Análisis relacional de enfoques de aprendizaje asociados al trabajo en equipo y aprendizaje cooperativo: Revisión sistemática de la literatura

The relational analysis of learning approaches associated with teamwork and cooperative learning: A systematic literature review

Análise relacional de abordagens de aprendizagem associadas ao trabalho em equipe e à aprendizagem cooperativa: revisão sistemática da literatura

Ricardo Pérez Zúñiga
Universidad de Guadalajara, Centro Universitario de Ciencias Exactas e Ingeniería, México
perezuniga@udgvirtual.udg.mx
http://orcid.org/0000-0001-9377-6083

Mario Martínez García *
Universidad de Guadalajara, Centro Universitario de los Valles, México
mario.mgarcia@academicos.udg.mx
https://orcid.org/0000-0002-5816-8434

Andrés Palomera Chávez
Universidad de Guadalajara, Centro Universitario de Ciencias de la Salud, México
andres.palomera@academicos.udg.mx
https://orcid.org/0000-0003-0124-523X

* Corresponding author

Resumen

Este estudio analiza cinco enfoques de aprendizaje, destacando el predominio del aprendizaje colaborativo y el trabajo en equipo en la educación universitaria, además del aprendizaje cooperativo, el trabajo colaborativo y el trabajo cooperativo. Se analiza su adaptabilidad a distintos contextos y niveles académicos, así como las barreras identificadas, las herramientas de evaluación y las competencias asociadas a cada enfoque. Además, se examina cómo su conceptualización puede afectar su efectividad. Dado que estas

metodologías comparten numerosas similitudes, podrían dar lugar a confusión dentro de la comunidad académica.

Este trabajo busca responder cuál de estas metodologías de aprendizaje es la más empleada y qué contextos, competencias, barreras, tecnologías, herramientas de evaluación y características se asocian con su implementación, según la revisión sistemática de la literatura. El objetivo general es analizar estos cinco enfoques por medio de una revisión sistemática de la literatura, dentro de las modalidades educativas presenciales, en línea e híbridas en la educación superior.

El análisis de 133 documentos muestra que el aprendizaje colaborativo es el enfoque más predominante, seguido por el trabajo en equipo y el aprendizaje cooperativo. Este hallazgo demuestra la flexibilidad del aprendizaje colaborativo en contextos presenciales, en línea e híbridos. Mientras las publicaciones científicas mencionan más el aprendizaje colaborativo, el lenguaje controlado que nos presentan los tesauros, no menciona el término. Entre las competencias más desarrolladas destacan el trabajo en equipo y la comunicación, ambos esenciales en la formación universitaria.

Palabras clave: Trabajo colaborativo, trabajo cooperativo, aprendizaje colaborativo, pensamiento crítico, competencias relevantes, instrumentos de evaluación.

Abstract

This study examines five learning approaches, with a focus on the predominance of collaborative learning and teamwork in higher education. It also explores cooperative learning, collaborative work, and cooperative work. It explores their adaptability to various contexts and academic levels, as well as the barriers identified, assessment tools, and competencies or characteristics of each approach in its conceptualization, which hinder their effectiveness. Since these methodologies share numerous similarities, they may cause confusion within the academic community.

This paper seeks to answer the question: Which of these learning methodologies is the most widely used? What contexts, competencies, barriers, technologies, assessment tools, and characteristics are associated with their implementation according to the reviewed literature? The general objective is to analyze these five approaches through a systematic literature review, within the frameworks of in-person, online, and hybrid education in higher education.

The analysis of 133 documents shows that collaborative learning is the predominant approach, followed by teamwork and cooperative learning. This finding demonstrates the flexibility of collaborative learning in in-person, online, and hybrid contexts. While scientific publications mention collaborative learning more frequently, the controlled vocabulary in thesauri, does not include this term. Among the most developed competencies, teamwork and communication are essential in university education.

Keywords: Collaborative work, cooperative work, collaborative learning, critical thinking, relevant competencies, assessment instruments

Resumo

Este estudo analisa cinco abordagens de aprendizagem, destacando a predominância da aprendizagem colaborativa e do trabalho em equipe na educação universitária, além da aprendizagem cooperativa, do trabalho colaborativo e do trabalho cooperativo. É analisada sua adaptabilidade a diferentes contextos e níveis acadêmicos, bem como as barreiras identificadas, ferramentas de avaliação e competências associadas a cada abordagem. Além disso, é examinado como sua conceituação pode afetar sua eficácia. Como essas metodologias compartilham inúmeras semelhanças, elas podem causar confusão na comunidade acadêmica.

Este artigo busca responder qual dessas metodologias de aprendizagem é a mais amplamente utilizada e quais contextos, competências, barreiras, tecnologias, ferramentas de avaliação e características estão associadas à sua implementação, com base em uma revisão sistemática da literatura. O objetivo geral é analisar essas cinco abordagens por meio de uma revisão sistemática da literatura, nas modalidades educacionais presenciais, on-line e híbridas no ensino superior.

Uma análise de 133 documentos mostra que a aprendizagem colaborativa é a abordagem mais prevalente, seguida pelo trabalho em equipe e pela aprendizagem cooperativa. Esta descoberta demonstra a flexibilidade da aprendizagem colaborativa em contextos presenciais, online e híbridos. Embora as publicações científicas mencionem mais a aprendizagem colaborativa, a linguagem controlada que nos é apresentada pelos tesauros não menciona o termo. Entre as habilidades mais desenvolvidas estão o trabalho em equipe e a comunicação, ambas essenciais na formação universitária.

Introduction

This study, based on the analysis of 133 documents on five learning approaches, highlights that collaborative learning is the most common, followed by teamwork and cooperative learning. These approaches demonstrate remarkable flexibility, adapting effectively to diverse educational environments, including in-person, virtual, and hybrid learning. Although collaborative and cooperative work are less represented, their implementation in different educational modalities highlights their importance, especially at the undergraduate level, where they are widely used in bachelor's degree programs.

The similarity between the characteristics of these five learning approaches can lead to terminological confusion, making it difficult to compare studies and implement consistent educational methodologies. This lack of conceptual clarity can also lead to inconsistencies in educational research, as variability in the interpretation and application of terms affects the quality and comparability of results.

In higher education, instructors have evolved from considering teamwork as a secondary objective to integrating it as a key learning objective in courses (Chinoy et al., 2022) . The skills inherent in teamwork are necessary components in university education, as they have been associated with various benefits, such as increased self-esteem, confidence, interpersonal and conflict management skills, as well as the development of leadership, extracurricular and creativity skills (De Prada et al., 2024) .

Consequently, teamwork is incorporated into the curricula of numerous educational programs as a transversal skill, providing a wide range of benefits (Planas-Lladó et al., 2018) . The skills developed through these methodologies, such as teamwork and communication skills, are essential in today's educational environment.

However, its implementation is limited by barriers related to the context and students' lack of skills, the use of technology, and the development of group dynamics that would help facilitate these practices. The assessments applied to the study methodologies, on the other hand, tend to be structured methods such as Likert-type surveys and questionnaires.

Teamwork is characterized by the collaboration of two or more people with shared goals, highlighting the synergy between members (Watson et al., 2022) . In the classroom, it

involves at least three people (Andrés et al., 2023) and requires seven key behaviors for its effectiveness: adaptability, communication, coordination, decision-making, interpersonal relationships, performance monitoring, and shared situational awareness (Cannon-Bowers et al., 1995) .

It has been shown to foster active student engagement, as well as the development of social and interpersonal skills, cooperation, and collaboration (De Prada et al., 2022) . In this process, individuals leverage both their unique and shared knowledge to achieve a common goal. Emphasis is placed on coordination and interaction among team members to harmonize intellectual resources and effectively achieve common goals (Bui and Tran, 2024) .

Collaboration is considered a productive way to solve complex and non-routine problems (Riivari et al., 2021) . However, it is important to note that teamwork alone is not enough. To achieve this goal, it is also essential for students to learn to organize, plan, review the work and functioning of the team, as well as to propose improvement objectives that allow them to develop effective teamwork skills (Planas-Lladó et al., 2018) .

Despite this, numerous investigations show that poor group processes can negatively affect student performance (Kamau and Spong, 2015) , and their efficiency is significantly influenced by the effectiveness of the distribution of roles within the team, which largely depends on the individual cognitive characteristics of each member (Buzhinskaya et al., 2022) .

Cooperative work is defined as a process in which several individuals collaborate to achieve a common goal, sharing resources, responsibilities and participating in decision-making (Benford et al., 1994) . This process involves activities in which multiple actors work together towards a specific goal, being interdependent in their execution (Schmidt, 1991) . Students collaborate in small, heterogeneous groups, supporting each other in the learning process. Interaction to give and receive support, under the active supervision of the teacher, is considered one of the most effective methodologies to facilitate learning (Cañabate et al., 2020) .

This learning methodology promotes autonomous learning among students. Furthermore, it encourages students to take an active role in their learning process, strengthening cooperation among them to promote the development of a collective understanding of the subject, conceived as a shared learning area (Sein-Echaluce et al., 2021) ; as well as developing key skills and competencies, such as effective communication, conflict resolution, adaptability, critical thinking, autonomy, empathy, and decision-making,

among others, all of which are important for their future professional practice (Díaz-Pompa et al., 2023) .

On the other hand, it fosters intellectual capacities and the development of knowledge; this educational approach plays an important role in creating and strengthening students' social skills (Óhidy, 2008) . As already mentioned, cooperative learning ranges from informal group discussions to structured activities, focused on team building and individual responsibility (Hennebry and Fordyce, 2017) , which is reflected in the importance of emerging coordinated interactions, essential to achieve common goals (Delgado-García et al., 2022) .

Collaborative work, understood as the use of groups to improve learning through teamwork, is also known as collaborative learning (Kurni and K, 2021) . The intense interaction between team members facilitates the sharing, development, application, and modification of knowledge (Bui and Tran, 2024) and fosters the development of critical thinking (Dewiyanti et al., 2005) . The results are developed in sequential stages. First, ideas are generated, which includes brainstorming and debates, allowing students to explore different perspectives. This is followed by the organization of ideas, where the group analyzes and synthesizes the initial ideas (Naamati-Schneider and Alt, 2023) .

Collaborative work implies a relationship of positive interdependence between team members, individual responsibility for achieving the common goal, diversity in characteristics, communication skills, symmetrical and reciprocal relationships, and the desire to share task resolution (Flores Ureba et al., 2022) . This approach is complemented by the perspective that emphasizes the importance of positive interdependence and individual responsibility in small groups, promoting discussion and reflection as means to achieve deep and collaborative learning (Haugland et al., 2022) .

Together, both quotes highlight that collaborative work depends not only on cooperation among members but also on a structured approach that facilitates reflection and meaningful learning through interaction and diverse contributions within the team. Their focus is on students' individuality, as well as on strengthening their verbal activity and critical thinking (Zhou et al., 2023) .

