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Contributions of active learning methodologies in accounting: an integrative review

Contribuições das metodologias ativas de aprendizagem em contabilidade: uma revisão integrativa

Camila Lima Bazani^a , Geovane Camilo Santos^b 

^a Universidade Federal de Uberlândia - Brazil

^b Universidade Federal Fluminense - Brazil

Keywords

Active learning methodologies.

Accounting.

Skills.

Integrative review.

Abstract

This research aims to conduct an integrative review to identify the contributions of active learning methodologies to the development of student's skills in accounting disciplines, as well as to present possibilities for future research. The articles were collected from the Scopus database, using the expressions "Accounting" and "Active Learning" and "Accounting" and "Active Methodology", linked by the connector "and". The final sample consists of 79 papers, and an integrative review is used to analyze the articles. The results revealed that: i) most studies were developed after 2011; ii) researchers are applying active methodologies in countries from 5 continents, predominantly in the United States of America; iii) the most used active methodologies were case studies, Problem-Based Learning (PBL), flipped classroom, and methodologies focused on technologies. It is concluded that active methodologies are valid and effective in developing a context that enhances students' professional and emotional competencies. This study contributes to researchers by presenting the results of previous research as well as indicating possibilities for future research and constant gaps in the literature, using the integrative review, which is a little methodology explored in the accounting area and can synthesize knowledge and present the applicability of results from existing studies.

Palavras-chave

Metodologias ativas de aprendizagem.

Contabilidade.

Habilidades.

Revisão integrativa.

Resumo

Esta pesquisa visa realizar uma revisão integrativa para identificar as contribuições das metodologias ativas de aprendizagem para o desenvolvimento das habilidades dos estudantes em disciplinas da área contábil, além de apresentar possibilidades para pesquisas futuras. Os artigos foram coletados na base Scopus, utilizando-se as expressões "Accounting" e "Active Learning" e "Accounting" e "Active Methodology", ligadas pelo conectivo "and". A amostra final é composta por 79 trabalhos, sendo utilizada a revisão integrativa para análise dos artigos. Os resultados revelaram que: i) maioria dos estudos foram desenvolvidos após 2011; ii) há pesquisas aplicando metodologias ativas em países dos 5 continentes, predominantemente nos Estados Unidos da América; iii) as metodologias ativas mais usadas foram estudos de caso, Problem-Based Learning (PBL), sala de aula invertida e metodologias focadas em tecnologias. Conclui-se que as metodologias ativas são válidas e eficazes no desenvolvimento de um contexto que aprimore as competências profissionais e emocionais dos alunos. Este estudo contribui com pesquisadores apresentando resultados de pesquisas anteriores, bem como indicando possibilidades para pesquisas futuras e lacunas constantes na literatura, utilizando para tanto a revisão integrativa, que é uma metodologia pouco explorada na área contábil, e que pode sintetizar o conhecimento e apresentar aplicabilidade dos resultados de estudos pré-existent.

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Practical implications

The results have a positive impact on classrooms, confirming to teachers how useful and positive active learning methodologies are for students' performance and assimilation of content, and providing possibilities for future studies on active learning methodologies.

1 INTRODUCTION

One of the concerns with the teaching-learning process is the acquisition of skills and competencies that make the student suitable for the job market (Kavanagh & Drennan, 2010). Research has shown that students graduate in Accounting but do not feel qualified to work in the market (Kavanagh & Drennan, 2010). In this context, active methodologies can play an important role, since they have the potential to facilitate the acquisition of skills by students (Guerra & Teixeira, 2016; Sugahara & Lau, 2019).

The adoption of active methodologies in the classroom by teachers can increase student performance (Rocha Neto & Leal, 2020; Sugahara & Dellaportas, 2018). That is because they can make lessons more enjoyable (Bonwell & Eison, 1991; Krivogorsky & Ballam, 2019), increase motivation to participate in the classroom (Brickner & Etter, 2008; Grávalos-Gastaminza et al., 2022; Sugahara et al., 2016; Sugahara & Dellaportas, 2018), and contribute to the student's autonomy in constructing their learning (Brickner & Etter, 2008).

In the accounting area, the use of active learning methodologies can facilitate the acquisition of skills for the job market (Guerra & Teixeira, 2016; Sugahara & Lau, 2019). Among the main skills developed are increased questioning ability (Huels & Weber, 2021; Stanley & Marsden, 2012; Warren & Young, 2012), communication (Ainsworth, 2021; Stanley & Marsden, 2012), teamwork (Ainsworth, 2021; Stanley & Marsden, 2012), negotiation (Ainsworth, 2021), and problem-solving (Ainsworth, 2021; Stanley & Marsden, 2012).

