

ANALYSIS OF STUDIES ON DISTANCE ACCOUNTING EDUCATION BY
BIBLIOMETRIC NETWORK MAPPING METHOD

**BİBLİYOMETRİK AĞ HARİTALAMA YÖNTEMİYLE UZAKTAN MUHASEBE EĞİTİMİ
ÜZERİNE YAPILAN ÇALIŞMALARIN ANALİZİ**

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ABSTRACT

This study aims to examine the trends and developments in scientific publications related to distance accounting education. Articles published between 1994 and 2022 in the Web of Science database were comprehensively analyzed using bibliometric network mapping. The analysis included yearly publication counts, distribution of research areas, the most influential authors, journals, institutions, countries, frequently used keywords, and co-authorship relations. The results reveal a significant increase in both publications and citations in the field over the last three years. Most studies focus on the impact of innovative techniques used in distance accounting education on students' academic success and self-efficacy. Additionally, "online learning" was identified as the most commonly used keyword. The journal with the highest number of publications is Accounting Education, while the United States ranks first in publication output. Australia stands out in co-authorship networks, and Monash University along with RMIT University are recognized as the leading institutions in collaborative research within this field.

MAKALE BİLGİLERİ*Makale Tarihçesi:**Gönderilme Tarihi* 04.08.2025*Kabul Tarihi* 01.09.2025*Anahtar Kelimeler:* Muhasebe

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Bu çalışma, uzaktan muhasebe eğitimi alanında yayımlanan bilimsel çalışmaların eğilimlerini ve gelişimini incelemeyi amaçlamaktadır. Web of Science veri tabanında 1994 ile 2022 yılları arasında yayımlanmış makaleler bibliyometrik ağ haritalama yöntemi kullanılarak kapsamlı şekilde analiz edilmiştir. Analiz sürecinde yıllara göre yayın sayıları, araştırma alanlarının dağılımı, en etkili yazarlar, dergiler, kurumlar, ülkeler, en sık kullanılan anahtar kelimeler ve ortak yazarlık ilişkileri detaylı olarak değerlendirilmiştir. Araştırma sonuçları, özellikle son üç yıl içerisinde uzaktan muhasebe eğitimi alanında yayın ve atıf sayılarında kayda değer bir artış olduğunu ortaya koymaktadır. Çalışmaların çoğunluğu, uzaktan eğitimde kullanılan yenilikçi tekniklerin muhasebe öğrencilerinin akademik başarısı ve öz yeterlik düzeylerine etkilerini incelemektedir. Ayrıca, “çevrim içi öğrenme” terimi en yaygın kullanılan anahtar kelime olarak tespit edilmiştir. Alandaki en fazla yayına sahip dergi Accounting Education iken, en çok yayın yapan ülke Amerika Birleşik Devletleri olmuştur. Ortak yazarlık ilişkilerinde Avustralya ön plana çıkarken, Monash Üniversitesi ve RMIT Üniversitesi en güçlü iş birliği kurumları olarak belirlenmiştir.

1. INTRODUCTION

Teaching takes place within an environment that encompasses various components, including instructors, learners, and instructional resources (Halawi et al., 2009). Traditionally, active learning has been limited to face-to-face interaction among the educator and the student (Gavira & Omoteso, 2013). Educational institutions utilize computer-based tools and techniques as part of their teaching-learning processes. Furthermore, the emergence of new technologies has led to changes in traditional instructional methods in higher education, while the widespread adoption of collaborative technologies supported by web-based tools is also increasing (Gavira & Omoteso, 2013). Since the 1990s, there has been a growing trend in using distance methods for delivering educational content (Fortin et al., 2019). In the last phase of distance education, there are virtual classrooms based on internet technology and online learning environments in universities (Cabı & Ersoy, 2017). Distance education and virtual classroom forums are a reality of today's education system (Duncan et al., 2012; Clark & Gibb, 2006; Shea-Schultz & Fogerty, 2002). Distance education refers to a structured learning method where learners and instructors are geographically separated, necessitating specific instructional design and the use of technology (Moore & Kearsley, 2011). The shift from classic face-to-face education to distance education poses numerous challenges for educators (Ali et al, 2021). One of the notable challenges of distance education is that educators deliver quality education in an online environment that does not compromise student learning (Duncan et al., 2012). Chernish et al. (2005) point out a challenge for distance educators and emphasize that students feel less comfortable in the online learning environment compared to the traditional face-to-face format. Dunbar (2004) argues that distance education reduces the interaction between students and educators.

Distance education has successfully accomplished various challenges with the introduction of new technologies such as satellite technology, video conferencing, and the internet. Distance education previously faced challenges including communication delays, limited interaction, and difficulties in monitoring progress. These advancements have significantly contributed to the improvement and effectiveness of distance education programs (Kutluk & Gulmez, 2012). Distance education provides educational institutions with the advantage of increasing their student enrollment since the geographical location of students is no longer a constraining factor (Morgan, 2015). Equal educational opportunities are offered to individuals with time, geographical and financial constraints through distance education (Reyneke & Shuttleworth, 2018: 140). Distance education saves the cost of education by eliminating various expenses such as transportation, accommodation and catering (Çukadar & Çelik, 2003; Sad et al., 2014).

