




Systematic Review

# Use of Active Methodologies in Basic Education: An Umbrella Review

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## Abstract

Active methodologies are consolidated as a key trend in education for the competence development of students at all educational stages, due to the academic, social, personal, and professional benefits that their implementation in the classroom provides. The profusion of systematic reviews on different types of active methodologies in recent years provides a high level of accumulated evidence. Therefore, a review of reviews allows comparing and contrasting different studies, offering a comprehensive perspective on their impact on Basic Education (Primary and Secondary Education). This study carries out an umbrella review through a qualitative systematic analysis using WoS, Scopus, and Dialnet databases. Reviews carried out in the last six years on the use of different active methodologies have been analysed, obtaining a total of 33 final references. The findings indicate that general research on active methodologies in Basic Education is limited, and these have a positive impact on students with favorable effects on their academic performance and comprehensive development. Despite their relevance, passive and directive methodologies remain predominant. Furthermore, the need for teacher training for effective implementation of active methodologies in the classroom is highlighted.

**Keywords:** basic education; active methodologies; umbrella review; active learning



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## 1. Introduction

In recent years, active methodological approaches have emerged as one of the main educational trends (Arán Sánchez et al., 2021; Bazurto-Briones & García-Vera, 2021). They are part of innovative practices aimed at fostering the development of competences, the acquisition of values by students, and the attainment of solid knowledge with shared characteristics that align with learners' interests, needs, abilities, and learning paces (Silva Quiroz & Maturana Castillo, 2017). These approaches also promote the inclusion of all students and their sense of belonging within the group (Piñeiro Aboy, 2022; Zapatero Ayuso, 2017), as well as their competence development (Castillo-Rodríguez & Prat Fernández, 2022; Paños Castro, 2017; Silva Souza & Santos Silva, 2021).

Active learning is treated as an overarching pedagogical stance in which students construct knowledge through purposeful activity and dialogue, typically outperforming lecture-centric instruction (Freeman et al., 2014; Doolittle et al., 2023). Building on that stance, active methodologies refer to the specific instructional designs that operationalize it, such as flipped classroom, project/problem-based learning, or cooperative learning, by reorienting teaching from content transmission to knowledge construction through authentic, challenging tasks, with the teacher acting as facilitator and assessment embedded

in the activity (Crisol-Moya et al., 2020). Recent literature consistently characterizes these approaches as strategies that increase cognitive engagement and promote deep and higher-order learning (Doolittle et al., 2023). For example, the flipped classroom shifts content delivery outside the classroom and dedicates in-person time to problem solving, discussion, teamwork, and feedback, with extensive evidence of implementation across disciplines and educational levels (O’Flaherty & Phillips, 2015).

The theoretical grounding is constructivist. Learning is conceived as a meaning-making process in which students activate and reorganize prior knowledge through action, reflection, and social interaction in relevant contexts (Taber, 2024). From this perspective, active methodologies not only align instructional design with student participation but also demonstrate positive effects on performance and retention, according to meta-analyses and large-scale studies (Freeman et al., 2014; Theobald et al., 2020). Recent contributions from neuroscience further reinforce this account by linking improved outcomes to higher levels of engagement and processing during the activity (Tsehay et al., 2024).

Such approaches are key to fostering positive development in Basic Education, which includes primary education and secondary education, as the benefits extend beyond the academic domain to include social, personal, emotional, and professional dimensions (Bazurto-Briones & García-Vera, 2021; Hernández et al., 2021; Piñeiro Aboy, 2022). Active teaching methods are characterized by the creation of practical and stimulating learning environments in which students can engage dynamically, motivationally, and experientially as active participants in the teaching–learning process (Daher et al., 2022; Fernández Olivero & Simón Medina, 2022).

The use of active methodologies by teachers has gradually increased over time, showing positive results for the entire educational community by fostering inclusive education, participation, and student progress (Muntaner et al., 2022; Orozco & Moriña, 2020; Simón et al., 2021). Reviews may reveal some ways for identifying obstacles in change processes, as suggested by Robinson (2022).

At the same time, this pedagogical approach entails a change in the role of teachers in classroom sessions: teachers are no longer mere custodians of knowledge but rather facilitators who motivate, guide, and support their students. Several studies highlight this shift (Du Plessis, 2020; Fombona et al., 2020), pointing out that active learning methodologies place students at the center of the educational process, while teachers act as facilitators and organizers of learning.

The breadth of the topic, given the wide range of active methodologies (cooperative learning, problem-based learning, flipped classroom, service learning, project-based learning, among others), has led to a large number of review studies on the different types of active methodologies and the disciplines in which they are applied. However, this diversity makes it difficult to reach general conclusions, as there are no reviews that comprehensively integrate the variety of studies available. Meta-reviews or umbrella reviews emerge precisely to address this gap.

The main objective of this study is to analyze multiple reviews of interventions based on active methodologies in order to assess their impact on teachers, students, and the educational process. From this, two specific objectives are derived: (1) to describe the reported benefits of implementing active methodologies in the classroom and (2) to determine how these methodologies have been applied in educational settings.

