.º ciclos do ensino básico. Conclui-se que tais metodologias constituem um caminho para uma educação superior mais participativa, crítica e transformadora, capaz de responder às necessidades formativas identificadas no contexto português.
Palavras-chave: metodologias ativas; Ensino Superior; inovação pedagógica; formação de professores; aprendizagem significativa.

Introduction

Contemporary education faces the challenge of training professionals capable of responding to rapid social, technological, and cultural transformations. In higher education, this responsibility takes on a strategic dimension: preparing critical, creative, and collaborative citizens, capable of acting ethically in complex and uncertain contexts. This objective requires a profound revision of traditional pedagogical practices, which are often centered on the vertical transmission of knowledge (Moran, 2020).

Active methodologies emerge as a response to this need, as they prioritize meaningful, student-centered learning. According to Felix, Valim, and Freitas (2025), such methodologies transform the teaching-learning process into a space for collective construction, where the student ceases to be a mere recipient and becomes the protagonist of their own education.

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In teacher education, the use of active methodologies is particularly relevant, as it allows for the integration of theory and practice, the development of professional autonomy, and the fostering of critical reflection (Graça, Ramos & Solé, 2023). Thus, the central objective of this article is to analyze the role of active methodologies in higher education, with a focus on teacher education for the 1st and 2nd cycles of basic education.

The study is structured in five parts: (1) theoretical framework, (2) methodological framework, (3) pedagogical proposal, (4) discussion, and (5) conclusions. The literature review draws on classical and contemporary authors, as well as recent research exploring the relationship between pedagogical innovation, digital technologies, and teacher education. This work reflects on and expands upon the perspectives of Freire (2004) and Dewey (1938), for whom teaching constitutes an ethical, social, and intentional act, built upon the relationship between individuals and shared experience.

This vision conveys the essential purpose of the article, titled *"Teaching (With) Meaning: Active Methodologies and Pedagogical Innovation in Teacher Education*,**"** whose central focus lies in understanding how active practices can impart new meaning to higher education and teacher education in the contemporary world. Indeed, we assume that the act of teaching has a dual meaning: *teaching with meaning*, which refers to intentionality, significance, and reflection, and *teaching by mutual consent*, which values the collaborative, dialogic, and participatory nature of the educational process. Thus, *"how do active methodologies contribute to pedagogical innovation and to teacher education in Portuguese higher education*?" becomes the starting point of this study.

Theoretical Framework

Concept and foundations of active methodologies

Active methodologies are pedagogical approaches that place the student at the center of the educational process, valuing autonomy, participation, and the collective construction of knowledge. According to Berbel (2019), these are strategies that "place the student as the subject of learning, encouraging their autonomy and responsibility" (p. 30). Moran (2020) adds that these methodologies "foster deeper, more creative, and meaningful learning, as they focus on experience and interaction" (p. 42).

The notion of student activity and agency is not new. Dewey (1938) already advocated for learning through experience and problem-solving, emphasizing that education must prepare the individual to actively participate in democratic life. Piaget (1970) reinforced the idea of the active construction of knowledge, according to which learning results from the interaction between the individual and the environment. Vygotsky (1978), in turn, highlighted the role of social interactions and mediation in the formation of higher psychological functions, suggesting that knowledge is a cultural product, constructed collectively.

In the same vein, Kolb (1984) systematized the theory of experiential learning, which describes the cycle of learning by doing, reflecting, conceptualizing, and applying. These ideas underpin contemporary active methodologies, which strive to integrate experience, reflection, and collaboration.

Valente (2021) argues that active methodologies foster knowledge construction through action and critical reflection, bringing students closer to reality and the professional context. For Silva and Lopes (2022), such practices develop cognitive and socio-emotional competencies essential for the 21st century, namely critical thinking, communication, cooperation, and problem-solving.

In light of the above, active methodology has been highlighted theoretically and academically, remaining relevant in higher education in general and in teacher education in particular, aligning with Fonseca's (2024) assertion that, in the context of teacher education, the future teacher must experience active learning practices during their initial training in order to be able to critically and actively recreate them in their future professional practice.

Purpose and Relevance in Higher Education

The primary purpose of incorporating active methodologies into higher education is to transform the way knowledge is constructed and shared. Fonseca (2024) argues that "innovative pedagogical practices, when well-structured, lead to significant improvements in student learning and engagement" (p. 62).