Active methodologies should not be used trivially and their application needs to be aligned with educational objectives. These are understood as the expected and foreseen results of the educational action used (Sousa & Leal, 2019). Nogueira et al. (2020) propose the division of active methodologies into 5 strategies: i) exposition; ii) discussion; iii) dynamics; iv) connection with practice; and v) art-based. Therefore, the teacher needs to determine what their educational objective is when establishing the methodology to be used.

Sava (2018) presented the advantages and effectiveness of using three active methodologies: i) Problem-Based Learning (PBL), ii) gamification, and iii) simulation and role-playing, through a literature review. Soschinski et al. (2019) analyzed how learning processes develop with respect to the relationship structures between authors and the themes studied in the field of Accounting Sciences. Bortolanza et al. (2020) carried out a systematic review of Portuguese-language articles to identify the methodologies used to teach accounting concepts and practice in distance learning. Vendramin et al. (2020) analyzed the main points discussed at the USP Accounting Congress.

In this context, this research aims to conduct an integrative review to identify the contributions of active learning methodologies to the development of student's skills in accounting subjects, as well as provide possibilities for future research.

It can be seen that the Bortolanza et al. (2020), Soschinski et al. (2019), and Vendramin et al. (2020) studies carried out bibliometric analyses or systematic reviews on active methodologies in Brazilian databases. Review studies in the field of accounting show that the majority use systematic and/or bibliometric reviews. Thus, by using the integrative review, this study will differ from previous ones, since this research method is more meticulous (Ercole et al., 2014). It also summarizes the results found in studies on a subject, in a systematic, orderly, and comprehensive way, to provide the best knowledge on the subject under study (Ercole et al., 2014). The integrative review is also a research methodology that has not yet been explored. The use of this methodology provides more comprehensive results in the discussion of the contributions of active methodologies in the accounting area (Broome, 1993; Whittemore & Knafl, 2005).

The research also differs by considering the Scopus database, which is one of the largest academic production databases that focuses on articles of the highest quality (Valenzuela-Fernandez et al., 2019). The study also advances concerning the study of Sava (2018), since the author only analyzed a few methodologies and did not suggest possibilities for future research. The research contributes to researchers by presenting the state of the art on the contributions of studies on active methodologies in the accounting area, as well as providing possibilities for studies that can be developed to expand knowledge in accounting education, with a focus on active methodologies.

Although this topic has been discussed for some time, there is still resistance from teachers to applying this type of learning methodology. In a practical sense, this research introduces and confirms to teachers the relevance of using active learning methodologies as a positive tool for developing students' skills, improving performance, and better assimilation of content, as well as making classes more enjoyable and interesting. Therefore, it is expected that this research will be another tool for further studies in accounting education, ratifying the relevance of this discussion to improve the learning process.

2 THEORETICAL FRAMEWORK

Active learning is a method that involves students as agents in the construction of their knowledge (Prince, 2004). In this sense, active methodologies are teaching strategies in which the student assumes the role of protagonist of their learning (Diesel et al., 2017; Rocha Neto et al., 2020). This means that the student is at the center of the teaching-learning process, and using their autonomy, they develop their knowledge (Blankley et al., 2017). In the active method, the teacher is not at the center of the process, but is also not isolated, and has the role of mediator, facilitator, and activator of learning (Diesel et al., 2017).

According to Bonwell and Eison (1991), the role of active methodologies is to get students to analyze, synthesize, and evaluate information effectively and, based on this, make their own decisions. In a study of teachers considered to be effective in teaching accounting, Wygal and Stout (2015) found that one of the main points mentioned by teachers for the development of active learning is the creation of an active environment, through problem-based learning with cooperative work. Consequently, active methodologies must prioritize the discussion of reality, teamwork, and innovation (Diesel et al., 2017).

According to Dewey (1979), teaching is focused on action and not instruction, meaning that for him, the teaching-learning process must seek concrete and active experience to allow the student to develop their knowledge. The author adds that when applying any learning technique, it's necessary to be clear about what is expected from the activity. This means that the teacher shouldn't apply a technique just because it is attractive, or because it is used by others.

The methodological construction of active methodologies is related to the New School current. This is a "movement of revision and criticism" (Mesquita, 2010, p. 63). Considering Dewey's (1979) perspectives on the teaching-learning process and the New School current, the vision of Blankley et al. (2017, p. 105) reinforces these ideas, since for the author "people learn by doing". Consequently, active learning requires students to carry out activities to think about what they are doing (Sugahara & Dellaportas, 2018).