## 2. Materials and Methods

The study, qualitative in nature, is framed within a review of reviews or umbrella review methodology, an approach that compares and contrasts publications to provide an overall perspective on a specific topic, with the purpose of gathering studies that

have already conducted systematic or literature reviews (Aguilera Eguía & Arroyo Jofre, 2016). According to Olry de Labry Lima et al. (2016), this approach includes only reviews, thereby allowing for the synthesis of a larger amount of information. Belbasis et al. (2022) emphasize that it provides evidence of diverse interventions and outcomes.

2.1. Research Strategy

To conduct this study, three major databases were selected: Web of Science (WoS), Scopus, and Dialnet. All of them are considered relevant sources of available scientific output, as they provide broad coverage, dissemination, and impact (Alcaraz García, 2021; Codina et al., 2020; Segura-Robles et al., 2020). The use of multiple databases enables a more comprehensive overview of the research landscape and increases the likelihood of successful retrieval (Delgado Vázquez et al., 2019; Fernández Olivero & Simón Medina, 2022).

The search process began with the WoS database, followed by Scopus, and, finally, Dialnet, in cases where references were not found in the previous two databases.

Initially, the search was performed using three descriptors linked to the study topic (active methodologies, educational stage, and review). However, after applying the inclusion criteria, the results obtained were either scarce or largely irrelevant to the research objective. For this reason, the decision was made to focus on review articles addressing the most frequently cited active methodologies in prior searches: gamification (28.57%), flipped classroom (19.05%), cooperative learning (14.29%), project-based learning and problem-based learning (9.52% each), service learning (4.76%), and inquiry-based learning (0.9%). Table 1 details the search terms used. Data extraction was carried out between September and December 2023.

Table 1. Search terms.

Search Terms			
"gamification" OR "gamificación" "flipped classroom" OR "inverted classroom" OR "clase invertida" "cooperative learning" OR "aprendizaje cooperativo" "project-based learning" OR "aprendizaje basado en proyectos" "problem-based learning" OR "aprendizaje basado en problemas" "service learning" OR "aprendizaje servicio" "inquiry-based learning" OR "aprendizaje basado en la indagación"	AND	"primary education" OR "secondary education" OR "basic education" OR "educación secundaria" OR "educación primaria" OR "educación básica"	AND "review" OR "revisión"

2.2. Data Selection Process

After obtaining the results, a data refinement process was undertaken to enhance the analysis. The inclusion criteria applied were as follows:

- Year of publication: last six years up to the present (2018, 2019, 2020, 2021, 2022, and 2023), to capture recent, comparable evidence during a period of rapid pedagogical change.
- Research domain: educational research (WoS) and social sciences (Scopus).
- Language: English and Spanish.

- Document type: articles and review articles.

In the case of Dialnet, since it does not provide the same filters as WoS and Scopus, the year of publication, document type, and relevance of the references were taken into account.

For data refinement, an initial reading of the abstracts was carried out, followed by an in-depth reading of the documents to verify compliance with the established inclusion criteria. Documents that did not meet these criteria were excluded, following the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Cuevas-Molano et al., 2019):

- Records that did not contain the specified descriptors in the title, keywords, or abstract, or that, although including them, did not fit the research topic.
- Results whose content did not correspond to the required language, research domain, or document type.
- Primary studies and narrative reviews without an explicit method/synthesis, given that the design required reviews with an explicit synthesis.
- Reviews that did not verifiably report sources/search dates, search terms, and eligibility criteria, preventing traceability.
- Lack of access to the full text.

Data were recorded and managed in a Microsoft Excel database. Duplicates were removed, and titles, abstracts, and full texts were screened; records not meeting eligibility criteria were excluded.

The selection procedure followed the PRISMA phases, and the literature search was conducted individually for each active methodology, rather than combining all descriptors into a single search strategy. In the initial stage, 1326 references were identified across the three databases. Once filters had been applied, 602 documents were retained at the screening stage and 254 at the eligibility stage. Next, reviews for each methodology underwent analytical prioritization to guide in-depth analysis, resulting in the selection of the five most cited reviews per methodology.

Given the large volume of reviews on active methodologies, the reason for selecting the five most-cited reviews within each approach was to introduce an additional prioritization criterion that would enable an in-depth, comparative analysis. This procedure concentrated, within each methodology, the studies with the greatest academic impact, facilitating cross-method comparison and the identification of common patterns and divergences in results and research designs. However, a potential bias toward older or more widely disseminated reviews is acknowledged.

The final corpus comprised 33 documents (Figure 1) because only three reviews satisfied the inclusion criteria for problem-based learning. The details of the process for specific active methodologies are presented in Table 2.

To reduce the risk of bias, studies eligible for inclusion were appraised using the Scale for Evaluating Scientific Articles in the Social Sciences and Humanities, known by its Spanish acronym EACSH (López-López et al., 2019), assessing the introduction, methodology, results, and discussion. This appraisal documented the article's clarity, transparency, and completeness.