Similarly, it fosters positive interpersonal relationships that offer personal and academic support, improve mental health and well-being, including self-esteem and social skills (Cañabate et al., 2020) , and prevent negative competition between individuals (Zhou et al., 2023) . On the other hand, it can be applicable to all educational levels and focuses on

the comprehensive training of students, with the teacher acting as a mediator in social interaction. This approach is based on didactics enriched by methods, forms of organization and evaluation aimed at promoting learning and socialization through group work, encouraging responsibility (Díaz-Pompa et al., 2023) .

Furthermore, although these methodologies do not rely heavily on technology, as evidenced in the analysis, their integration could be considered a gap in today's increasingly digitalized educational context. Finally, the need for standardized terminology is important to facilitate both research and participants' understanding of methodological strategies, with the use of thesauri being a possible solution to mitigate this ambiguity.

This systematic literature review focuses on the analysis of the scientific production available in the Clarivate Web of Science (WoS) database, related to the methodologies of teamwork, collaborative work, cooperative work, collaborative learning and cooperative learning in the context of higher education, focusing exclusively on students.

Based on this, this study poses the following research question: Which of these learning methodologies is the most widely used, and what contexts, competencies, barriers, technologies, assessment tools, and characteristics are associated with their implementation according to the literature reviewed? The overall objective is to analyze these five approaches through a systematic literature review, within face-to-face, online, and hybrid educational modalities in higher education.

Methodology

Systematic literature reviews allow information to be presented in a clear and structured manner, using a methodology with defined objectives. This allows for research that identifies, selects, and assesses scientific evidence for analysis (Moher et al., 2014) . The PRISMA (Preferred Reporting Items for Systematic Review and Meta- Analysis) was used as a methodological framework (Rethlefsen and Page, 2022) . This guide assists the academic community in preparing comprehensive and clear reports (Kolaski et al., 2023) .

Stages of the investigation

The study began with the formulation of the general objective and proceeded in two phases. First, a systematic review was conducted, which included the search and selection of relevant literature. Subsequently, a qualitative analysis was performed (Jäger-Roschko and Petersen,

2022) . To obtain the literature, the PRISMA guidelines were applied in the WoS database
(**Fig. 1**).

Figure 1. Methodological steps for the development of a systematic literature review.
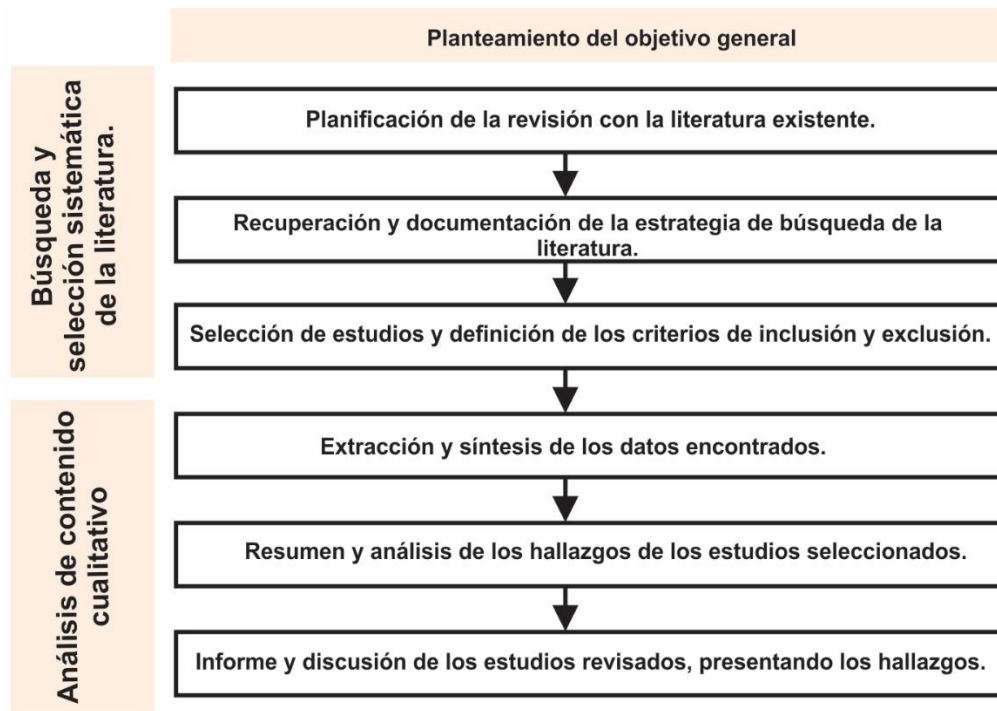
Source: Prepared by the authors based on Jäger-Roschko and Petersen, 2022 .

Verification of controlled language through thesauri

Three specialized thesauri in the educational sciences were consulted, with the aim of
verifying whether the five selected terms were recognized, related, and standardized as
controlled language. In the ERIC thesaurus (Institute of Education Sciences [IES], n.d.) , the
only terms identified were teamwork and cooperative learning. In the European Education
Thesaurus (Commission of the European Communities, 2018) , only the term teamwork was
found. Finally, in the UNESCO Thesaurus (United Nations Educational, Scientific and
Cultural Organization [UNESCO], n.d.) , none of the controlled terms were identified. These
findings seem to indicate that the concept of teamwork could be more commonly recognized
as a standardized term in the educational field.

Databases

The scientific literature search was carried out in the WoS digital database. This tool is recognized as one of the most comprehensive and with the greatest impact on the academic and scientific community, as it is essential for accessing published articles, books, reports and other resources containing relevant information to pose specific research questions. (Karanović et al., 2023) .

Search strategy

In this process, research patterns and key terms were identified in studies on the five learning approaches. Specific filters and search strings were applied to cover as many relevant scientific articles as possible on the subject of study analyzed. The research focused on studies related to teamwork, collaborative work, cooperative work, cooperative learning, and collaborative learning in the context of higher education. The search strategy included the selection of scientific articles according to the criteria set out in **table 1.**

Table 1. Search strings

	Keywords	Search string	Period	Date of investigation	Language	Filters (WoS categories)	Number of items
1	(teamwork) (Title) AND (" higher education ")	(teamwork) (Title) AND (" higher education ") (Topic) and Open Access and Article or Review Article (teamwork) (Title) AND (" higher education ") (Topic) and Open Access and Article or Review Article (Document Types) and English (Languages)	Free	June 14, 2024	English	Open Access and Article or Review Article (teamwork) (Title) AND (" higher education ") (Topic) and Open Access and Article or Review Article (Document Types) and English (Languages)	31
2	(" collaborative " work ") (Title) AND (" higher education ")	(" collaborative " work ") (Title) AND (" higher education ") (All Fields) and Open Access and Article or Review Article (Document Types) and English (Languages) and English (Languages)	Free	June 14, 2024	English	Open Access and Article or Review Article (Document Types) and English (Languages) and English (Languages)	10
3	("cooperative work ") (Title) AND (university)	("cooperative work ") (Title) AND (university) (All Fields) and Open Access and	Free	June 14, 2024	English	Open Access and Article (Document Types) and English (Languages)	19

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		Article (Document Types) and English (Languages)					
4	("cooperative learning ") (Title) AND (" higher education ")	("cooperative learning ") (Title) AND (" higher education ") (Topic) and Open Access and Article or Review Article (Document Types) and English (Languages)	Free	June 14, 2024	English	Open Access and Article or Review Article (Document Types) and English (Languages)	26
5	(" collaborative " learning ") (Title) AND (" higher education ")	(" collaborative " learning ") (Title) AND (" higher education ") (Topic) and Open Access and Article or Review Article (Document Types) and English (Languages) and Education Educational Research (Research) Areas)	Free	June 14, 2024	English	Open Access and Article or Review Article (Document Types) and English (Languages) and Education Educational Research (Research) Areas)	70
						TOTAL=	156

Source: Prepared by the authors based on the results obtained from the WoS

Study selection criteria

After applying the search terms, inclusion and exclusion criteria were established (**Table 2**). The titles, abstracts, results, discussions, and conclusions of the identified studies were reviewed. In cases where access to a document was restricted, the authors were

contacted to request a copy of the article, thus obtaining 100% of the publications necessary to continue the research.

Table 2. Criteria for including or excluding articles in this systematic review study

| Inclusion criteria	Exclusion criteria
Articles that include the keywords in the title.	Books and book chapters.
Studies on the following methodologies: 1) Teamwork, 2) Collaborative work, 3) Cooperative work, 4) Cooperative learning and 5) Collaborative learning, focused on the context of higher education.	Studies that do not address higher education.
Scientific and review articles.	Scientific articles and reviews that are not written in English.
With DOI registration.	Articles without DOI number.
English language.	Studies that did not use any of the five methodologies and that do not meet the objective of this research.

Source: Prepared by the authors

Data control

A total of 156 documents were obtained from the WoS database. The information extracted included type of publication, author(s) name(s), titles, journals, abstracts, year of publication and DOI (Digital Object Identifier). Repeated articles were then removed, resulting in a total of 155 articles. A DOI review was then conducted, and those without one were discarded, leaving a total of 154 documents. Finally, the abstracts were analyzed to exclude irrelevant articles, such as publications not written in English, book chapters, studies not addressing higher education, and unavailable documents. This resulted in the exclusion of 21 publications. The final metadata sample consisted of a total of 133 documents. The PRISMA

methodology (University of North Carolina at Chapel Hill [UNC], 2024) designed for this study is presented in (**Fig. 2**).

