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# E-commerce Teaching Trends in Higher Education: A Meta-synthesis (1999-2023)

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**Abstract: E-commerce Reaching Trends in Higher Education: A Meta-synthesis (1999-2023).** The purpose of this study was to review the development of the scientific literature on teaching e-commerce in higher education. The method used was a meta-synthesis of the Scopus database and resulted in 123 relevant articles. The main results of this study are: (1) the scientific literature on teaching e-commerce in higher education began to emerge in 1999; (2) the authors, journals, citations, and countries involved in research in this area are still very few; (3) research collaborations have not been formed significantly; and (4) the common themes of research articles on teaching e-commerce in higher education. The results of this study will be useful for readers to find out the model of writing about e-commerce teaching in higher education, identify potential collaborations with authors and institutions in different countries, and develop new topics on e-commerce in business education and entrepreneurship.

**Keywords:** e-commerce, e-commerce education, business education, entrepreneurship education, bibliometrics.

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## INTRODUCTION

Since the early 2000s, online commerce has gradually dominated and shaped the global marketplace. This has prompted several researchers to study the phenomenon from various perspectives, ranging from consumer habits and privacy risks to related technological innovations (Ballerini, Yahiaoui, Giovando, & Ferraris, 2023). The development of technology has made people's lives faster and more convenient. Nowadays, people no longer need to go to the store to shop. Using a smartphone and an Internet connection, they can buy the items they want (Chong & Ali, 2022). Recent studies in the international startup sector show that e-commerce adoption will continue to grow (Tolstoy, Nordman, Hånell, & Özbek, 2021).

Despite the rapid development of e-commerce, according to (Y. Wang & Tang, 2020) Entrepreneurship education is becoming increasingly important to governments, communities, and universities as e-commerce grows and the need for vocational training increases. Innovation and entrepreneurship education plays an important role in economic development, regional economy, and social development. The country should encourage educational institutions to train students in the use and operation of the Internet and e-commerce and pay special attention to the specialized training of qualified future e-commerce managers (Akimov, Karpa, Parkhomenko-Kutsevil, Kupriichuk, & Omarov, 2021).

Numerous stakeholders have made various efforts to promote and transform the e-commerce sector, recognizing its pivotal role in modern commerce. With the global e-commerce volume reaching $29 trillion in 2017, this figure is

expected to increase with the widespread adoption of the Internet and information and communication technology (ICT) (HAJI, 2021). Ongoing assessments of e-commerce practices in commerce continue among researchers and businesses, as evidenced by studies by (Fan et al., 2022), (Gajewska, Zimon, Kaczor, & Madzík, 2019), (Panova et al., 2019), (Romano Alho et al., 2021), and (C.-N. Wang, Dang, & Nguyen, 2021). Similarly, the integration of e-commerce into education is an evolving area of focus, as highlighted by the work of (Al-Hattami, 2021), (B. Li, 2023), and (S. Wang & Wang, 2021). It is important to link e-commerce with education and teaching, noting that the rapid development of e-commerce and the rise of online education have prompted educational institutions and enterprises to pay more attention to the quality and effectiveness of e-commerce education (Luo, Tang, Wang, & Zhang, 2023).

The main objective of this bibliometric analysis is to provide a map of e-commerce pedagogy research in higher education by identifying: (1) publication trends; (2) main authors, institutions, and countries/regions; (3) research collaboration networks between countries; (4) disciplines of e-commerce pedagogy; (5) keywords that are the subject of e-commerce pedagogy research. The discussion is presented in the form of tables and figures to help readers better understand the information presented. These results will be useful for readers in identifying models for writing about e-commerce education, identifying potential collaborations with authors and institutions in different countries, and developing the focus of e-commerce education research. Develop new research on e-commerce instruction within existing research areas or expand existing research foci into new research areas.

**Overview of e-commerce education**

The first literature review on teaching e-commerce appeared in 1999. It discusses a semester-long e-commerce course taught in the spring of 1998 at George Washington University in Washington, D.C. The course focused on a Web-based market system that allowed students to buy and sell goods and services electronically while building an infrastructure similar to the real thing. Classes included technical performance, marketing, and accounting. For example, students from a variety of majors discuss a variety of e-commerce topics, including network infrastructure, economics, retailing, Internet marketing and advertising, security and privacy, payment systems, the social impact of cryptocurrencies, legal implications, public policy, and online publishing (Dhamija, Heller, & Hoffman, 1999). In addition, in 2000-2001, research on teaching e-commerce expanded to include technology application issues and curriculum development (Angelaccio & Buttarazzi, 2016; Ge & Sun, 2000; Krovi & Vijayaraman, 2000; Maj, Veal, & Charlesworth, 2000; Mitchell & Strauss, 2001; Sadagopan, 2000; Tripathi, 2000).

