Mapping Active Learning in Accounting Research: A Bibliometric Analysis

Victor Daniel Vasconcelos
Universidade de São Paulo – Ribeirão Preto
victordaniel@usp.br

Claudio de Souza Miranda
Universidade de São Paulo – Ribeirão Preto
csmiranda@usp.br

Abstract

Active learning usually refers to any method of instruction that involves students in the learning process, and its use in accounting can lead to greater student engagement in the classroom, increasing learning of accounting content. The study aims to map the studies of active learning in accounting, through the analysis of 61 documents collected in the Scopus database in the period 1995-2020. With the aid of VOSviewer software, scientific mapping, descriptive statistics, and network analysis were performed using 5 methods: co-authorship, co-occurrence, citation, bibliographic coupling, and co-citation. The results indicate that there is currently no cross-country collaboration in the study of active learning in accounting and that the most recent articles on active learning in accounting focus on classroom participation, student engagement and oral communication skills. The results also reveal that the authors Barbara A. Apostolou and Markus J. Milne are the most recognized in this area. United States is the country with the largest number of published papers and citations. Journal of Accounting Education is the journal with the most published papers and citations. Furthermore, Bentley College (United States) is the university with the most citations. The study reinforces the importance of active learning in accounting education and shows that the use of active methodologies increases the engagement of accounting students in class and is crucial in the students' learning process.

Keywords: Active Learning; Accounting; Science Mapping; Network Analysis; VosViewer

Linha Temática: Pesquisa e ensino da contabilidade

1 Introduction

Institutions and professional societies have strived to provide students with active-learning opportunities in the classroom (Lombardi et al., 2021). Active learning is "generally defined as any instructional method that engages students in the learning process" (Prince, 2004) and active learning has been used to enhance student learning and motivate student effort (Brown et al., 2016). In this line, active learning gets students to engage and think about what they are doing as opposed to passive learning where students are only recipients of information (Chiang et al., 2021), promoting student self-learning (Loeb, 2015). Thus, active learning techniques enhance students' critical thinking skills and are pedagogical tools conducive to classroom learning (Freeman & Friedman, 2020).

The curriculum of accounting courses receive criticism for failing to develop generic and professional skills needed for accounting students' suitability for the job market (Ainsworth, 2021), for example, audit education has received criticism for the absence of concrete experiences (Chiang et al., 2021). Active learning in accounting improves learning performance and encourages accounting students to pursue a career in accounting (Sugahara & Dellaportas, 2018) and accounting professors increasingly seek to develop the skills of accounting students to meet market expectations (Russo et al., 2021). Therefore, active learning in accounting helps accounting students increase their interest in accounting through understanding the importance of accounting in a real business environment and applying technical knowledge in practical accounting (Sugahara & Cilloni, 2021) and accounting faculty can present content more effectively by modifying the traditional expository lecture approach to approaches that incorporate visual instruction and increase student engagement in class through active learning activities (Cook & Hazelwood, 2002).

Bibliometrics is "a set of quantitative tools used for analyzing bibliographic data" (Donthu, Kumar, Pandey, et al., 2021). Bibliometric analysis is useful in mapping scientific knowledge and studying the evolution of established fields, making sense of unstructured data in rigorous ways (Donthu, Kumar, Mukherjee, et al., 2021) and bibliometric methods provide evidence for categories that are derived theoretically in a review article and introduce quantitative rigor into the subjective analysis of the literature (Ellegaard & Wallin, 2015). In this context, bibliometric analysis assists in investigating the relationship between research collaboration and the variables related to the research problems (Subramanyam, 1983).

Previous studies address the use of active learning methods in accounting, such as GLB (Sugahara & Cilloni, 2021), story writing (Freeman & Friedman, 2020), Team-Based Learning (TBL) (Ainsworth, 2021), business simulation (Levant et al., 2016), flipped classroom (Brown et al., 2016; Williams et al., 2019), case studies (Wynn-Williams et al., 2008), service-learning projects (Gujarathi & McQuade, 2002), simulation exercise (Phillips & Graeff, 2014). To the best of our knowledge, little research has covered bibliometric analysis of active learning in general (Marchand Martella et al., 2021; Rodríguez-Sabiote et al., 2020; Segura-Robles et al., 2020) , but such analysis in accounting context has yet to be done. Thus, the study aimed to examine the scientific information related to active learning in accounting by mapping learning research in accounting.

The study analyzed 61 documents in the period 1995-2020 collected in the Scopus database, these documents are of article type, belong to the Business, Management and Accounting area and are English language. Subsequently, scientific mapping and network analysis was performed, the results show that the United States is the most prominent country in publications, with professors Barbara A. Apostolou and Markus J. Milne are the most recognized in the area and the authors

with the most publications are Dellaportas, S. and Sugahara, S. and the authors with the most citations are Adler, R.W, Whiting, R.H and Wynn-Wiliams, K. The results also show that the most recent articles address the themes: classroom participation, student engagement and oral communication skills.

The study has contributions. First, the study examines the existing literature on active learning in accounting through bibliometric analysis. Second, the study reinforces the importance of active learning in accounting education, showing that the use of active methodologies is important in student engagement. Third, Scopus database, the world's largest peer-reviewed citation database is used. Finally, five network analysis methods (co-authorship, co-occurrence, citation, bibliographic coupling, and co-citation) are used from the VOSviewer software.

Rest of the paper is organised as follows. Section 2 focuses on review of literature. Section 3 explores the methodology and Section 4 presents the results. Section 5 concludes the study

2 Literature review

Active learning can be defined as a classroom situation in which the instructor and teaching activities explicitly provide students with agency in learning (Lombardi et al., 2021), i.e., students actively contribute in class (Robertson, 2018). In this context, active learning is a teaching method in which real-world problems are experienced by students when making decisions (Claro & Esteves, 2021), incorporating numerous instructional approaches and interpretations that must be part of undergraduate courses for student success (Marchand Martella et al., 2021). Furthermore, active learning usually presents itself as a radical change from traditional teaching, polarizing the faculty and attracting advocates among teachers for methods that differ from traditional ones in teaching (Prince, 2004).

Active learning leads to greater understanding of the content (Precourt & Gainor, 2019) and for many, active learning involves any instruction other than the traditional class in which students sit and listen to an instructor, taking notes (Lombardi et al., 2021). In active learning, students communicate in the classroom, asking questions and providing answers (Alshurafat et al., 2020). Active learning involves application, authenticity, and engagement of learning through experiences (Butler et al., 2019) and active learning helps students develop mind maps that can help them recall course content (Nsor-Ambala, 2021). Furthermore, knowledge of technology is necessary for the use of active learning methods in accounting, not least because accounting students need to learn about the sources of accounting research available on the Internet (Gioiosa & Kinkela, 2019a).