In the business area, there is a gap between the skills acquired in undergraduate courses and those required by the job market (Albrecht & Sack, 2000; Pires et al., 2010). Applying these methodologies can enable students to develop the necessary knowledge to work in the job market in a more active way (Kavanagh & Drennan, 2010). Thus, in the area of management and business, learning is something that must be learned and practiced (Leal et al., 2017), in which teachers can work on various contents using different active learning techniques (Malusá et al., 2017).

The use of active methodologies can lead management and business students to improve the process of creativity and innovation, facilitate decision-making, and develop problem-solving skills (Jakka & Mantha, 2012). In this context, active methodologies develop students' skills, abilities, and attitudes to enable them to work in the job market (Guerra & Teixeira, 2016; Marrone et al., 2018).

Kruck e Lending (2003) found evidence that motivation has a greater predictive value in choosing a career than a student's performance during their degree. In this respect, active methodologies not only contribute to students' learning but can also encourage them to pursue the accounting profession (Sugahara & Dellaportas, 2018). Sugahara and Dellaportas (2018) mention that if students have a low interest in accounting, then there will be a tendency for them not to choose the accounting profession as a field of work. But, if teachers involve students using active methodologies, they will be able to arouse interest in the profession, as they will be motivated.

In the opinion of Blankley et al. (2017), various active learning techniques can be used by accounting teachers. The main activities for developing skills can be through the adoption of the Socratic method, i.e., questioning students during the lesson (Blankley et al., 2017); using reversed classes (Brown et al., 2016); cooperative and collaborative learning (Blankley et al., 2017); applying case studies to develop analysis and discussion (Okougbo et al., 2021). With technological advances, teachers can also adopt online forums, blogs, chat rooms, and response systems such as clickers, and Kahoot, among others (Grávalos-Gastaminza et al., 2022; Krom, 2012; Mellado-Silva et al., 2020).

3 METHODOLOGY

3.1 Integrative review

The literature review is divided into two parts: narrative reviews and systematic literature reviews (Botelho et al., 2011). The first describes the state-of-the-art of a specific subject, based on a theoretical or contextual perspective, but does not present a methodology for collecting references, the sources used, and the criteria for

evaluating the works (Botelho et al., 2011; Rother, 2007). On the other hand, a systematic review is designed to answer a specific question, using explicit and systematic methods for identifying, selecting, and evaluating studies, and collecting and analyzing these studies, i.e., they are methodologically rigorous (Rother, 2007). This method is divided into meta-analysis, systematic review, qualitative review, and integrative review (Botelho et al., 2011).

The integrative review provides a more comprehensive result on a specific issue for various subjects and areas and can be used for different purposes. This method summarizes past empirical or theoretical literature to obtain a more comprehensive understanding of a specific phenomenon (Broome, 1993; Whittemore & Knaf, 2005). It reflects the state of the science and can contribute to the development of theory, as well as having direct applicability in practice and politics (Whittemore & Knaf, 2005).

As it is a broader research method, the integrative review allows the simultaneous inclusion of experimental and non-experimental research to understand a specific interest. The integrative review allows for the definition of concepts, the review of theories and evidence, and the analysis of methodological issues on a specific topic (Broome, 1993). By using this method, the researcher can get closer to the problem they wish to investigate, and thus draw up an overview of scientific production, knowing the evolution of the subject over the years and visualizing possible opportunities for future research (Botelho et al., 2011).

Ercole et al. (2014, p. 12) explain that “the integrative literature review is a method whose purpose is to synthesize results obtained in research on a theme or question, in a systematic, orderly and comprehensive way”. By reviewing, analyzing, and synthesizing empirical and theoretical literature in an integrated way, this methodology is a distinct form of research that generates new knowledge on the subject under analysis, creating perspectives on a specific topic (Torraco, 2016). The study adopts an integrative review of the themes of active learning methodologies and accounting, making it possible to analyze the main contributions and highlight possibilities for further studies.

3.2 Data collection and processing

Data collection followed the six stages proposed by Botelho et al. (2011). The first was to identify the research question: What are the contributions of active methodologies to the field of accounting? At this stage, Scopus was also chosen as the basis for data collection, as it is considered the largest peer-reviewed database that indexes abstracts and citations, with multidisciplinary editors across the world (Valenzuela-Fernandez et al., 2019). The collection descriptors were also defined, which were “Accounting” and “Active Learning”, and then the expressions “Accounting” and “Active Methodology”, linked by the connective “and”, in the titles, abstracts, and/or keywords.