There is a significant transformation taking place in educational methods (Bozok, 2011). Before Covid-19 pandemic, many universities offered accounting programs face-to-face interaction (Ali et al., 2021). The Covid-19 pandemic has forced the accounting academy to confront new challenges with the sudden transition to distance education (White, 2021). Due to the pandemic, higher education institutions have enhanced their

adaptability to disruptions and have increasingly embraced the utilization of distance education (Ali et al., 2021; Scull et al., 2020). In this process, both instructors and students have undergone changes in their ability to utilize and adapt to the distance learning system (Alshurafat et al., 2021). The Covid-19 pandemic has forced educators across the world to adopt distance teaching-learning systems and replace conventional face-to-face assessments with online evaluation methods (Macias et al., 2021; White, 2021). Prior to the coronavirus outbreak, distance education systems were not fully adopted in accounting and business departments at most universities, and this could have a negative impact on the education process (Alshurafat et al., 2021). Considering the current developments in the world, Covid-19 pandemic has put learning methods on an irreversible path, making distance education 'the new normal' (Ali et al., 2021). The transition to distance education caused by the global pandemic has created limitations for professional accounting bodies in terms of their efforts. The Covid-19 pandemic has caused significant disruption to in-person learning, affecting approximately 1.5 billion learners worldwide across all levels of the education system (UNESCO, 2021).

Accounting has traditionally been perceived as a challenging, repetitive, and demanding field of work. This perception has discouraged many individuals from considering accounting as a career option (Elsayed, 2022). The field of accounting is often seen as practical yet challenging, requiring meticulous work and systematic study. As a result, the shift from traditional classroom teaching to online learning requires innovative thinking and approaches (Grabinski et al., 2020). According to Reyneke et al. (2021), the transmission from traditional to online accounting education was already underway because of digital transformation, but the COVID-19 pandemic has accelerated this process. The shift to distance learning in accounting education during the pandemic has provided a valuable learning experience and has the potential to shape the future of accounting education (Haidar, 2022). The trend of changes in global accounting education highlights the increasing necessity for the adoption of online education (Tabatabaieian et al., 2021). Technology is particularly important to the accounting curriculum, and many technologies are related to this curriculum (Alshurafat et al., 2021). Technological advancements have brought about significant improvements and changes in instructional technologies, while also introducing new disciplines in education, such as distance education (Sad et al., 2014). Offering distance education courses can be advantageous for accounting programs with a large student population (Fortin et al., 2019). Miihkinen and Virtanen (2018) highlighted the limited attention given to assessment in the accounting education literature, despite its crucial role and significance in the field. Additionally, distance accounting teaching faces numerous challenges due to the practical nature of the discipline (Ali et al., 2021). Gagne and Shepherd (2001) conducted a comparative study between graduate accounting classes delivered through distance education and face-to-face instruction. Their findings revealed no significant difference in student performance between the two modes of delivery. However, students in the online course expressed lower satisfaction regarding instructor availability compared to their counterparts in the face-to-face class. There is a scarcity of research conducted on e-learning in the field of accounting education (Grabinski et al. 2020).

In general, the term distance education refers to the education that takes place when the student and the teacher are in independent environments in terms of time and space (Akdemir, 2011). The long-standing practice of distance education has resulted in the establishment of numerous distance education institutions as a consequence of significant advancements, particularly during the 1980s. As a result, a larger population has gained access to learning opportunities, various learning needs and demands have been addressed, and the utilization of modern teaching approaches has become prevalent (Akyürek, 2020). The widespread use of the internet as a result of the developments in technology over time has made the internet a popular tool as a teaching channel. Today, distance education, which is performed over the internet, is rapidly becoming widespread in higher education. Different terms are used for online distance education via the Internet. Terms commonly used to online distance education include online learning, e-learning, internet learning, networked learning, virtual learning, web-based learning and distance learning (Ally, 2011). In Europe, the terms distance education, open education, open learning, and remote learning are used interchangeably (Cabı & Ersoy, 2017). In this study, the use of the term distance education was preferred because it is the oldest and most comprehensive term.

The primary objective of the study was to analyze and explore the current trends and patterns in research concerning Distance Accounting Education (DAE). This study has contributions to literature. First, to the best

of the authors' knowledge, this is the first study that has comprehensively carried out a bibliometric analysis of DAE. Secondly, this study presents a network analysis using VOSviewer software which gives significant insights while determining themes.

2. LITERATURE REVIEW

There has been a large amount of literature on DAE from past to present. Many researchers have focused on this topic, and the most cited studies in the field of DAE were examined. Wells et al. (2008), provides data on the use of Blackboard as a learning aid to create a Virtual Learning Environment (VLE) from undergraduate accounting students in New Zealand. The findings of the research show that although students seem reluctant to join in mutual online activities, they clearly adopt VLE and support its adoption by lecturers in other courses. Arbaugh et al., (2009) have identified opportunities for future research by examining the status of online and blended learning research in various business disciplines including Accounting. Metrejean and Noland (2011) examined the perceptions of Certified Public Accountant (CPA) firm recruiters regarding the significance of an online Master of Accounting degree in the hiring decision. The results suggest that recruiters do not distinguish between candidates with an online accounting degree and those from a conventional classroom-based accounting program.

Duncan et al. (2012) conducted a study to investigate the correlation between students' achievement and their engagement in two online environments: the synchronous forum (chat room) and the asynchronous forum (discussion board). The findings demonstrated that promoting active and meaningful participation in both synchronous and asynchronous forums can significantly enhance student performance. The study conducted by Chen et al. (2013) investigated the effectiveness of online accounting education compared to classic in-class delivery, especially focusing on the influence of course level. The results of their study supported the notion that blended learning, combining online and in-class components, can be advantageous for both lower and higher-level accounting courses. Gavira and Omoteso (2013) evaluated accounting students' perceptions of the usefulness of online learning environments and examines the factors that affect their choices for online learning in comparison to face-to-face learning. Papageorgiou and Halabi (2014) investigated the factors affecting the performance of students who have completed a three-year financial accounting program through distance education. The factors influencing accounting performance have been examined in a distance education setting, revealing a significant relationship between mathematical background, academic ability, and student performance. Grossman and Johnson (2016) focused on how accounting employers perceive individuals who receive their accounting education online. The findings of research show that respondents are increasingly finding distance education more acceptable, although candidates with traditional education are preferred.