Typically, instructional approaches that use experiential learning to teach e-commerce in business are often created within an application. The structure of the instructional activities follows the broader framework of problem-based learning or project-based learning. This includes introducing students to a specific problem, project, or case; facilitating collaborative learning; guiding independent or group inquiry; supporting the development and presentation of work; and reviewing and assessing the learning process. Some literature emphasizes a collaborative strategy in e-business education, in which university faculty and administrators actively engage in dialogue with businesses. They invite companies to participate in classes by sharing real-world technical challenges related to the implementation of e-commerce in their organizations. These challenges are then transformed into authentic case studies that students addres through interdisciplinary research.

Articles that focus on both theory and the use of learning media in the application of e-commerce instructional models (Alzahrani, Adnan, Aljohani, Alarood, & Uddin, 2022; Harfoushi, 2017; Hu, 2023; Huang, 2019; R. Li & Meng, 2023; Ngo-Ye, Choi, & Gittens, 2019; Xu, Chen, Zou, & Li, 2017; W. Zhao, Qiu, & Sun, 2011). The development of e-commerce teaching research in higher education is increasingly focused, especially on articles (Busby & Huang, 2012; Hasan et al., 2020; Lee, Chong, & Ramayah, 2017; Michaelson, 2005; Zeng, Zheng, Tian, & Jebbouri, 2022). Despite its specificity, e-commerce teaching research continues to develop in the direction of technological development. The development of teaching models is increasingly diverse, especially including problem-based learning, project-based learning, and collaborative learning with industry, and even articles with gamification learning models on e-commerce teaching (Isabelle, 2020) discuss the focus on entrepreneurship courses with gamification using a standalone gaming platform integrated with Shopify, a global e-commerce platform for online stores. Students experience the entire entrepreneurial process in a hands-on way, from ideation to launching and growing a real business. In addition, leaderboards instantly track team performance and add a competitive element to experiential learning.

## METHOD

### Research Design

This research used a meta-synthesis approach. This approach attempts to interpret the results of many interrelated studies (Sattar, Lawton, Panagioti, & Johnson, 2021). The literature in this research on e-commerce education in higher education uses metadata extracted from Scopus. Scopus and Web of Science (WoS) are two major bibliographic databases that are widely recognized as the most comprehensive data sources for a variety of purposes (Pranckutë, 2021). Scopus was chosen as the data source because it has several advantages that may make it more reliable than Web of Science (Kamath & Pawar, 2022).

### Search Strategy

The record search was conducted in the Scopus.com database in the second week of September 2023. Four keywords were entered into the database to search for representative documents for the investigation: "e-commerce" AND "student" OR "teacher" OR "school". The searches kept the keywords as specific as possible to ensure that the results focused on research and reviews on teaching e-commerce in higher education.

### Inclusion and Exclusion Criteria

The initial search yielded 1,482 documents from 1999 to 2023. Documents were then selected based on article document type and English language to make the selected publications more specific, resulting in 604 articles. The documents were then selected more carefully by manually reading the titles and abstracts one by one, resulting in 123 documents that specifically discussed teaching e-commerce. A limitation of the data collection process in this study is that the keyword search was performed only in the Scopus database. Therefore, relevant literature published outside the Scopus database may not be included in this study. However, the authors believe that with the search method applied in this study, there are valuable implications for developing the way scholars study e-commerce teaching and believe that this study will contribute a valuable research map for and guide future research.