Accounting is an ancient discipline, with merchants using accounting techniques for business for several centuries, and although the first use of accounting is attributed to Luca Pacioli in Italy in the 14th century, accounting originated in Arabia and was brought to Venice by Arab merchants (Merigó & Yang, 2017). Student engagement in management accounting is usually low (Holmes & Rasmussen, 2018) and a crucial aspect of successful accounting student learning is reducing the negative view of accounting (Sugahara & Cilloni, 2021). Accounting professors face challenges when teaching managerial principles, such as students' lack of work experience that can make the concepts difficult to grasp and the class considered boring or difficult by many students (Matherly & Burney, 2013). Moreover, students from other courses, such as business, when studying accounting complain that accounting is abstract and difficult to understand and say that accounting has long desired a move away from the traditional format in accounting classes (Phillips & Graeff, 2014).

Sugahara and Dellaportas (2018) examined the effect of active learning approaches on

encouraging first-year undergraduate business students to major in accounting and desire an accounting career. The results indicate that active learning does not always help students on the job and active learning improves student motivation and confidence and helps students stay focused. Gioiosa & Kinkela, (2019b) found that accounting students had positive perceptions of active learning exercises done in six classes asked to complete a survey that evaluated active learning exercises done with the goal of promoting oral communication skills and knowledge of technology used in accounting. Levant *et al.*, (2016) studied the application of the active learning technique business simulation in business schools and university in France and Morocco (French speaking context) and as results found that business simulations benefit, male and female students from various ethnic and cultural backgrounds, regardless of whether they have previous work experience or not. Brown *et al.*, (2016) found that requiring students to answer guided reading questions motivates them, showing the importance of the flipped classroom. Williams *et al.*, (2019) studied flipped and traditional teaching perspectives in a first-year introductory accounting class in an undergraduate business course, the results indicate that more research is needed to verify whether flipped teaching approach is effective for first-year students.

Gujarathi and McQuade (2002) used service-learning projects as an active learning strategy in an intermediate accounting course, the results show that service-learning fits within the scope of business courses and assists in promoting the goals of relevant management education. Wynn-Williams *et al.*, (2008) demonstrated that business case studies are important for the development of accounting graduates, and it is also important to maintain the business case activity so that less balanced learning styles do not occur. Precourt and Gainor (2019) suggest that the more students speak up in class and engage in meaningful discussions, the more students learn and retain content. Ainsworth (2021) described the team-based approach from students in a graduate accounting course, the results confirm that TBL improves student preparation by increasing engagement, accountability, and satisfaction as well as makes the student improve teamwork and skills needed for the workplace.

Case studies are used in accountant training to reflect the actual work of accounting departments (Januszewski & Grzeszczak, 2021). Phan et al., (2020) suggest that accounting graduates should be equipped with active learning activities, such as project-based and work-integrated to meet the needs of employers. Cook and Hazelwood (2002) presented accounting concepts through the game "Who Wants to Win...?" in which the instructor acquires a role of master of ceremonies and the students have the role of competitors. The results show that this method can be used to pass accounting content and that it provides greater student engagement in class, a higher level of fun, and a higher level of advance preparation for the students. Phillips and Graeff (2014) suggest that the simulation exercise can be considered an effective method of active learning in accounting, serving to assist accounting students in understanding accounting concepts used in practice by companies. Sugahara and Cilloni (2021) used game-based learning (GBL) with a LEGO simulation game as active learning material for undergraduate accounting students at a northern Italian university and the use of GBL changed students' perceptions of accounting, especially in terms of the unstructured and absorbing image of accounting. Young and Warren (2011) indicated that experiential learning is an active learning technique, as well as being the pedagogy for the Challenge Problem approach that can be used in accounting to stimulate the development of critical thinking in accounting students. Loeb (2015) addresses what active learning strategies in accounting ethics can facilitate learning in accounting ethics. Freeman and Friedman (2020) suggest that story writing can be used as an active learning technique in accounting because it engages students, allows a personal connection to the subject content, and increases critical

thinking skills.

3 Methodology

Bibliometrics is a special case of scientometrics that addresses "the collection, the handling and the analysis of quantitative bibliographic data, derived from scientific publications (Verbeek et al., 2002). Bibliometric methods are used because research with data can be considered more relevant than subjective evaluation (Nobanee et al., 2021) and bibliometric analysis have been used in quantitative analyses of written publications and play an increasing role in the classification of research departments and institutions (Ellegaard & Wallin, 2015). In this line, bibliometric analysis quantitatively measures the existing literature and identifies research gaps, providing guidelines for future research (Zainuldin & Lui, 2021). The analysis of bibliographic data, such as citations, author affiliations and keywords with the aim of revealing characteristics of the knowledge base is done by scientific mapping (Hallinger & Kovačević, 2021). Scientific mapping aims to display the structure and dynamics of scientific fields, using bibliometric methods to analyze the relationship between disciplines, specialties, fields, and individual articles (Zupic & Čater, 2015).

Scopus is the largest database of citations and abstracts of peer-reviewed literature: books, scientific journals, conferences, and industry publications (Elsevier, 2021). Scopus has consistent repositories of documents, and has information such as authors' countries, citations per document, and other information that is important in terms of quality and quantity (El Baz & Iddik, 2021) and Scopus has demonstrated progress in coverage and functionality since its inception (Gavel & Iselid, 2008). Moreover, Scopus has easy navigability and is popular among researchers (George et al., 2021). Thus, we selected Scopus as the data sources.

We explored the Scopus database on September 14, 2021 for articles related to active learning and accounting in journals and the year 2021 was deleted to reduce the chronological factor in the results. Using keywords such as "active learning" and "accounting" in both "title" and "keywords", limited to the areas of Business, Management and Accounting. In addition, the selected documents are English language articles published in journals. Finally, 61 documents were found. Boolean operators were applied to filter the results: English-language, article-type documents published in journals in the period 1995-2020 and collected on September 14, 2021. Table 1 displays the search approach in the Scopus database.

Table 1

Search approach on Scopus database

Search Parameter	Scopus Search Syntax
Category	Title-Abstract-Keywords (TITLE-ABS-KEY)
Subject area	Business, Management and Accounting (BUSI)
Combination of sets	Combined using AND
Exact phrases	Double quotations marks “ ”
Filters	Language: English LIMIT-TO (LANGUAGE,”English”) Document type: Article LIMIT-TO (DOCTYPE, “ar”) Source type: Journal LIMIT-TO (SRCTYPE,”j”)
Search Date	14-9-2021
Exact Query String	TITLE-ABS-KEY ("active learning") AND TITLE-ABS-KEY ("accounting")) AND (EXCLUDE (PUBYEAR,2021)) AND (LIMIT-TO (SUBJAREA ,"BUSI")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-

	TO (SRCTYPE, "j")
Total documents	61

The VOSviewer software was used to construct the bibliometric mapping. VOSviewer is a computer program that builds and visualizes bibiliometric maps, for example, it can build actor maps based on co-citation data, and is freely available from www.vosviewer.com. (Van Eck & Waltman, 2010). VOSviewer was developed in 2010 by Nees Jan van Eck and Ludo Waltman at Leiden University's Centre for Science and Technology Studies (CWTS) and has become popular in Scientometrics and other disciplines that use scientific maps for its ease of use and its many features, such as clustering techniques and natural language processing (Orduña-Malea & Costas, 2021) and VOSviewer provides a map explaining the relationship of the items by the distance between them (Goyal & Kumar, 2021).