Fortin et al. (2019) carried out a comparative study that examined the achievement and pleasure of students in accounting education, comparing face-to-face and online course formats. The study found that in advanced accounting courses with comparable content and design, students performed similarly and reported an equal grade of satisfaction regardless of the lecture delivery format (face-to-face or online). Herrador-Alcaide et al. (2019) examined students' perceptions regarding their levels of satisfaction in a virtual learning environment. The findings reveal that students generally have a high perception of satisfaction. Herrador-Alcaide et al. (2020) conducted a study to survey the perceived benefit of online learning tools among university students. The findings indicated that adult students enrolled in a DAE program rated their attitude to accounting and the role of the educator in virtual learning as high. Alshurafat et al. (2021) examined the factors affecting the use of online learning systems by accounting students. Ali et al. (2021) conducted a study on online accounting learning during the COVID-19 pandemic. The paper emphasizes the importance of employing effective techniques and strategies to enhance student engagement in the online accounting learning environment.

3. METHOD

In this study, bibliometric analysis method was used. Bibliometrics is a set of methods that trace to the related discipline, field, topic, organizations, countries, authors, collaboration between authors are used in the quantitative analysis of scientific publications such as journals, books, proceeding papers, articles (Ukşul, 2016). While mapping based on bibliographic data, co-occurrence of keywords and co-authorship analyzes were used. Co-occurrence analysis of keywords is used to investigate the comprehensive relationship between the keywords that authors include in their publications, and to determine the leading topics and relationships

between these topics (Ulukök, 2022). Co-authorship analysis is a valuable method used to examine collaboration patterns among authors, organizations, and countries in scientific research. It helps in understanding and assessing the extent of scientific collaboration (Fonseca et al., 2016).

The study is based on the Web of Science (WoS) database. The researchers focused on articles that contained the keywords 'Accounting' or 'Accounting Education' in the title and explored topics related to 'Distance Education', 'Distance Learning', 'Online Learning', 'Open Education', 'Online Education', 'Digital Education', 'Digital Learning' or 'Remote Education'. A total of 464 publications relevant to the topic of DAE were identified. Data obtained under the WoS categories of 'Education Educational Research', 'Business Finance', 'Education Scientific Disciplines', 'Management', 'Economics', 'Business' and 'Public Administration' were included in the research. As the research was conducted in May 2025, papers published in 2025 were excluded from the research. The research sample includes 314 papers published as of the end of 2024.

VOSviewer was used as the data analysis tool in the study. VOSviewer provides tools to visualize the co-occurrence of keywords and network visualization to show the level of relationship between different measurement parameters (Umar et al., 2020). The software has the ability to analyze and visualize data from many sources such as WoS, Scopus, Google Scholar and Microsoft Academic (Moral-Munoz et al., 2020). Various analyzes such as co-authorship, bibliographic matching, co-citation networks, analysis of collaboration between publications and journals' citation relationships can be performed with the Vosviewer software.

4. RESULTS

The following are the findings obtained from the analysis conducted in this study: [Research Trends by Years – Countries and Institutions Contributing to DAE Research – Distribution of DAE Research by Document Type, Index, and Research Areas – Co-occurrence of Keywords in DAE Research – Co-authorship Situations in DAE Research by Countries and Institutions – Most Cited Study in DAE Research]. In terms of research trends by year, the number of publications and citations of the studies included in the research is shown in Figure 1.

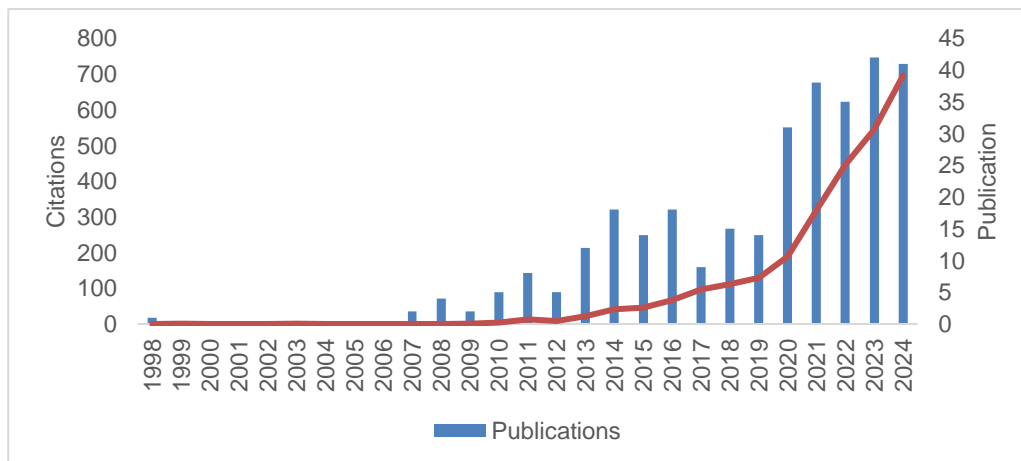


Figure 1. Publications and Citations Trends by Years

The oldest study in the field of DAE in the sources indexed in the WoS database is dated 1998. Since 2020, there has been an evident increase in the number of studies focusing on DAE. Alongside the rise in publications, there has been a continuous increase in citations over the past five years. The impact of the Covid-19 pandemic on accounting education has been a significant area of interest for researchers, contributing to the surge in publications and citations. Notably, publications in the last five years account for about 60 percent of the total, while citations in the same period constitute 80 percent of the total. Regarding the countries and institutions contributing to the DAE research, a total of 64 countries were identified. Table 1 displays only those with at least four studies. It is observed that the majority of DAE-related research.

