A BIBLIOMETRIC ANALYSIS OF RESEARCH ON DROPOUT IN OPEN AND DISTANCE LEARNING

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ABSTRACT

The purpose of this study is to examine research on school dropout in open and distance education in the Web of Science (WoS) database using bibliometric analysis and to reveal trends in this area. In line with this goal, a total of 1,615 studies published between 1980 and 2022 were identified in the Web of Science (WoS) indexes. Descriptive and evaluative bibliometric methods were employed in the analysis of these publications, and the results were visualized using VOSviewer software. According to the research findings, studies on school dropout in open and distance education intensified in 2019. The analysis revealed that E.T. Pascarella is the most cited author, and F.D. Pereira has the highest co-authorship network. An examination based on institutions showed that the Universitat Autònoma de Barcelona has the highest number of publications, while the University of Michigan ranks first in terms of citation numbers. Furthermore, in terms of publication productivity and citation numbers, the United States is ranked first, followed by Spain. Looking at the keywords used in articles on the topic, early studies emphasized concepts such as "distance education", "student retention", "attrition", "student success", "social integration", "academic integration", "survival analysis", "education policy", "graduation", and "financial aids". In subsequent years, these were replaced by terms such as "learning analytics", "educational data mining", "systematic review", "engagement", "drop prediction", "decision tree", "student performance", "gamification", "massive open online course-MOOC", and "artificial intelligence". In this context, discussions were conducted within the framework of the literature, and various recommendations were provided based on the obtained findings.

Keywords: Open learning, distance education, e-learning, dropout, bibliometric analysis, VOSviewer.

INTRODUCTION

With origins dating back to the 19th century, open and distance education has become an interdisciplinary field with expanded implementation possibilities in the 21st century (Bozkurt, 2020; Ozkul & Aydin, 2013; Yuzer, 2013). The rapid changes in information and communication technologies have led to various innovative approaches and practices in the field of education, similar to those in fields such as communication, healthcare, transportation and industry. One of these practices is the provision of open and distance education services, which enable individuals of all ages and from any location to receive education without the constraints of time and place. In the current literature, the terms "distance education" (referring to the act of taking courses at a distance), and "open education/teaching" (referring to equal access to educational opportunities delivered at a distance) are often combined to form "open and distance learning". In addition, the terms "distance learning" and "open learning" are often used interchangeably in many contexts. However, the concept of open learning may differ from distance learning in some respects. For example, in open learning, students can often enrol in the courses or programs of their choice without many academic restrictions or prerequisites (Ekren & Kumtepe-Genc, 2018). Addressing the issue from the context of the network society and the concept of learning within the connectivism paradigm, Bozkurt (2014) asserts that the power of networks is increasing with new technologies, and the idea of a network society in distance education is emerging as a new concept. These advances have led to an era where access

to information is more important than the information itself. Siemens (2005) states that methods or tools such as courses, emails, communities, chats, web searches, blog reading and more can be used to implement the principles of a connectivist approach. Building on this, Siemens and Downes ventured into designing a learning environment in line with a connectivist approach, which led to the concept of Massive Open Online Courses (MOOCs) in the field of distance education (Downes, 2012). MOOCs can be described as a new form of existing online learning approaches that are becoming increasingly prevalent in the field of open and distance learning. Wang, Zhao, Wu, & Goh (2023) liken the online learning represented by MOOCs to a digital tsunami in the history of global education. This description underlines the considerable interest in and demand for MOOCs over the past decade.

The increasing global population and rising costs of education are increasing the importance and demand for open and distance education to meet the educational needs of individuals (Behr, Glese, Herve, & Katja, 2020; Muljana & Luo, 2019; T. Yilmaz, 2020; Vieira, Filho, Junior, & Santos, 2023). Despite all these developments, institutions providing open and distance education are faced with challenges such as dropout rates. The effectiveness of educational institutions is often measured practically by the employment opportunities of their graduates and theoretically by their success rates or school dropout rates (Agus, 2019). It has been noted in the literature that the dropout rate in open and distance education institutions is significantly higher than those offering traditional face-to-face education (Lee & Choi, 2011; Radovan, 2019; Yukselturk & Inan, 2006). For example, despite serving as a model for universities worldwide in open and distance learning processes and providing extensive support services to its students, The Open University in the England has a graduation rate of 22%. By comparison, Athabasca University in Canada has a rate of 5.3%, the Open University of the Netherlands 2.5%, Ambedkar University in India 14% and the University of South Africa 6% (Simpson, 2010; Simpson, 2013). Similar to other open and distance universities, the Anadolu University Open Education System in Turkiye faces high dropout and low completion rates. About 40% of students drop out within the first two years, while only 49% of associate degree students and only 25% of bachelor degree students manage to graduate (Latchem et al., 2006).