4 Results

4.1 Descriptive statics

The number of publications by year is displayed in Table 2. We observe that in the period 1997-2001 there were no publications on active learning in accounting, a steady growth is noted in the period between 2002-2013 and from the year 2014 a further increase is observed. The highest peak in the period was in the year 2019 with 8 reported publications and there was some consolidation in the year 2020 with 5 publications.

Table 2

Number of publications by year

Year	Number of articles	%
1995	1	1.64
1996	2	3.28
2002	3	4.92
2004	1	1.64
2005	1	1.64
2006	1	1.64
2008	1	1.64
2009	3	4.92
2010	2	3.28
2011	2	3.28
2012	3	4.92
2013	3	4.92
2014	6	9.84
2015	5	8.20
2016	4	6.56
2017	6	9.84
2018	4	6.56
2019	8	13.11
2020	5	8.20
Total	61	100

Using VOSviewer software we performed a co-authorship analysis, ranking the main authors by documents and citations. Table 3 shows the authors by documents and citations. According to Table 3, the authors who have published the most papers addressing active learning in accounting are Dellaportas, S. and Sugahara, S. (3 papers), it is also noteworthy that only 8 authors have published two or more papers. Table 3 also brings the authors by citation and the most

cited authors are Adler, R.W, Whiting, R.H and Wynn-Wiliams, K. (68 citations) this is due to the articles "Student-led and teacher-led case presentations: Empirical evidence about learning styles in an accounting course" (40 citations) (Adler et al., 2004) and "The influence of business case studies on learning styles: An empirical investigation" (28 citations). (Wynn-Williams et al., 2008).

Table 3

Authors by documents and citations

Rank	Author by documents	Documents
1	Dellaportas, S.	3
2	Sugahara, S.	3
3	Adler, R.W	2
4	Whiting, R.H	2
5	Wynn-Wiliams, K.	2
6	Lee Warren, D.	2
7	Gainor,M.	2
8	Kinkela, K.	2
Rank	**Author by citation**	**Citations**
1	Adler, R.W	68
2	Whiting, R.H	68
3	Wynn-Wiliams, K.	68
4	Gujarathi, M.R	46
5	Mcquade, R.J	46
6	Coulmont, M	38
7	Levant, Y	38
8	Sandu, R.	38

Table 4 shows the 10 most cited articles among the 61 documents analyzed in the Scopus database in the period 1995-2020. The most cited article is "Service-Learning in Business Schools: A Case Study in an Intermediate Accounting Course" (Gujarathi & McQuade, 2002) published in Journal of Education for Business which has CiteScore 1.6 in the year 2020. "The CiteScore methodology reflects the citation impact of a journal's research-based contributions with greater stability and consistency in applied time ranges"(Scopus, 2021). We observe that the journals with the most articles among the 10 most cited articles are: Accounting Education (5; CiteScore 2020 = 3.3), Issues in Accounting Education (3; CiteScore 2020 = 1.7), and Journal of Education for Business (2; CiteScore = 1.6).

Table 4

Top 10 most cited documents

Rank	Title	Authors	Journal	CiteScore	Citations
1	Service-Learning in Business Schools: A Case Study in an Intermediate Accounting Course	Gujarathi & McQuade, (2002)	Journal of Education for Business	1.6	46
2	Student-led and teacher-led case presentations: Empirical evidence about learning styles in an accounting course	Adler R.W., Whiting R.H., & Wynn-Williams K, (2004)	Accounting Education	3.3	40
3	Business simulation as an active learning activity for developing soft skills	Levant Y., Coulmont M., Sandu R., (2016)	Accounting Education	3.3	38
4	An active learning strategy for the	Cook & Hazelwood,	Journal of	1.6	30

	classroom-"who wants to win...some mini chips ahoy?"	(2002)	Accounting Education for business		
5	The influence of business case studies on learning styles: An empirical investigation	Wynn-Williams K., Whiting R.H. & Adler R.W., (2008)	Accounting Education	3.3	28
6	Enhancing accounting students' problem-solving skills: The use of a hands-on conceptual model in an active learning environment	Kern (2002)	Accounting Education	3.3	27
7	Active learning, cooperative active learning, and passive learning methods in an accounting information systems course	Riley & Ward, (2017)	Issues in Accounting Education	1.7	27
8	Fostering deep and active learning through assessment	Hand et al., (1996)	Accounting Education	3.3	21
9	Encouraging the development of critical thinking skills in the introductory accounting courses using the challenge problem approach	Young & Warren, (2011)	Issues in Accounting Education	1.7	20
10	Active learning activities to revitalize managerial accounting principles	Matherly & Burney, (2013)	Issues in Accounting Education	1.7	20

Table 5 shows the ranking according to the countries of each author, the countries that have contributed most to the study of active learning in accounting are identified according to the number of articles published by each country and the number of citations per country. Based on Table 4, the United States is the country with the most papers (38), followed by Australia (8) and Canada (4). According to the number of citations, the country with the most citations is also the United States (403), followed by Canada (68) and New Zealand (68). The results show that the research of active learning in accounting is concentrated in the United States because of the great difference between the United States and other countries.

Table 5

Countries by documents and citations

Rank	**Country by documents**	**Documents**
1	United States	38
2	Australia	8
3	Canada	4
4	Japan	3
5	New Zealand	2
6	Spain	2
7	United Kingdom	2
Rank	**Country by citation**	**Citations**
1	United States	403
2	Canada	68
3	New Zealand	68
4	France	38
5	Australia	31
6	United Kingdom	25
7	Japan	10

8	Spain	2
9	Taiwan	1
10	Belgium	1
11	Brazil	1

Table 6 reveals the ranking by documents and citations of the journals that the active learning in accounting articles were published. We find that the journal Accounting Education (CiteScore 2020 = 3.3 has the most articles (14) and the most citations (32.52). Acounting Education journal has publications in accounting education and training, with a focus on financial and business analytics and management, public and managerial accounting. The journal Accounting Education is also Q1 (2020) CiteScore Best Quartile and is a journal of the Taylor & Francis Group. The journal Issues in Accounting Education (2020 CiteScore = 1.7) is the second journal with the most papers (12) and citations (152), with publications that seek to assist accounting faculty in teaching by addressing important accounting education issues, and is printed quarterly in February, May, August, and November. Finally, the Journal of Accounting Education (CiteScore 2020 = 4.7) is the third journal with the most documents (10) and citations (95), with publications about accounting education and is part of the Elsevier group.