Table 1. Distribution of DAE Studies by Country

<i>Countries</i>	<i>Publications Numbers</i>	<i>% of 314</i>
USA	41	13.057
Australia	38	12.102
South Africa	31	9.873
Spain	22	7.006
Brazil	19	6.051
New Zealand	19	6.051
England	16	5.096
Canada	14	4.459
Indonesia	14	4.459
China	10	3.185
Malaysia	9	2.866
Romania	8	2.548
Scotland	8	2.548
Germany	7	2.229
Portugal	7	2.229
Italy	5	1.592
Singapore	5	1.592
Sweden	5	1.592
Egypt	4	1.274
Ireland	4	1.274
Jordan	4	1.274
Mexico	4	1.274
Saudi Arabia	4	1.274

Table 2 presents the universities that contributed to the DAE research at least four studies. The most studies were conducted by the University of South Africa (9), followed by the Royal Melbourne Institute of Technology (7) from Australia and the Stellenbosch University (6) from South Africa.

Table 2. Distribution of DAE Research by Institutions

<i>Institutions</i>	<i>Publications Numbers</i>	<i>% of 314</i>
University of South Africa	9	2.866
Royal Melbourne Institute of Technology (RMIT)	7	2.229
Stellenbosch University	7	2.229
Deakin University	6	1.911
Auckland University of Technology	5	1.592
Bucharest University of Economic Studies	5	1.592
State University System of Florida	5	1.592
University of Johannesburg	5	1.592
Federation University Australia	4	1.274
Singapore Management University	4	1.274
Universidade De Sao Paulo	4	1.274
Universitas Negeri Semarang	4	1.274
University Of Pretoria	4	1.274
University Of Valencia	4	1.274
University Of Witwatersrand	4	1.274

With respect to the distribution of DAE research by document type, index, and research areas, Figure 2 shows that 82.8 percent (260) of the studies are articles, 14.97 percent (47) are proceeding papers, 3.19 percent (10) are book chapters, 2.87 percent (9) are review articles, and 1.91 percent (6) are early access publications.

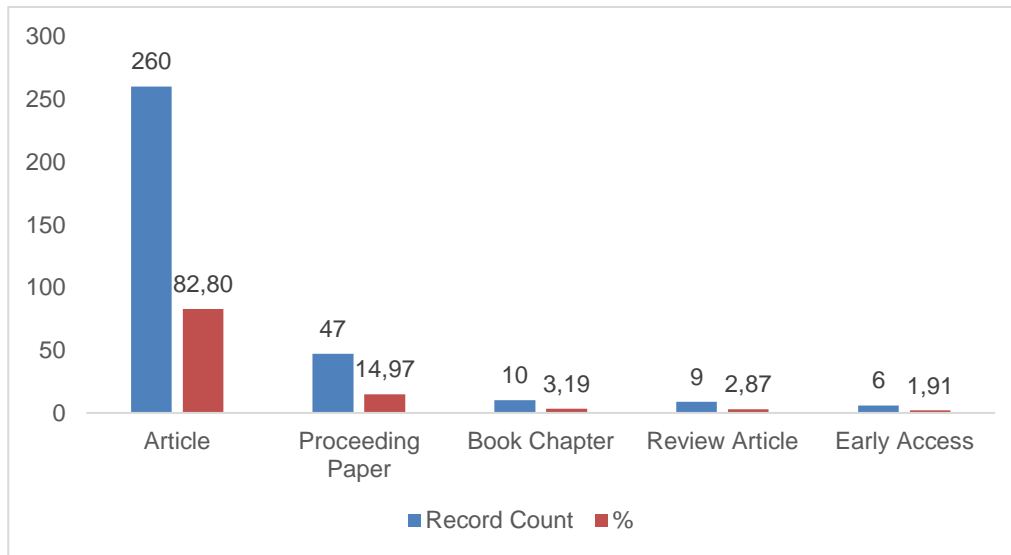


Figure 2. Distribution of Publications by Document Type

Figure 3 presents distribution of DAE research by indexes in WoS. As shown in Figure 3, 67.2 percent (211) of the published studies are indexed in the Emerging Sources Citation Index (ESCI), 14.65 percent (46) are indexed in the Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH), and 14.01 percent (44) in the Social Sciences Citation Index (SSCI).