A high dropout rate within an educational institution may signal that something is wrong or lacking in that institution. The consequences of a student leaving an institution are not only negative for the student but also for the institution itself (Utami et al., 2020). Not only does it indicate that the student has failed to achieve their personal goals, but it also affects the decision of other students to choose that institution. This in turn translates into financial losses for the institution in future years (Levitz et al., 1999). Given the cost of developing and supporting open and distance education courses, identifying the reasons why students leave or choose to continue their studies is of great importance to open and distance education institutions (Lee & Choi, 2011). This study aims to examine, from a broad perspective, the publication trends related to the reasons for dropping out, which is an important issue in open and distance education.

LITERATURE

"Dropout and Persistence Models" in Open and Distance Learning

While there are no field-specific theories or models on "persistence and dropout" in open and distance education, existing theories and models on dropout and persistence in traditional face-to-face education are used (A. Yilmaz, 2020; Agus, 2019; Lee et al., 2013). One of these models is the "Sociological Model of the Dropout Process" developed by Spady (1970), which emphasizes individual factors in dropout. Subsequently, Tinto (1975) proposed the "Student Integration Model" in his study, claiming that in addition to individual factors, organizational factors also play a role in the dropout phenomenon. According to him, dropout can be understood as a longitudinal process of interaction between individual, academic and social systems. This model, applicable to both face-to-face and distance learning, examines learners' pre-entry characteristics in the first stage, commitment issues from both personal and institutional perspectives in the second stage, and academic and social integration in the third stage (McGivney, 2009). As a basis for subsequent research, this model is also widely used in current studies (Guzman et al., 2021; Kilian et al., 2020; Venegas-Muggli, 2020;).

Bean (1983) developed a second model called the "Student Attrition Model". This model emphasizes the impact of environmental factors on students' decisions to persist or withdraw (Cabrera et al., 1992). Later, Bean & Metzner (1985) created "A Conceptual Model of Nontraditional Undergraduate Student Attrition", based on the assumption that nontraditional students have different characteristics from traditional students. This model, based on the work of Spady (1971), Tinto (1975) and Pascarella & Terenzini (1980), outlines three key characteristics of non-traditional students. Firstly, non-traditional students typically do not live on campus and have to commute from outside on a daily basis. Secondly, they are older than traditional students, often over the age of 24, suggesting a greater degree of self-control and maturity. They are also less responsive to social integration than traditional students, meaning that they may not need as much interaction with faculty and peers. Another characteristic of these students is their tendency to work part-time. The most significant difference between non-traditional and traditional students in terms of reasons for dropping out is that non-traditional students are more influenced by environmental factors (such as work, financial circumstances, etc.) than by social integration factors. (Bean & Metzner, 1985).

In this regard, Kember (1989) argues that the concepts within the first tier, namely personal characteristics, should be examined more comprehensively in order to be more appropriate for distance learners. In particular, the student's home environment, family responsibilities and problems, and work situation are highly significant factors in the decision to continue or drop out. Kember (1995) built on the idea that in distance education dropout and persistence are correlated with student achievement. On this basis he developed the "A Model of Student Progress in Open learning". This model, similar to Tinto's (1975) model, includes components such as demographic characteristics, student motivation, academic ability and social factors.

Rovai (2003) noted that while the works of Tinto (1975) and Bean & Metzner (1985) were quite comprehensive in explaining the dropout situations of traditional students, these models fell short in explaining the situations of open and distance education students because they were developed for "on-campus students". According to the authors, the characteristics and needs of open and distance education students are different from those of face-to-face learners. Furthermore, virtual learning environments (the distance education environment) have different characteristics from the campus environment (A. Yilmaz, 2020). Based on this, Rovai (2003) developed the "Composite Persistence Model", which is primarily used and developed to explain the dropout situations of distance education students. In this model, the author synthesized Tinto's and the work of Bean and Metzner in relation to non-traditional students, while incorporating the unique features of the distance education process (Rovai, 2003). Critiquing Rovai's model, Park (2007) argued that the "Composite Persistence Model" needed structural revision and that some variables that were considered insignificant in the research should be removed. Furthermore, according to Park, the external influences in Rovai's model should focus not only on post-entry but also on pre-entry assumptions in terms of their impact on a student's decision to persist or leave (Agus, 2019). Another criticism of Rovai's model by Park is the need for a bidirectional interaction between internal and external factors, rather than a unilateral influence (A. Yilmaz, 2020).