### Data Analysis

In this study, frequency distributions were used to determine directional trends in publications and citations of e-commerce

instruction in higher education. Publication frequency and citation rankings were used to identify the leading authors, institutions, and countries, as well as the most commonly used keywords in the field. This study used VOSViewer software version 1.6.19 to explore and visualize the relationships between authors, institutions, countries, journals, and terms in the database. VOSViewer is a freely available software (www.vosviewer.com) for network data-based construction and visualization of bibliometric maps. In this software, nodes represent authors, institutions, journal countries, and keywords. VOSViewer has three main panels for presenting research visualizations: network visualization, overlay visualization, and density visualization (van Eck & Waltman, 2021). This research mainly uses network visualization to show the clusters of each data and overlay to identify the year of publication. These two visualizations were used to conduct co-authorship analysis to determine the main authors, institutions, and countries of the published articles on e-commerce teaching; co-citation analysis for the published articles; co-citation analysis to examine which disciplines were researched; and co-occurrence analysis to cluster the keywords of the publications in the dataset to reveal common themes of e-commerce teaching in the research of higher education institutions.

## ■ RESULT AND DISCUSSION

### Trends in E-Commere Teaching Publications

This dataset contains 123 documents and has been cited 855 times in 24 years. The first article discussing the teaching of e-commerce was published in 1999 by (Dhamija et al., 1999) with the title "Teaching E-commerce: Toward a Multidisciplinary Class" published in the Association for Computing Machinery (ACM) journal. After this first article, publications on teaching e-commerce experienced ups and downs. Then, starting from 2010, the number of publications on teaching e-commerce gradually increased, although there were several years of decline, and continued to increase, although not significantly, in 2022 and 2023, with the highest number of articles published at 11 articles per year. It is expected that this number will continue to increase in the following years, exceeding the total number of publications in 2022, as many authors are now focusing on this topic. The number of publications on teaching e-commerce is shown in Figure 1.

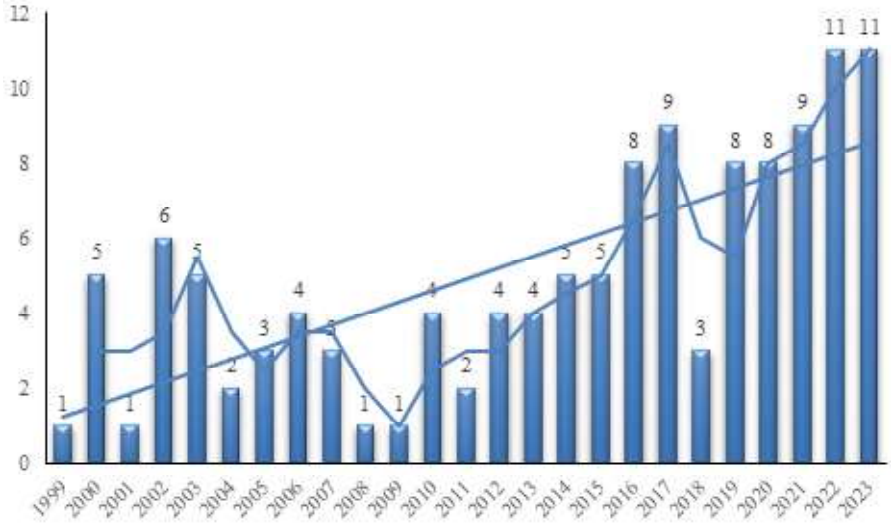


**Figure 1**. Number of publications on e-commerce teaching (1999-2023)

**Journals, citations, and authors in e-commerce education**

Table 1 shows the journals with the largest collection of documents, including journals that have published a significant number of articles. According to the dataset, the United Kingdom-based journal Emerald Emerging Markets Case Studies leads with the highest number of published articles on teaching e-commerce, with a total of 5 documents. Close behind are Bulletin Tecnico/Technical, Bulletin Communications of the ACM, and International Journal of Emerging Technologies in Learning, each with 3 documents. However, several other sources have a limited number of publications on the topic.

**Table 1.** Top journals on e-commerce teaching

| Journal | Number of Document |
|---|---|
| Emerald Emerging Markets Case Studies | 5 |
| Boletin Tecnico/Technical Bulletin | 3 |
| Communications of the ACM | 3 |
| International Journal of Emerging Technologies in Learning | 3 |
| British Journal of Educational Technology | 2 |
| Computers and Education | 2 |
| Decision Sciences Journal of Innovative Education | 2 |
| Education for Information | 2 |
| Eurasia Journal of Mathematics, Science and Technology Education | 2 |
| ICIC Express Letters, Part B: Applications | 2 |
| International Journal of Innovation and Learning | 2 |
| International Journal of Online Engineering | 2 |
| International Journal of Scientific and Technology Research | 2 |
| Issues in Information Systems | 2 |
| Journal of Information Systems Education | 2 |
| Journal of Internet Commerce | 2 |
| Journal of Marketing Education | 2 |
| Studies in Computational Intelligence | 2 |
| World Transactions on Engineering and Technology Education | 2 |