Ferreira, Matos, and Correia (2025) emphasize that the effectiveness of active methodologies depends not only on the technique employed but also on teachers' pedagogical training and institutional support. For them, it is essential that universities promote educational innovation policies, with incentives for experimentation and collaboration among faculty.

The integration of active methodologies brings higher education closer to the demands of contemporary society, marked by digital ubiquity and lifelong learning. Silva, Lopes, and Andrade (2025) assert that such approaches foster autonomy, creativity, and social responsibility—characteristics indispensable to the training of reflective and participatory professionals.

According to Moran (2020), pedagogical innovation is not limited to the introduction of new technologies but implies a shift in the teaching mindset. The teacher ceases to be a transmitter of knowledge and begins to act as a mediator and facilitator, guiding students in the development of critical thinking and meaningful learning, engaging in a process that values the journey more than the product.

Key characteristics of active methodologies

Based on Moran (2020), Valente (2021), and Bacich and Moran (2018), active methodologies present a set of structural principles:

- Student-centeredness: the student takes a leading role in their learning process;
- Participation and collaboration: knowledge is socially constructed through the exchange of experiences;
- Integration of theory and practice: learning occurs through the resolution of real, contextualized problems;
- Reflection and metacognition: students analyze their own learning process, developing critical awareness;
- Use of digital technologies**:** technological tools mediate and enrich learning, promoting personalization.

These principles align with socioconstructivist theory and contemporary perspectives on active learning, integrating cognitive, affective, and social dimensions. This corroborates Barros, Lima, and Ribeiro (2023) when they state that active methodologies "stimulate student creativity and autonomy, providing more dynamic and collaborative learning environments" (p. 49). Furthermore, they promote dialogue, active listening, and respect for diversity—core values for the realization of a genuinely inclusive and democratic education.

Based on the theoretical review conducted, it is possible to identify various contributions that support the integration of active methodologies in higher education, redefining the epistemological shift regarding the roles of the student, the teacher, and knowledge. Table 1 presents a summary of the main conceptual axes analyzed, highlighting the evolution of pedagogical perspectives and the guiding principles of active learning in teacher education.

Table 1 - Summary of theoretical contributions on active methodologies in higher education

Theoretical Dimension	Key Concepts	Main Contributions to Higher Education
Meaningful learning	Meaning-making; relationship between new and prior knowledge; experience as a source of learning.	Fosters students' cognitive and emotional engagement, promoting lasting learning that is relevant to teaching practice.
Student autonomy and agency	Responsibility for one's own learning path; self-regulation; critical thinking.	Stimulates the future teacher's intellectual independence and ethical commitment, valuing lifelong learning.
Collaboration and social interaction	Group work; co-learning; negotiation of meanings.	Consolidates communication and interpersonal skills, essential for professional practice and the development of inclusive practices.
Integration of theory and practice	Linking scientific foundations with concrete experiences.	Transforms the learning environment into a laboratory for pedagogical experimentation, bringing teaching closer to educational reality.
Pedagogical use of digital technologies	Technological mediation; educational innovation; collaborative digital resources.	Expands the possibilities for accessing, sharing, and creating knowledge, diversifying learning contexts and strategies.

Theoretical Dimension	Key Concepts	Main Contributions to Higher Education
Reflection and metacognition	Self-assessment; critical analysis of pedagogical practice; awareness of learning.	Promotes the development of reflective teachers, capable of investigating and reconfiguring their own professional practice.

Source: Author's own work.

The summary presented confirms that active methodologies are grounded in interdependent principles that aim for autonomy, collaboration, and critical reflection as the structural pillars of learning. In higher education, these principles constitute a dynamic, experience-centered training model in which knowledge is constructed in a participatory and contextualized manner. Thus, the theoretical framework outlined provides conceptual support for the methodological proposal that follows, highlighting the coherence between pedagogical foundations and educational practice oriented toward innovation and the training of reflective teachers.

Active methodologies are grounded in solid theoretical principles that integrate contributions from different pedagogical and psychological currents, as systematized in Table 2, which presents a synthesis of the relationships between active learning approaches and the main theories of education, highlighting how each underpins practices centered on experience, interaction, and knowledge construction. This articulation demonstrates that pedagogical innovation in higher education does not emerge in isolation but results from a continuous dialogue between theory and practice.