In this context, Park (2007) examined experimental research in the literature related to dropping out of school in open and distance education to enhance the criticized model's effectiveness. Based on the information obtained, Park developed a model named "The Revised Model of Dropouts from Distance Learning in Organizations." This model is a refined and criticism-free version of the "Composite Persistence Model" developed by Rovai (2003) according to Radovan (2019).

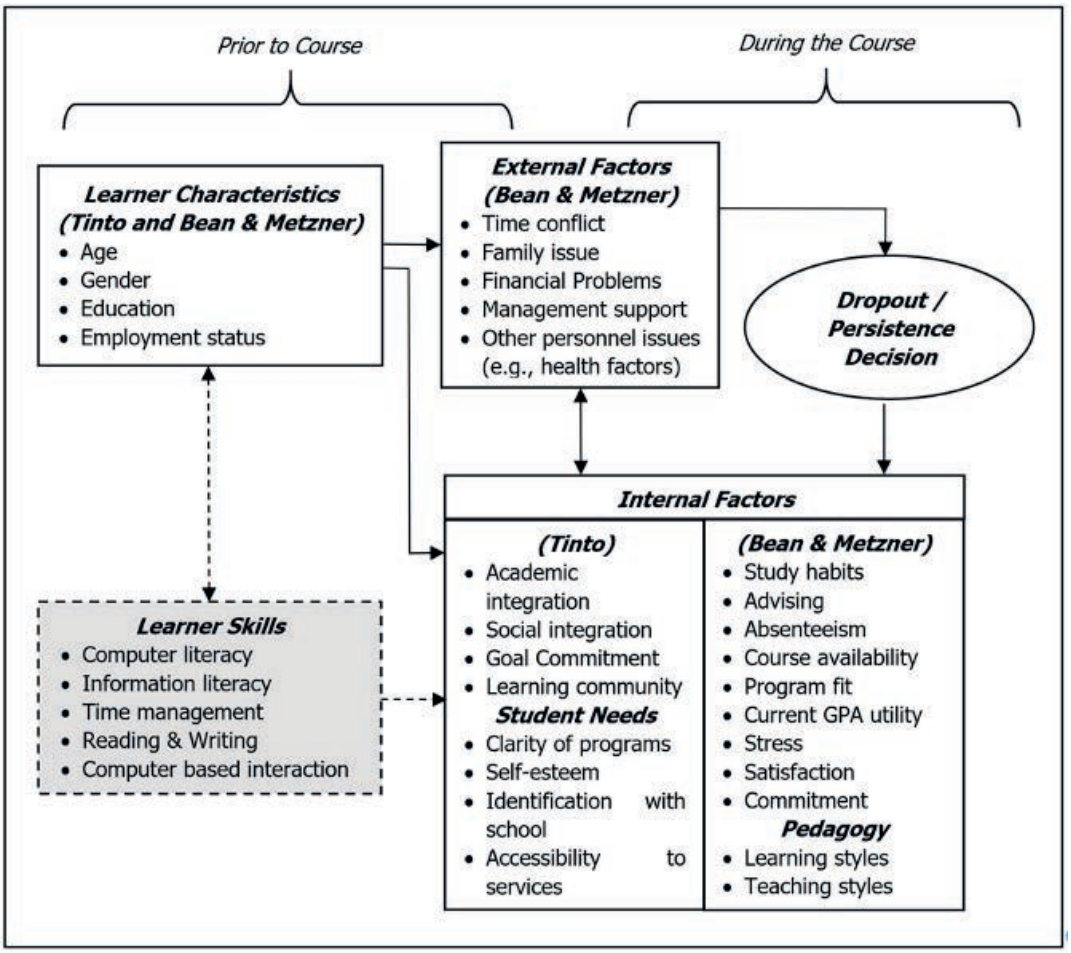

Figure 1. The revised model of dropout from distance learning in organizations (Adapted from Rovai, 2003 & Park, 2007)