Table 6

Journals by documents and citations

Rank	Source	CiteScore 2020	Documents	Percentage
1	Accounting Education	3.3	14	22.95
2	Issues in Accounting Education	1.7	12	19.67
3	Journal of Accounting Education	4.7	10	16.39
4	Journal of Education for Business	1.6	4	6.26
5	Accounting Research Journal	7.1	2	3.28
6	Education and Training	3.8	2	3.28
7	Journal of Emerging Technologies in Accounting	3.5	2	3.28
8	Meditari Accountancy Research	5.2	2	3.28
9	Accounting Perspectives	1.0	1	1.64
10	Advances in Science, Technology and Engineering Systems	-	1	1.64
11	Australasian Journal of Information Systems	2.5	1	1.64
12	Contemporary Accounting Research	4.3	1	1.64
13	Intelligent Systems in Accounting, Finance and Management	6.4	1	1.64
14	International Journal of Innovation and Learning	1.0	1	1.64
15	Journal of Business Ethics	9.0	1	1.64
16	Journal of Hospitality and Tourism Education	1.8	1	1.64
17	Journal of Hospitality, Leisure, Sport and Tourism Education	3.1	1	1.64
18	Journal of International Education in Business	1.8	1	1.64
19	Journal of Management Education	2.4	1	1.64
20	Journal of the International Academy for Case Studies	-	1	1.64
21	Revista de Contabilidad-Spanish Accounting Review	2.7	1	1.64
Rank	**Source**	**CiteScore 2020**	**Citations**	**Percentage**
1	Accounting education	3.3	200	32,52
2	Issues in Accounting Education	1.7	152	24,72
3	Journal of Accounting Education	4.7	95	15,45

4	Journal of Education for Business	1.6	67	10,89
5	Journal of Management Education	2.4	18	2,93
6	Journal of Business Ethics	9.0	17	2,76
7	Contemporary Accounting Research	4.3	9	1,46
8	Revista de Contabilidad-Spanish Accounting Review	2.7	9	1,46
9	Journal of Hospitality, Leisure, Sport and Tourism Education	3.1	8	1,30
10	Meditari Accountancy Research	5.2	8	1,30
11	Journal of Hospitality and Tourism Education	1.8	7	1,14
12	Journal of Emerging Technologies in Accounting	3.5	6	0,98
13	Journal of International Education in Business	1.8	4	0,65
14	Accounting Research Journal	7.1	4	0,65
15	Australasian Journal of Information Systems	2.5	3	0,49
16	Accounting Perspectives	1.0	3	0,49
17	Journal of the International Academy for Case Studies	-	3	0,49
18	Intelligent Systems in Accounting, Finance and Management	6.4	1	0,16
19	International Journal of Innovation and Learning	1.0	1	0,16
20	Education and Training	3.8	0	0,00
21	Advances in Science, Technology and Engineering Systems	-	0	0,00

Table 7 shows the ranking according to the affiliation obtained from each author in the database, the affiliations that contributed the most to research on active learning in accounting are identified according to the number of articles published by each affiliation and the number of citations per affiliation. Only two affiliations had two papers published by authors from the affiliation (School of Accounting, RMIT University and Belmont University), located in Australia and the United States, respectively. Regarding citations, Bentley College is the university that stood out the most with 46 citations, followed by University of Otago and Faculty of Administration, department of Accounting, Université de Sherbrooke, with 40 and 38 citations, respectively, only 6 affiliations had 30 or more citations.

Table 7

Affiliations by documents and citations

Rank	**Affiliations**	**Country**	**Documents**
1	School of Accounting, RMIT University	Australia	2
2	Belmont University	United States	2
Rank	**Affiliations**	**Country**	**Citations**
1	Bentley College	United States	46
2	University of Otago	New Zeland	40
3	Faculty of Administration, department of Accounting, Université de Sherbrooke	Canada	38
4	Skema Business School	France	38
5	Belmont University	United States	36
6	University of Louisiana at Lafayette	United States	30

4.2 Network Analysis

Network analysis makes use of the relational technique to examine bibliographic data that

classifies as co-authorship, co-occurrence, citation, bibliographic coupling, and co-citation (Zainuldin & Lui, 2021). Thus, in this section we will show you each classification of bibliographic data: co-authorship, co-occurrence, citation, bibliographic coupling, and co-citation.

4.2.1 Co-authorship analysis

Co-authorship analysis is "the number of publications two researchers have co-authored" (Van Eck & Waltman, 2021) and the co-authorship analysis explains the connection between researchers from different backgrounds (Zainuldin & Lui, 2021). Figure 1 shows the network mapping of countries based on co-authorship analysis, according documents weight. We observed that there is no research collaboration between countries on the themes of active learning in accounting, which can be explained by the specific contexts of each country in relation to encouraging the use of active learning. Thus, future research could analyze active learning in accounting in different contexts.

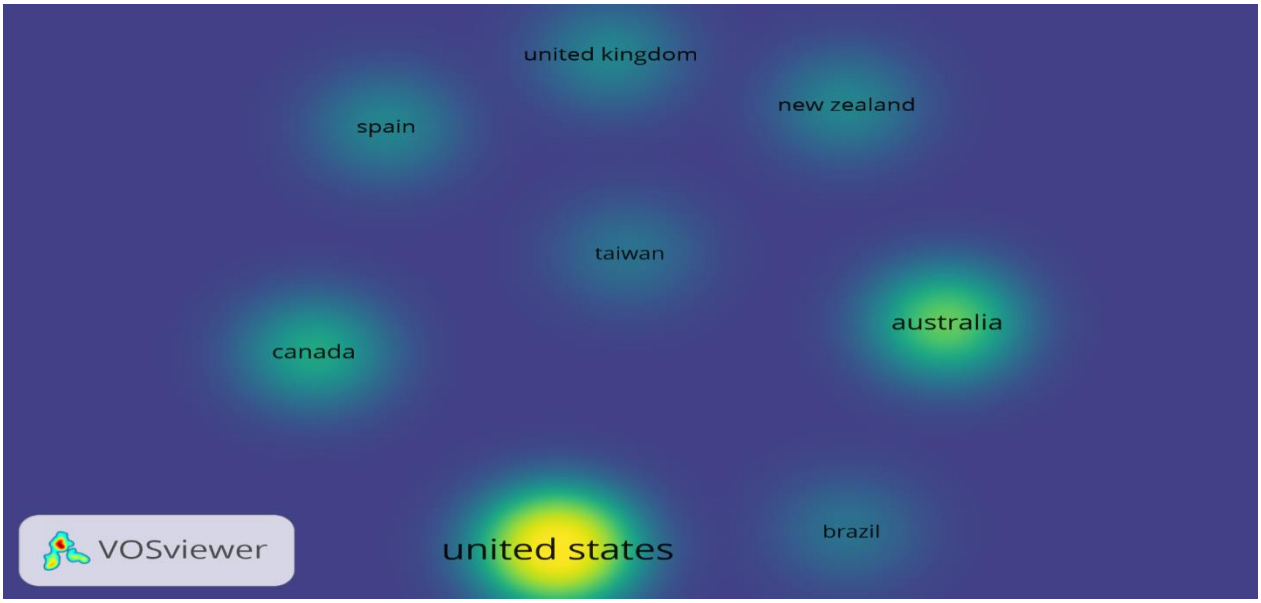

Figure 1: Country cooperation network

4.2.2 Co-occurrence analysis

Co-occurrence is "the number of publications in which two terms occur together" (Van Eck & Waltman, 2021) and in co-occurrence, the distance between two keywords is inversely proportional to their similarity, that is, words that have a higher co-occurrence rate tend to be close to each other (Bornmann et al., 2018). Thus, co-occurrence networks are based on the number of publications that two keywords occur together in the title, abstract, or in the keywords and quantitatively express their connection (Picone et al., 2021). Figure 2 shows the overlap visualization of the popular keywords. The overlay visualization of VOSviewer was used because it allows you to show how items have evolved over time, based on the average publication year of the documents in which the keywords occurred (Picone et al., 2021). The prominent keyword is active learning, which represents the largest cluster, we also note that there is a recent focus in the active learning articles in accounting for classroom participation, student engagement and oral communication skills.