Table 2 - Relationship between active methodologies and educational theories

Active Methodology	Theoretical Basis	Key Associated Authors	Contribution to Educational Practice
Problem-Based Learning (PBL)	Constructivism – knowledge is constructed through problem-solving and experience.	Piaget (1970); Dewey (1938)	Promotes critical thinking and learning by doing, encouraging autonomy and inquiry.
Flipped Classroom	Self-directed and self-regulated learning – students manage their own pace of study.	Knowles (1984); Zimmerman (2002)	Encourages student responsibility and autonomy, promoting the active use of technological resources.
Project-Based Learning (PBL)	Social constructivism – knowledge emerges from collaboration and collective problem-solving.	Vygotsky (1978); Bruner (1996)	Emphasizes group work, communication, and engagement with real-world, meaningful contexts.
Gamification	Theories of motivation and experiential learning – intrinsic motivation drives active engagement.	Deci & Ryan (1985); Kolb (1984)	Promotes emotional and cognitive engagement, making the learning process more dynamic and participatory.
Collaborative Learning	Social interdependence theory – cooperation promotes collective success.	Johnson & Johnson (1999)	Develops social and communication skills, promoting inclusion and empathy in educational settings.
Case Study and Critical Reflection	Critical theory of education – reflection and critical awareness lead to social transformation.	Freire (2004); Mezirow (1991)	Encourages ethical analysis and reflection on practice, training critical and conscious teachers.

Source: Author's own work.

The framework presented demonstrates that active methodologies are not limited to a set of teaching strategies, but reflect complementary epistemological views on how one learns and teaches. By integrating principles of constructivism, socioconstructivism, and critical theory, these approaches establish a scientific foundation that legitimizes their application in teacher education, contributing to the development of innovative, reflective, and socially engaged pedagogical practices.

In summary, the theoretical review identified the foundations underpinning the adoption of active methodologies as innovative training practices in higher education. Based on these premises, the methodological framework that follows describes the research approach adopted, the specific objectives of the study, and the practical proposal that puts the analyzed principles into practice.

Active methodologies and contemporary learning theories

Recent literature shows that active methodologies engage with the main learning theories, reinterpreting them in light of new digital realities. Dewey (1938) argued that learning occurs through experience and reflective action; Piaget (1970) viewed knowledge as a progressive construction; Vygotsky (1978) introduced the concept of the zone of proximal development; and Freire (2004) placed dialogue and critical consciousness at the center of the educational process.

Kolb (1984) consolidated this vision into the theory of experiential learning, the foundation of many current models of active teaching. In turn, Felix, Valim, and Freitas (2025) demonstrate that active methodologies enhance student agency, stimulating curiosity and decision-making skills. These authors emphasize that higher education needs to reformulate and/or reconfigure its practices in order to break with the 19th-century instructional paradigm and foster collaborative, research-centered environments.

Graça, Ramos, and Solé (2023) emphasize that digital technologies can enhance the reach of active methodologies, provided they are used with pedagogical intent. Innovation, in this sense, lies not only in the resources but in the design of activities and in teacher mediation.

In light of the above, the theoretical framework shows that active methodologies are not merely a trend or fad, but tend to represent a profound paradigm shift that redefines the roles of the student, the teacher, and the educational institution itself.

Methodological Framework

Research Approach and Design

This research adopts a qualitative, descriptive, and exploratory approach, the purpose of which is to understand the perceptions and practices related to the use of active methodologies in higher education, particularly in the context of teacher education.

According to Creswell (2014), qualitative research seeks to interpret meanings attributed by subjects to social phenomena, considering the contexts in which they occur. In the specific case of this study, the focus is on understanding how faculty members and future teachers experience and perceive the integration of active pedagogical practices into their academic and professional trajectories.

The qualitative nature of the study is justified by the complexity of the educational phenomenon, which involves cognitive, affective, and sociocultural dimensions. Thus, the study focuses on the analysis of texts, documents, and discourses produced in the academic sphere, complementing the theoretical framework with descriptive data obtained from the literature review and documentary analysis.

It should be noted that the study follows a methodological design structured according to a systematic review protocol inspired by the PRISMA 2020 guidelines, ensuring transparency, traceability, and rigor in the selection, screening, and analysis of sources.

Methodological Objectives

The article articulates three main objectives:

1. To analyze the relevance of active methodologies in higher education, based on recent theoretical and empirical contributions;
2. Relate active teaching practices to learning theories and teacher education for the 21st century;
3. To present a practical pedagogical proposal consisting of six planned lessons using different active methodologies, applicable to the training of teachers for the 1st and 2nd cycles of basic education.