Figure 2. PRISMA diagram describing the article selection process in this research
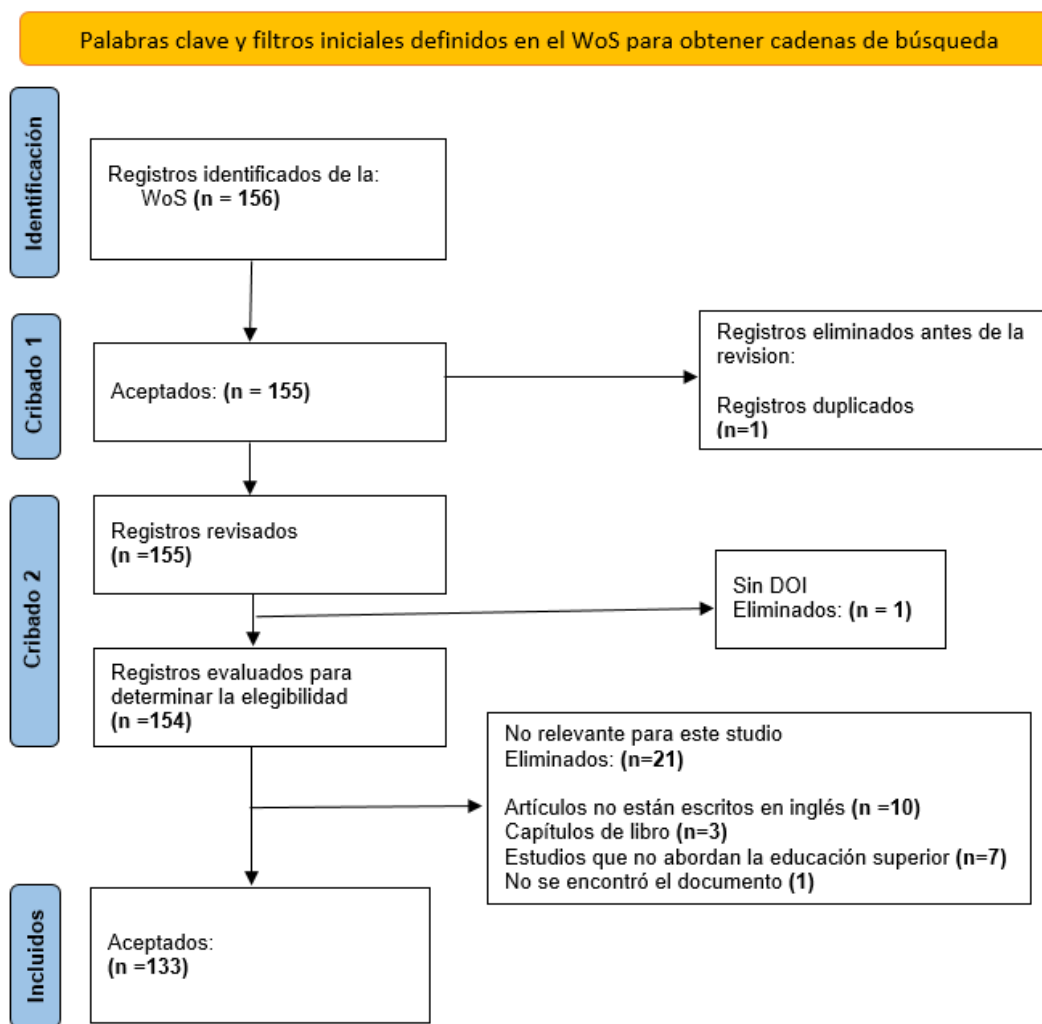
Source: Prepared by the authors based on the results obtained from the search string.

Research questions

The eleven research questions (**Table 3**) were formulated in accordance with the main objective and validated by the authors. These questions were formulated to guide the search strategy, review, and analysis of the data obtained. The answers to these questions were obtained after metadata purification. Subsequently, the data were normalized to facilitate a clearer analysis, thus guaranteeing the quality and integrity of the information. For the normalization of the answers (PI-2), the journal titles were abbreviated according to the ISO

4:1997 standard (ISO, 1997) ; the proposals for professional competencies (PI-7) according to (Galdeano Bienzobas and Valiente Barderas, 2010) were taken into account. Regarding barriers and obstacles (PI-8), the proposals of (Galindo-Domínguez et al., 2024) and (Martínez García et al., 2024) were considered .

Table 3. Research questions

Research questions	Answers
PI-1 Which countries are the most active in producing scientific articles related to the five methodologies?	Names of countries.
PI-2: What journals have these articles been published in?	Names of abbreviated journals.
PI-3 What is the most commonly used methodology?	Teamwork, Collaborative work, Cooperative work, Cooperative learning and Collaborative learning.
PI-4 In what context is it applied?	In-person, online, and hybrid.
PI-5 What is the academic level of the participants?	Undergraduate, postgraduate and graduate.
PI-6 In which disciplinary area are these methodologies applied?	Various areas, education and pedagogy, health sciences, computer science and information technology, economic and administrative sciences, engineering and exact sciences, unspecified, languages, STEM education, social sciences and arts
PI-7 What was the most relevant competency among the five learning methodologies?	Teamwork skills, oral and written communication, ability to learn and update, commitment to society and culture, critical reasoning, problem solving, computer skills, research skills, organization and planning, ethical commitment, knowledge of a foreign language (not mentioned), independent learning, creativity, ability to work internationally, motivation and decision making
PI-8 Are any barriers or obstacles identified in the implementation of the learning method?	Difficulties due to the type of context, lack of student skills, adaptation problems, communication deficiencies, assessment difficulties, lack of teacher preparation, resistance to change, stress and anxiety, lack of organization, scheduling problems, lack of motivation, lack of institutional support, lack of leadership, not mentioned, unequal participation, feedback difficulties, lack of self-confidence and insecurity, contempt for members, predominance of the leader

PI-9 Was any technology implemented or used in any of the methodologies?	No, teamwork training tool, social networks, video conferencing, educational technologies, entertainment software, blogs and wikis, specialized technology, devices and hardware, MS Office, specialized software, video creation, educational video, databases.
PI-10 Is any evaluation instrument used in the implementation of these methodologies?	Likert survey, questionnaire, peer assessment, report, individual performance, group performance, self-assessment, data analysis and processing, not specified, exam, assessment rubric, assignments, interview, project assessment, focus groups, discourse analysis, observation, video recording, portfolios, research productivity, and others.
PI-11. According to the publications obtained in the search strings, what are the most relevant characteristics of each of the methodologies analyzed according to the theory found in the systematic literature review?	Communication, decision making, effective collaboration, problem solving, job roles, individual contributions, required skill diversity, common goals, group cohesion, adaptability, group interaction, coordination, small groups, fostering critical thinking, developing social and interpersonal skills, positive interdependence, monitoring performance, shared situational awareness, cooperation, conflict management, leadership development, developing creativity, organizing, planning, fostering independent learning, peer discussion, individuality, empathy, responsibility, increasing motivation, co-regulation and regulation of learning, division of labor into sub-tasks, equitable participation.

Source: Prepared by the authors

Results

PI-1 Which countries are the most active in producing scientific articles related to the five methodologies?

Sankey diagram (**Fig. 3**) shows the geographical distribution of scientific and review articles on five learning methodologies, highlighting the number of publications per country. Collaborative learning is the most referenced methodology, with (63) publications, followed by teamwork (28), cooperative learning (22), cooperative work (12) and, finally,

collaborative work (8). Spain leads the list with (32) articles, followed by the United Kingdom with (16) and the United States with (9).

Other countries with significant contributions include the Netherlands and China, with (5) publications each, while Portugal, Norway, Finland and Australia each record (4) publications. In conclusion, collaborative learning is the most frequently mentioned methodology, especially in Spain and the United Kingdom. In contrast, collaborative work is the least frequently mentioned.

Figure 3. Sankey diagram illustrating the geographical distribution and number of publications corresponding to the five learning methodologies
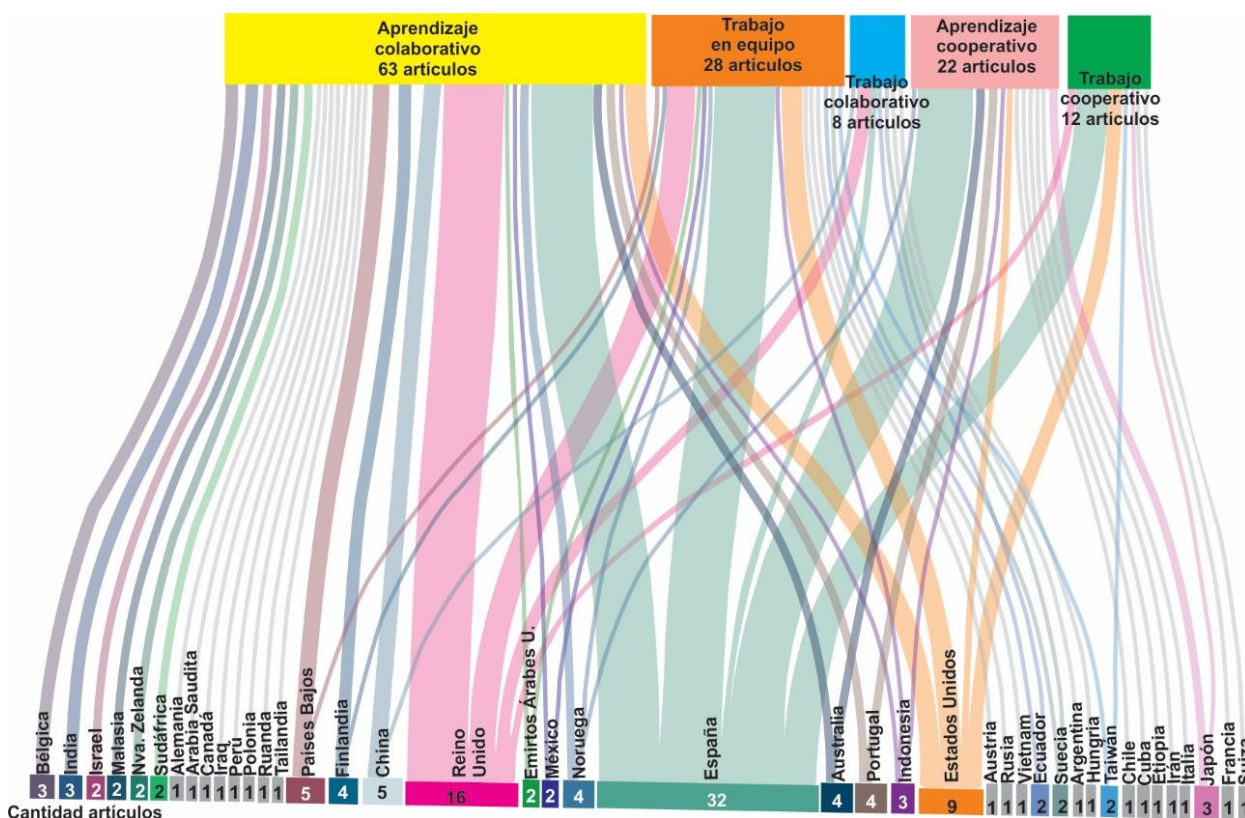
Source: Prepared by the authors, based on information obtained from metadata analysis