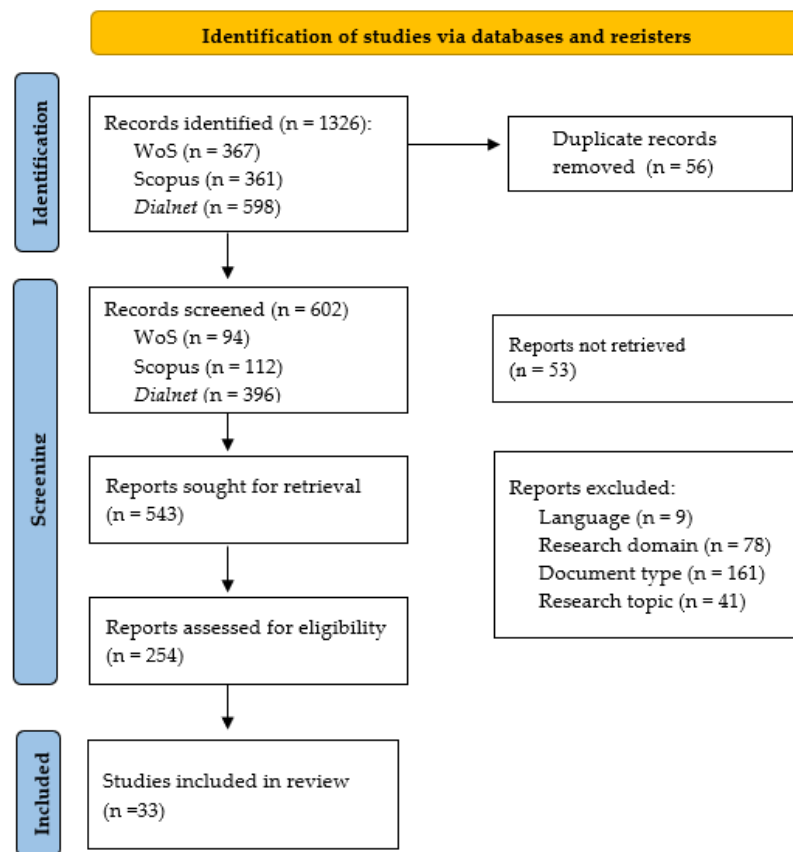


Figure 1. PRISMA protocol for literature review. Adapted from Page et al. (2021).

Table 2. Details of the process for specific active methodologies.

Active Methodologies	Identification No. of Documents Identified	Screening No. of Documents After Applying Filters	Eligibility No. of Most Cited Documents Included in the Analysis	Inclusion
Gamification	WoS: 51	WoS: 24	5	
	Scopus: 49	Scopus: 19		
	Dialnet: 199	Dialnet: 130		
Flipped classroom	WoS: 35	WoS: 12	5	
	Scopus: 32	Scopus: 12		
	Dialnet: 23	Dialnet: 14		
Cooperative learning	WoS: 70	WoS: 15	5	
	Scopus: 57	Scopus: 23		
	Dialnet: 117	Dialnet: 69		
Project-based learning	WoS: 53	WoS: 9	5	
	Scopus: 72	Scopus: 17		
	Dialnet: 69	Dialnet: 47		
Problem-based learning	WoS: 50	WoS: 8	3	
	Scopus: 68	Scopus: 14		
	Dialnet: 73	Dialnet: 60		
Service learning	WoS: 34	WoS: 6	5	
	Scopus: 32	Scopus: 7		
	Dialnet: 104	Dialnet: 70		
Inquiry-based learning	WoS: 74	WoS: 20	5	
	Scopus: 51	Scopus: 20		
	Dialnet: 13	Dialnet: 6		
Total	1326 documents	602 documents	33 documents	

### 2.3. Data Extraction Process

The analysis and extraction of information from the 33 review studies were conducted manually through a detailed and thorough reading of each selected article. During this process, codes were generated to organize and classify relevant information in accordance with the stated objectives. Subsequently, these codes were systematized and recorded in a Word document, which facilitated data consolidation and comprehensive analysis. This procedure ensured a rigorous and systematic approach to the information, enabling comparison across studies and the identification of common patterns and divergences in the reported findings.

The entire process was conducted by a single reviewer and subsequently checked by a second reviewer. Any discrepancies were resolved by consensus.

## 3. Results

Of the 33 studies selected, 63.64% correspond to systematic reviews, while the remaining 36.36% are literature reviews. Beginning the search in the WoS and Scopus databases, it was found that the majority of references originated from these sources (69.7% and 54.55%, respectively). In addition, 51.52% of the references are also available in Dialnet, with five documents being exclusive to this database due to the lack of corresponding references in WoS and Scopus.

A larger number of review studies were identified focusing on the active methodologies of gamification, flipped classroom, and cooperative learning, while it was more difficult to find a significant number of studies centered on service learning, project-based learning, inquiry-based learning, and problem-based learning.

Regarding the subject areas, some documents focused specifically on particular disciplines. Among the review studies, those related to Physical Education (10 documents) stand out, followed by Foreign Language (2 documents), and Mathematics, Biology, and Geography (1 document each). Four additional studies focused more broadly on the Social Sciences, Experimental Sciences, and core curriculum areas.

The selected review articles encompass a total of 1054 documents analyzed. Table 3 shows the number of studies included in each of the references, with the exception of two studies that did not specify the number of documents employed in their bibliographic analysis (Espinoza Freire, 2022; Guamán Gómez & Espinoza Freire, 2022).