These objectives guide the organization of data and critical analysis, enabling an integrative approach between theory and practice, research and action. Their implementation was aligned with the stages of the PRISMA protocol, ensuring that the literature review systematically supports the analysis of categories and the development of the pedagogical proposal.

Participants and Context

The study focuses on the context of initial and continuing teacher education, targeting students in the Bachelor's degree program in Basic Education and the Master's degree program in Preschool Education and

Primary Education (1st Cycle of Basic Education), aged approximately 19 to 25 years, enrolled in courses on teaching methodology and pedagogical practice.

This is a context that values reflection on teaching and learning practices, promoting the experimentation with methodologies that can later be transferred to practice, that is, to elementary schools. According to Fonseca (2024), this prior experience constitutes an essential component of teacher education, as it "allows the future teacher to understand the teaching process as a dynamic, interactive, and transformative experience" (p. 64), anticipating potential scenarios for educational intervention.

Although no empirical data was collected from the participants, their profile is relevant for contextualizing the applicability of the active methodologies analyzed and the pedagogical proposals developed.

Data collection and analysis procedures

The research is based on a systematic literature and documentary review, supported by scientific databases (SciELO, ERIC, Scopus) and the six selected texts that comprise the corpus of analysis. The works consulted focus on the period 2019–2025, prioritizing recent studies on active methodologies, pedagogical innovation, and teacher education.

Thus, our inclusion criteria prioritize: publications from 2019 to 2025 and peer-reviewed studies; works focused on active methodologies, pedagogical innovation, or teacher education; documents in Portuguese, English, or Spanish; and full-text access. As exclusion criteria, we established opinion pieces without scientific basis; exclusively quantitative studies unrelated to pedagogical practices; and duplicate works or those without direct relevance to the analytical categories. The descriptors used were "active methodologies," *"active learning*," "teacher education," "higher education," "collaborative learning," "gamification," *"project-based learning*," and *"problem-based learning*."

Data analysis followed the steps proposed by Bardin (2016) in the thematic content analysis model, consisting of:

1. Pre-analysis: skimming the texts and organizing the theoretical material;
2. Exploration of the material: categorization of ideas and identification of units of meaning;
3. Processing and interpretation of results: linking emerging categories to the theoretical framework.

The final categories defined were:

- Pedagogical innovation and institutional culture;
- Active learning and student agency;
- Integration of digital technologies;
- Teacher autonomy and reflection.

The relationship between these categories and the sources was established systematically, ensuring that each category is supported by explicit theoretical evidence. This articulation is presented in the data analysis section . According to Ferreira, Matos, and Correia (2025), thematic analysis is particularly suitable for educational studies that aim to identify conceptual patterns and innovative pedagogical practices, allowing for an understanding of how theory is implemented in teaching practices.

Validity Criteria and Research Ethics

The validity of the qualitative research was ensured through triangulation of sources and theoretical validation, that is, by comparing different studies and perspectives on the same educational phenomenon (Creswell, 2014). The study's credibility is reinforced by the coherence between objectives, theoretical framework, methodology, and analysis.

From an ethical standpoint, the research adheres to the principles of academic integrity, transparency, and rigorous citation of the sources used. The collection and use of documentary data adhered to the ethical principles enshrined in the Ethical Charter of Educational Sciences (Portuguese Society of Educational Sciences [SPCE], 2016), as well as the European standards for scientific integrity and personal data protection established by Regulation (EU) 2016/679 of the European Parliament and of the Council. The research also complied with the guidelines of the European Code of Conduct for Research Integrity (European Commission, 2018), ensuring rigor, transparency, and confidentiality in the analysis of documentary sources.

As this was a literature review, no personal data was collected, and no interviews or direct observations were conducted, thereby eliminating ethical risks associated with human participation. Nevertheless, rigor, social responsibility, and respect for scientific integrity were ensured at all stages of the process.

Results

The qualitative analysis of the data followed the stages of Bardin's (2016) content analysis model, allowing for the identification of four thematic categories that reflect the central dimensions of the research. These categories emerged from the articulation between the theoretical framework and the practical evidence resulting from pedagogical planning. Table 3 presents a summary of this articulation, demonstrating how the objectives, theoretical foundations, and practical experiences integrate into a coherent framework of active and reflective teacher education.