Although Emerald Emerging Markets Case Studies has more documents than other journals, in terms of citations, computer journals are more popular than Emerald Emerging Markets Case Studies (see Table 2). The 123 articles and 284 authors in this dataset were published in 98 journals in 36 countries around the world. Table 1 shows the most influential authors in e-commerce education with the highest number of citations. The article from (Elbadrawy et al., 2016) is the most influential in this field with the most citations, namely 117 citations, and published in the journal "Computer". In second place is the article by (Hasan et al., 2020) with 76 citations and published in the journal "Applied Sciences (Switzerland)". The following is the top ranking of articles on e-commerce education on author, journal, and highest number of citations.

**Table 2**. Top authors, journals and citations on teaching e-commerce

| No | Authors | Journal | Year | Citations |
|---|---|---|---|---|
| 1 | Asmaa Elbadrawy; Agoritsa Polyzou; Zhiyun Ren; Mackenzie Sweeney; George Karypis; Huzefa Rangwala | Computer | 2016 | 117 |
| 2 | Raza Hasan; Sellappan Palaniappan; Salman Mahmood; Ali Abbas; Kamal Uddin Sarker; Mian Usman Sattar. | Applied Sciences (Switzerland) | 2020 | 76 |
| 3 | Robert A. Ellis; Rafael Calvo; David Levy; Kelvin Tan | Higher Education Research and Development | 2004 | 56 |
| 4 | Robert A. Ellis; Rafael Calvo. | British Journal of Educational Technology | 2006 | 46 |
| 5 | Cameron Guthrie. | Journal of Entrepreneurship Education | 2014 | 32 |
| 6 | Diane A. Isabelle. | Decision Sciences Journal of Innovative Education | 2020 | 32 |
| 7 | Yi-Shun Wang; Shin-jeng Lin; Ching-Hsuan Yeh; Ci-Rong Li; Hsien-Ta Li. | Thinking Skills and Creativity | 2016 | 29 |
| 8 | Bernard Susser; Taeko Ariga. | Computers and Education | 2006 | 27 |
| 9 | Neil Granitz; C. Scott Greene. | Journal of Marketing Education | 2003 | 26 |
| 10 | Ted Mitchell; Judy Strauss. | Journal of Marketing Education | 2001 | 23 |
| 11 | Jonathan Foster; Angela Lin. | British Journal of Educational Technology | 2003 | 22 |
| 12 | Sid Davis; Keng Siau; Kumar Dhenuvakonda. | Communications of the ACM | 2003 | 22 |

The dataset includes 123 articles authored by individuals affiliated with institutions in 36 different countries worldwide. Table 3 provides an overview of the main contributors to the research on teaching e-commerce in higher education. According to the dataset, Y. Li, E.W.T. Ngai, and X. Zhang are the most prolific authors, each having published 3 articles on teaching e-commerce in Scopus. Given the relatively rare nature of research on e-commerce education in higher education, only 11 of the 309 authors produced at least 2 articles. This means that 96.44% of the authors in our dataset have contributed only a single article on the topic.

**Table 3.** Top authors by number of publications and links

| Number | Authors | Document | Citations |
|---|---|---|---|
| 1 | ellis, r.a. | 2 | 102 |
| 2 | foster, j. | 2 | 26 |
| 3 | lam, s.s. | 2 | 1 |
| 4 | li, y. | 3 | 1 |
| 5 | lin, a. | 2 | 26 |
| 6 | liu, y. | 2 | 3 |
| 7 | ngai, e.w.t. | 3 | 18 |
| 8 | poon, j.k.l. | 2 | 1 |
| 9 | xu, y. | 2 | 0 |
| 10 | zhang, x. | 3 | 6 |
| 11 | zhu, y. | 2 | 3 |

Conversely, the arrangement of the top authors based on citation counts differs significantly from the information presented in Table 3. As shown in Table 2, despite not being among the most prolific authors, Elbadrawy et al. (2016) have garnered 117 citations for their single paper on e-commerce education titled "Predicting Student Performance Using Personalized Analytics," which was published in a computer journal of the IEEE Computer Society. This citation count slightly exceeds that of Y. Li and Ellis R.A., who are identified as the most prolific authors in the field with 3 documents and 102 citations.