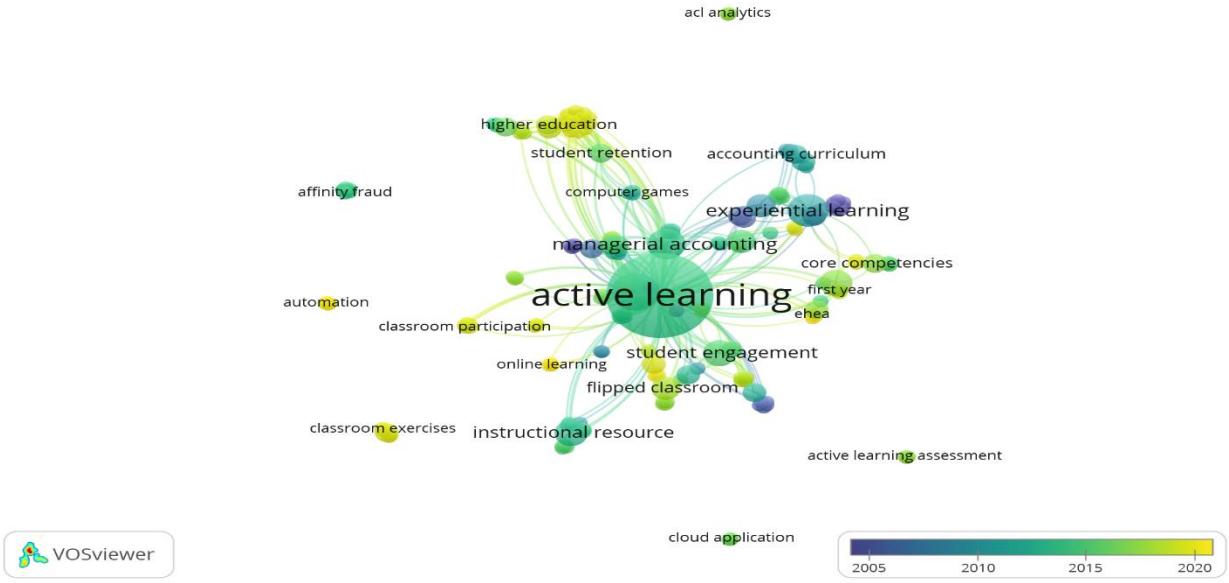

Figure 2: Overlay visualization of the co-occurrence network map of keywords

4.2.3 Citation analysis

"A citation link is a link between two items where one item cites the other" (Van Eck & Waltman, 2021) and highly cited articles usually indicate their influence within a field (Zainuldin & Lui, 2021). Figure 3 shows the density mapping of active learning articles in accounting based on citation analysis. We observe the existence of 8 clusters: Cluster 1 has as a highlight the article "Fostering deep and active learning through assessment" (Hand et al., 1996) that tries to develop an assessment strategy to foster learning by actively involving the student with the content. Cluster 2 highlights the article An active learning strategy for the classroom-"who wants to win... some mini chips ahoy?" (Cook & Hazelwood, 2002) which applies a game ""Who Wants to Win...?" to assist students in teaching accounting. Cluster 3 features the article "Active learning, cooperative active learning, and passive learning methods in an accounting information systems course" (Riley & Ward, 2017) that compares the effectiveness of active learning methods with passive learning methods in accounting. Cluster 4 features the essay "Reclaiming 'sense' from 'cents' in accounting education" (Dellaportas, 2015) as a highlight, this essay discusses the limitation of accounting education when taught only as technical practice. Cluster 5 highlights the article "Integrated accounting principles: A best practices course for introductory accounting" (Warren & Young, 2012), which aims to develop content based on the "Integrated Accounting Principles". Cluster 6 features the article "Using an In-Class Simulation in the First Accounting Class: Moving From Surface to Deep Learning" (Phillips & Graeff, 2014) as a highlight that aims to create a simulation of buying and selling goods, accounting the transactions to lead students to a deep learning of the content. Cluster 7 features the article "Active Learning Activities to Revitalize Managerial Accounting Principles" (Matherly & Burney, 2013) as a highlight that provides accounting faculty with four active learning activities to aid student engagement in the classroom: managerial accounting terminology, activity-based costing, variance analysis, and special-order decision making. Cluster 8 features the article "Active learning: An advantageous yet challenging approach to accounting ethics instruction" (Loeb, 2015) as a highlight that discusses the advantages and

challenges of implementing active learning.