The articulation shown in Table 4 demonstrates that the qualitative analysis process goes beyond the simple categorization of content, constituting an interpretive process that relates objectives, theories, and practices. The four identified categories express complementary dimensions of a single pedagogical vision: that innovation, technology, autonomy, and active learning are interdependent pillars for the construction of critical, reflective, and transformative teacher education.

Table 3 - Relationship between categories of analysis, objectives, theoretical framework, and practical component

Category of Analysis	Associated Specific Objective	Theoretical Framework	Practical Component (Classes)
Pedagogical innovation and institutional culture	To understand how active methodologies contribute to transforming teaching practices and the culture of higher education institutions.	Moran (2020) – innovation as cultural and methodological change; Ferreira et al. (2025) – importance of leadership and institutional support.	Classes 3 (Project-Based Learning) and 4 (Gamification): promote innovative and collaborative practices that foster a participatory culture.
Active learning and student agency	Promoting student participation and engagement in the learning process.	Bacich & Moran (2018); Valente (2021) – focus on the student as an active and reflective agent of learning.	Lessons 1 (PBL) and 2 (Flipped Classroom): center the student on problem-solving and prior preparation of content.
Integration of digital technologies	Exploring the potential of digital technologies as mediators of the educational process.	Silva & Lopes (2022); Fonseca (2024) – technologies as tools for innovation and pedagogical mediation.	Lessons 2 (Flipped Classroom) and 4 (Gamification): use of digital platforms and interactive tools that enhance learning.
Teacher autonomy and reflection	Foster the development of critical teachers capable of analyzing and reconfiguring their own pedagogical practice.	Freire (2004); Kolb (1984); Graça et al. (2023) – reflection and experience as pillars of professional development.	Lessons 5 (Collaborative Learning) and 6 (Case Study and Critical Reflection): promote self-regulation, ethics, and teacher metacognition.

Source: Author's own elaboration based on Bardin (2016).

Pedagogical Proposal: Six-Class Plan

The pedagogical proposal presented below aims to implement the use of active methodologies in initial teacher education, integrating theoretical principles, professional competencies, and collaborative practices.

The six-class plan was designed for General Didactics and Pedagogical Practice courses, aimed at students in the Bachelor's in Basic Education and Master's in Preschool Education and Primary Education programs.

The sessions were structured according to the assumptions of authors such as Moran (2020), Bacich & Moran (2018), Valente (2021), and Ferreira et al. (2025), who highlight the importance of diverse, active, and integrative strategies capable of promoting meaningful learning and reflective skills.

Class 1 – Problem-Based Learning (PBL)

Topic: Sustainability and educational practices in elementary school
Objectives:

- Understand the concept of sustainability and its applicability to elementary education;
- Develop problem-solving and collaborative work skills;
- Apply the PBL methodology in real educational contexts.

Methodology: Problem-Based Learning (*PBL*) according to **Duch, Groh & Allen (2001)**.
Activities:

1. Presentation of a real-world problem regarding school waste management;

2. Group research and consultation of scientific sources;
3. Development of sustainable intervention proposals;
4. Oral presentation with critical discussion.

Materials: articles, videos, digital resources, and recyclable materials.
Duration: 2 hours.
Expected outcomes: development of critical thinking and cooperation skills.
Assessment: participatory observation and formative self-assessment.

The proposal focuses on sustainability and school waste management, effectively linking PBL to a real-world problem. The objectives align with the methodology and promote essential skills for the 1st cycle, such as critical thinking and collaboration. The sequence of activities follows the PBL framework: problem presentation, research, solution development, and sharing.

Lesson 2 – Flipped Classroom

Topic: Teaching Reading and Writing in Elementary School
Objectives:

- To encourage students to prepare content in advance;
- Develop autonomy and responsibility in studying;
- Experiment with the flipped classroom model applied to initial teacher education.

Methodology: *Flipped Classroom* according to **Bergmann & Sams (2012)**.
Activities:

1. Prior study of instructional videos and texts in a virtual learning environment;
2. Class discussion on reading instruction strategies;
3. Planning of practical activities for elementary school classes.

Materials: educational videos, digital platforms (*Moodle, Padlet*), interactive whiteboard.
Duration: 1 hour 30 minutes.
Expected outcomes: active engagement, greater conceptual mastery, and critical reflection.
Assessment: reflective questionnaire and peer *feedback*.