The second step was to establish the inclusion and exclusion criteria. As inclusion criteria, the studies had to belong to the area of “Business, Management, and Accounting”. The exclusion criteria were not being an article published in a journal, excluding 15 published in congresses, and the article repeating the two collection terms used, identifying 2 articles.

In the third stage, the pre-selected studies were identified by reading their abstracts, titles, and keywords. At this stage, articles were also excluded according to the following criteria: i) the methodologies were not applied in accounting disciplines (31); ii) there was no application of the methodologies, only theoretical discussion (23) and iii) it was not possible to access the full article (43). Figure 1 shows the research design from the initial sample to the final sample.

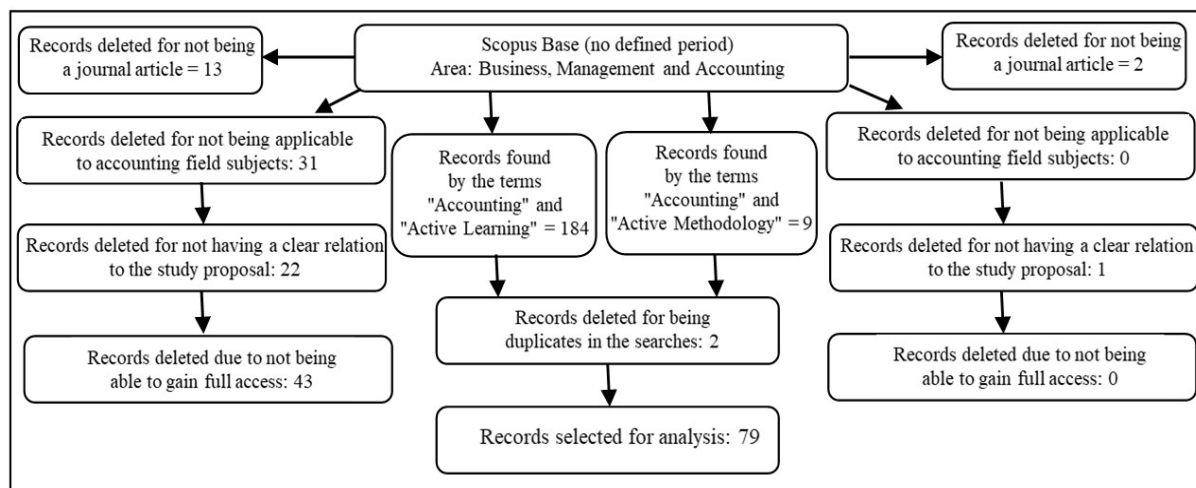


Figure 1. Research design and processes

In the fourth stage, a matrix was created using electronic spreadsheets to summarize the results, identifying the authors, year of publication, and the main results of the research. The results were then discussed (fifth stage) and the following points were identified from the articles: i) period of publication; ii) journal with the highest number of publications; iii) most recurrent authors; iv) geographical region with the highest number of publications; v) most used methodologies; and vi) disciplines with the most applications. And finally, in the sixth stage, suggestions were made for future research.

4 PRESENTATION AND DISCUSSION OF RESULTS

4.1 Analysis and discussion of the studies

Based on the fourth stage of the integrative review proposed in this study, Table 1 (appendix A) was drawn up, summarizing the information on the publication year of the study, the authors, and the main results.

The results indicate that the first studies to apply the active learning methodology were conducted in the 1990s, with two studies found during this period. In conclusion, both Berg et al. (1995) and Hand et al. (1996) proposed a tool, and therefore an assessment strategy, to promote the quality of student learning in the subject of Introductory Accounting. Even with different tools and applications in different countries, the United States of America and the United Kingdom, respectively, both studies proved that active methodologies could foster a deeper learning process and, as a result, improve student performance.

Between 1995 and 2010 the sample consisted of 17 articles, while between 2011 and 2022 there were 62 articles. It should be noted that the years 2021 and 2022 contributed almost 25% of the research between 2011 and 2022, which shows that this discussion has been growing more recently. The increase in the number of articles in the last few years can also be explained by technological advances, as these have reinforced the era of education, enabling worldwide access to various sources of information (Souza et al., 2021).

The journal that published the most studies on active learning methodologies applied to accounting subjects was the Journal of Accounting Education, with 10 articles, followed by Accounting Education and Issues in Accounting Education, with 9 and 8 articles, respectively. The authors with the highest number of publications were Satoshi Sugahara, Ralph W. Adler, and C. Andrew Lafond, both with 3 publications.