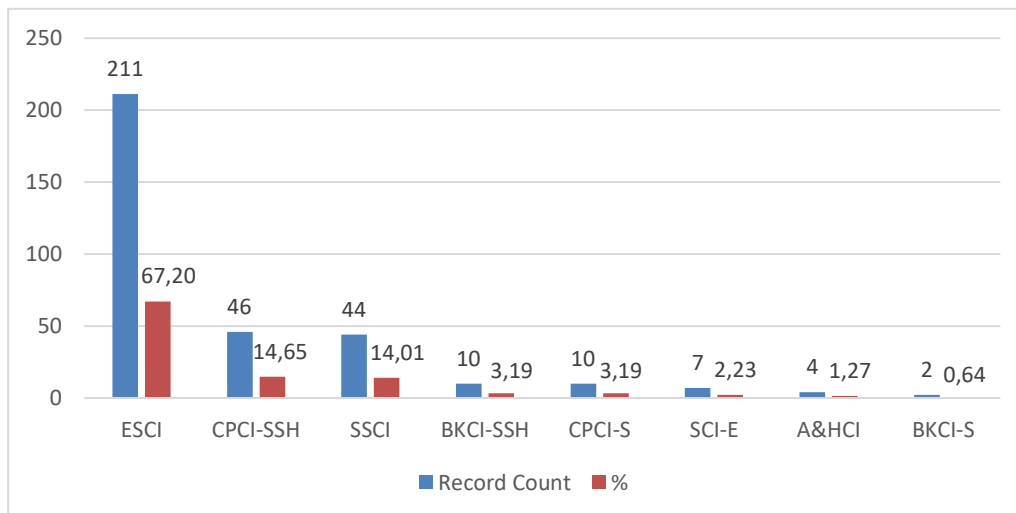


Figure 3. Distribution of Publications by Index

Figure 4 displays the research areas covered in the studies analyzed within the context of this examination. When the research areas of DAE studies are investigated, it is observed that most research are studied in the fields of Business Educational Research (146), Business Finance (126) and Management (36).

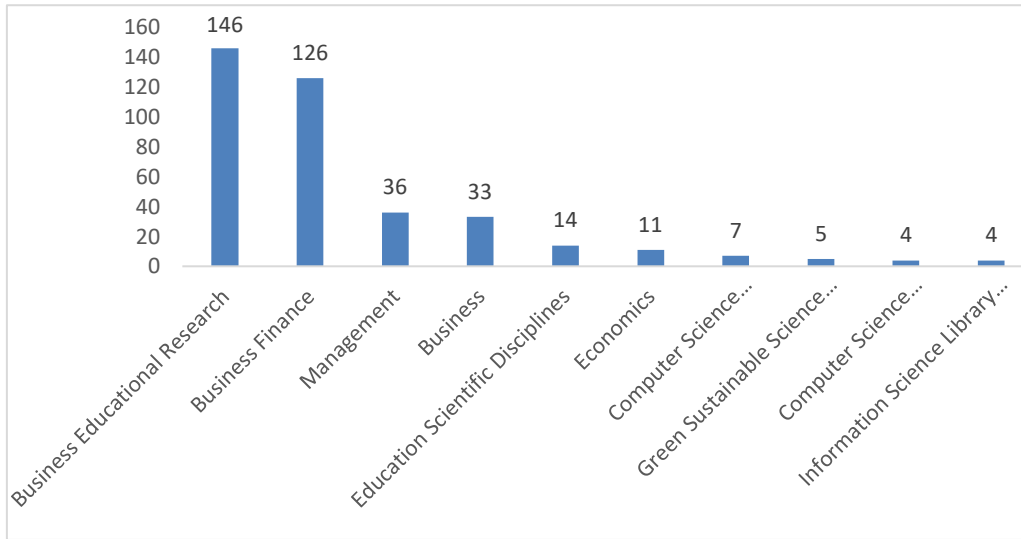


Figure 4. Publications Numbers by Research Areas

In terms of the sources and authors contributing to DAE research, Table 3 presents the most frequently utilized sources. The highest number of studies (44) appeared in Accounting Education, followed by Issues in Accounting Education (11), and Accounting Research Journals, Journal of Accounting for Business, Pacific Accounting Review, and South African Journal of Higher Education, each with 7 studies. Journals and conferences with fewer than four studies were excluded from Table 3.

Table 3. Distribution of DAE Studies by Sources

<i>Journals/Conferences</i>	<i>Publications Numbers</i>	<i>% of 314</i>
Accounting Education	44	14.013
Issues in Accounting Education	11	3.503
Accounting Research Journal	7	2.229
Journal of Accounting for Business	7	2.229
Pacific Accounting Review	7	2.229
South African Journal of Higher Education	7	2.229
Education and Information Technologies	5	1.592
Int. Conf. of Education, Research, and Innovation (ICERI) Proceedings	5	1.592
Meditari Accountancy Research	5	1.592
Int. Conf. on Educ. and New Learning Technologies (EDULEARN)	4	1.274
International Journal of Management Education	4	1.274
Journal of Emerging Technologies in Accounting	4	1.274
Journal of Financial Reporting and Accounting	4	1.274
Procedia Social and Behavioral Sciences	4	1.274

Table 4 presents the authors that most contributed to the DAE research. As seen in Table 4, the authors who made the most studies are Halabi, A.K., and Moya, S., each with 4. Authors with less than 3 academic studies were not presented in Table 4.

Table 4. Distribution of DAE Studies by Authors

<i>Authors</i>	<i>Publications Numbers</i>	<i>% of 314</i>
Halabi, A.K.	4	1.274
Moya, S.	4	1.274
Ali, I.	3	0.955
Callimaci, A.	3	0.955
Carenys, J	3	0.955
Fortin, A.	3	0.955

Lubbe, I	3	0.955
Seow, P.S.	3	0.955
Steenkamp, G.	3	0.955
Van Rooyen	3	0.955
Weil, S.	3	0.955

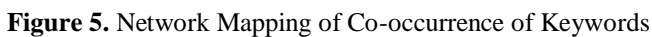
As for the co-occurrence analysis of keywords in DAE research, the analysis was conducted with a minimum occurrence threshold of 3, resulting in 69 relevant keywords out of a total of 1143. Among these, 67 keywords formed a highly interconnected cluster. Keywords with a total link strength of 10 or higher are listed in Table 5.