To facilitate traceability, Appendix A maps the key concepts referenced below to the review studies that support them (Table A1). The main conclusions drawn from the analysis of the different references indicate that active methodologies are emerging as a growing trend, attracting increasing interest from teachers (Escaravajal Rodríguez & Martín-Acosta, 2019; León-Díaz et al., 2019). However, the studies included in the research conducted by Arufe-Giráldez et al. (2022) point to the predominance of passive methods in classrooms, despite these being considered less effective for learning. The rigidity of the traditional curriculum contributes to the gap between school planning and actual classroom implementation and to the scarce reporting of how methods are enacted (duration, assessment alignment, teacher support) (Belduma-Suquilanda, 2021).

As Lampropoulos et al. (2022) argue, the current education system requires a shift toward playful and cooperative activity, as these practices enhance student productivity. In this regard, active methodologies facilitate interdisciplinary work and the participation of the wider educational community, including families and local partners (León-Díaz et al., 2018; Redondo-Corcobado & Fuentes, 2020). Service-learning reviews, in particular, highlight community participation, institutional commitment to the surrounding social environment, and students' civic and professional development (Redondo-Corcobado & Fuentes, 2020).

**Table 3.** Number of documents reviewed in the selected studies.

Range of Documents	Reference (Authorship and Year)	Reviewed Documents
Fewer than 10	(Gosálbez-Carpena et al., 2022)	8
	(Hellín Martínez et al., 2020)	9
	(Opanga & Venuste, 2022)	9
	(Ferrero et al., 2021)	11
	(Heindl, 2019)	13
	(Boix Vilella & Ortega Rodríguez, 2020)	14
Between 10–20	(Calvo Varela et al., 2019)	14
	(Pacheco Sanz et al., 2020)	14
	(Firman et al., 2019)	15
	(Arufe-Giráldez et al., 2022)	17
	(Moya-Mata & Peirats, 2019)	18
	(Escaravajal Rodríguez & Martín-Acosta, 2019)	19
	(Bermúdez Mendieta, 2021)	22
	(Ruiz Hidalgo & Ortega-Sánchez, 2022)	22
Between 20–30	(Belduma-Suquilanda, 2021)	24
	(Heredia Ponce et al., 2022)	26
	(León-Díaz et al., 2019)	26
	(Liu et al., 2021)	31
	(Ordoñez Ocampo et al., 2021)	31
Between 30–40	(Pinto et al., 2021)	32
	(León-Díaz et al., 2018)	32
	(Maside Pujol & González García, 2022)	34
	(López-de-Arana Prado et al., 2023)	37
	(Urdanivia Alarcon et al., 2023)	51
Between 50–60	(Dyson et al., 2022)	55
	(Redondo-Corcobado & Fuentes, 2020)	57
Between 60–70	(Pastes Urbano et al., 2020)	61
	(Van Leeuwen & Janssen, 2019)	66
Between 80–90	(Fornons & Palau, 2021)	86
	(Herrada Valverde & Baños Navarro, 2018)	87
More than 100	(Lampropoulos et al., 2022)	113
Total:		1054 documents

Active methodologies are rooted in constructivist theories that promote active, meaningful, contextualized, and experiential learning; within these approaches, students play an active role and teachers act as facilitators (Bermúdez Mendieta, 2021; Urdanivia Alarcon et al., 2023). Effects are design-dependent: gains are stronger when tasks are authentic, scaffolding is explicit, and assessment is aligned with intended outcomes (Fornons & Palau, 2021).

These methods also address classroom diversity and different learning paces by responding to students' needs and interests, fostering acceptance and inclusion, personalization, and a positive classroom climate. Reported benefits include greater belonging and reduced exclusion, although equity-focused outcomes are less systematically assessed (Calvo Varela et al., 2019).

Active methodologies promote the holistic development of students, fostering personal growth and competence acquisition and reinforcing attitudes, values, and social skills necessary for life in society; they are closely linked to the development of key competences, particularly personal, social, learning-to-learn, and digital (Hellín Martínez et al., 2020; Ordoñez Ocampo et al., 2021).

Several studies report improvements in student performance and academic achievement when active methodologies are implemented, especially when formative assessment and feedback routines are embedded (Fornons & Palau, 2021; Ruiz Hidalgo & Ortega-

Sánchez, 2022). These methodologies stimulate understanding, activate prior knowledge, and consolidate learning; however, effects are not uniform, and there is a documented risk of cognitive overload if pacing and scaffolding are inadequate (Liu et al., 2021).

The majority of the reviewed studies highlight increases in student motivation and engagement, which in turn enhances participation, interest, and satisfaction among both students and teachers; durability appears contingent on guided autonomy, meaningful tasks, and regular low-stakes feedback (Lampropoulos et al., 2022). Students tend to value these approaches because they make classes more engaging and allow better use of learning opportunities (Escaravajal Rodríguez & Martín-Acosta, 2019).

Regarding emotional development, reviews emphasize gains in self-regulation and emotional stability; related constructs such as self-esteem and self-confidence also show improvements (López-de-Arana Prado et al., 2023).

Active approaches also promote creativity, particularly creative thinking, and support effective conflict-resolution strategies by stimulating communication, socialization, argumentation, decision-making, and interpersonal relationships (Ordoñez Ocampo et al., 2021; Bermúdez Mendieta, 2021).

Active methodologies foster teamwork and cooperation and promote collaboration among students by encouraging social interaction among peers and with teachers; crucially, collaborative gains rely on structured roles, clear goals, shared rubrics, and teacher guidance, as poorly managed activities can undermine cooperation or even trigger counter-productive competition (Van Leeuwen & Janssen, 2019; Liu et al., 2021).