**Author collaboration between countries**

Figure 2 shows the country of origin of the authors with the highest number of publications. Of the 123 documents of articles related to teaching e-commerce, three countries publish the most articles on teaching e-commerce, namely China as many as 36 documents, the United States as many as 30 documents, and India as many as 10 documents. Illustrated in the figure below.

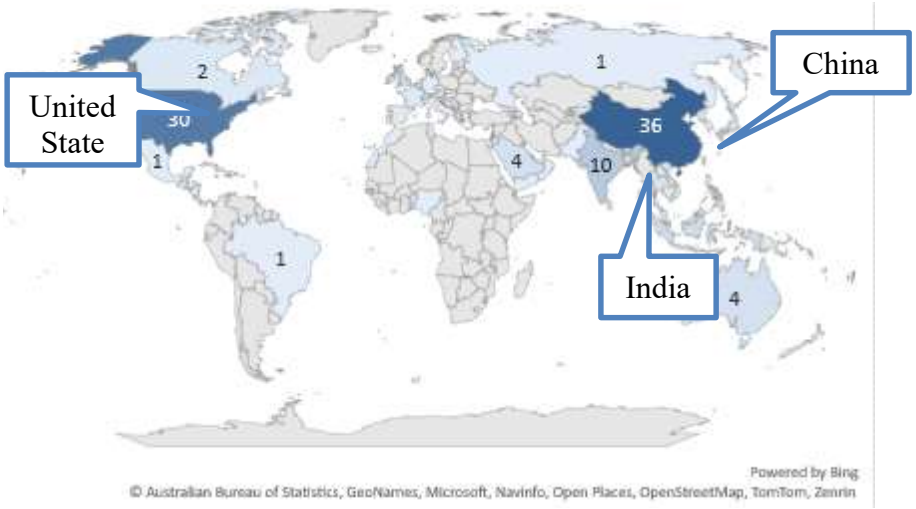


**Figure 2.** Top countries by number of publications

While the cooperation between countries in teaching e-commerce is shown in Figure 3, of the 36 countries that published articles on teaching e-commerce, there are 18 links of cooperation between countries. The United States, which has the most cooperation links, has 9 cooperation links with other countries, and China ranks second with 4 cooperation links with other countries. The complete cooperation links between countries are shown in the following figure.

According to Behl et al. (2020), an effective method for assessing research output remains elusive. However, one measure includes both qualitative aspects, such as direct contributions to the body of knowledge, and quantitative elements, such as impact on other research through citations or collaborations. Increasing the scope of research collaboration across institutions and countries is expected to improve the wider dissemination of research results. One strategic approach to increasing the impact of research is to collaborate with international authors who are highly active in the same field, especially in larger collaborative teams(Martinez & Sá, 2020).

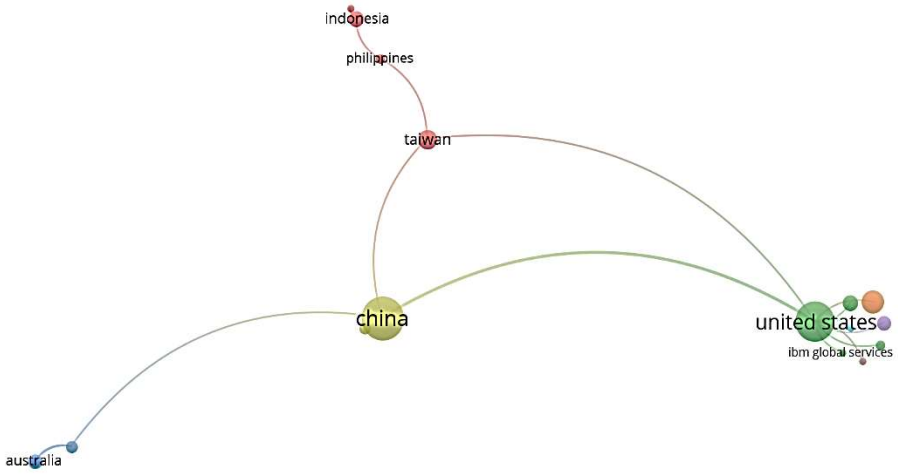


**Figure 3.** Collaboration by authors' country of origin

## Common Themes of e-Commerce Teaching Research Focus

Researchers set a threshold at this stage, namely Shared keywords displayed with a minimum of 3 publications, which means that keywords that have been used together in 3 or more publications will be displayed on the Shared keywords page with the help of VOSviewer. From 285 keywords after setting the threshold, it becomes only 60 keywords.