Table 5. The Most Used Frequent and Strongest Keywords and Their Total Link Strength

<i>Keywords</i>	<i>Occurrences</i>	<i>Total Link strength (TLS)</i>
accounting education	85	124
accounting	41	53
higher education	20	47
covid-19	23	38
online learning	20	36
blended learning	17	32
e-learning	12	31
artificial intelligence	9	18
student engagement	8	16
technology acceptance	3	15
digitalization	6	14
student perceptions	5	14
distance education	8	13
Pandemic	6	12
distance learning	4	12
online education	11	11
active learning	6	11
accounting profession	7	10
remote teaching	5	10

According to Table 5, the keyword ‘accounting education’ is identified as both the most frequently used and strongest keyword in DAE research. The second highest link strength is associated with the keyword ‘accounting’, followed by ‘higher education’ as the third highest link strength keyword. Additionally, ‘covid-19’, ‘online learning’, ‘blended learning’ and ‘e-learning’ are also among the keywords with high link strength.

The co-occurrence analysis of keywords yielded a total of 67 keywords, which were grouped into 7 clusters. These keywords were found to be connected by a total of 283 links, with cumulative link strength of 420. This analysis provides valuable insights into the relationships and associations between keywords, indicating common themes or topics within the domain of study. The resulting network visualization has been shown in Figure 5.



Cluster 3 (Dark Blue – 11 Items), which addresses online learning, features ‘online learning’ as the most frequently used keyword with 20 occurrences and a link strength of 35. It is followed by ‘student engagement’, with 8 occurrences and a link strength of 16. Other important keywords in this cluster are ‘action research’, ‘assessment’, ‘engagement’, ‘motivation’, ‘self-assessment’, ‘self-efficacy’ and ‘online’. The studies in which the keywords in this cluster are included consist of studies on student engagement in online learning of accounting. The sample studies in which the keywords in this cluster are Ali et al. (2021), Paulsen and McCormick (2020), Malan (2020). Cluster 4 (Yellow – 9 Items), which pertains to higher education and e-learning, is led by ‘higher education’ with a link strength of 45, followed by ‘e-learning’ (29) and ‘digitalization’ (14). Other important keywords in this cluster include ‘accounting profession’, ‘information technology’, ‘learning outcomes’, and ‘teaching methods’. Some of the sample studies in which the keywords in this cluster are Van Royeen (2015), Fernandes et al. (2022), Cunha et al. (2022), Grabinski et al., 2020, Kashora et al., 2016, Wong et al., 2019, Isa et al., (2023). Cluster 5 (Purple – 9 Items), which emphasizes remote teaching, includes ‘remote learning’ with the highest occurrence (5) and a link strength of 9, followed by ‘technology’. Other key terms are ‘digital transformation’, ‘curricula’, ‘education’, and ‘generic skills’. The studies in this keyword cluster focus on the integration of emerging technologies as a result of digital transformation into accounting curricula (Qasim et al., 2022; Almeida and Carvalho, 2022; Tuononen et al. 2022). Cluster 6 (Blue – 5 Items), which centers on accounting education, highlights ‘accounting education’ as the most significant keyword in the entire network, with 85 occurrences and a link strength of 124. It is followed by ‘active learning’ (16), along with ‘academic performance’, ‘competencies’, and ‘serious games’. The sample studies in which the keywords in this cluster are

Carvalho and Neto (2022), Hernández (2022), Jordan and Samuel (2020). Cluster 7 (Orange – 5 Items), which is related to student technology acceptance, identifies ‘technology acceptance’ as the leading keyword with a link strength of 15, followed by ‘students’ (13). Other important keywords in this cluster are ‘teaching’, ‘financial accounting’ and ‘case-based learning’. Some of the sample studies in which the keywords in this cluster are Vysotskaya and Prokofieva (2024), Van Den Berg and Rothmann (2024), Maldonado et al. (2023).

With regard to the co-authorship analysis of DAE research, the analysis was conducted based on countries and institutions. The analysis of co-authorship among countries involved determining a threshold of at least 1 document for each country. The strength of co-authorship links among the 65 countries that met this threshold was calculated. Since some countries in the network were not connected to each other, the set of connected countries consisted of 39 countries. Table 6 presents the countries with the strongest co-authorship links, excluding those with a total link strength below 5. The results indicate that Australia has the highest total link strength in DAE co-authorship relations, followed by England and New Zealand.

Table 6. Countries with the Highest Total Link Strength by the Results of Co-authorship Analysis

<i>Countries</i>	<i>Documents</i>	<i>Citation</i>	<i>TLS</i>
Australia	38	665	16
England	16	211	12
New Zealand	19	217	11
Iran	3	3	8
Malaysia	9	48	7
Canada	14	132	6
Germany	6	46	6
Saudi Arabia	4	76	6
USA	41	499	6
Iraq	2	3	6
Egypt	4	37	5
Singapore	5	56	5
Uzbekistan	1	0	5
Vietnam	2	0	5

As a result of the co-authorship analysis of countries, 5 clusters and 65 links with total connection strength of 77 were attained. The resulting network visualization has been shown in Figure 6.