Several studies show that active methodologies foster self-regulated learning, providing students with greater autonomy and self-direction; this, in turn, supports reflective processes and critical thinking, and encourages both individual and collective responsibility (Bermúdez Mendieta, 2021; Redondo-Corcobado & Fuentes, 2020). A recurring finding is the need for regular formative feedback, quizzes, rubrics, and timely guidance to help students monitor performance and adjust strategies (Pinto et al., 2021).

According to Belduma-Suquilanda (2021), active methodologies can improve classroom management and time efficiency. Their combination with digital resources often enhances access, product creation, and collaboration, strengthening digital competence and mitigating space–time constraints; however, impact depends on infrastructure and teachers' digital skills, and practical barriers such as limited equipment, time/space constraints, and technical issues are frequently reported (Gosálbez-Carpena et al., 2022; Pinto et al., 2021).

Among the negative aspects of active methodologies, organizational difficulties and limited disciplinary/pedagogical knowledge are emphasized. Adoption requires considerable time and effort, increasing workload; large classes, rigid schedules, and misalignment between activities and assessment recur as cross-cutting barriers to fidelity and scalability (León-Díaz et al., 2018; Ruiz Hidalgo & Ortega-Sánchez, 2022).

Another relevant issue is the need for teacher training. For effective implementation, teachers' level of knowledge influences the selection of appropriate methods and resources; coaching or ongoing support appears critical in new educational scenarios, with attention to context-appropriate methodologies, real-life content, and task design (Heredia Ponce et al., 2022; Urdanivia Alarcon et al., 2023).

Finally, active methodological approaches enhance the teaching and learning process, increasing both effectiveness and efficiency when implementation is robust (Liu et al., 2021). Overall, the evidence is strong for motivation/engagement, promising but contingent on design for academic learning and competencies, and comparatively underdeveloped for equity and long-term outcomes; more detailed reporting of implementation (duration, assessment alignment, teacher preparation) would increase transferability to practice.

Figure 2 summarizes the main conclusions of the reviewed studies, providing a clearer visualization of the findings. The information highlighted in yellow refers to general aspects related to active methodologies; the green section presents the benefits derived from their implementation in the classroom; and the red section contains information regarding the barriers teachers encounter when applying them in educational settings.

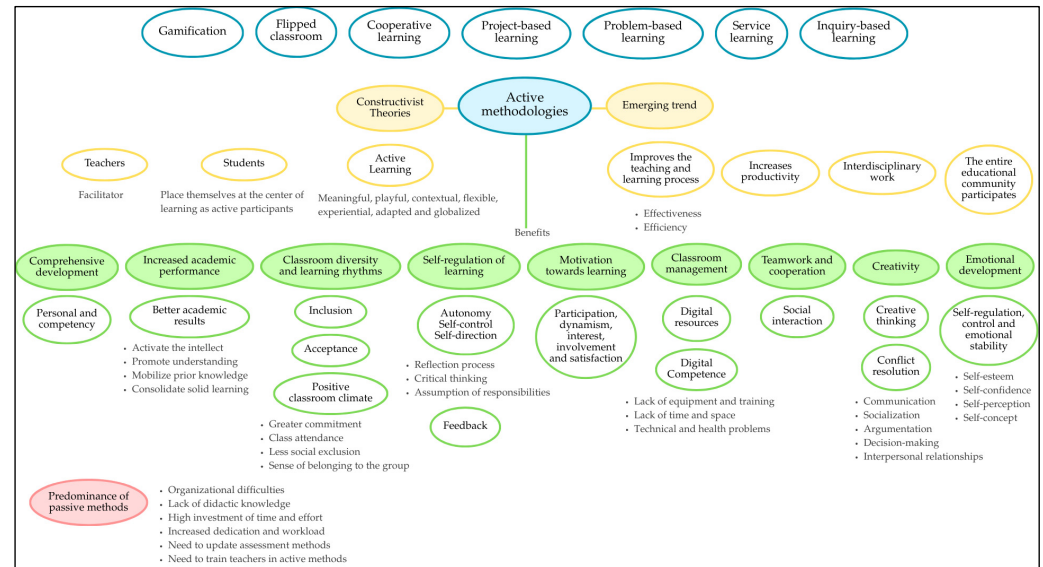


Figure 2. Summary of the main conclusions of the reviewed studies. Prepared by the authors.

#### 4. Discussion

The aim of this study is to provide indicative evidence of advances in the field of active methodologies, as well as to synthesize the findings of reviews addressing the implementation of different active methodologies in Basic Education classrooms within the time window and databases covered. Interpreting the corpus, effects appear design-dependent: the most consistent gains are observed when tasks are authentic, formative feedback is routine, and assessment aligns with targeted competencies; by contrast, brief interventions and design misalignment tend to weaken outcomes. At the same time, the evidence base acknowledges that classroom practice remains predominantly passive in many contexts, a pattern that likely varies by subject, stage, and local capacity.