As can be seen in Figure 1, the model developed by Park (2007) draws on the models developed by Tinto (1975), Bean & Metzner (1985) and Rovai (2003). Similar to how Rovai (2003) divided the model into two phases; pre-enrolment and post-enrolment, Park (2007) also includes two phases in the model, namely pre-class and post-class. However, while Rovai focuses on external factors only in the post-enrolment phase, Park argues that certain external factors also influence students' decisions before enrolment. Therefore, the author places external factors in the middle of both the pre-enrolment and post-enrolment phases. In this model, the box "student skills" is shown in grey due to the lack of substantial empirical support (A. Yilmaz, 2020). The model also emphasizes the interaction between internal and external factors. Park (2007) describes this interaction as follows: "The tendency of a student who has a high workload, limited time to study, and ineffective communication with instructors to drop out may be higher compared to a student with effective communication skills".

This model, updated by Park in 2007, has been used in several recent studies in the field. One of these studies, conducted by Aldowah et al. (2019), employed a multi-criteria decision-making method to identify the key factors and possible causal relationships responsible for high dropout rates in Massive Open Online Courses (MOOCs). Stephen et al. (2020) conducted a study to investigate the relationships between non-traditional online students and their predictor variables of self-regulation, self-direction, and self-efficacy with the criterion variable of term-to-term persistence, using logistic regression analysis. Gunduz and Karaman (2020) discuss the challenges encountered by students in open and distance learning, including difficulties in paying tuition fees, mismatches with online education formats, the need for printed books, and technical issues encountered in exams. Zuhairi et al. (2020) investigate strategies related to the effectiveness of student support services, a significant factor in school dropout. Yilmaz-Bagriacik & Karatas (2022) investigated the reasons for student dropout from the perspectives of students, domain experts, teachers, administrators, and support staff.

Dropout in Open and Distance Learning

In recent years, the field of distance education has rapidly developed. Despite its high popularity, the number of students dropping out is much higher than in traditional face-to-face education (A. Yilmaz, 2020; Esgice, 2015). Although it may seem like a reasonable decision for a distance learning student to drop out of education, it is important to note that one of the primary objectives of institutions providing distance education is to reduce dropout rates. To achieve this goal, it is crucial for distance education institutions to comprehend the reasons why students leave school, so that necessary precautions can be taken (Lee & Choi, 2011). In recent years, there has been a notable rise in scientific publications regarding dropout rates in distance education. This increase has been further emphasized by the COVID-19 pandemic and rapid technological transformation, highlighting the need for bibliometric analysis of research in this field.

Bibliometrics is both a field of study and a research method that quantitatively determines the distribution of knowledge produced based on various factors (Yilmaz, 2019). The first study in the field of bibliometric analysis is generally considered to be the examination of the "Journal of American Chemical Society" in 1927 (White, 1985). While bibliometric analysis studies were rare until the 1990s, an increased interest has been observed since the 2000s (Kirdar & Benli, 2020). Bibliometrics provides quantitative insights into the productivity of countries, authors, universities and journals, weak and strong research areas, gaps in the literature, collaborative networks, potential opportunities and the widespread impact of outputs in each area (Dirik et al., 2023). Bibliometrics can be divided into two main types: descriptive and evaluative (Nicholas & Ritchie, 1978; Osareh, 1996). Descriptive bibliometrics involves the quantitative study of the distribution of relevant literature by countries, authors, publications, publication years, languages and subjects. Evaluative bibliometrics, on the other hand, involves the analysis of relationships between authors, publications, and countries based on quantitative methods, especially through citations (Hebebci & Ozer, 2023; Yilmaz, 2019). In other words, evaluative bibliometrics focuses on assessing the qualitative aspects of scientific activity and, more importantly, scientific performance (Van Leeuwen, 2004). Bibliometric analysis studies provide researchers in the field with data on both past and current research. This method of analysis has different characteristics from systematic literature reviews.

In the field of literature review, it has been observed that a wide range of scanning methods are used. For example, Pare et al., (2015) conducted a review of scanning studies in information systems journals, resulting in an extensive classification of traditional review, meta-analysis, descriptive review, mixed methods review, critical review, scoping/mapping review, qualitative systematic review, umbrella review, theoretical review, and realist review (Yildiz, 2022). Systematic literature reviews aim to derive findings based on conceptualization. In other words, these studies provide insights into the content and nature of the topic. Bibliometric analysis, on the other hand, is not concerned with information about the content and nature of the subject; it only provides information about the breadth and quantity of the subject.