The articles found in this research sample show that, although the use of active learning methodologies is not yet a common reality in classrooms, as the literature in general already shows, it was possible to verify their application in several countries in America, Africa, Europe, Asia, and Oceania, with the United States standing out with around 40% of the studies.

Regarding the active learning methodologies applied in the studies under analysis, there is a variety, with emphasis on the strong use of case studies, PBL flipped classrooms, and technologies in general. All the methodologies adopted in the studies proved to be valid and effective for developing a context that enhances students' professional and emotional competencies. So, they are consistent with each other and with what the literature has already shown about the importance of active learning methodologies.

Table 2 contains a list of the methodologies adopted in the studies analyzed. It should be noted that in some studies it was not possible to identify precisely the methodology being used, given that the authors had developed their tool to actively involve the student, but with a nomenclature that has not yet been consolidated in the literature, as is the case with the strategy called Management of Competence in the Areas of Accounting (MANCOMA) proposed by Gómez e Berrocoso (2021).

The mentioned authors define MANCOMA as a competency model aimed at university students in the area of Financial Accounting, which integrates: i) a pedagogical approach based on active and meaningful student learning, ii) the promotion of collaborative learning, iii) the use of assessment rubrics for learning and iv) a hybrid learning environment, combining face-to-face teaching with distance learning. The results show the students' positive perception of the model, suggesting that its use facilitates learning and provides greater motivation.

Table 2. Active learning methodologies used in the studies under analysis

Teaching cases	Lectures	Flipped classroom
Drawings	Problem-Based Learning (PBL)	Simulation
Group discussions / Study groups	Business plan	Storytelling
Dramatizations	Portfolio	Various technologies*
Films / Videos	Learning project	Field visits / Practice
Gamification / Games	Quizzes	Workshop

Note: *Online activities, chatbot, clickers, spreadsheets, social networks and software.

Regarding the subjects in which the methodology was applied, some studies did not specify it, they only mentioned that it was a subject in the accounting course, whether undergraduate or even postgraduate. The study by Kuang et al. (2021) stands out, in which a game was applied to evaluate its effectiveness as a learning and teaching tool to help high school accounting students in New Zealand acquire and apply fundamental accounting concepts. In this country, in addition to the core subjects, schools offer others, such as Accounting. The methodology was applied to 144 students and identified that there is evidence of significant and longer-lasting learning benefits and that the use of the game can develop higher skills in students.

In the sample of articles that identified the discipline, which corresponds to more than 80% of the articles, there is a prevalence of application in Introductory Accounting, Financial, Management, and Cost disciplines, with little application in other disciplines, such as Taxation. Table 3 shows the subjects in which active learning methodologies were applied.

Table 3. Disciplines in which active learning methodologies were applied

Data analysis	Intermediate accounting	Governmental accounting
Auditing	Introductory accounting	Management accounting
Analytical accounting	Structure of accounting statements	Accounting information system
Cost accounting	Accounting ethics	Tax
Business accounting	Accounting principles	Financial accounting
Management principles		

It was found that there were only two studies on Tax Accounting. Chu and Libby (2010) applied a technique in the subject of Tax Accounting to 84 students at a university in Canada, in which they were required to write six mini-cases in multiple-choice format, each of which included a problem scenario and four plausible alternative solutions. The student feedback indicated that the task improved their learning of technical tax knowledge, required them to be creative and original, encouraged them to make links between related tax concepts, and motivated them to use research resources more effectively. Mellado-Silva et al. (2020), applying a chatbot to teach tax regulations in Chile, also verified its effectiveness in improving student performance.

It is believed that, in part, this result can be explained by the fact that some subjects, especially those with a greater business focus, require more student learning of practical issues, leading to more dynamic classroom development, to deepen creativity, innovation, and improving the ability to solve problems. However, as the literature already agrees, the use of active methodologies brings benefits in all areas. It is highlighted that even when faced with different country contexts, the number of students, the discipline, and the methodology used, the articles analyzed, as a rule, showed positive results regarding the application of active learning methodologies in accounting disciplines.

Adler et al. (2004) explored the student benefits of using student-led versus teacher-led case studies. Although they did not find significant results for actively involved students in terms of a change in learning style, they point out that the research also offers no reason to contest that business case studies promote important skills. However, they emphasize that what is important for improving generic learning skills is how the methodology is applied and the level of student involvement. The findings of the study by Russo et al. (2022) confirm and reveal that the characteristics of the students influence their perceptions of the use of active methodologies.