The research themes can be identified by the clusters shown in Figure 4, where different colors represent different clusters related to e-commerce in higher education. Six clusters can

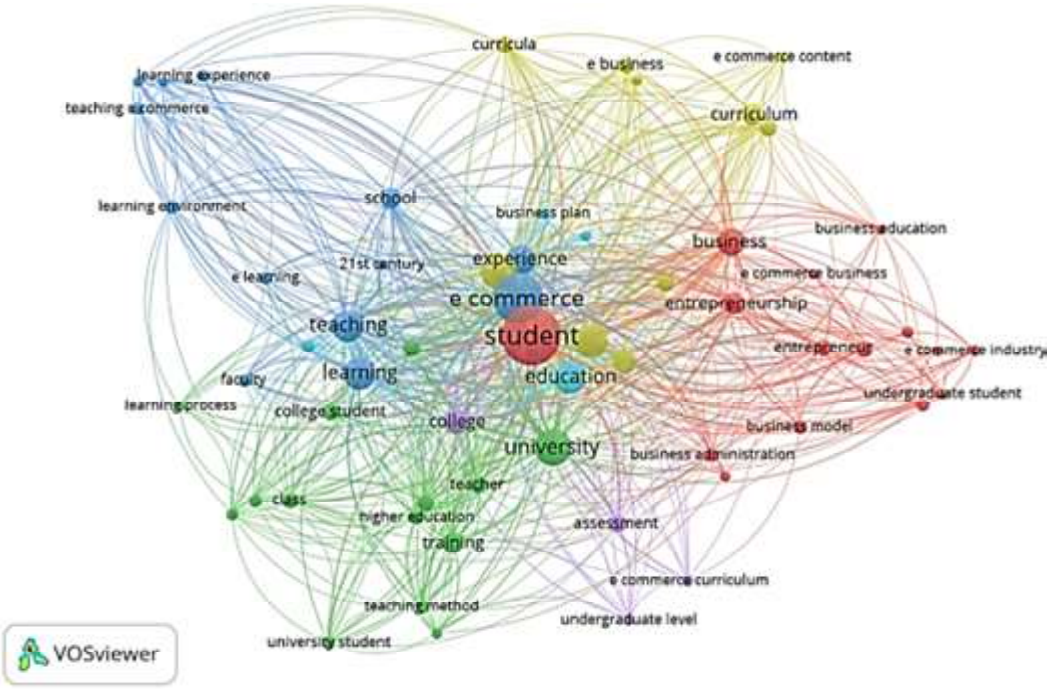


**Figure 4**. Common themes in e-commerce education research

be identified, with the red cluster being the most prominent, followed by the blue, yellow, green, tosca, and purple clusters.

Looking at the largest cluster (in red), which consists of 15 items, the size of the circles within this cluster indicates that the keywords with the largest diameter are student, business, and entrepreneurship. This suggests that the primary focus of e-commerce research in higher education revolves around students, with a focus on business and entrepreneurship development. Moving to the second cluster (in green) consisting of 14 items, the keywords University, Training, and Teacher emphasize a more specific focus of e-commerce research in higher education, particularly centered on universities and teacher training. In a broader context, this theme encompasses teaching methods in higher education, addressing both university-level education and student learning.

Next, the third cluster (shown in blue) of 13 items underscores the importance of learning content, specifically e-commerce, teaching, and learning. This indicates that the primary focus of e-commerce research in higher education is on the instructional aspects of teaching and learning. Moving on to the fourth cluster (in yellow), which consists of 10 items, the focus shifts to technology, courses, and e-commerce courses. This suggests that this cluster is more specialized in exploring e-commerce teaching techniques with a direct application of technology.

The fifth cluster (colored purple) with 4 items emphasizes the research focus of e-commerce in higher education, particularly in college settings. The keywords assessment, and e-commerce curriculum emphasize a research focus on curriculum development and assessment of e-commerce instruction in higher education. Finally, the sixth cluster (in Tosca color), composed of 4 items, focuses on education, e-commerce applications, and student entrepreneurship. This implies that the research in this cluster is focused on education through the use of e-commerce applications, specifically in the context of student entrepreneurship.