In reviewing the current literature, it is evident that analytical studies on the reasons for dropout in open and distance learning generally consist of systematic literature reviews or delve into more specific topics. The first systematic literature review on dropout in online learning was conducted by Lee & Choi (2011). This study examined existing empirical research between 1999 and 2008 on dropout in online courses in higher education. The authors identified 69 factors influencing students' dropout decisions and categorized them into three main groups: (a) student factors, (b) course/program factors, and (c) environmental factors. Strategies were then developed to address these dropout factors: (a) understanding each student's challenges and potential, (b) providing quality course activities and well-structured support, and (c) developing strategies to deal with environmental issues and emotional challenges. These strategies were discussed at length. Another literature review conducted by Okur et al., (2019) also found that students may drop out for reasons related to the institution, themselves, and their environment. According to the authors, students who find tuition fees high, are concerned about academic failure, and lack academic or career aspirations are more likely to drop out. The study also concluded that inadequate learning materials and examination conditions have a significant impact on students' decisions.

Another study using the systematic literature review method, which aimed to observe potential reasons for suboptimal completion rates in online learning environments and identify suggested strategies to increase school engagement rates, was conducted by Muljana & Luo (2019). This study developed strategies related

to institutional support, programs difficulty, fostering a sense of belonging, facilitating learning, course design, student behavioral characteristics and demographic variables to increase completion rates. Kara et al. (2019) conducted research on the challenges faced by adult students in online environments. They analyzed articles published in leading journals in the fields of open and distance education, instructional technology, and adult education using a constant comparative analysis method. The research findings indicate that adult students experience challenges related to internal, external, and program-related factors, demonstrating the interrelated nature of these challenges.

Based on the literature review, another study aimed to identify the factors that influence learning engagement in MOOCs. Previous research has shown that learning engagement is a critical factor influencing student achievement and participation rates. However, it's noted that there is a limited number of literature reviews that specifically focus on learning engagement in online courses. Furthermore, the study highlights that both internal and external factors influencing learning engagement have not been fully elucidated and provides solutions to address this gap (Wang et al., 2022).

One of the most recent studies in this area is an evaluation of research trends on dropout in the distance learning literature using data mining and analytical approaches. A study conducted by Elibol & Bozkurt (2023) examines how the term "dropout" is often misinterpreted in different contexts and how inhuman analyses are insufficient to explain the phenomenon, revealing interesting insights. The study also provides promising results for reducing dropout rates in open and distance learning environments. Furthermore, the study emphasizes the need for a precise definition of the term "dropout" in the context of distance learning for future research, the establishment of ethical principles for the use of algorithmic approaches to predicting student dropout, the development of policies and frameworks, and finally the adoption of a human-centered approach to reducing dropout rates.

The review results indicate that there are relatively few bibliometric studies investigating the reasons for dropping out of open and distance education. These studies are limited to a specific educational period (Ertem & Aypay, 2023), distance education method MOOCs (Billsberry & Alony, 2023; Wang et al., 2023), country Spain (Ferrandiz, 2021), rural areas (Guzman et al., 2021), and method/technique data mining and social network analysis (Elibol & Bozkurt, 2023).

Significance of the Research

The demand for open and distance education is increasing, leading to a rise in the number of institutions offering such programs. This trend is driven by a desire to enhance institutional recognition and provide students with a wider range of flexible learning options. The growing number of institutions provides students with more choices, allowing them to select the most qualified option to suit their needs. According to Muljana and Luo (2019), the number of students is one factor that indicates the quality of an institution. According to Muljana and Luo (2019), the number of students is one factor that indicates the quality of an institution. According to Muljana and Luo (2019), the number of students is one factor that indicates the quality of an institution. However, it is also crucial to consider how many students continue their education and how many drop out. In fact, the decision of a single student to drop out can influence the opinions of many others about the institution. Therefore, institutions must take measures to ensure that their current students continue their education. Various findings in foreign literature discuss the measures and factors that influence students' decisions. However, it is important to note that the expectations and preferences of students may vary depending on their cultural background and the institution they attend (Yilmaz, 2020). Therefore, there is a need for studies on the subject of effective coordination (stakeholder management) in open and distance learning. Such studies are limited in the literature and should examine all stakeholders involved. Furthermore, it is important to thoroughly examine environmental factors that may impact the open and distance learning system, such as demographic, economic, political, technological, legal, and cultural structures, as well as library facilities and geographical conditions. The concept of 'dropout' in open and distance education should be clearly and precisely defined, as stated by Elibol & Bozkurt (2023).