More generally, the findings show that in addition to benefiting learning, and improving performance through the development, and deepening of skills and competencies, the use of active methodologies was able to motivate and engage students to value and get involved in classes. The students had positive perceptions and felt

more satisfied, free secure, and confident in participating in the discussions.

The results were significant regarding the development and improvement of various aspects such as content assimilation, knowledge construction, independence, critical thinking, communication, creativity, teamwork, and problem-solving, among others, as well as bringing the classroom closer to the professional reality due to the practical experiences. Consequently, the studies were consistent and fully demonstrated the validity of applying active learning methodology to subjects in the accounting area and the importance of applying it to subjects in the accounting area on courses for non-accountants (Krom, 2012).

4.2 Presentation of gaps and suggestions for future research

Considering the above, although there has been an increase in research into active methodologies recently, there is still a need for greater consolidation in the methodologies adopted. Some studies presented a particular development tool, which this study was unable to identify precisely. This is a gap that, if developed and consolidated, could be useful and effective for overflowing academic research and therefore be applied in classrooms.

Some studies in the sample generate concern by proposing the development of their active methodologies. If, on one hand, it consists of a specific methodology for a given group, moment, and discipline, on the other hand, questioning and deepening a possible discussion about the parameters and criteria used to develop this tool is a considerable point.

The restriction of the use of active learning methodologies to a small group of subjects is also a gap in the literature. Why not expand the use of these methodologies to other accounting disciplines? Given the importance of active methodologies for student learning, they could be adopted in areas such as auditing, forensics, actuarial, and tax, among others, to contribute to students' knowledge. This can even be adopted in postgraduate courses (*Lato Sensu* and *Stricto Sensu*).

Gioiosa e Kinkela (2019a), suggests for future studies to determine the impact that the application of the exercise activity has on the learning process and results. For some specific topics, some prior analysis is necessary. Okougbo and Okike (2021) indicate that future studies should address methodologies for teaching accounting ethics. They propose conducting a pre-test on the relationship between accounting ethics education and the ethical awareness of accounting undergraduates to identify whether there is a difference in the ethical awareness of the subjects before completing an accounting ethics course.

Studies usually focus on the benefits of active methodologies. However, studies could answer the following question: what are the obstacles and cons that hinder their application? Another point that could be discussed in future research and which will help to clarify some issues identified in a low number of the articles in the sample involves a detailed investigation into the pre-application of a methodology, i.e., what preparation is necessary for its use to be completely valid and effective. It is well known that the preparation of both students and teachers for the use of active learning methodologies is crucial. Considering this, it is questionable whether this is an obstacle to teachers becoming complacent and not engaging and motivating themselves to use active methodologies instead of traditional teaching methods.

Also, does it only apply to what is strictly business-related? Further study of the use of active learning methodologies, covering the diversity of these tools and the areas/disciplines in which they can be applied, could also help to answer this question. The findings of Spiceland and Hawkins (2002) show that learning can also be enhanced in an active format in an online course. Malan (2021) found that group work can be effectively conducted and managed in an online environment. Consequently, the application of a particular active methodology with technology and/or asynchronous classes could generate a positive result, so this research could be further developed.

It should also be noted that there is a lack of studies comparing the application of different active methodologies for the same group to better develop which may be more effective. For example, isn't the use of case studies in management/costing courses more valid than lectures with discussions? Which methodology would be more interesting and give better results in a specific subject? If the purpose, for example, is to develop a specific skill, how do we know which methodology is most suitable for this? So, we need to think about it and deepen our studies.

Studies could also explore the contributions and difficulties in applying active methodologies during the remote phase. This is because in this period, teachers had to adapt to a challenging scenario, and active methodologies may have helped students' learning during this period. Another point that could be explored is the relationship between learning styles and students' preference for active methodologies. This research proposal

could generate information for teachers to evaluate their teaching practices and develop mechanisms to respond to different learning styles, contributing to better student performance.

5 FINAL CONSIDERATIONS

In a context in which the development of student's skills and abilities for the job market is essential, given that students don't feel qualified to work in the market, discussing the application of active learning methodologies in the classroom is beneficial. The change in the teaching-learning scenario and the identification of the need to adopt a paradigm in which students are responsible for constructing their knowledge and are actively involved in classes is a broad discussion that has already been addressed, perhaps still timidly, in the literature.

In this scenario, the restlessness of understanding how this theme has been worked on and developed motivated this research. For this purpose, an integrative review was conducted to consolidate the main results of studies on the application of active learning methodologies in accounting subjects. It also highlights possibilities for future research and gaps in the literature.