The three clusters within the dataset indicate that the majority of publications focus on formal educational management aimed at introducing e-commerce to students. These areas include e-commerce instructional development (cluster one), teaching methods (cluster three), and curriculum development (cluster six). This suggests that many colleges or schools have formally incorporated e-commerce into their curriculum structures (X. Zhao, Li, Liu, & Liu, 2019). The remaining three clusters, on the other hand, are more focused on practical techniques for teaching e-commerce to students, with a particular emphasis on the use of technology. Angelaccio & Buttarazi (2016) endeavored to enhance the application of e-commerce teaching using web programs, while other authors explored approaches and evaluations of e-commerce teaching (Chau, Wong, Zhou, Qin, & Chen, 2010; Hasan et al., 2020; Leung, Shamsub, Tsang, & Au, 2015).

Despite the successes reported by some researchers in applying e-commerce teaching methods, various studies have identified challenges that need to be addressed. Issues include the broad scope of e-commerce-related content taught (Cao, 2017; Elbadrawy et al., 2016; Zhong & Ding, 2022) and the need for teaching methods and applications to keep pace with technological advancements (Liu & Bai, 2022), resulting in a lack of alignment between teaching practices and real-world conditions. Other challenges associated with teaching e-commerce and related topics in the classroom include the difficulty of observing lasting changes in students' behavior due to limited meeting and observation time (Ang, Ge, & Seng, 2020), the need for additional teaching staff, the escalating teaching workload of instructors, facility-related problems, and the complexity of designing

appropriate evaluation methods (Guàrdia, Clougher, Anderson, & Maina, 2021).

Figure 5 illustrates the evolution of research topics in e-commerce education from 2010 to 2023. The beginnings of teaching sustainability in e-commerce date back to 1999, when the first article on the topic was published. Titled "Teaching e-commerce: To a multidisciplinary class," it was authored by Dhamija R et al from the Department of Management Information Systems, University of California, Berkeley. This means that the concept of introducing students to e-commerce was born 24 years ago, although formal implementation had not yet taken place. In this seminal article, Dhamija (1999) described a hands-on e-commerce learning course that faced challenges such as unexpected system crashes during student projects, lack of clear procedures or chain of command for interacting with the technical support staff at the university's computing center, limited Web access, and computer malfunctions. Through the practical experience gained in the long semester, the concept of teaching e-commerce has evolved over the years, as shown in the evolving research themes from 2010 to 2023 in Figure 5.