PI-2: What journals have these articles been published in?
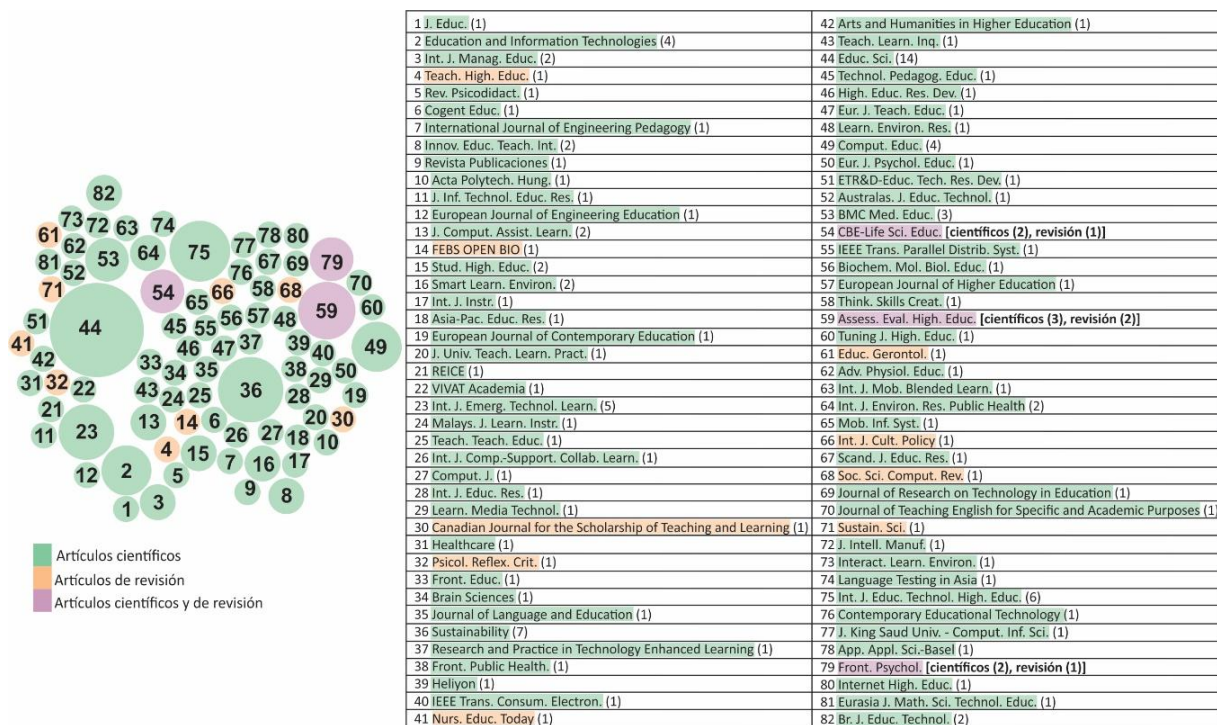
The bubble cluster chart (**Fig. 4**) illustrates the relevance of publications, which are grouped into three color-coded categories: green for scientific articles, orange for review articles, and purple for a combination of both types of publications. The size of each bubble reflects the number of published articles; the larger the bubble, the greater the number of

articles represented. Each bubble is labeled with a number, which allows you to view both the number of publications and the journal names in the box to the right.

The magazines with the highest number of publications are: Educ. Sci. (14), Sustainability (7), Int. J. Educ. Technol. High. Educ. (6), Int. J. Emerg. Technol. Learn. (5), Comput. Educ. (4), Education and Information Technologies (4), BMC Med. Educ. (3), Br. J. Educ. Technol. (2), Innov. Educ. Teach. Int. (2), Int. J. Environ. Public Res. Health (2), Int. J. Manag. Educ. (2), J. Comput. Assist. Learn. (2), Smart Learn. Environ. (2), and Stud. High. Educ. (2). It is important to highlight that all the journals analyzed are scientific, specialized and of recognized prestige in the scientific dissemination on this topic.

The journals that present combined publications, that is, both scientific and review articles, represented in purple, are: Assess. Eval. High. Educ. (with 3 scientific articles and 2 review articles), CBE- Life Sci. Educ. (with 2 scientific articles and 1 review article), and Front. Psychol. (with 2 scientific articles and 1 review article). Finally, it is noted that nine journals have only one review article.

Figure 4. Bubble chart cluster chart illustrating the relevance of scientific and review publications in academic journals

1 J. Educ. (1)	42 Arts and Humanities in Higher Education (1)
2 Education and Information Technologies (4)	43 Teach. Learn. Inq. (1)
3 Int. J. Manag. Educ. (2)	44 Educ. Sci. (14)
4 Teach. High. Educ. (1)	45 Technol. Pedagog. Educ. (1)
5 Rev. Psicodidact. (1)	46 High. Educ. Res. Dev. (1)
6 Cogent Educ. (1)	47 Eur. J. Teach. Educ. (1)
7 International Journal of Engineering Pedagogy (1)	48 Learn. Environ. Res. (1)
8 Innov. Educ. Teach. Int. (2)	49 Comput. Educ. (4)
9 Revista Publicaciones (1)	50 Eur. J. Psychol. Educ. (1)
10 Acta Polytech. Hung. (1)	51 ETR&D-Educ. Tech. Res. Dev. (1)
11 J. Inf. Technol. Educ. Res. (1)	52 Australas. J. Educ. Technol. (1)
12 European Journal of Engineering Education (1)	53 BMC Med. Educ. (3)
13 J. Comput. Assist. Learn. (2)	54 CBE-Life Sci. Educ. [científicos (2), revisión (1)]
14 FEBS OPEN BIO (1)	55 IEEE Trans. Parallel Distrib. Syst. (1)
15 Stud. High. Educ. (2)	56 Biochem. Mol. Biol. Educ. (1)
16 Smart Learn. Environ. (2)	57 European Journal of Higher Education (1)
17 Int. J. Instr. (1)	58 Think. Skills Creat. (1)
18 Asia-Pac. Educ. Res. (1)	59 Assess. Eval. High. Educ. [científicos (3), revisión (2)]
19 European Journal of Contemporary Education (1)	60 Tuning J. High. Educ. (1)
20 J. Univ. Teach. Learn. Pract. (1)	61 Educ. Gerontol. (1)
21 REICE (1)	62 Adv. Physiol. Educ. (1)
22 VIVAT Academia (1)	63 Int. J. Mob. Blended Learn. (1)
23 Int. J. Emerg. Technol. Learn. (5)	64 Int. J. Environ. Res. Public Health (2)
24 Malays. J. Learn. Instr. (1)	65 Mob. Inf. Syst. (1)
25 Teach. Teach. Educ. (1)	66 Int. J. Cult. Policy (1)
26 Int. J. Comp.-Support. Collab. Learn. (1)	67 Scand. J. Educ. Res. (1)
27 Comput. J. (1)	68 Soc. Sci. Comput. Rev. (1)
28 Int. J. Educ. Res. (1)	69 Journal of Research on Technology in Education (1)
29 Learn. Media Technol. (1)	70 Journal of Teaching English for Specific and Academic Purposes (1)
30 Canadian Journal for the Scholarship of Teaching and Learning (1)	71 Sustain. Sci. (1)
31 Healthcare (1)	72 J. Intell. Manuf. (1)
32 Psicol. Reflex. Crit. (1)	73 Interact. Learn. Environ. (1)
33 Front. Educ. (1)	74 Language Testing in Asia (1)
34 Brain Sciences (1)	75 Int. J. Educ. Technol. High. Educ. (6)
35 Journal of Language and Education (1)	76 Contemporary Educational Technology (1)
36 Sustainability (7)	77 J. King Saud Univ. - Comput. Inf. Sci. (1)
37 Research and Practice in Technology Enhanced Learning (1)	78 App. Appl. Sci.-Basel (1)
38 Front. Public Health. (1)	79 Front. Psychol. [científicos (2), revisión (1)]
39 Heliyon (1)	80 Internet High. Educ. (1)
40 IEEE Trans. Consum. Electron. (1)	81 Eurasia J. Math. Sci. Technol. Educ. (1)
41 Nurs. Educ. Today (1)	82 Br. J. Educ. Technol. (2)

Artículos científicos
Artículos de revisión
Artículos científicos y de revisión

Source: Prepared by the authors, based on information obtained from metadata analysis

Sankey diagram (**Fig. 5**) provides a comprehensive analysis of research questions PI-3, PI-4, PI-5, and PI-6 by examining four interrelated factors: "learning methodologies", "implementation context", "participants' academic level" and "disciplinary areas". This association allows for a deeper understanding of how each factor contributes to the main research objective, providing a holistic view of the results obtained.

PI-3 What is the most commonly used methodology?

The main learning methodologies represented in the Sankey diagram are collaborative learning (47.37%), the most frequently mentioned in scientific publications. Teamwork follows (21.05%). Cooperative learning (16.54%), although less cited than the previous methods, has a significant presence. Finally, cooperative work (9.02%) and collaborative work (6.02%) are the least frequently mentioned in scientific publications in the context of higher education.

PI-4 In what context is it applied?

The methodologies analyzed are implemented in three educational modalities: in-person (36.09%), online (34.59%), and hybrid (29.32%). The results of our research indicate that collaborative learning, teamwork, and cooperative learning are more prevalent in all three modalities, compared to cooperative work and collaborative work. Although the latter are also present in all three modalities, their incidence is significantly lower.

PI-5 What is the academic level of the participants?

Regarding academic levels, most of the application of these methodologies is concentrated at the undergraduate level (70%). This is followed by a combination of undergraduate and graduate studies (17.29%), and, to a lesser extent, graduate studies (10.53%). These results suggest that this may be due to the larger student population at the undergraduate level within university education. Furthermore, it is important to highlight that a significant proportion of publications (17.29%) focus on studies that cover both undergraduate and graduate levels. Very few publications combine different academic levels, such as studies that include both graduate and graduate students (1.5%) or undergraduate and graduate students (0.75%).

PI-6 In which disciplinary area are these methodologies applied?

The diagram also illustrates how these methodologies are implemented in different areas of knowledge. It is noteworthy that in (29.32%) of cases, the application of these methodologies spanned "diverse areas", implying that at least two or more study programs were simultaneously considered to apply one of the aforementioned methodologies. Furthermore, the areas of "education and pedagogy" accounted for (15.79%), while "health sciences" accounted for (12.03%). This indicates that, together, these three areas are the most prominent in the implementation of these methodologies.

On the other hand, it is observed that the areas of "computer science and information technology" represent (10.53%), "economics and administrative sciences" (9.02%), and "exact sciences and engineering" (8.27%). These data indicate that these areas represent a significant percentage in the implementation of the methodologies studied. Finally, the areas of languages (3.76%), "STEM education" (3.01%), "social sciences" (2.26%), and arts (1.50%) are mentioned, which are less relevant in terms of the application of these methodologies.

Figure 5. Sankey diagram representing the comprehensive analysis of the learning methodologies (PI-3), the application context (PI-4), the academic level of the participants (PI-5) and the disciplinary area (PI-6)
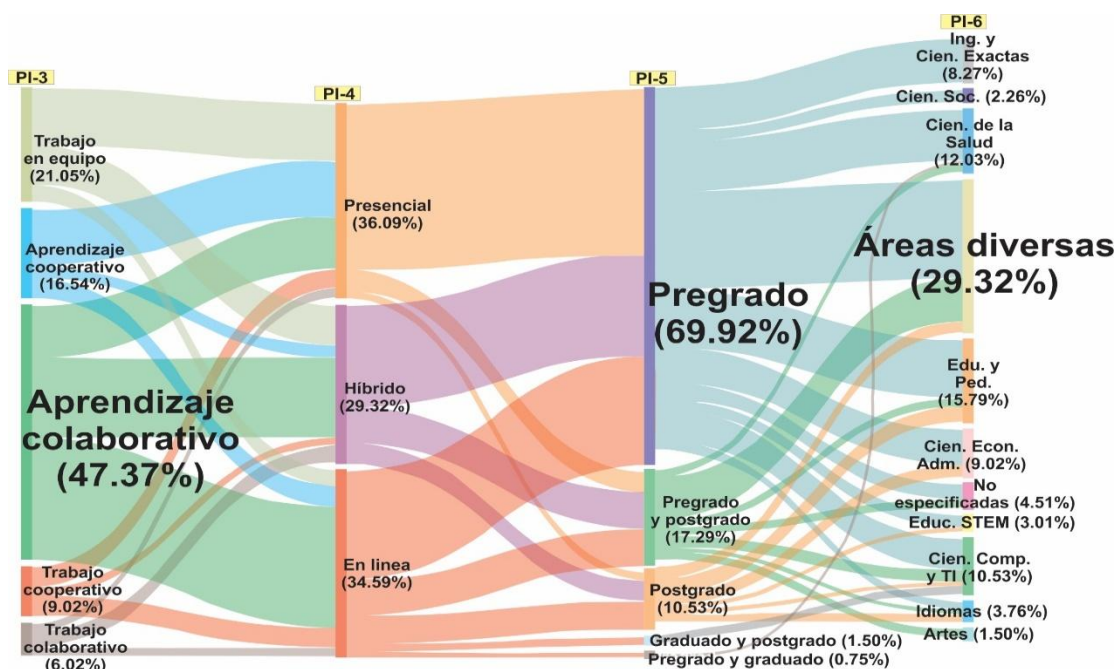
Source: Prepared by the authors, based on information obtained from metadata analysis

PI-7 What was the most relevant competency among the five learning methodologies?