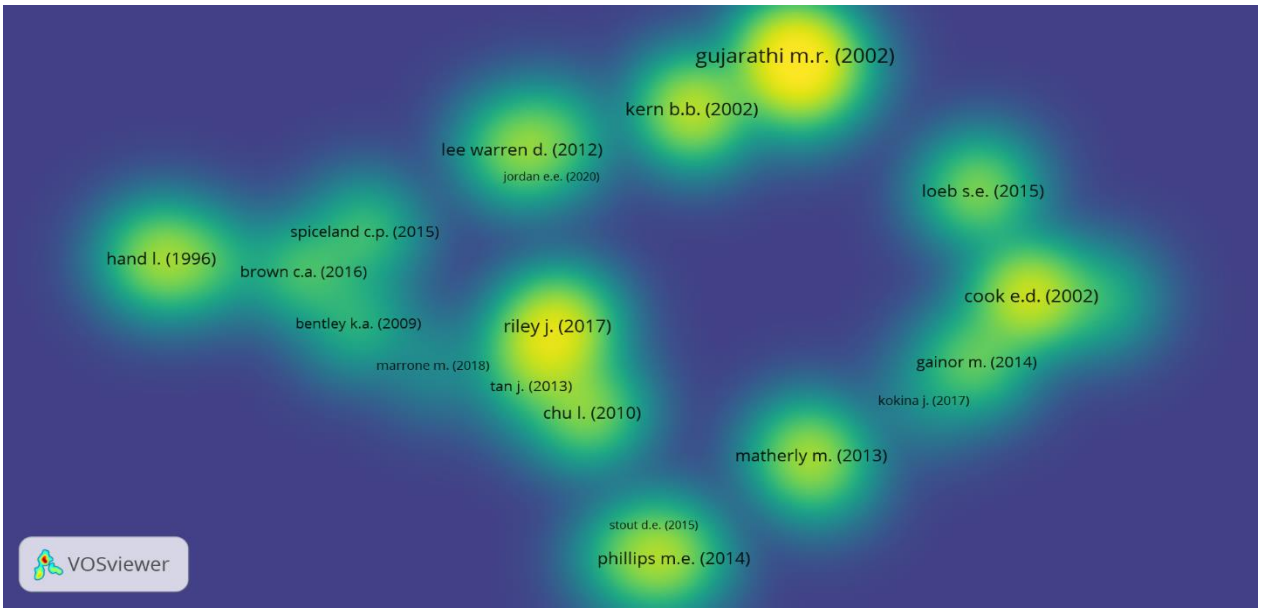

Figure 3: Density mapping of citation analysis

4.2.4 Bibliographic coupling analysis

"A bibliographic coupling link is a link between two items that both cite the same document" (Van Eck & Waltman, 2021) and occurs when the same reference is cited by two articles (Kessler, 1963). Figure 4 shows the network mapping of active learning in accounting articles based on the bibliographic coupling analysis. We observe that the article "Research initiatives in accounting education: Improving learning effectiveness" (Jordan & Samuels, 2020) has the most strength in its links, that is, it has the most common references (uses the same reference item), and is an important article for active learning research in accounting.

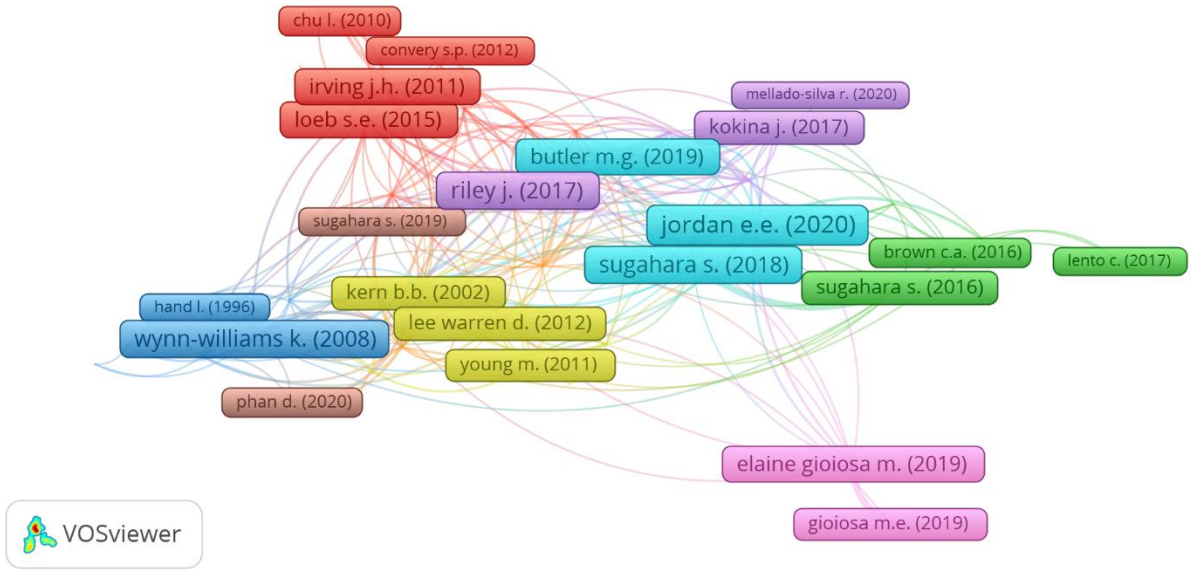

Figure 4: Bibliographic coupling analysis

4.2.5 Co-Citation analysis

"A co-citation link is a link between two items that are both cited by the same document" (Van Eck & Waltman, 2021) and co-citation occurs when two documents (or multiple articles) appear in a third bibliographic reference list, forming a co-citation relationship (Meng et al., 2020), i. e., is "the occurrence when two articles are cited by other articles" (Zainuldin & Lui, 2021). Figure 5 demonstrates the co-citation analysis of the authors. We observe 6 clusters, with 2 clusters being most significant: red cluster, led by Apostolou and green cluster, led by Milne). Barbara A. Apostolou is a recognized accounting professor who has h-index 16, according to the Scopus database and many of his publications address the review of the accounting education literature. Markus J. Milne is a professor of Accounting at the University of Canterbury, which is recognized and has h-index 29 according to Scopus base.

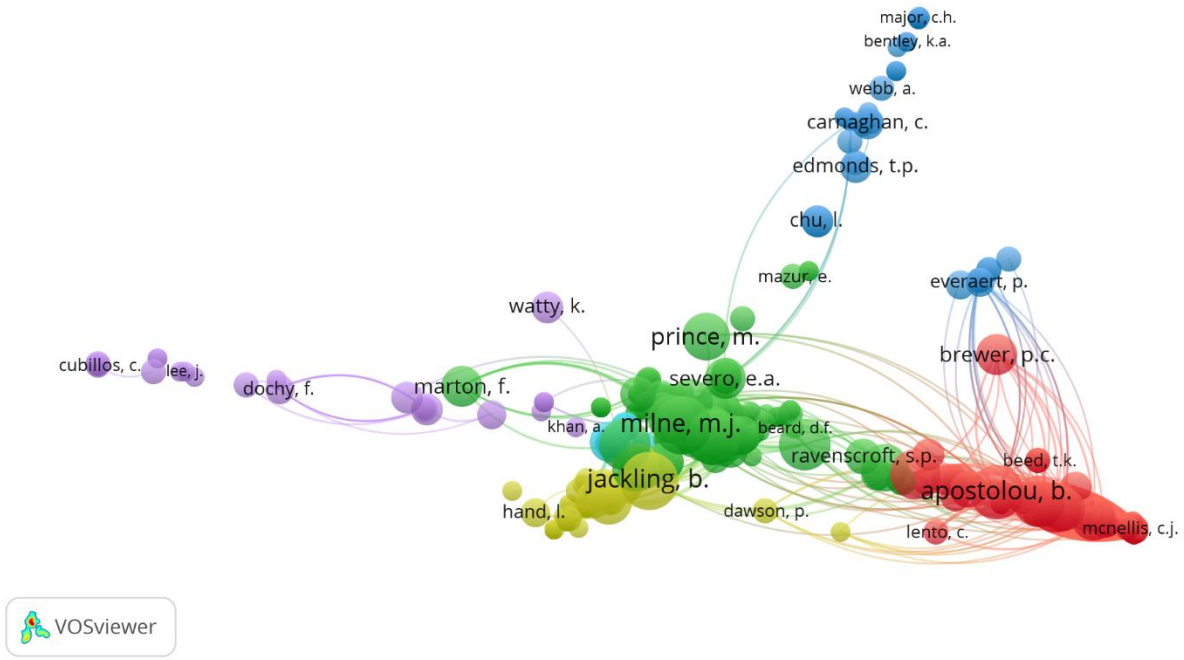

Figure 5: Co-citation analysis

5 Conclusions

The study aimed at mapping the studies of active learning in accounting, through the analysis of 61 documents of the article type, from the Business, Management and Accounting area and English language, extracted on September 14, 2021 from the Scopus database in the period 1995-2020, subsequently, we made scientific mapping and performed descriptive statistics and employed 5 methods with the help of the VOSViewer software: co-authorship, co-occurrence, citation, bibliographic coupling, and co-citation.