Based on the analysis of the 79 articles, it was found that active learning was generally positive and consistent with the existing literature. It was also possible to identify gaps and suggestions for future research to continue the development of this topic, which is relevant in the current teaching-learning scenario, especially given the advances in technology that should be prioritized.

The results have implications for teachers, showing that active methodologies contribute positively to the development of skills in the classroom. This confirms to teachers that active learning methodologies can increase performance and the assimilation of content. Another implication is that the study offers researchers possibilities for future studies on active learning methodologies.

Some limitations were identified in the research, such as the definition of the search only in the Scopus database, in addition to the fact that many articles were excluded from the sample due to not having full access to the work. This study also focused on the accounting area. However, we suggest expanding the research to other business courses, such as Business Administration and Economics, to make a comparison and identify more effective methodologies for certain subjects. In this sense, the increase of this sample is a suggestion for the expansion of this research, which is considered to contribute positively to the progress of the discussion on the use of active learning methodologies.

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APPENDIX A

This supplementary document includes a table summarizing the results of the articles analyzed in the study.

Table 1. Summary of the key studies on the practical contributions of active methodologies

Authors (Year)	Main results
Berg et al. (1995)	Increased understanding, better performance in class, and interesting discussions.
Hand et al. (1996)	It promoted deep learning.
Kern (2002)	It increased problem-solving skills but did not increase conceptual memory.
Murdoch and Guy (2002)	Significantly higher results in the final exam.
Gujarathi and McQuade (2002)	The promotion of management education objectives is relevant.
Spiceland and Hawkins (2002)	Positive attitudes from students about their learning in an online course, with space for improvement in this learning format.
Adler et al. (2004)	There have been no significant improvements with the use of active methodologies.
Coram (2005)	The active learning approach is beneficial for all accounting students.
Nikolai (2006)	The students reported that they had learned a lot, suggesting that active learning had occurred.
Barksy (2008)	Students value the opportunity to engage in a realistic exercise that allows them to profit from their consumer experiences.
Wynn-Williams et al. (2008)	The lack of active involvement in cases results in less balanced learning styles.
Bentley et al. (2009)	It has increased students' preparation, participation, and learning.
Tate and Grein (2009)	The activity was considered both valuable and effective.
Chu and Libby (2010)	There was an improvement in the learning of technical tax knowledge, development of creativity, integration of tax concepts, and motivation to research more effectively.
Irving (2011)	For 94% of respondents, there was an improvement in their accounting-related knowledge, skills, and abilities.
Edmonds and Edmonds (2010)	There was a significantly stronger concordance for students with new technologies.
Hosal-Akman and Simga-Mugan (2010)	There was no significant difference in the academic performance of the students in the treatment and control groups, but the average scores of the students with cooperative learning were higher.
Lento (2010)	The positive points for the students were competitiveness, fun activity, and the defense of a position. The negative points were shyness and insufficient time for negotiations.
Young and Warren (2011)	There was a contribution to the development of critical thinking.
Krom (2012)	It has contributed to a deeper understanding of the accounting content; it has increased satisfaction and results in the development of relationships between colleagues and teachers-students.
Warren and Young (2012)	The students' engagement was encouraged.
Convery and Swaney (2012)	There was an increase in the preparation of students for their main higher education courses and careers in business.
Matherly and Burney (2013)	There was more free participation in the discussions, with more students participating.
Ballester and Guerrero (2013)	There was a contribution to improving the average results obtained by students in subjects and accounting questions.
Braun (2013)	There was an improvement in the student's ability to learn a cost system and a greater awareness of management decisions and accounting problems.
Phillips and Graeff (2014)	A more positive attitude towards accounting and a deeper understanding of accounting principles were created.
Gainor et al. (2014)	It was easier to understand the subject and more competitive.
Kagwesage (2014)	There was a promotion of the construction of knowledge in the disciplines and the safe participation of the students.
Siriwardane (2014)	The students recommended that the case be used in an introductory accounting course in the future.