This lesson emphasizes student autonomy and prior preparation, aligning with Bergmann & Sams (2012), as it integrates prior study with in-class discussion, reinforcing the importance of metacognition and responsibility in the learning process.

Class 3 – Project-Based Learning (PBL)

Theme: The school and the community – building bridges of citizenship
Objectives:

- Develop skills in planning and executing interdisciplinary projects;
- To foster social engagement and collaborative learning;
- Integrate citizenship and sustainability practices.

Methodology: *Project-Based Learning* according to **Thomas (2000)** and **Bacich & Moran (2018)**.
Activities:

1. Identification of a community problem (e.g., food waste);
2. Development of a pedagogical intervention plan in groups;
3. Presentation and public discussion of the projects.

Materials: computer, *internet*, interactive whiteboards, and visual aids.
Duration: 3 hours.
Expected outcomes: development of planning, communication, and problem-solving skills.
Assessment: project rubric and ongoing formative *feedback*.

PBL is applied to a theme of citizenship and community, which reinforces the social relevance of learning. The structure, which addresses problem identification, planning, and public presentation, is aligned with Thomas (2000), fostering planning, communication, and social intervention skills.

Lesson 4 – Gamification

Topic: Playful strategies in the teaching-learning process
Objectives:

- Apply game elements to promote motivation and engagement;
- Understand the role of play in learning;
- Integrate innovative technological tools.

Methodology: Gamification (*Game-Based Learning*) according to **Kapp (2012)** and **Deterding et al. (2011)**.
Activities:

1. Creating a digital *quiz* (*Kahoot, Socrative,* or *Mentimeter*) on curriculum content;
2. Group activities with scoring and instant *feedback*;
3. Group reflection on the benefits and limitations of gamification.

Materials: computers, *tablets*, projector, *internet* access.
Duration: 1 hour and 30 minutes.
Expected outcomes: increased motivation, cooperation, and content retention.
Assessment: teacher observation and self-assessment of performance.

This lesson integrates playful elements and digital tools, promoting motivation and engagement. The creation of *quizzes* and scoring mechanisms aligns with Kapp (2012), and the final reflection on limitations and potential fosters students' reflexivity and awareness.

Lesson 5 – Collaborative Learning

Topic: Teamwork and Inclusive Practices
Objectives:

- To promote teamwork and collaborative learning;
- Foster empathy and respect for diversity;
- Reflect on inclusive teaching practices.

Methodology: Collaborative learning according to **Johnson & Johnson (1999)**.
Activities:

1. Discussion groups on school inclusion;
2. Case studies on diversity in the classroom;
3. Development of a collaborative plan for an inclusive lesson.

Materials: supporting texts, whiteboard, digital forms.
Duration: 2 hours.
Expected outcomes: strengthening of social and communication skills, empathy, and collective responsibility.
Assessment: self-assessment and group *feedback*.

This fifth proposal emphasizes inclusion, empathy, and teamwork in line with the principles advocated by Johnson & Johnson (1999). The case study and the development of a collaborative plan reinforce the connection between theory and practice.

Class 6 – Case Study and Critical Reflection

Topic: Ethics and Decision-Making in the Educational Context
Objectives:

- Develop ethical and critical thinking;
- Analyze real-life situations in the school setting;
- Relate theory and practice in resolving pedagogical dilemmas.

Methodology: Case study according to **Yin (2014)**.
Activities:

1. Reading accounts of real educational practices;
2. Identifying ethical and pedagogical dilemmas;
3. Plenary discussion;
4. Preparation of an individual reflective report.

Materials: scientific articles, case reports, computer, and projector.
Duration: 2 hours.
Expected outcomes: strengthening of critical analysis skills and the ability to make informed decisions.
Assessment: individual reflective report and guided discussion.

Finally, addressing ethical dilemmas fosters critical thinking and decision-making, as evidenced in the lesson plan for Lesson Six, further corroborating Yin's (2014) methodology through reading, analysis, debate, and reflective reports.

To complement the pedagogical proposal detailed in Table 4, a summary diagram is presented below that highlights the central elements of each active methodology. It organizes, in a comparative manner, the main focus, the competencies developed, and the contributions of each strategy to teacher education. This framework facilitates a comprehensive understanding of the proposed practices and highlights the coherence between educational objectives and the principles of pedagogical innovation.