Figure 6 shows that the "teamwork ability" competency is the most valued, representing (30.08%) of the total. It is followed by "oral and written communication" at (13.53%). Other relevant competencies include the "ability to learn and keep up to date", at (8.27%), and "commitment to society and culture", at (7.52%). "Critical reasoning" at (6.77%). "Problem-solving" at (5.26%), and "computer skills" at (4.51%) also stand out, underscoring the importance of these technical and analytical skills. Finally, competencies such as "decision-making" and "motivation", both at (0.75%), are the least mentioned.

Figure 6. Most relevant professional skills
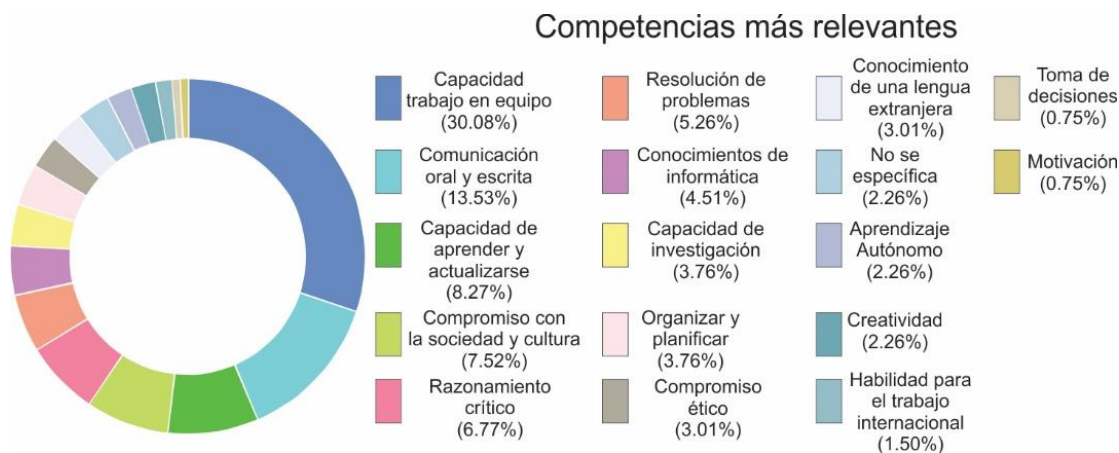
Source: Prepared by the authors, based on information obtained from metadata analysis

PI-8 Are any barriers or obstacles identified in the implementation of the learning method?

Figure 7 presents an analysis of the various barriers or obstacles identified in the study. The most significant difficulty reported is "difficulties due to the type of context", at (15.79%). This is closely followed by "lack of student skills", at (14.29%). Other relevant difficulties include "adaptation problems", "communication deficiencies", and "assessment difficulties", each representing (7.52%). "Resistance to change" appears at (6.77%), and "stress and anxiety" at (5.26%).

Based on these figures, a progressive decrease in the frequency of obstacles such as "lack of organization", "scheduling problems", "lack of motivation", and "lack of institutional

support" is observed; all with percentages ranging from (4.51%) to (3.76%). The least frequent categories, which range from (1.50%) to (3.01%), include "lack of leadership", "feedback difficulties", "insecurity and lack of self-confidence", and "leader dominance".

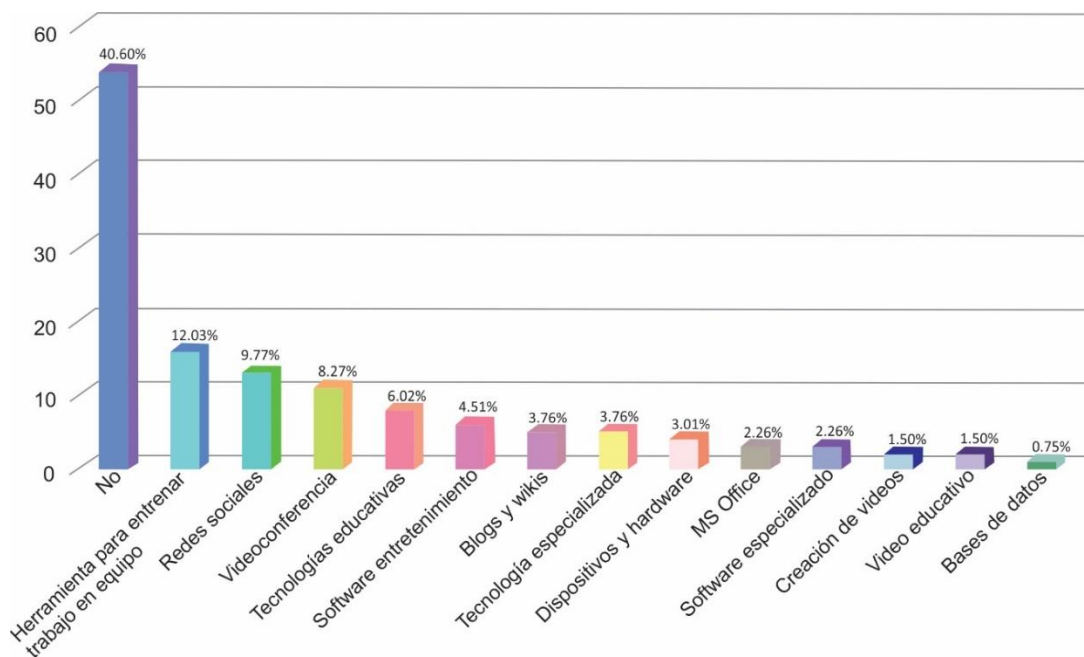**Figure 7.** Main barriers and obstacles in the implementation of learning methodologies
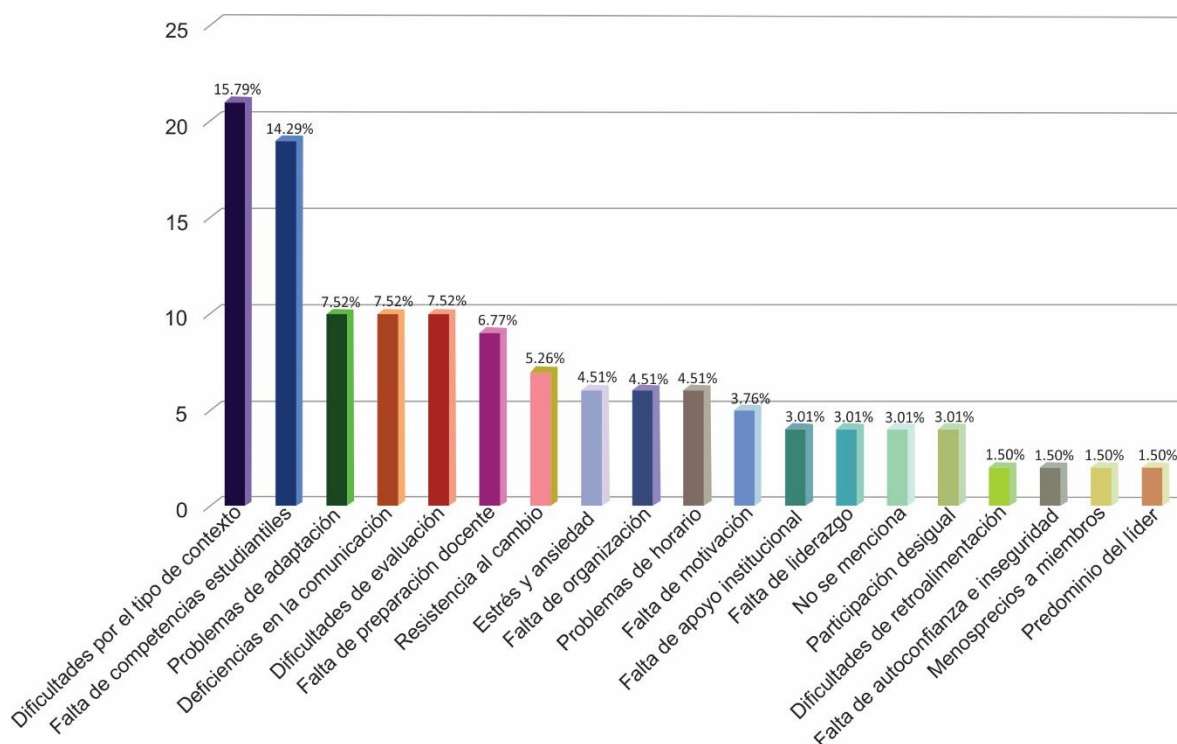
Source: Prepared by the authors, based on information obtained from metadata analysis

PI-9 Was any technology implemented or used in any of the methodologies?

Figure 8 shows the results on the implementation of technologies. (40.60%) of the publications did not implement technology in any of the learning methodologies. One (12.03%) used specific tools to train teamwork. The use of social networks (9.77%) and video conferencing (8.27%) was notable in mixed and hybrid contexts. Educational technologies accounted for (6.02%), while (4.51%) mentioned entertainment software for dynamics. Other technologies, such as blogs and wikis (3.76%), specialized hardware (3.76%), MS Office (3.01%), specialized software (2.26%), video creation (2.26%), educational videos (1.50%), and databases (0.75%), showed a lower frequency of use. It is concluded that the non-adoption of technology in learning methodologies is the most feasible option for developing group activities.

Figure 8. Implementation of technologies in group work dynamics

Source: Prepared by the authors, based on information obtained from metadata analysis

PI-10 Is any evaluation instrument used in the implementation of the method or technique?

Figure 9 presents the assessment techniques identified in the studies analyzed. The most commonly used technique is the Likert-based questionnaire, accounting for (11.91%) of the total. It is closely followed by the questionnaire, at (11.49%), and peer review, at (10.64%). These three techniques represent a significant portion of the total, highlighting their prevalence in the reviewed studies. Other techniques with considerable use include reporting and individual performance, both at (7.66%) and (6.81%), respectively. Techniques such as group performance (6.81%), self-assessment (5.96%), and data analysis and processing (5.53%) are also notable for their use. In contrast, techniques such as research productivity and portfolios are the least commonly used, each at (0.85%). These low frequencies indicate that these techniques are underutilized in the evaluated studies, either due to lack of adoption or lower applicability.