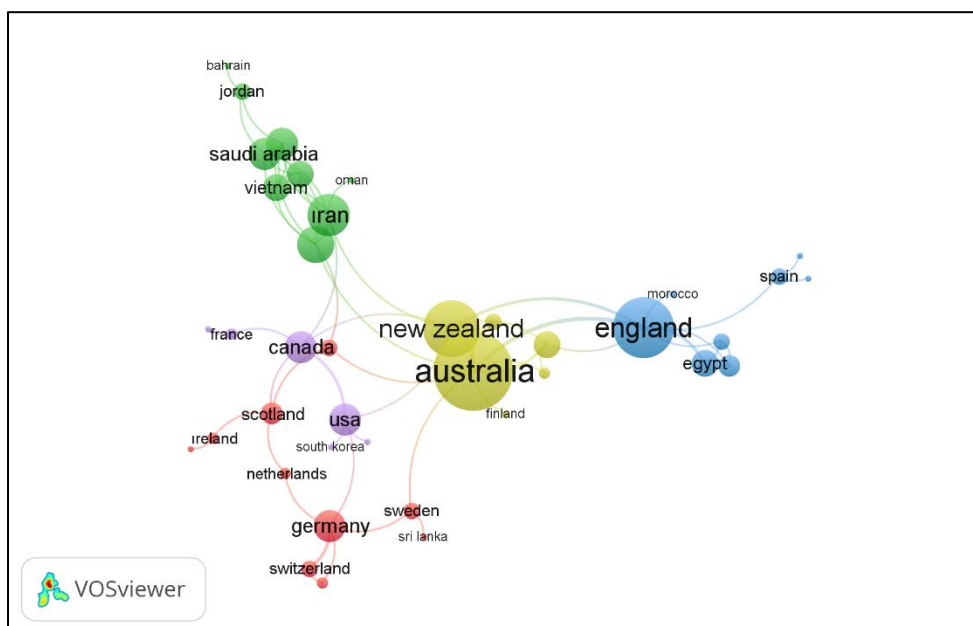


Figure 6. Network Mapping of Co-authorship Relations of Countries

As seen in the network map in Figure 6, Australia is the country with the strongest co-authorship relations, with 9 links and 16 total link strengths. Countries with co-authorship links with Australia are New Zealand, Singapore, South Africa, England, Sweden, Indonesia and Malaysia. Italy, Sri Lanka, Brazil, Finland, South Korea, Colombia and Türkiye are the countries with the weakest co-authorship links in the network. As these countries have a co-authorship link with only one country, their total link strength is weak.

When analyzing the co-authorship of institutions, a minimum threshold of 1 document and citation was set for each institution. Out of the 408 organizations included in the analysis, 336 met these thresholds. The total strength of co-authorship links with other organizations was calculated for each of the 336 organizations. Not all organizations in the network were connected to each other, resulting in the largest set of connected organizations consisting of 18 institutions. Table 7 presents the organizations with the strongest co-authorship links, excluding those with a total link strength below 4.

Table 7. Institutions with the Highest Total Link Strength by the Results of Co-authorship Analysis

<i>Institutions</i>	<i>Documents</i>	<i>Citation</i>	<i>TLS</i>
RMIT University (Australia)	7	133	15
The University of the Witwatersrand (South Africa)	4	28	10
Monash University (Australia)	3	59	8
University of Aveiro (Portugal)	2	9	7
University of Cape Town (South Africa)	3	12	7
Universiti Sains Malaysia (Malaysia)	2	31	7
Universiti Teknologi MARA (Malaysia)	2	16	7
North-West University (South Africa)	2	10	6
University of Fort Hare (South Africa)	2	10	6
Universitas Negeri Semarang (Indonesia)	4	39	6
York University (Canada)	1	5	6

As seen in Table 7, the institution with the strongest co-authorship link is RMIT University from Australia, with 7 documents, 133 citations, and 15 total link strengths. The second institution with the strongest link is University of the Witwatersrand from South Africa. The third institution with the highest link strength is Monash University from Australia, followed by University of Aveiro from Portugal. Previously, it was reported in Table 6 that Australia was the country with the strongest co-authorship link. In this table, it is seen that 2 institutions from Australia are among the institutions with the strongest co-authorship link.

As a result of the co-authorship analysis of organizations, 5 clusters and 36 links with total connection strength of 38 were attained. Network visual of connected organizations is shown in Figure 7. Clusters consist of institutions that have the most connections among themselves. There are 8 institutions in the first cluster in red. Among these institutions, RMIT University has the strongest co-authorship link of both this cluster and the network, with 13 links and 14 total link strengths. There are 5 institutions in the second cluster in green. Among these institutions, Auckland University of Technology from New Zealand has the strongest co-authorship link of this cluster, with 4 links and 4 total link strengths. The second institution with strong co-authorship links in the green cluster is Singapore Management University, with 3 links and 3 total link strengths.

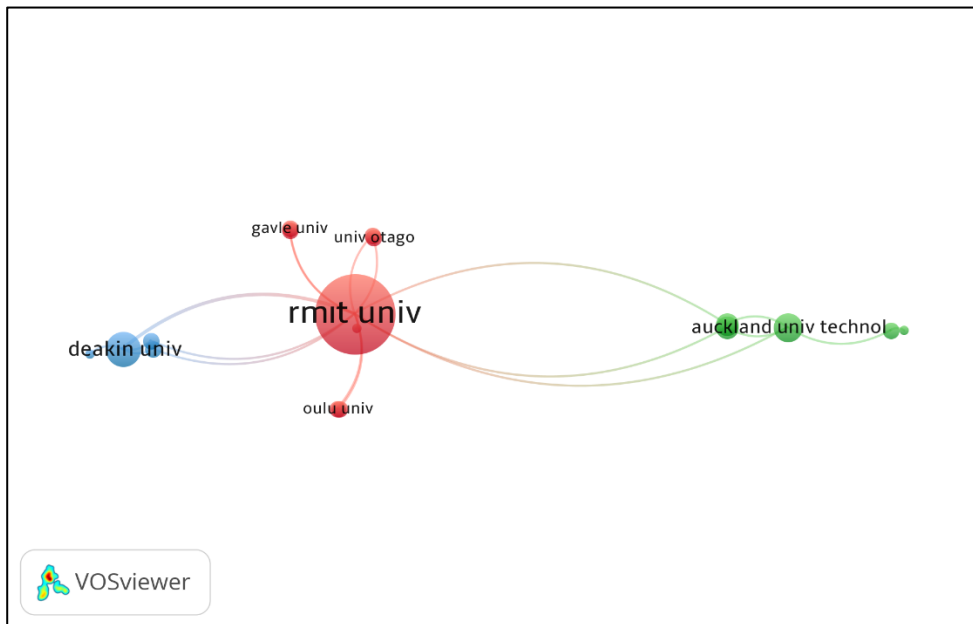


Figure 7. Network Map Visual of Co-authorship of Institutions

There are 4 institutions from Australia in the blue cluster. Among these institutions, Deakin University has the strongest co-authorship link of this cluster, with 4 links and 5 total link strengths. In addition, Deakin University is the institution with the strongest co-authorship link in the network after RMIT University.