Beyond compiling benefits, the umbrella review helps explain variation in impact. Outcomes are stronger under enabling conditions (adequate duration, structured collaboration, and assessment literacy). To account for the research–practice gap, a multilevel lens is useful: design features (authenticity, scaffolding, assessment alignment, collaborative roles); organizational conditions (time structures, class size, co-planning, coaching, infrastructure); and reporting routines (duration, teacher preparation, assessment artifacts). This framing clarifies why labels alone do not travel; effects are mediated by teacher expertise and school affordances (Belduma-Suquilanda, 2021; Van Leeuwen & Janssen, 2019). Accordingly, findings should be read as directional rather than definitive and transferable primarily to contexts comparable to those represented in the reviewed sources.

A salient gap concerns implementation detail. Of the 33 studies reviewed, none provides systematic, class-level descriptions of how approaches are enacted. Only Guamán Gómez and Espinoza Freire (2022) outline steps for problem-based learning, and Fornons and Palau (2021) highlight challenges in flipped classroom implementation, including the need for pedagogical and technological training. This scarcity of procedural reporting constitutes a significant limitation, as it constrains causal interpretation and the transferability of practices across settings. The scarcity of procedural reporting limits transferability and

deprives teachers of practical guidance, so future reviews and primary studies should standardize implementation reporting (duration/dosage, assessment alignment, teacher preparation, and collaboration structures).

Across subjects, the literature consistently reports positive effects on learning (Castillo-Rodríguez & Prat Fernández, 2022; Daher et al., 2022; Muntaner et al., 2022; Orozco & Moraña, 2020; Silva Souza & Santos Silva, 2021; Simón et al., 2021). These studies converge on improvements in participation, motivation, engagement, and the development of academic, personal, and social competences, reinforcing, within the bounds of the present review, the case for models oriented to students' holistic development and preparation for contemporary challenges.

The evidence also points to gains in responsibility, self-regulation, autonomy, and teamwork, echoing other reviews that underscore growth in social interaction skills with peers and teachers (Arán Sánchez et al., 2021; Bazurto-Briones & García-Vera, 2021; Hernández et al., 2021). In this sense, active methodologies affect not only academic achievement but also the capacity to work productively in collaborative environments.

Technological integration emerges as a consistent enabler of engagement and meaningful, contextualized learning (Piñeiro Aboy, 2022; Ruiz Hidalgo & Ortega-Sánchez, 2022; Silva Souza & Santos Silva, 2021). At the same time, it surfaces demands for teacher training and adequate infrastructural support in schools, indicating that digital affordances amplify, rather than replace, sound pedagogical design.

Teacher professional development is therefore pivotal. Studies emphasize the need for sustained training in both pedagogical and digital competences to enable effective implementation (Arán Sánchez et al., 2021; Silva Quiroz & Maturana Castillo, 2017; Zapatero Ayuso, 2017). For this reason, designing programs that address resistance, build new skills, and support purposeful use of resources remains a priority for educational action.

Finally, while multiple studies mention barriers to change (Robinson, 2022), the present evidence base offers limited depth on concrete pathways to address them. Future work should examine contextual, organizational, and training conditions that enable or hinder application, moving beyond outcome summaries to the mechanisms and stages of classroom enactment. Notably, reviews on "active methodologies" in Basic Education remain scarce, especially stage-specific syntheses for Primary or Secondary education. Stage-specific reviews should adopt subject-sensitive search strings, broaden database coverage to include grey literature, and report implementation using shared templates to increase comparability and practical relevance.

## 5. Conclusions

This review indicates that active methodologies have positive effects on learning that extend beyond academic achievement to personal and relational domains. Benefits are broadly consistent across approaches when designs feature authentic tasks, routine formative feedback, and assessment aligned with targeted competencies.

Policy and practice should therefore prioritize methodological innovation through sustained teacher development, adequate technological provision, and supportive regulatory frameworks. Organizational and cultural barriers to adoption need to be addressed so that innovation becomes part of school culture rather than an isolated initiative, with implementation supports that enable fidelity and informed adaptation.

The evidence base has grown in recent years, but it remains uneven in how it reports implementation. Most reviews synthesize outcomes without detailing classroom enactment, which limits transferability and practical guidance for teachers. Adopting common reporting checklists for class-level procedures (duration, grouping, task structure, feedback, assessment) would strengthen cumulative learning.

Several limitations qualify these conclusions. Only three databases were consulted. Relevant studies indexed elsewhere (e.g., ERIC, EBSCO) may have been missed, so the findings represent a useful approximation rather than a complete synthesis.

Strict inclusion and exclusion criteria improved consistency and transparency but likely reduced the number of eligible studies and may have omitted valuable work that fell outside the parameters.

The quality and depth of the analysis largely depend on the information reported in the included articles. Most studies summarized outcomes but offered little detail on classroom implementation, limiting practical guidance and transferability.

Language and terminology posed challenges. Non-literal correspondences between Spanish and English terms (e.g., “inquiry-based learning”) may have hindered retrieval and led to unintentional omissions.

Citation-based prioritization served as a proxy for influence. This can favor widely cited work and overlook rigorous but less visible studies. Cross-checks with recent and/or higher-quality reviews and a constrained time window helped, but residual bias cannot be ruled out.

Reporting quality was described with the EACSH for feasibility. Tools designed for reviews (e.g., AMSTAR-2) were not applied, so review-specific weaknesses may have gone undetected.

Screening, extraction, and coding were performed by a single reviewer, with partial verification by a second reviewer. This mitigates, but does not eliminate, risks of error and bias.