Figure 9. Evaluation techniques used in the reviewed publications

Source: Prepared by the authors, based on information obtained from metadata analysis

PI-11. According to the publications obtained in the search strings, what are the most relevant characteristics of each of the methodologies analyzed according to the theory found in the systematic literature review?

A thorough analysis of the 133 documents resulting from our search was conducted to identify the presence of clear definitions or objective descriptions of the characteristics associated with the five methodologies in the study. In cases where the characteristics were not explicitly mentioned or a formal definition was not provided, the publication was discarded. **Table 4** presents a detailed summary of the results obtained, showing the characteristics identified in the reviewed documents and providing a comparative overview of the different methodologies.

In summary, the five methodologies present numerous similarities, including communication, effective collaboration, shared goals, small groups, and positive interdependence. To a lesser extent, other characteristics are emphasized, such as problem-solving, group interaction, coordination, fostering critical thinking, and cooperation.

Table 4. List of competencies or characteristics identified from the articles obtained

through the search strings

	Teamwork	Collaborative work	Cooperative work	Cooperative learning	Collaborative learning
Communication	(Cannon-Bowers et al., 1995) , (Van Horne and Rakedzon, 2024) , (Martín-Hernández et al., 2022)	(Haugland et al., 2022)	(Díaz-Pompa et al., 2023)	(Zhou et al., 2023) , (Procopio et al., 2022)	(Abuhassna et al., 2023)
decision making	(Cannon-Bowers et al., 1995)		(Benford et al., 1994) , (Díaz-Pompa et al., 2023)	(Procopio et al., 2022)	
Effective collaboration	(Watson et al., 2022) , (De Prada et al., 2022)	(Haugland et al., 2022)	(Benford et al., 1994) , (Cañabate et al., 2020)	(Catarino et al., 2019)	(Awang-Hashim et al., 2023)
Troubleshooting	(Riivari et al., 2021)	(Haugland et al., 2022) , (Márquez Cañizares et al., 2023)		(Frania and De Sousa Correia, 2022)	(Awang-Hashim et al., 2023)
Job roles	(Buzhinskaya et al., 2022)		(Sein-Echaluce et al., 2021)	(Hamadi et al., 2022)	
Individual contributions	(Fathi et al., 2019)	(Haugland et al., 2022)			(Han and Ellis, 2021)
Diversity of skills is required	(Martín-Hernández et al., 2022) , (De Prada et al., 2024)				

| Common goals	(Soboleva et al., 2023)	(Haugland et al., 2022)	(Benford et al., 1994) , (Schmidt, 1991)	(Delgado-García et al., 2022)	(Chatzipanagio tou et al., 2024)
Group cohesion	(Cannon-Bowers et al., 1995)			(Díaz-Pompa et al., 2023)	
Adaptability	(Cannon-Bowers et al., 1995)		(Díaz-Pompa et al., 2023)		
Group interaction	(Bui and Tran, 2024)	(Márquez Cañizares et al., 2023) , (Frania and De Sousa Correia, 2022)		(Frania and De Sousa Correia, 2022)	(Riivari et al., 2021) , (Er et al., 2021)
Coordination	(Cannon-Bowers et al., 1995) , (Bui and Tran, 2024)			(Delgado-García et al., 2022)	(Er et al., 2021)
Small groups	(Watson et al., 2022)		(Cañabate et al., 2020)	(Silva et al., 2022)	(Awang-Hashim et al., 2023)
Promotes critical thinking		(Dewiyanti et al., 2005)	(Díaz-Pompa et al., 2023)	(Zhou et al., 2023)	(Abuhassna et al., 2023)
Promoting social and interpersonal skills	(De Prada et al., 2022)			(Cañabate et al., 2020) , (Óhidy, 2008)	(Dillenbourg, 1999) , (Abuhassna et al., 2023)
Positive interdepende nce	(Fathi et al., 2019)	(Haugland et al., 2022)	(Schmidt, 1991)	(Chatzipanagio tou et al., 2024)	(Falcione et al., 2019)
Performance monitoring	(Cannon-Bowers et al., 1995)				
Shared situational awareness	(Cannon-Bowers et al., 1995)				
Cooperation	(Van Horne and Rakedzon, 2024) , (De	(Haugland et al., 2022)	(Sein-Echaluce et al., 2021)		

	Prada et al., 2022)				
Conflict management	(De Prada et al., 2024)				
Leadership development	(De Prada et al., 2024)				
Development of creativity	(De Prada et al., 2024)				
Organization	(Planas-Lladó et al., 2018)			(Díaz-Pompa et al., 2023)	
Planning	(Planas-Lladó et al., 2018)				(Er et al., 2021)
Promoting independent learning		(Revilla-Cuesta et al., 2020)			
Discussion in pairs			(Revilla-Cuesta et al., 2020)		(Cañabate et al., 2019)
Individuality			(Díaz-Pompa et al., 2023) ,	(Reza Keramati and Gillies, 2022) , (Hennebry and Fordyce, 2017)	
Empathy			(Díaz-Pompa et al., 2023)		
Responsibility				(Díaz-Pompa et al., 2023)	
Increased motivation				(Díaz-Pompa et al., 2023)	
Co-regulation and regulation of learning					(Er et al., 2021)
Division of labor into sub-tasks			(Sasaki and Inoue, 2019)		
Equal participation				(Hamadi et al., 2022)	

Source: Prepared by the authors

Venn diagram (**Fig. 10**) shows the intersection of the five methodologies. The numbers in the diagram correspond to the elements listed on the left, which describe various associated competencies or characteristics. Each subset of circles in the diagram represents the areas in which these approaches overlap, highlighting the common skills among the different methodologies.

Some competencies or characteristics are shared, while others are unique to a particular approach. The diagram shows the close and complementary relationship between the five methodologies analyzed. This representation demonstrates that the methodologies are not isolated entities, but rather interact and share common principles. With this approach, the visualization adopted allows for a more precise understanding of how certain principles operate in various contexts.

Figure 10. Venn diagram illustrating learning methodologies and the competencies or characteristics shared between them
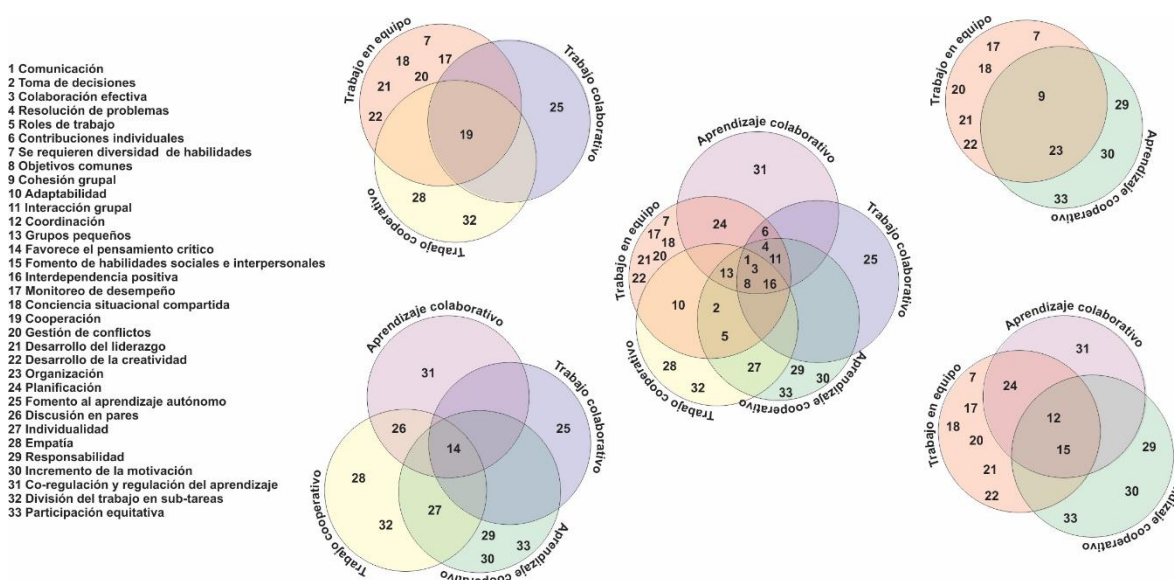
Source: Prepared by the authors, based on information obtained from metadata analysis

Discussion

Just as the words collaborative and cooperative are intertwined in their definitions, work and learning are also concepts that can be terminologically confused in these methodologies. Despite their conceptual similarity, "working" and "learning" are distinct verbs that underlie these approaches and are sometimes not adequately differentiated in the literature. "Working" implies performing an activity with the goal of obtaining a tangible result, while "learning" refers to the process of acquiring knowledge or skills. When defining the differences between cooperative and collaborative work, some authors equate cooperative and collaborative learning, using them as synonyms (Villavicencio, 2024) .

While some researchers use the terms interchangeably, others establish a clear epistemological distinction between collaborative and cooperative approaches (Garrote Rojas et al., 2019) . Teamwork, like previous approaches, is no exception. Both cooperative and collaborative work are considered part of this concept, and the terms are often used interchangeably to refer to situations linked to teamwork (Ruíz Hernández and Sánchez Jaramillo, 2021) .

Despite these distinctions, many authors interchange the terms work and learning, especially when referring to cooperative and collaborative, which can lead to confusion about the purposes and objectives of each methodology (Yang, 2023) . These approaches have been treated inconsistently in the literature, leading to confusion and interchangeable use of the terms (Chowdhury, 2021) .

It is important to mention that these findings seem to indicate that the ERIC and European Education Thesauri identify the concept of teamwork as the most commonly recognized controlled language in the field of education. Cooperative learning is also included in ERIC. It is particularly relevant to note that the term collaborative learning is not mentioned in any of the three thesauri considered in this study.

In the literature analyzed, collaborative learning appears in (47.37%) of publications, making it the most frequently used term in the scientific and academic community. However, the thesauri consulted do not recognize it as part of controlled language. Teamwork is in second place (21.05%), and cooperative learning (16.54%) is in third place among the results obtained in WoS search strings.

Limitations of the work

The analysis was conducted considering the characteristics, definitions, and conceptualizations identified in the 133 documents selected using the PRISMA methodology. Most of the resources found focused on the practical application of the five approaches, without a detailed analysis of their theoretical foundations. Studies that, using other search strategies, delved deeper into the conceptualizations, comparisons, and competencies associated with the analyzed methodologies may have been excluded. However, by not delimiting the analyzed conceptualizations, this work would become too extensive.

The exclusion of articles in Spanish could have limited the scope of the study, reducing the diversity of perspectives analyzed. The inclusion of studies in Spanish would have allowed for a broader view of the topic and greater validity of the conclusions.