The results show that the most cited authors by papers are Dellaportas, S. and Sugahara, S. with 3 papers and by citations are Adler, R.W, Whiting, R.H and Wynn-Wiliams, K. with 68

citations. The most cited paper is "Service-Learning in Business Schools: A Case Study in an Intermediate Accounting Course" and the country that publishes the most per author is United States (38), also being the most cited (403). Regarding the journal, the one with the most publications and citations is Accounting Education with 14 papers and 200 citations, respectively. Finally, the affiliations that most published documents were School of Accounting, RMIT University (Australia) and Belmont University (United States) and the affiliation that was most cited was: Bentley College (United States) with 46 citations.

Network analysis was also employed with the help of VOSviewer software and showed that in the cohort analysis, the results show that there is no cross-country collaboration in research on active learning in accounting. Co-occurrence analysis reveals a recent focus in active learning articles in accounting for classroom participation, student engagement and oral communication skills. Citation analysis indicates the existence of 8 clusters. Bibliographic coupling analysis reveals that the article "Research initiatives in accounting education: Improving learning effectiveness" has the most references in common with the others, showing it to be important to the field of active learning in accounting. Finally, the co-citation analysis indicates that the most representative teachers are: Barbara A. Apostolou and Markus J. Milne.

The study has theoretical and empirical implications. As theoretical implications, the study reinforces current lines of research in active learning in accounting, such as classroom participation, student engagement and oral communication skills, and may indicate future lines of research for researchers in this area. As practical implications, the study may help universities and professors to know the details of active learning research in accounting, being important for the application of active methodologies in the future.

The study has limitations, such as the use of only one base (Scopus) for the study of active learning in accounting, the consideration of only one type of document (article) and the consideration of only English language articles. Future research could use other bases, such as Web of Science, other types of documents, such as books, book chapters, and conferences, and use articles from other languages.

References

Adler, R. W., Whiting, R. H., & Wynn-Williams, K. (2004). Student-led and teacher-led case presentations: empirical evidence about learning styles in an accounting course. *Accounting Education*, *13*(2), 213–229.

Ainsworth, J. (2021). Team-Based Learning in professional writing courses for accounting graduates: positive impacts on student engagement, accountability and satisfaction. *Accounting Education*, 1–24.

Alshurafat, H., Beattie, C., Jones, G., & Sands, J. (2020). Perceptions of the usefulness of various teaching methods in forensic accounting education. *Accounting Education*, *29*(2), 177–204.

Bornmann, L., Haunschild, R., & Hug, S. E. (2018). Visualizing the context of citations referencing papers published by Eugene Garfield: a new type of keyword co-occurrence analysis. *Scientometrics*, *114*(2), 427–437. https://doi.org/10.1007/s11192-017-2591-8

Brown, C. A., Danvers, K., & Doran, D. T. (2016). Student perceptions on using guided reading questions to motivate student reading in the flipped classroom. *Accounting Education*, *25*(3), 256–271.

Butler, M. G., Church, K. S., & Spencer, A. W. (2019). Do, reflect, think, apply: Experiential education in accounting. *Journal of Accounting Education*, *48*, 12–21. https://doi.org/https://doi.org/10.1016/j.jaccedu.2019.05.001

Chiang, C., Wells, P. K., & Xu, G. (2021). How does experiential learning encourage active learning in auditing education? *Journal of Accounting Education*, *54*, 100713.

Claro, P. B., & Esteves, N. R. (2021). Teaching sustainability-oriented capabilities using active learning approach. *International Journal of Sustainability in Higher Education*.

Cook, E. D., & Hazelwood, A. C. (2002). An active learning strategy for the classroom—"who wants to win… some mini chips ahoy?" *Journal of Accounting Education*, *20*(4), 297–306.

Dellaportas, S. (2015). Reclaiming 'sense'from 'cents' in accounting education. *Accounting Education*, *24*(6), 445–460.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285–296.

Donthu, N., Kumar, S., Pandey, N., & Gupta, P. (2021). Forty years of the International Journal of Information Management: A bibliometric analysis. *International Journal of Information Management*, *57*, 102307.

El Baz, J., & Iddik, S. (2021). Green supply chain management and organizational culture: a bibliometric analysis based on Scopus data (2001-2020). *International Journal of Organizational Analysis*.

Ellegaard, O., & Wallin, J. A. (2015). The bibliometric analysis of scholarly production: How great is the impact? *Scientometrics*, *105*(3), 1809–1831.

Elsevier. (2021). *Expertly curated abstract & citation database*. https://www.elsevier.com/solutions/scopus

Freeman, M. S., & Friedman, M. (2020). Story writing in the accounting classroom. *The Accounting Educators' Journal*, *30*.

Gavel, Y., & Iselid, L. (2008). Web of Science and Scopus: a journal title overlap study. *Online Information Review*.

George, T. T., Obilana, A. O., Oyenihi, A. B., & Rautenbach, F. G. (2021). Moringa oleifera through the years: a bibliometric analysis of scientific research (2000-2020). *South African Journal of Botany*, *141*, 12–24. https://doi.org/https://doi.org/10.1016/j.sajb.2021.04.025

Gioiosa, M. E., & Kinkela, K. (2019a). Active learning in accounting classes with technology and communication skills: A two-semester study of student perceptions. *Journal of Education for Business*, *94*(8), 561–568.

Gioiosa, M. E., & Kinkela, K. (2019b). Classroom exercises with technology and communication skills: Students' perceptions. *Journal of International Education in Business*.

Goyal, K., & Kumar, S. (2021). Financial literacy: A systematic review and bibliometric analysis. *International Journal of Consumer Studies*, *45*(1), 80–105.

Gujarathi, M. R., & McQuade, R. J. (2002). Service-Learning in Business Schools: A Case Study in an Intermediate Accounting Course. *Journal of Education for Business*, *77*(3), 144–150. https://doi.org/10.1080/08832320209599063

Hallinger, P., & Kovačević, J. (2021). Science mapping the knowledge base in educational leadership and management: A longitudinal bibliometric analysis, 1960 to 2018. *Educational Management Administration & Leadership*, *49*(1), 5–30.

Hand, L., Sanderson, P., & O'Neil, M. (1996). Fostering deep and active learning through assessment. *Accounting Education*, *5*(2), 103–119.