Editorial heterogeneity also qualifies the corpus. Not all 33 documents were published in Q1 journals, which may affect robustness and generalizability.

Finally, the review covered a specific time frame and focused on indexed publications. This may introduce publication bias, as innovative school-based practices are often under-reported. A sensitivity analysis extending the window (e.g., to 2015) would help test the stability of conclusions.

These limitations do not invalidate the findings, but they call for cautious interpretation. Future reviews should be focused on specific educational stages and refine search strings around particular subjects and implementation features. Broadening database coverage and adding grey literature will reduce publication bias and yield a more complete picture of the field.

Procedural rigor needs strengthening. Prioritization should not rely solely on citation counts. Combine alternative metrics with forward–backward citation chasing and expert elicitation, and then stress-test conclusions through planned sensitivity analyses.

Furthermore, a line of research emerges focused on identifying barriers to implementation and analyzing the procedures necessary for integrating these methodologies into the classroom. This includes understanding the phases, strategies, roles, and resources involved in their practical application. This responds to a recurrent gap in the literature, which tends to report outcomes but not classroom enactment.

In summary, within the bounds of the present review, more inclusive, contextualized, and practice-oriented syntheses are needed. Moving from promise to scalable practice requires coupling sound pedagogical design with structural supports and classroom-embedded teacher learning, and reporting implementation consistently so schools can adopt, adapt, and sustain active methodologies across diverse settings.

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## Abbreviations

The following abbreviations are used in this manuscript:

WoS	Web of Science
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
EACSH	Scale for Evaluating Scientific Articles in the Social Sciences and Humanities, Spanish acronym

## Appendix A

**Table A1.** Principal conclusions and supporting reviews.

Main Conclusions	References
Interdisciplinary work	(León-Díaz et al., 2018; Moya-Mata & Peirats, 2019; Ordoñez Ocampo et al., 2021; Ruiz Hidalgo & Ortega-Sánchez, 2022).
Participation of the educational community	(León-Díaz et al., 2018; Pacheco Sanz et al., 2020).
Constructivist theories	(Bermúdez Mendieta, 2021; Espinoza Freire, 2022; Guamán Gómez & Espinoza Freire, 2022; León-Díaz et al., 2018; León-Díaz et al., 2019; Ordoñez Ocampo et al., 2021; Pacheco Sanz et al., 2020; Urdanivia Alarcon et al., 2023).
Role of students	(Ferrero et al., 2021; Fornons & Palau, 2021; Heredia Ponce et al., 2022; Lampropoulos et al., 2022).
Role of teachers	(Liu et al., 2021; Opanga & Venuste, 2022; Urdanivia Alarcon et al., 2023).
Acceptance and inclusion	(Calvo Varela et al., 2019; Ruiz Hidalgo & Ortega-Sánchez, 2022).
Personalization and individualization	(Escaravajal Rodríguez & Martín-Acosta, 2019; Espinoza Freire, 2022).
Positive classroom climate	(Calvo Varela et al., 2019; Fornons & Palau, 2021; Herrada Valverde & Baños Navarro, 2018; León-Díaz et al., 2019; Moya-Mata & Peirats, 2019).
Commitment and sense of group belonging	(Calvo Varela et al., 2019; Lampropoulos et al., 2022; Dyson et al., 2022).

Table A1. Cont.