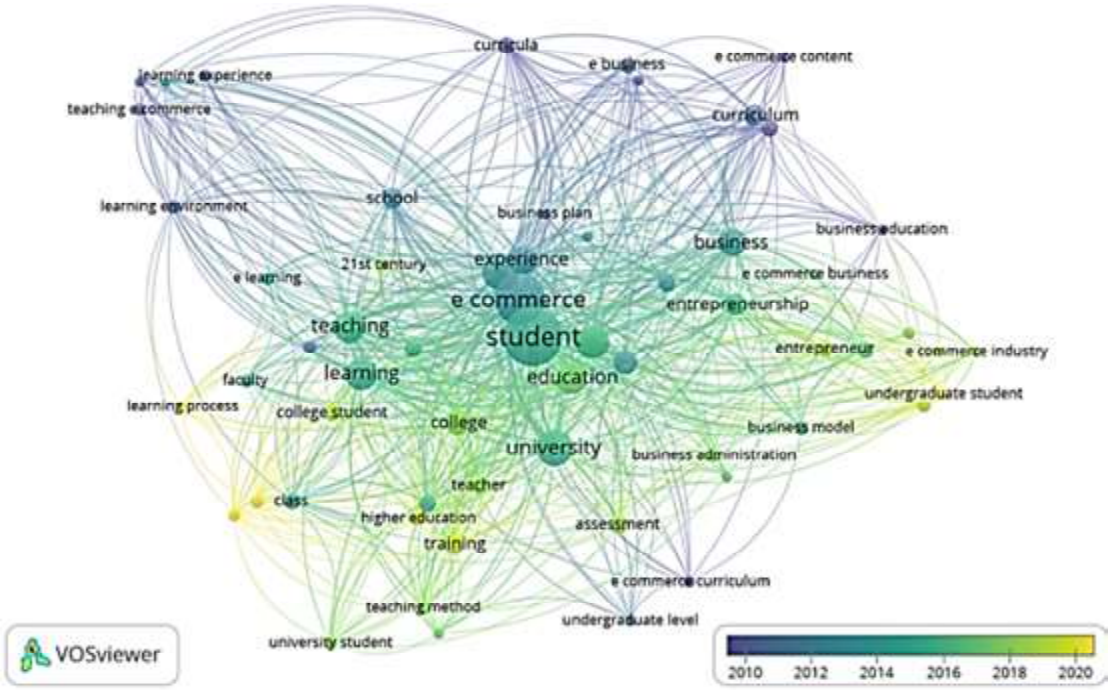


**Figure 5**. Evolution of e-commerce education research topics (2010-2023)

Since 2019, research themes in e-commerce teaching have continued to evolve, gaining increasing popularity, particularly in China. Numerous authors are striving to identify optimal practices for reshaping students' perspectives and attitudes toward e-commerce. Noteworthy examples include Ngo-ye et al. (2019), who integrated an e-commerce database web application into university events at Alabama State University, and Zhao JJ et al. (2019), who initiated a project to implement e-commerce practices for students at Ball State University. This trend is indicative of diverse approaches employed by various authors to impart e-commerce education to students.

While China remains a prominent contributor, recent years have witnessed a global expansion of research on teaching e-commerce.

Since 2020, an increasing number of countries from different continents have published their research findings on e-commerce education. Notable contributions from the Americas include works from the United States (Drake & Paul, 2021) and Mexico(Orozco-Rodriguez, Palafox González, & Valenzuela García, 2023). In Asia, significant contributions come from China (Fang & Huy, 2023; Hu, 2023; Yan, Xiaohui, & Yufei, 2023), Saudi Arabia (Bazuhair, 2023; Mohammed, Ahmed Bamahros, Grada, & Alaswadi, 2023), India (Arora, Krishna, & Dhir, 2023), Israel (Davidovitch & Eckhaus, 2022), and Yemen (Al-Hattami, 2021). Additionally, other continents are gradually making strides in contributing more to research on e-commerce teaching.

In the coming years, it is expected that the literature and research on teaching e-commerce will continue to evolve, with a focus on developing collaborative models between educational institutions and stakeholders. The goal is to ensure that classroom activities remain relevant to technological advances, industry practices, environmental concerns, and government policies. It is also expected that multidisciplinary approaches to the delivery of e-commerce courses will become increasingly popular. Recognizing that e-commerce content is not limited to engineering, business, or design, it is envisioned to be seamlessly integrated into comprehensive learning plans.

As a fundamental component, it is advocated that courses on e-business, covering basic concepts and practices, be promoted as general courses accessible to students in a variety of higher education disciplines, particularly in business and entrepreneurship programs. In this context, faculty leaders are encouraged to prioritize interdisciplinary approaches to course delivery. In addition, business schools are urged to broaden their focus beyond the development of circular business models based solely on marketing theory. Attention should also be given to macroeconomic issues, global business trends and strategies for achieving global market leadership. In addition, the central role of digital technology is highlighted as a critical factor in determining the success of delivering e-commerce materials to students at all levels of education. This technological integration is seen as beneficial for practitioners, helping them to incorporate e-commerce-oriented product strategies (Kleisiari, Duquenne, & Vlontzos, 2021).

## ■ CONCLUSION

The number of publications on e-commerce education is growing. In higher education, e-commerce education has been implemented in several courses and has become a separate program of study. The learning methods used also vary, mostly based on problem-based learning, project-based learning, and technology-based application development in collaboration with campus stakeholders to remain relevant. Common themes in teaching e-commerce show that most of the published research addresses best practices and challenges in teaching e-commerce. These challenges have prompted other studies to discuss how to improve the process of teaching e-commerce and to come up with new, more comprehensive ideas. In addition, these studies show that e-commerce education should be supported by technology-based approaches and support facilities. In terms of publication data collection, international cooperation on e-commerce education needs to be strengthened to disseminate research results. This study and its findings are still limited due to limited information sources, and this study may have missed some relevant publications and issues. Therefore, future research needs to consider different data sources (e.g., WoS, Google Scholar, or ERIC) to obtain a more comprehensive research map of e-commerce education. Despite its limitations, this study is

believed to provide a comprehensive and relevant picture of the literature on teaching e-commerce, especially in higher education.

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