Upon examination of the literature, it is evident that there are few studies that comprehensively explore the factors contributing to student dropout rates in higher education open and distance learning. As noted by Selelo & Manamela (2022), the significance of distance education has been further highlighted by the

Covid-19 pandemic and rapid technological advancements, underscoring the need for bibliometric analysis in research. Bibliometric analysis methods can add objectivity to the evaluation of scientific literature. They have the potential to reduce researcher bias in scientific literature reviews by combining the views of many scientists working in the field. Bibliometric methods are expected to complement meta-analysis and qualitative structured literature reviews as a way of analysing and evaluating scientific literature (Zupic and Cater, 2015).

This study differs from other bibliometric analyses on the subject (Billsberry & Alony, 2023; Ertem & Aypay, 2023; Ferrandiz, 2021; Guzman et al., 2021; Wang et al., 2023) by taking a broader perspective on the dropout of open and distance education students, rather than a narrow one. Furthermore, the study's use of both descriptive and evaluative bibliometric techniques to analyse data obtained from Web of Science (WoS) is a notable feature. As noted by Hebebci and Ozer (2023), given the heightened importance of distance education in 2020 and beyond, there is a need for an increase in the quality and quantity of bibliometric studies conducted in this context. Additionally, such studies are crucial for identifying gaps in the literature, contributing to it, and guiding future research. Therefore, this study can make significant contributions to the literature by presenting the current state of the field in general terms.

Objective of the Research

The aim of this study is to analyze and visualize the bibliometric characteristics of publications on the subject of reasons for dropout in open and distance education indexed in the Web of Science (WoS) database between 1980 and 2022. Another aim of the research is to outline the current state of studies on dropout and to provide guidance for future research in this area. In order to identify trends in the field, the following questions are addressed:

With regard to research on reasons for dropout in open and distance education indexed in the WoS database:

- What is the distribution of publications across years and WoS indexes?
- What are the most cited sources, institutions and studies?
- What kind of cooperation exists between institutions and countries?
- What are the relationships between the most cited authors?
- What are the relationships between the most studied topics/concepts?

METHOD

This study employs a descriptive survey model to examine trends in studies on dropout rates in open and distance education. Bibliometric and descriptive analysis methods were used to analyse academic studies on dropout. Bibliometric analysis is a method used to evaluate the development, scientific quality, impact, and sources of studies on any subject. It has recently been frequently used by researchers in different fields (Billsberry & Alony, 2023; Ertem & Aypay, 2023; Hebebci, 2021; Hebebci & Alan, 2021; Hebebci & Ozer, 2023; Kushairi & Ahmi, 2021; Ozturk, 2021; Zupic & Cater, 2015). Although bibliometric analysis studies do not replace literature reviews, they provide a critical complementary factor. They can analyse thousands of studies together, reveal author, word and citation relationships, and use visual mapping at a high level (Hebebci & Ozer, 2023; Talan, 2021; Zupic & Cater, 2015). Furthermore, the bibliometric analysis method can be used to identify trends, gaps, social networks, intellectual structure, and cognitive structure within a particular research field (Borner et al., 2003; Van Eck & Waltman, 2018). Additionally, it aids in evaluating the most influential articles, topics, authors, universities, or journals in a research field (Dede & Ozdemir, 2022).

The study design followed the aforementioned guidelines. Descriptive bibliometric techniques were employed to analyse publications based on year, type, language, and WoS indexes. Evaluative bibliometric techniques included citation analysis (journal, publication, and country), co-authorship analysis (institutions and countries), co-occurrence of keyword analysis by authors, and co-citation analysis by sources.