As for the citation analysis of DAE research, a threshold of five citations per document was set. Out of 314 documents analyzed, 153 met this criterion. The largest connected set among these consisted of 77 documents. Table 8 presents the documents with the highest citation links. Documents with fewer than 30 citations, as well as those with high citation counts but without any citation links, are not included. As shown, the most cited document is Sangster et al. (2020) with 160 citations, followed by Damerji and Salimi (2021) with 89 citations.

Table 8. Documents with the Highest Link and Citations by the Results of Citation Analysis

<i>Documents</i>	<i>Citation</i>	<i>Links</i>
Sangster et al., (2020)	160	12
Damerji & Salimi (2021)	89	1
Al-Htaybat et al. (2018)	67	4
Tsiligiris and Bowyer (2021)	66	5
Duncan et al. (2012)	59	5
Alshurafat et al. (2021)	58	7
Carenys & Moya (2016)	52	3
Marshall & Lambert (2018)	51	1
Ali et al. (2021)	45	4
Fogarty, T.J. (2020)	42	6
Chen et al. (2013)	38	8
Christensen et al. (2019)	35	1
Botes et al. (2014)	35	1
Malan (2020)	33	2
Lento (2016)	32	2
Sargent et al. (2011)	31	3
Kotb et al. (2019)	31	5

As a result of the citation analysis of documents, 5 clusters and 114 links were obtained. The network image of the citation linked documents is shown in Figure 8. In the network image, the name of first authors of

[illegible]

There are 21 documents in the first cluster in red. Al-Haybat et al. (2018), which is the most cited document of this cluster with 67 citations, has 4 citation links. The second document with the highest number of citations in the red cluster is Carenys and Moya (2016) with 52 citations. This is followed by Springer Sargent et al. (2018) with 31 citations. There are 20 documents in the second cluster in green. Duncan et al. (2012) is the most cited study among studies within the green cluster with 5 links 59 citations. The second document with the highest number of citations in the green cluster is Lento (2016) with 2 links and 32 citations. There are 14 documents in the blue cluster. Ali et al (2021) are the most cited study in the blue cluster, with 4 links and 45 citation numbers. The second document with the highest number of citations in the blue cluster is Chen et al. (2013) with 38 citations. There are 11 documents in the yellow cluster. The document with the highest number of citations in the yellow cluster is Damerji and Salimi (2021) with 89 citations. It is followed by Tsiligiris and Bowyer (2021) with 66 citations. There are 11 documents in the purple cluster as well. The document with the highest number of citations in the purple cluster is Sangster et al. (2020) with 12 links and 160 citations. As can be seen in the network visual, this study has the highest citation link.

This article utilizes a bibliometric approach to identify trends in DAE research. In the study, 314 papers in the WoS database were analyzed. The research findings indicate that the global spread of the Covid-19 pandemic has led to an increased number of academic studies in the field of distance education. This is a result of the transition to distance education in many countries as a response to the pandemic. Publications in the last five years constitute 60 percent of the total number of publications. A notable observation is that with the increase in the number of publications in the field of distance education, there has been a concurrent rise in the number of citations. Specifically, citations from the last five years account for 80 percent of the total citations.

When the co-occurrence status of the keywords is examined, the keywords 'accounting education', 'accounting', 'higher education', 'covid-19', 'online learning', 'blended learning' and 'e-learning' are the most frequently used words along with other keywords. The frequency of keyword usage in the articles indicates that

various themes are covered in the discussions. These themes include the impact of online education and virtual learning environments on the academic performance of accounting students, the influence of innovative distance education techniques on students' self-efficacy, and the role of distance education during the Covid-19 era.

The countries with the strongest co-authorship relationship in DAE themed studies are Australia, England, and New Zealand. When the co-authorship relationship is evaluated in terms of institutions, RMIT University and Monash University from Australia and Witwatersrand University from South Africa are the institutions that have the strongest co-authorship connection. Australia stands out as the country that the most contributes to DAE research. Sangster et al. (2020) is the most cited study among DAE studies.

Despite the remarkable information that this study provided about DAE research, it has some limitations. Firstly, it focused solely on bibliometric mapping, analyzing the co-occurrence of keywords and co-authorship. Additionally, it relied exclusively on the WoS database, which may have resulted in different findings if studies from other databases on the topic of distance education in accounting research were included. Nevertheless, this study offers directions for future research. Future research endeavors could consider revisiting the theme of DAE by leveraging data from diverse databases and employing varied analysis methods. Such an approach would contribute to a deeper and more comprehensive understanding of the field, allowing for further advancements in knowledge and insights.

Ethics Committee Declaration

Ethics committee declaration is not required for the study.

Author Contributions

The manuscript was written by Mustafa Kılılı and İlker Keefe.

Conflict of Interest

The authors declare no conflict of interest.

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