Conclusions

An analysis of 133 documents on five learning approaches reveals that collaborative learning is the most prevalent methodology in the scientific literature, followed by teamwork and cooperative learning. Cooperative work and collaborative learning were mentioned less frequently; their high representation in face-to-face, online, and hybrid educational modalities highlights their flexibility and adaptability to the three contexts. No statistically significant differences were found between collaborative learning, teamwork, and cooperative learning.

The predominance of these methodologies at the undergraduate level highlights their relevance to university education, possibly due to the larger undergraduate student population. Twenty-nine point three percent of the cases correspond to diverse areas, suggesting a significant cross-disciplinary integration of collaborative approaches into curricula. This indicates that, beyond specific disciplines such as social sciences, engineering, or natural sciences, collaborative methods are consistently applied in diverse academic areas.

The skills developed through these methodologies, especially teamwork and oral and written communication skills, highlight their relevance in the educational context. However, the identification of significant barriers, such as difficulties due to the context and a lack of student skills, highlights the need to address these challenges to improve the effectiveness of

the methodologies. The limited use of technology in these methodologies, in which group dynamics develop without dependence on technology, suggests that it is not always necessary for group work. Furthermore, the most common assessment techniques, such as Likert-based surveys and questionnaires, indicate a preference for these more complex and structured methods.

The similarities among learning approaches, such as communication, positive interdependence, effective collaboration, problem-solving, shared goals, group interaction, small groups, and fostering critical thinking, indicate that these approaches share very similar characteristics. From this relationship, we can conclude that too many characteristics or competencies were found in common across the five approaches. This finding underscores the main problem: the confusion generated by the imprecise and interchangeable use of these five terms in the scientific literature. This lack of clear distinction affects both the student community and teachers, who rely on academic literature to structure their classes and promote collaborative skills in their students.

Ambiguity, lack of clarity, and overlapping definitions hinder the implementation of pedagogical strategies and the achievement of educational objectives. Furthermore, they affect educational research by preventing a rigorous evaluation of the effectiveness of collaborative practices. It follows that, as long as this ambiguity persists, it will be difficult for teachers and students to fully benefit from these methodologies. Rigorous conceptual clarification is urgently needed to overcome these challenges and achieve more effective application in education.

The importance of thesauri can be appreciated as a controlled vocabulary that will encompass key terms related to collaborative approaches, providing clear and precise definitions that reflect their characteristics and competencies in the development of scientific publications. The mandatory inclusion of specific thesauri in scientific journals would benefit the educational community by providing a standardized and precise vocabulary.

Finally, it is essential that researchers and academics recognize the existing terminological confusion. Before using any resource, they should review the educational literature to select reliable information, thus contributing to the standardization and normalization of methodologies used in higher education.

Future research

The analysis of the five learning approaches in higher education reveals the need to clarify terminology and concepts. The similarity in their characteristics and the limited differences found in the literature hinder their application and research. It is also essential to explore strategies to overcome contextual barriers and the lack of student competencies, in addition to evaluating the impact of technology on optimizing these methodologies in a digital environment.

Additionally, it is suggested to investigate how the development of key competencies such as teamwork and communication influences professional success and to develop better assessment tools. A better understanding of the epistemology of these methodologies would allow for the formulation of new research questions, benefiting both teachers and students at all educational levels, with a special emphasis on higher education. Finally, it is suggested to investigate their effectiveness in various disciplines to optimize their implementation in higher education.

Supplementary material: The following supplementary information can be found at: https://drive.google.com/drive/u/0/folders/1SGpa3EcVIqWK7SN-VWVhJjTNVeDqHMk-

References

Abuhassna, H., Busalim, A. H., Yahaya, N., Megat Zakaria, M. A. Z., y Abdul Latif, A. B. (2023). Study from Home! The Antecedents and Consequences of Collaborative Learning on Malaysian University Students. Journal of Information Technology Education: Research, 22, 071-095. https://doi.org/10.28945/5074

Andrés, A. I., Petrón, M. J., Carrapiso, A. I., Morales, S., y Timón, M. L. (2023). Development of Teamwork Skills Using ICTs in Undergraduate Students of Food Industry Engineering Degree. International Journal of Engineering Pedagogy (IJEP), 13(4), Article 4. https://doi.org/10.3991/ijep.v13i4.36971

Awang-Hashim, R., Yusof, N., Benlahcene, A., Kaur, A., y Suppiah Shanmugam, S. K. (2023). Collaborative learning in tertiary education classrooms: What does it entail. Malaysian Journal of Learning and Instruction, 20(2), Article 2. https://doi.org/10.32890/mjli2023.20.2.1

Benford, S., Bowers, J., Fahlén, L. E., Mariani, J., y Rodden, T. (1994). Supporting Cooperative Work in Virtual Environments. The computer Journal, 37(8), 653-688. https://doi.org/10.1093/comjnl/37.8.653

Bui, T. K., y Tran, T. H. (2024). Knowledge-intensive teamwork development through social media adoption after the COVID-19 pandemic in higher education institutions. Heliyon, 10(4), 1-13. https://doi.org/10.1016/j.heliyon.2024.e26210

Buzhinskaya, N. V., Vaseva, E. S., y Shkabara, I. E. (2022). Cognitive style of a future IT specialist in a teamwork process. Obrazovanie i NaukaCoLab, 24(4), 79-111. https://doi.org/10.17853/1994-5639-2022-4-79-111

Cannon-Bowers, J. A., Tannenbaum, S. I., Salas, E., y Volpe, C. E. (1995). Defining competencies and establishing team training requirements (Guzzo, R. y Salas E.). https://www.libs.uga.edu/reserves/docs/scans/defining%20competencies.pdf

Cañabate, D., Garcia-Romeu, M. L., Menció, A., Nogué, L., Planas, M., y Solé-Pla, J. (2020). Cross-Disciplinary Analysis of Cooperative Learning Dimensions Based on Higher Education Students' Perceptions. Sustainability, 12(19), Article 19. https://doi.org/10.3390/su12198156

Cañabate, D., Serra, T., Bubnys, R., y Colomer, J. (2019). Pre-Service Teachers' Reflections on Cooperative Learning: Instructional Approaches and Identity Construction. Sustainability, 11(21), Article 21. https://doi.org/10.3390/su11215970

Catarino, P., Vasco, P., Lopes, J., Silva, H., y Morais, E. (2019). Cooperative learning on promoting creative thinking and mathematical creativity in higher education. 17(3), 5-22. https://doi.org/10.15366/reice2019.17.3.001

Chatzipanagiotou, N., Mirijamdotter, A., y Mörtberg, C. (2024). Work-integrated learning in managers' cooperative work practices. The Learning Organization, ahead-of-print(ahead-of-print), 1-17. https://doi.org/10.1108/TLO-12-2022-0157

Chinoy, N., Stoub, H., Ogrodzinski, Y., Smith, K., Bahal, D., y Zubek, J. (2022). Assessing student desire for professional skills development within the undergraduate science curriculum: A focus on teamwork. Advances in Physiology Education, 46(1), 179-189. https://doi.org/10.1152/advan.00051.2021

Chowdhury, T. A. (2021). Fostering Learner Autonomy through Cooperative and Collaborative Learning. Shanlax International Journal of Education, 10(1), Article 1. https://doi.org/10.34293/education.v10i1.4347

Comisión de las Comunidades Europeas. (2018). Tesauro Europeo de la Educación (es) [Text]. TemaTres 3.5. https://vocabularyserver.com/tee/es/

De Prada, E., Mareque, M., y Pino-Juste, M. (2022). Teamwork skills in higher education: Is university training contributing to their mastery? Psicologia: Reflexão e Crítica, 35(1), 5. https://doi.org/10.1186/s41155-022-00207-1

De Prada, E., Mareque, M., y Pino-Juste, M. (2024). Self-Esteem among University Students: How It Can Be Improved through Teamwork Skills. Education Sciences, 14(1), Article 1. https://doi.org/10.3390/educsci14010108

Delgado-García, M., Conde Vélez, S., y Toscano Cruz, M. de la O. (2022). Cooperative learning at university: Opinion of students and application of the instrument Cooperative Learning Questionnaire (CLQ). Innovations in Education and Teaching International, 59(5), 564-573. https://doi.org/10.1080/14703297.2021.1932557

Dewiyanti, S., Brand-Gruwel, S., y Jochems, W. (2005). Applying reflection and moderation in an asynchronous computer-supported collaborative learning environment in campus-based higher education. British Journal of Educational Technology, 36(4), 673-676. https://doi.org/10.1111/j.1467-8535.2005.00544.x

Díaz-Pompa, F., Hernández-Carreón, N. V., Lores-Leyva, I., y Ortiz-Pérez, O. L. (2023). Cooperative learning and social cohesion: Study in the 4th year classes of tourism degree of Cuba and Mexico. Tuning Journal for Higher Education, 10(2), Article 2. https://doi.org/10.18543/tjhe.2417

Dillenbourg, P. (1999). What do you mean by collaborative learning? (In P. Dillenbourg (Ed), Vol. 1). Elservier. https://telearn.hal.science/hal-00190240/document

Er, E., Dimitriadis, Y., y Gašević, D. (2021). A collaborative learning approach to dialogic peer feedback: A theoretical framework. Assessment & Evaluation in Higher Education, 46(4), 586-600. https://doi.org/10.1080/02602938.2020.1786497

Falcione, S., Campbell, E., McCollum, B., Chamberlain, J., Macias, M., Morsch, L., y Pinder, C. (2019). Emergence of Different Perspectives of Success in Collaborative Learning. The Canadian Journal for the Scholarship of Teaching and Learning, 10(2), 1-23. https://doi.org/10.5206/cjsotl-rcacea.2019.2.8227

Fathi, M., Ghobakhloo, M., y Syberfeldt, A. (2019). An Interpretive Structural Modeling of Teamwork Training in Higher Education. Education Sciences, 9(1), 1-18. https://doi.org/; https://doi.org/10.3390/educsci9010016

Flores Ureba, S., Simón de Blas, C., Borrás-Gené, O., y Macías-Guillén, A. (2022). Analyzing the Influence of Belbin's Roles on the Quality of Collaborative Learning for the Study of Business Fundamentals. Education Sciences, 12(9), Article 9. https://doi.org/10.3390/educsci12090594

Frania, M., y De Sousa Correia, F. L. (2022). Interpersonal Competences and Attitude to Online Collaborative Learning (OCL) among Future Pedagogues and Educators—A Polish and Portuguese Perspective. Education Sciences, 12(1), Article 1. https://doi.org/10.3390/educsci12010023

Galdeano Bienzobas, C., y Valiente Barderas, A. (2010). Competencias profesionales. Educación química, 21(1), 28-32.