Table 1. Summary of the key studies on the practical contributions of active methodologies

Authors (Year)	Main results
Lafond and Wentzel (2015)	There was an improvement in leadership skills, critical thinking, and experience in analyzing the effectiveness of cost accumulation systems.
Spiceland et al. (2015)	There was an increase in performance, greater retention of students, and incentives to expand the number of accounting courses compared to those in administration.
Stout (2015)	There was a positive response from the students, and most of them suggested using the tool in future courses.
Green and Repetti (2015)	Performance was significantly better when clickers were used, and students felt more engaged in the classroom.
Brown et al. (2016)	There was a positive impact on student motivation, reading comprehension, level of effort, and understanding of the material before the classes.
Camacho-Miñano et al. (2016)	Most students found the videos useful, satisfying, and motivating, although complex.
Sugahara et al. (2016)	The students' motivation to learn was stimulated.
Watson et al. (2016)	There was an increase in knowledge of the accounting information system, system navigation skills, and the ability to learn on their own.
Fratto et al. (2016)	There was an improvement in student performance and satisfaction with the course.
Lento (2016)	There was an improvement in students' grades, performance in final exams, and pass rates.
Tamayo and Uriarte (2016)	There was a high degree of job satisfaction, acceptance of the methodology and learning how to deal with real professional situations.
Bergner and Brooks (2017)	There was a significant improvement in the grades of the students who received revision with Monopoly when compared to those who did not receive revision, but no improvement when compared to the students who received traditional revision.
Bodle et al. (2017)	There were positive student attitudes, with improved learning and student understanding, as well as facilitating critical reflection, engagement in learning, and the development of academic skills.
Gusc and van Veen-Dirks (2017)	Improved students' understanding of sustainability issues.
Huber et al. (2017)	The tasks were effective in developing many of the AICPA's core competencies and "real world" skill sets.
Vallet-Bellmunt et al. (2017)	There was a direct positive influence of cooperative learning on student learning.
Shernof et al. (2017)	Significant improvement in learning.
Calabor et al. (2018)	Contribution to the acquisition of skills.
Holmes and Rasmussen (2018)	Improved engagement and ability to understand the topics discussed.
Ibrahim et al. (2018)	Development of communication and critical thinking skills.
Marrone et al. (2018)	Improved engagement and understanding of the unit material.
Sugahara and Dellaportas (2018)	Improved student confidence and motivation, with an increased likelihood of choosing accounting as their course of study.
Liu (2018)	There were improvements in student focus, participation, and interaction.
Van Mourik and Wilkin (2019)	There was an improvement in involvement and conceptual understanding.
Gioiosa and Kinkela (2019a)	A significant increase in the number of answers to questions.
Park et al. (2019)	There were favorable changes in terms of perception of accounting.
Williams et al. (2019)	There were significant differences in class preparation, focus, confidence, satisfaction, and learning.
Gioiosa and Kinkela (2019b)	The perception was positive.
Krivogorsky and Ballam (2019)	There was a high level of satisfaction with the class and an increase in learning.
Jayasinghe (2021)	Most students responded positively to radical constructivist learning, with an innovative environment close to real-life situations.
Schwartz (2020)	There was greater learning of accounting, as it facilitated understanding of accounting concepts.

Table 1. Summary of the key studies on the practical contributions of active methodologies

Authors (Year)	Main results
Urrutia-Heinz et al. (2020)	There was an improvement in the assimilation of content.
Chiou et al. (2020)	There was an increase in student motivation and performance.
Mellado-Silva et al. (2020)	There was an improvement in student performance.
Rocha Neto et al. (2020)	Skills required by the job market were developed, as well as skills in teamwork, good communication, management, organization of processes and people, and active participation in decision-making.
Ainsworth (2021)	Teamwork, communication, negotiation, and problem-solving skills as well as individual and team responsibility were developed.
Okougbo et al. (2021)	Positive impact on students' ethical awareness.
Sarkar et al. (2021)	There was an improvement in students' knowledge of the application of big data in the accounting area.
Gómez and Berrococo (2021)	Facilitated the construction of learning and increased motivation.
Huels and Weber (2021)	Contribution to learning and understanding the use of cost-volume-profit.
Januszewski and Grzeszczak (2021)	There was an increase in accounting knowledge and the development of personal skills, such as problem-solving, independence in performing tasks, organization, and teamwork.
Kuang et al. (2021)	Development of critical thinking and knowledge retention.
Malan (2021)	Development of group work.
Okougbo and Okike (2021)	Preference for the use of active teaching strategies.
Sugahara and Cilloni (2021)	Positive perception of knowledge development.
Castilla-Polo et al. (2022)	Creating an effective learning environment involving professional and emotional skills.
Grávalos-Gastaminza et al. (2022)	Development of concentration, greater commitment in class, fun, motivation, perceived learning, satisfaction, and greater interaction between students.
Russo et al. (2022)	Improved writing skills.
Tadesse and Vincent (2022)	Developed skills in working with databases.
Lafond and Wentzel (2022)	Improved understanding of the main management accounting concepts.