Holmes, A. F., & Rasmussen, S. J. (2018). Using Pinterest to stimulate student engagement, interest, and learning in managerial accounting courses. *Journal of Accounting Education*, *43*, 43–56.

Januszewski, A., & Grzeszczak, M. (2021). Internship of Accounting Students in the Form of E-Learning: Insights from Poland. *Education Sciences*, *11*(8), 447.

Jordan, E. E., & Samuels, J. A. (2020). Research initiatives in accounting education: Improving learning effectiveness. *Issues in Accounting Education*, *35*(4), 9–24.

Kern, B. B. (2002). Enhancing accounting students' problem-solving skills: the use of a hands-on conceptual model in an active learning environment. *Accounting Education*, *11*(3), 235–256.

Kessler, M. M. (1963). Bibliographic coupling between scientific papers. *American Documentation*, *14*(1), 10–25.

Levant, Y., Coulmont, M., & Sandu, R. (2016). Business simulation as an active learning activity for developing soft skills. *Accounting Education*, *25*(4), 368–395.

Loeb, S. E. (2015). Active learning: An advantageous yet challenging approach to accounting ethics instruction. *Journal of Business Ethics*, *127*(1), 221–230.

Lombardi, D., Shipley, T. F., & Astronomy Team Chemistry Team, Engineering Team, Geography Team, Geoscience Team, and Physics Team, B. T. (2021). The curious construct of active learning. *Psychological Science in the Public Interest*, *22*(1), 8–43.

Marchand Martella, A., Yatcilla, J. K., Park, H., Marchand-Martella, N. E., & Martella, R. C. (2021). Investigating the active learning research landscape through a bibliometric analysis of an influential meta-analysis on active learning. *SN Social Sciences*, *1*(9), 1–24.

Matherly, M., & Burney, L. L. (2013). Active learning activities to revitalize managerial accounting principles. *Issues in Accounting Education*, *28*(3), 653–680.

Meng, L., Wen, K.-H., Brewin, R., & Wu, Q. (2020). Knowledge Atlas on the Relationship between Urban Street Space and Residents' Health—A Bibliometric Analysis Based on VOSviewer and CiteSpace. *Sustainability*, *12*(6), 2384.

Merigó, J. M., & Yang, J. (2017). Accounting research: A bibliometric analysis. *Australian Accounting Review*, *27*(1), 71–100.

Nobanee, H., Al Hamadi, F. Y., Abdulaziz, F. A., Abukarsh, L. S., Alqahtani, A. F., AlSubaey, S. K., Alqahtani, S. M., & Almansoori, H. A. (2021). A bibliometric analysis of sustainability and risk management. *Sustainability*, *13*(6), 3277.

Nsor-Ambala, R. (2021). The impact of collaborative learning approaches on assessment outcomes in an accounting theory class. *Accounting Education*, 1–38.

Orduña-Malea, E., & Costas, R. (2021). Link-based approach to study scientific software usage: the case of VOSviewer. *Scientometrics*, 1–34.

Phan, D., Yapa, P., & Nguyen, H. T. (2020). Accounting graduate readiness for work: a case study of South East Asia. *Education and Training*.

Phillips, M. E., & Graeff, T. R. (2014). Using an in-class simulation in the first accounting class: Moving from surface to deep learning. *Journal of Education for Business*, *89*(5), 241–247.

Picone, F., Buonocore, E., Chemello, R., Russo, G. F., & Franzese, P. P. (2021). Exploring the development of scientific research on Marine Protected Areas: From conservation to global ocean sustainability. *Ecological Informatics*, *61*, 101200. https://doi.org/https://doi.org/10.1016/j.ecoinf.2020.101200

Precourt, E., & Gainor, M. (2019). Factors affecting classroom participation and how participation leads to a better learning. *Accounting Education*, *28*(1), 100–118.

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, *93*(3), 223–231.

Riley, J., & Ward, K. (2017). Active learning, cooperative active learning, and passive learning methods in an accounting information systems course. *Issues in Accounting Education*, *32*(2),

1–16.

Robertson, L. (2018). Toward an epistemology of active learning in higher education and its promise. In *Active Learning Strategies in Higher Education*. Emerald Publishing Limited.

Rodríguez-Sabiote, C., Úbeda-Sánchez, Á. M., Álvarez-Rodríguez, J., & Álvarez-Ferrándiz, D. (2020). Active Learning in an Environment of Innovative Training and Sustainability. Mapping of the Conceptual Structure of Research Fronts through a Bibliometric Analysis. *Sustainability*, *12*(19), 8012.

Russo, A., Warren, L., Neri, L., Herdan, A., & Brickman, K. (2021). Enhancing accounting and finance students' awareness of transferable skills in an integrated blended learning environment. *Accounting Education*, 1–25.

Scopus. (2021). *CiteScore 2020 values are now live!* https://blog.scopus.com/posts/citescore-2020-values-now-live

Segura-Robles, A., Parra-González, M., & Gallardo-Vigil, M. (2020). Bibliometric and collaborative network analysis on active methodologies in education. *Journal of New Approaches in Educational Research (NAER Journal)*, *9*(2), 259–274.

Subramanyam, K. (1983). Bibliometric studies of research collaboration: A review. *Journal of Information Science*, *6*(1), 33–38.

Sugahara, S., & Cilloni, A. (2021). Mediation effect of students' perception of accounting on the relationship between game-based learning and learning approaches. *Journal of Accounting Education*, *56*, 100730. https://doi.org/https://doi.org/10.1016/j.jaccedu.2021.100730

Sugahara, S., & Dellaportas, S. (2018). Bringing active learning into the accounting classroom. *Meditari Accountancy Research*.

Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538.

Van Eck, N. J., & Waltman, L. (2021). *VOSviewer Manual*.

Verbeek, A., Debackere, K., Luwel, M., & Zimmermann, E. (2002). Measuring progress and evolution in science and technology–I: The multiple uses of bibliometric indicators. *International Journal of Management Reviews*, *4*(2), 179–211.

Warren, D. L., & Young, M. N. (2012). Integrated accounting principles: A best practices course for introductory accounting. *Issues in Accounting Education*, *27*(1), 247–266.

Williams, B., Horner, C., & Allen, S. (2019). Flipped v's traditional teaching perspectives in a first year accounting unit: an action research study. *Accounting Education*, *28*(4), 333–352.

Wynn-Williams, K., Whiting, R. H., & Adler, R. W. (2008). The influence of business case studies on learning styles: An empirical investigation. *Accounting Education: An International Journal*, *17*(2), 113–128.

Young, M., & Warren, D. L. (2011). Encouraging the development of critical thinking skills in the introductory accounting courses using the challenge problem approach. *Issues in Accounting Education*, *26*(4), 859–881.

Zainuldin, M. H., & Lui, T. K. (2021). A bibliometric analysis of CSR in the banking industry: a decade study based on Scopus scientific mapping. *International Journal of Bank Marketing*.

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods*, *18*(3), 429–472.