Galindo-Domínguez, H., Galarraga Arrizabalaga, H., Sainz de la Maza, M., y Losada Iglesias, D. (2024). Principales conflictos en los trabajos grupales y modos de resolución: El Aprendizaje Cooperativo como reto en la formación de futuros docentes. Revista complutense de educación, 35(1), 57-67. https://doi.org/10.5209/rced.82542

Garrote Rojas, D., Jiménez-Fernández, S., y Martínez-Heredia, N. (2019). El Trabajo Cooperativo como Herramienta Formativa en los Estudiantes Universitarios. REICE. Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación, 17(3), Article 3. https://doi.org/10.15366/reice2019.17.3.003

Hamadi, M., El-Den, J., Azam, S., y Sriratanaviriyakul, N. (2022). Integrating social media as cooperative learning tool in higher education classrooms: An empirical study. Journal of King Saud University - Computer and Information Sciences, 34(6, Part B), 3722-3731. https://doi.org/10.1016/j.jksuci.2020.12.007

Han, F., y Ellis, R. A. (2021). Patterns of student collaborative learning in blended course designs based on their learning orientations: A student approaches to learning perspective. International Journal of Educational Technology in Higher Education, 18(1), 1-16. https://doi.org/10.1186/s41239-021-00303-9

Haugland, M. J., Rosenberg, I., y Aasekjær, K. (2022). Collaborative learning in small groups in an online course – a case study. BMC Medical Education, 22(1), 1-10. https://doi.org/10.1186/s12909-022-03232-x

Hennebry, M. L., y Fordyce, K. (2017). Cooperative learning on an international masters. Higher Education Research & Development, 37(2), 270-284. https://doi.org/10.1080/07294360.2017.1359150

Institute of Education Sciences [IES]. (s. f.). ERIC Institute of Education Sciences. Recuperado 2 de septiembre de 2024, de https://eric.ed.gov/

ISO. (1997). ISO 4:1997. ISO. https://www.iso.org/obp/ui/en/#iso:std:iso:4:ed-3:v1:en

Jäger-Roschko, M., y Petersen, M. (2022). Advancing the circular economy through information sharing: A systematic literature review. Journal of Cleaner Production, 369, 133210. https://doi.org/10.1016/j.jclepro.2022.133210

Kamau, C., y Spong, A. (2015). A student teamwork induction protocol. Studies in Higher Education, 40(7), 1273-1290. https://doi.org/10.1080/03075079.2013.879468

Karanović, G., Dragičević, D., y Draženović, B. O. (2023). Financing Higher Education and Moral Hazard: A Systematic Literature Review. KnE Social Sciences, 233-255. https://doi.org/10.18502/kss.v8i1.12650

Kolaski, K., Logan, L. R., y Ioannidis, J. P. A. (2023). Guidance to best tools and practices for systematic reviews. BMC, 12(1), 96. https://doi.org/10.1186/s13643-023-02255-9

Kurni, M., y K, S. (2021). Applying Collaborative Learning for Enhancing the Teaching-Learning Process in Online Learning through Social Media. International Journal of Emerging Technologies in Learning (IJET), 16(16), Article 16. https://doi.org/10.3991/ijet.v16i16.23207

Márquez Cañizares, J. C. M., Rojas, J. C., y Acuña, A. (2023). Idea generation and integration method for inclusion and integration teamwork. Frontiers in Education, 8, 1-14. https://doi.org/10.3389/feduc.2023.1009269

Martínez García, M., González Peña, O. I., Pérez Zúñiga, R., y Mena Hernández, E. (2024). El individualismo como conducta sustentable respecto al trabajo en equipo en la educación superior. RIDE, 14(28), 1-29. https://doi.org/DOI: https://doi.org/10.23913/ride.v14i28.1874

Martín-Hernández, P., Gil-Lacruz, M., Tesán-Tesán, A. C., Pérez-Nebra, A. R., Azkue-Beteta, J. L., y Rodrigo-Estevan, M. L. (2022). The Moderating Role of Teamwork Engagement and Teambuilding on the Effect of Teamwork Competence as a Predictor of Innovation Behaviors among University Students. International Journal of Environmental Research and Public Health, 19(19), Article 19. https://doi.org/10.3390/ijerph191912047

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., y Group, T. P. (2014). Ítems de referencia para publicar Revisiones Sistemáticas y Metaanálisis: La Declaración PRISMA.

Revista Española de Nutrición Humana y Dietética, 18(3), Article 3. https://doi.org/10.14306/renhyd.18.3.114

Naamati-Schneider, L., y Alt, D. (2023). Enhancing collaborative learning in health management education: An investigation of Padlet-mediated interventions and the influence of flexible thinking. BMC Medical Education, 23(1), 1-15. https://doi.org/10.1186/s12909-023-04796-y

Óhidy, A. (2008). Preparation for Lifelong Learning in practice: Cooperative learning. En Lifelong Learnig interpretations of an Education Policy in Europe (Vol. 1, pp. 89-106). Springer Nature. https://doi.org/10.1007/978-3-531-91123-6_5

Planas-Lladó, A., Feliu, L., Castro, F., Fraguell, R. M., Arbat, G., Pujol, J., Suñol, J. J., y Daunis-i-Estadella, P. (2018). Using peer assessment to evaluate teamwork from a multidisciplinary perspective. Assessment & Evaluation in Higher Education, 43(1), 14-30. https://doi.org/10.1080/02602938.2016.1274369

Procopio, M., Fernandes Procopio, L., Yáñez-Araque, B., y Fernández-Cézar, R. (2022). Cooperative work and neuroeducation in mathematics education of future teachers: A good combination? Frontiers in Psychology, 13, 1-8. https://doi.org/10.3389/fpsyg.2022.1005609

Rethlefsen, M. L., y Page, M. J. (2022). PRISMA 2020 and PRISMA-S: common questions on tracking records and the flow diagram. Journal of the Medical Library Association, 110(2), Article 2. https://doi.org/10.5195/jmla.2022.1449

Revilla-Cuesta, V., Skaf, M., Manso, J. M., y Ortega-López, V. (2020). Student Perceptions of Formative Assessment and Cooperative Work on a Technical Engineering Course. Sustainability, 12(11), Article 11. https://doi.org/10.3390/su12114569

Reza Keramati, M., y Gillies, R. M. (2022). Advantages and Challenges of Cooperative Learning in Two Different Cultures. Education Sciences, 12(1), Article 1. https://doi.org/10.3390/educsci12010003

Riivari, E., Kivijärvi, M., y Lämsä, A.-M. (2021). Learning teamwork through a computer game: For the sake of performance or collaborative learning? Educational Technology Research and Development, 69(3), 1753-1771. https://doi.org/10.1007/s11423-021-10009-4

Ruíz Hernández, Y. E., y Sánchez Jaramillo, A. F. (2021). Caracterización de las actividades de trabajo en equipo en una empresa. Revista Perspectiva empresarial, 8(2), 1-17. https://doi.org/10.16967/23898186.722

Sasaki, K., y Inoue, T. (2019). Coordinating Real-Time Serial Cooperative Work by Cuing the Order in the Case of Theatrical Performance Practice. Mobile Information Systems, 2019(1), 1-10. https://doi.org/10.1155/2019/4545917

Schmidt, K. (1991). Riding a Tiger, or Computer Supported Cooperative Work. En L. Bannon, M. Robinson, y K. Schmidt (Eds.), Proceedings of the Second European Conference on Computer-Supported Cooperative Work ECSCW '91 (Centre for Innovation&Cooperative Technology, pp. 1-16). Springer Netherlands. https://doi.org/10.1007/978-94-011-3506-1_1

Sein-Echaluce, M. L., Fidalgo-Blanco, A., García-Peñalvo, F. J., y Fonseca, D. (2021). Impact of Transparency in the Teamwork Development through Cloud Computing. Applied Sciences, 11(9), Article 9. https://doi.org/10.3390/app11093887

Silva, H., Lopes, J., Dominguez, C., y Morais, E. (2022). Lecture, Cooperative Learning and Concept Mapping: Any Differences on Critical and Creative Thinking Development? International Journal of Instruction, 15(1), Article 1. https://doi.org/10.29333/iji.2022.15144a

Soboleva, E. V., Suvorova, T. N., Chuprakov, D. V., y Khlobystova, I. Y. (2023). Formation of "Teamwork Skills" in Future Teachers when Creating Didactic Games with Traditional and Digital Components. European Journal of Contemporary Education, 12(1), Article 1. https://doi.org/10.13187/ejced.2023.1.188

United Nations Educational, Scientific and Cultural Organization [UNESCO]. (s. f.). : Tesauro de la UNESCO. Recuperado 3 de septiembre de 2024, de https://vocabularies.unesco.org/browser/thesaurus/es/

University of North Carolina at Chapel Hill [UNC]. (2024). Creating a PRISMA flow diagram: PRISMA 2020. University LIbraries. https://guides.lib.unc.edu/prisma/step-by-step

Van Horne, C., y Rakedzon, T. (2024). Teamwork Made in China: Soft Skill Development with a Side of Friendship in the STEM Classroom. Education Sciences, 14(3), 1-15. https://doi.org/10.3390/educsci14030248

Villavicencio, C. M. M. (2024). Los AVA y su Influencia en las Competencias Colaborativas de Futuros Docentes. PODIUM, 45, Article 45. https://doi.org/10.31095/podium.2024.45.6

Watson, H. R., Dolley, M.-K., Perwaiz, M., Saxelby, J., Bertone, G., Burr, S., Collett, T., Jeffery, R., y Zahra, D. (2022). 'Everyone is trying to outcompete each other': A

qualitative study of medical student attitudes to a novel peer-assessed undergraduate teamwork module. FEBS Open Bio, 12(5), 900-912. https://doi.org/10.1002/2211-5463.13395

Yang, X. (2023). A Historical Review of Collaborative Learning and Cooperative Learning. TechTrends, 67(4), 718-728. https://doi.org/10.1007/s11528-022-00823-9

Zhou, T., Wang, H., y Li, D. (2023). Focusing on the value of cooperative learning in physical education: A bibliometric analysis. Frontiers in Psychology, 14, 1-13. https://doi.org/10.3389/fpsyg.2023.1300986

Contribution Role	Author(s)
Conceptualization	Ricardo Pérez Zúñiga (principal).
Methodology	Andrés Palomera Chávez (principal); Mario Martínez García (supporter); and Ricardo Pérez Zúñiga (supporter).
Software	N/A
Validation	Mario Martínez García and Ricardo Pérez Zúñiga (same).
Formal Analysis	Andrés Palomera Chávez (principal); Ricardo Pérez Zúñiga (principal); Mario Martínez García (supporting).
Investigation	Mario Martínez García and Ricardo Pérez Zúñiga (same).
Resources	Ricardo Pérez Zúñiga (main) and Andrés Palomera Chávez (supporter).
Data curation	Mario Martínez García (main); Ricardo Pérez Zúñiga (supporting).
Writing - Preparing the original draft	Ricardo Pérez Zúñiga and Mario Martínez García (same).
Writing - Review and Editing	Mario Martínez García and Ricardo Pérez Zúñiga (same).
Display	Mario Martinez Garcia; Andres Palomera Chavez and Ricardo Perez Zuniga (same).
Supervision	Mario Martínez García and Ricardo Pérez Zúñiga (same).
Project Management	Ricardo Pérez Zúñiga and Andrés Palomera Chávez (same).
Acquisition of funds	Ricardo Pérez Zúñiga (principal).