The analysis and systematization of the pedagogical experiences presented demonstrate that active methodologies constitute a consistent path toward educational innovation in higher education. Indeed, the six lesson proposals demonstrate the potential of these approaches to promote meaningful learning, student autonomy, and participation, in line with contemporary learning theories and the principles of reflective teacher education. As highlighted by Moran (2020) and Valente (2021), the adoption of student-centered methodologies requires the teacher to adopt a mediating, investigative, and open-minded stance toward experimentation. In this context, the practices described demonstrate that the balanced integration of different strategies, such as project-based learning, gamification, and case studies, fosters the creation of dynamic, collaborative, and critical educational environments. Thus, the pedagogical proposal outlined in this study is not limited to methodological experimentation but constitutes an exercise in didactic and epistemological transformation, consistent with the educational demands arising from emerging needs and with the principles of higher education centered on meaningful, inclusive, and sustainable learning. It exemplifies the integrated application of different active methodologies in the context of teacher education, highlighting didactic/pedagogical intentionality and the articulation between cognitive, affective, and social competencies. According to Moran (2020) and Ferreira et al. **(2025)**, this approach contributes to the transformation of pedagogical practices in higher education, making them more participatory, ethical, and sustainable.

Table 4 - Summary of active methodologies applied to teacher education

Active Methodology	Main Focus	Competencies Developed	Contribution to Teacher Education
PBL – Problem-Based Learning	Resolving real-world, contextualized situations.	Critical thinking, research, and collaborative work.	Promotes the ability to analyze and intervene in real educational contexts.
Flipped Classroom	Prior study and student-centered learning.	Autonomy, responsibility, and conceptual mastery.	Encourages active preparation and the critical use of digital resources.
Project-Based Learning (PBL)	Integration between school and community.	Planning, cooperation, and communication.	Develops a sense of citizenship and social commitment in teaching practice.
Gamification	Motivation and playful engagement.	Creativity, collaboration, and content retention.	Stimulates pedagogical innovation and the diversification of teaching strategies.
Collaborative Learning	Teamwork and inclusion.	Empathy, cooperation, and social skills.	Reinforces inclusive practices and values of professional sharing.
Case Study and Critical Reflection	Analysis of real-world dilemmas and decision-making.	Ethics, critical thinking, and reflection on practice.	Consolidates the profile of a reflective and ethical teacher.

Source: Author's own work.

Discussion and Final Reflection

The results obtained allow us to answer the initial question: *How do active methodologies contribute to pedagogical innovation and teacher education in Portuguese higher education?*, demonstrating that these methodologies promote autonomy, critical thinking, collaboration, and the meaningful integration of technology, constituting a structural pillar of contemporary teacher education.

The analysis developed throughout this article confirms that the adoption of active methodologies in higher education represents not only a didactic strategy but a paradigm shift in the way teaching and learning are conceived. This transition from a teacher-centered model to a student-centered model requires a profound institutional and epistemological reconfiguration.

As Felix, Valim, and Freitas (2025) point out, active learning fosters the development of autonomy, critical thinking, and creativity, expanding students' ability to handle complex situations. The authors observe that, by actively participating in the educational process, students not only acquire knowledge but construct meaning

from what they learn, developing competencies to intervene ethically in social reality, as learning is less abstract and thus more amenable to understanding its applicability.

Similarly, Graça, Ramos, and Solé (2023) emphasize that higher education must create conditions for future teachers to experiment with innovative methodologies, integrating digital technologies and collaborative practices. This experience is crucial so that they can, in the future, replicate and adapt these practices to elementary and secondary school classrooms.

The study also revealed that the effectiveness of active methodologies rests on an essential triad: (1) pedagogical training of teachers, (2) an institutional culture conducive to innovation, and (3) active student engagement. For, as Ferreira, Matos, and Correia (2025) emphasize, it is not enough to adopt new strategies; it is necessary to ensure that educational institutions foster a culture of collaborative learning, supporting experimentation and the continuous professional development of teachers.

In this vein, Moran (2020) also emphasizes that pedagogical innovation is not limited to the introduction of technologies or new methods, but involves a shift in mindset. The 21st-century teacher must assume the role of mediator and facilitator—someone who guides, inspires, and challenges students to learn in a meaningful way. Innovation, therefore, lies more in the teacher's attitude and intent than in the tools used.

In this context, teacher education needs to be rethought. Fonseca (2024) and Silva, Lopes, and Andrade (2025) emphasize that future teachers must be prepared to act as reflective professionals, capable of integrating theory and practice, making ethical decisions, and continuously innovating in their pedagogical practice. This training requires the development of metacognitive, collaborative, and communicative skills, which are the pillars of active methodologies.