Main Conclusions	References
Competence acquisition	(Calvo Varela et al., 2019; León-Díaz et al., 2018; León-Díaz et al., 2019; Hellín Martínez et al., 2020; Herrada Valverde & Baños Navarro, 2018; Moya-Mata & Peirats, 2019; Ordoñez Ocampo et al., 2021; Pacheco Sanz et al., 2020).
Academic achievement	(Arufe-Giráldez et al., 2022; Bermúdez Mendieta, 2021; Boix Vilella & Ortega Rodríguez, 2020; Ferrero et al., 2021; Fornons & Palau, 2021; Gosálbez-Carpena et al., 2022; Heindl, 2019; Heredia Ponce et al., 2022; Herrada Valverde & Baños Navarro, 2018; Lampropoulos et al., 2022; León-Díaz et al., 2019; Liu et al., 2021; Pacheco Sanz et al., 2020; Redondo-Corcobado & Fuentes, 2020; Ruiz Hidalgo & Ortega-Sánchez, 2022).
Consolidate learning	(Belduma-Suquilanda, 2021; Bermúdez Mendieta, 2021; Boix Vilella & Ortega Rodríguez, 2020; León-Díaz et al., 2018; Moya-Mata & Peirats, 2019; Pacheco Sanz et al., 2020; Urdanivia Alarcon et al., 2023).
Motivation	(Arufe-Giráldez et al., 2022; Bermúdez Mendieta, 2021; Boix Vilella & Ortega Rodríguez, 2020; Dyson et al., 2022; Escaravajal Rodríguez & Martín-Acosta, 2019; Espinoza Freire, 2022; Firman et al., 2019; Fornons & Palau, 2021; Gosálbez-Carpena et al., 2022; Heredia Ponce et al., 2022; Herrada Valverde & Baños Navarro, 2018; Lampropoulos et al., 2022; León-Díaz et al., 2018; León-Díaz et al., 2019; Liu et al., 2021; Maside Pujol & González García, 2022; Moya-Mata & Peirats, 2019; Opanga & Venuste, 2022; Ordoñez Ocampo et al., 2021; Pacheco Sanz et al., 2020; Pastes Urbano et al., 2020; Pinto et al., 2021; Redondo-Corcobado & Fuentes, 2020; Ruiz Hidalgo & Ortega-Sánchez, 2022; Urdanivia Alarcon et al., 2023).
Emotional development	(Boix Vilella & Ortega Rodríguez, 2020; Calvo Varela et al., 2019; Dyson et al., 2022; Fornons & Palau, 2021; López-de-Arana Prado et al., 2023; Moya-Mata & Peirats, 2019; Redondo-Corcobado & Fuentes, 2020; Ruiz Hidalgo & Ortega-Sánchez, 2022).
Creativity	(Belduma-Suquilanda, 2021; Bermúdez Mendieta, 2021; Calvo Varela et al., 2019; Espinoza Freire, 2022; Guamán Gómez & Espinoza Freire, 2022; Moya-Mata & Peirats, 2019; Ordoñez Ocampo et al., 2021; Ruiz Hidalgo & Ortega-Sánchez, 2022; Urdanivia Alarcon et al., 2023).
Conflict resolution strategies	(Belduma-Suquilanda, 2021; Bermúdez Mendieta, 2021; Gosálbez-Carpena et al., 2022; Moya-Mata & Peirats, 2019; Pinto et al., 2021; Ruiz Hidalgo & Ortega-Sánchez, 2022).
Comunication	(Bermúdez Mendieta, 2021; Calvo Varela et al., 2019; Espinoza Freire, 2022; Lampropoulos et al., 2022; López-de-Arana Prado et al., 2023; Moya-Mata & Peirats, 2019; Pacheco Sanz et al., 2020; Redondo-Corcobado & Fuentes, 2020; Ruiz Hidalgo & Ortega-Sánchez, 2022; Urdanivia Alarcon et al., 2023).

Table A1. Cont.

Main Conclusions	References
Teamwork and cooperation	(Belduma-Suquilanda, 2021; Boix Vilella & Ortega Rodríguez, 2020; Calvo Varela et al., 2019; Dyson et al., 2022; Escaravajal Rodríguez & Martín-Acosta, 2019; Espinoza Freire, 2022; Fornons & Palau, 2021; Gosálbez-Carpena et al., 2022; Guamán Gómez & Espinoza Freire, 2022; Heredia Ponce et al., 2022; Lampropoulos et al., 2022; León-Díaz et al., 2018; León-Díaz et al., 2019; Liu et al., 2021; López-de-Arana Prado et al., 2023; Maside Pujol & González García, 2022; Moya-Mata & Peirats, 2019; Opanga & Venuste, 2022; Pinto et al., 2021; Ruiz Hidalgo & Ortega-Sánchez, 2022; Urdanivia Alarcon et al., 2023; Van Leeuwen & Janssen, 2019).
Self-regulated learning	(Bermúdez Mendieta, 2021; Boix Vilella & Ortega Rodríguez, 2020; Espinoza Freire, 2022; Fornons & Palau, 2021; Gosálbez-Carpena et al., 2022; Guamán Gómez & Espinoza Freire, 2022; López-de-Arana Prado et al., 2023; Moya-Mata & Peirats, 2019; Pastes Urbano et al., 2020; Redondo-Corcobado & Fuentes, 2020; Ruiz Hidalgo & Ortega-Sánchez, 2022; Urdanivia Alarcon et al., 2023; Van Leeuwen & Janssen, 2019).
Critical thinking	(Bermúdez Mendieta, 2021; Calvo Varela et al., 2019; Firman et al., 2019; Moya-Mata & Peirats, 2019; Ordoñez Ocampo et al., 2021; Redondo-Corcobado & Fuentes, 2020; Ruiz Hidalgo & Ortega-Sánchez, 2022).
Responsibility	(Boix Vilella & Ortega Rodríguez, 2020; Fornons & Palau, 2021; Heindl, 2019; León-Díaz et al., 2019; Guamán Gómez & Espinoza Freire, 2022).
Feedback	(Lampropoulos et al., 2022; Pinto et al., 2021; Van Leeuwen & Janssen, 2019).
Digital resources and competence	(Belduma-Suquilanda, 2021; Escaravajal Rodríguez & Martín-Acosta, 2019; Espinoza Freire, 2022; Herrada Valverde & Baños Navarro, 2018; Lampropoulos et al., 2022; Liu et al., 2021; Moya-Mata & Peirats, 2019; Ruiz Hidalgo & Ortega-Sánchez, 2022; Pastes Urbano et al., 2020; Urdanivia Alarcon et al., 2023).
Cognitive overload	(Liu et al., 2021).
Digital challenges	(Dyson et al., 2022; Gosálbez-Carpena et al., 2022; Pinto et al., 2021).
Workload for teachers	(León-Díaz et al., 2018; Pacheco Sanz et al., 2020).
Teacher training	(Arufe-Giráldez et al., 2022; Fornons & Palau, 2021; Heredia Ponce et al., 2022; Herrada Valverde & Baños Navarro, 2018; Pacheco Sanz et al., 2020; Urdanivia Alarcon et al., 2023).

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