From an institutional perspective, the incorporation of active methodologies into higher education requires structural and political support. As Valente (2021) argues, the transformation of university culture involves the creation of flexible, hybrid, and inclusive learning spaces that value autonomy and diversity.

In terms of practical implications, the proposal for six classes presented in this article demonstrates that it is possible to reconcile scientific rigor with pedagogical innovation. When applied to initial teacher education, it allows students to engage in these experiences and, consequently, prepares them to plan, implement, and evaluate teaching strategies that prioritize student agency and collaborative learning.

Finally, it is worth noting that the adoption of active methodologies contributes to the fulfillment of Sustainable Development Goal 4 (SDG 4) of the UN's 2030 Agenda by promoting inclusive, equitable, and quality education that fosters opportunities for lifelong learning.

In summary, active methodologies represent a promising path toward the co-construction of a critical, dialogic, participatory, and transformative higher education system capable of training reflective teachers and citizens committed to inclusion and the common good. The challenge, therefore, is to consolidate this transformation as an integral part of the pedagogical culture of higher education institutions.

Bibliographic References

Ausubel, D. P. (2003). *The acquisition and retention of knowledge: A cognitive view*. Springer.

Bacich, L., & Moran, J. (2018). *Active methodologies for innovative education: A theoretical-practical approach*. Penso.

Bardin, L. (2016). *Content analysis*. Edições 70.

Barros, F., Lima, M., & Ribeiro, C. (2023). Active methodologies and the role of the professor in higher education. *AEDB Journal*, 19(2), 45–61.

Berbel, N. A. N. (2019). Active methodologies and the promotion of student autonomy. *Revista Semestral da Educação*, 25(2), 25–38.

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education.

European Commission. (2018). *European Code of Conduct for Research Integrity* (2017 Revision). European Science Foundation & All European Academies (ALLEA). https://allea.org/code-of-conduct/

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining "gamification." *Proceedings of the 15th International Academic MindTrek Conference*, 9–15.

Dewey, J. (1938). *Experience and education*. Macmillan.

Duch, B. J., Groh, S. E., & Allen, D. E. (2001). *The power of problem-based learning*. Stylus Publishing.

Felix, D. R., Valim, R. L. M., & Freitas, V. G. G. (2025). Active methodologies in higher education: In support of the teaching-learning process. *Revista Presença*, 11(28), 99–110.

Ferreira, C., Matos, P., & Correia, R. (2025). Pedagogical innovation and teacher education in higher education. *Cuadernos de Educación y Desarrollo*, 17(3), 58–74.

Fonseca, S. (2024). *Pedagogical innovation and educational change in the Portuguese context*. Santarém Polytechnic Institute.

Freire, P. (2004). *Pedagogy of Autonomy: Knowledge Necessary for Educational Practice*. Paz e Terra.

Graça, J., Ramos, A., & Solé, M. (2023). Active methodologies and digital technologies in higher education: A critical perspective. University of Minho.

Johnson, D. W., & Johnson, R. T. (1999). *Learning together and alone: Cooperative, competitive, and individualistic learning* (5th ed.). Allyn & Bacon.

Kapp, K. M. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. Pfeiffer.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.

Moran, J. (2020). *Active methodologies for innovative learning*. Papirus.

Piaget, J. (1970). *The Formation of Symbols in Children*. Zahar.

Silva, M. R., & Lopes, P. F. (2022). Pedagogical innovation and active methodologies in higher education. *Education & Society*, 43(2), 45–59.

Silva, M. R., Lopes, P. F., & Andrade, L. (2025). Active methodologies and pedagogical innovation in higher education: Pathways to student agency. *Revista Aracê*, 19(1), 45–63.

Portuguese Society of Educational Sciences. (2016). *Ethical Charter of Educational Sciences*. SPCE. https://spce.pt/carta-etica/

Thomas, J. W. (2000). *A review of research on project-based learning*. The Autodesk Foundation.

European Union. (2016). *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation – GDPR)*. Official Journal of the European Union, L119, 1–88. https://eur-lex.europa.eu/eli/reg/2016/679/oj

Valente, J. A. (2021). The role of active methodologies in the transformation of higher education. *Revista Brasileira de Educação*, 26(1), 89–104.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). SAGE.