Data Collection

There are many databases available for data retrieval and bibliometric research. The most important of these databases are WoS (Web of Science), Scopus, Google Scholar, PubMed and MEDLINE (Chen, 2017). The WoS database was used to obtain the datasets for this study. This choice is due to the fact that it contains records of high-quality research publications and is recognized as a reliable source of bibliographic information (Birkle et al., 2020; Falagas et al., 2008; Zupic & Cater, 2015). Comparisons between databases in the literature tend to be aimed at identifying the strengths and weaknesses of each. Fingerman (2006) evaluated WoS and Scopus in terms of their current features and capabilities. The evaluation looked at the databases' coverage and search capabilities. Similarly, another study by Falagas, Pitsouni, Malietzis & Pappas (2008) evaluated the official websites of the databases in terms of content, use, updates, citation quality, search options and product developers. The evaluation highlighted that WoS provides users with more understandable and detailed graphical representations for citation analysis queries (Karasozen et al., 2011). WoS covers more than 211 million records from journals, books, and conference proceedings, and includes more than 13 million records in the sciences, social sciences, arts, and humanities (Clarivate, 2023).

The research-focused search string for data collection included key terms such as "dropout", "drop-out", "school dropout", "dropping out", "open learning", "open education", "distance education", "distance learning", and "higher education". A search sentence was created as TS=(("dropout*" or "drop-out*" or "school dropout*" or "dropping out*" or "open learn*" or "open edu*" or "open learn*" or "distance edu*" or "distance learn*) and ("higher edu*")). Later, following the instructions for "Quick add Keywords" in the detailed search tab of WoS, we arrived at the "Advanced Query" sentence. Table 1 shows the criteria used in the filtering process to obtain documents.

Table 1. Search Strategies

Scientific Database	Web of Science
Searching Date	08.08.2023
Advanced Query	((ALL=(dropout reasons) OR ALL=(drop out) AND ALL=(open learning) AND ALL=(distance learning)) OR (QMTS=("STUDENT DROPOUT")) OR (QMTS=("UNIVERSITY DROPOUT")) OR (QMTS=("DROPOUT")) OR (QMTS=("REASONS FOR DROPOUT"))) AND ((TASCA==("EDUCATION EDUCATIONAL RESEARCH") AND TMSO==("6.11 Education & Educational Research")) NOT (PY==("2023") OR TMSO==("1.112 Palliative Care" OR "1.100 Substance Abuse" OR "1.128 Fertility, Endometriosis & Hysterectomy" OR "1.119 Breast Cancer Scanning" OR "1.228 Virology - Tropical Diseases" OR "1.66 HIV" OR "1.150 Hearing Loss")))
Time Span	1980-2022
Total Number of Documents	1.615
Indexes	SSCI, ESCI, CPCI-SHH, CPCI-S, SCI-EXPANDED, BKCI-SHH, A&HCI, BKCI-S

In terms of disciplines, the majority of studies (n= 461) are in the social sciences. This is followed by 230 documents in computer science, psychology (n= 72), engineering (n= 59), medicine (n= 42), business, management and accounting (n= 34), arts and humanities (n= 33), mathematics (n= 29), decision sciences (n= 21), environmental sciences (n= 14), health professions (n= 13), energy (n= 12), economics, econometrics and finance (n= 12), physics and astronomy (n= 9), materials science (n= 6), multidisciplinary (n= 4), neuroscience (n= 2), earth and planetary sciences (n= 2), chemical engineering (n= 2) and agricultural and biological sciences (n= 1). In addition, the types and numbers of documents included in the searches, number of documents, time range and total number of documents obtained from the search results are shown in Table 1.

Data Analysis

Descriptive and evaluative bibliometric analysis techniques were used in the data analysis process of this study. In other words, descriptive bibliometric techniques were used to analyze publications based on year, type, language and WoS indexes. In terms of evaluative bibliometrics, the study used citation analyses (journal, publication and country), co-authorship analyses (institutions and countries), co-occurrence of keyword analyses carried out by authors and co-citation analyses based on sources.

In this study, Microsoft Office Excel was used to display descriptive results, while VOSviewer software was used to display evaluative results. VOSviewer, developed by Van Eck & Waltman (2018), is equipped with an algorithm known as "visualization of similarities" to visualize the relationships between elements. These elements consist of countries, keywords, journals, authors and other bibliographic information obtained from scientific databases (Prioteasa et al., 2023). VOSviewer uses elements from networks composed of scientific publications, journals, researchers, research institutions, countries, keywords and/or terms to create relationship networks through co-authorship, co-occurrence, citation, bibliographic coupling or co-citation links. These links are also the core analyses of the programs. Bibliographic data from databases such as Dimension, Lens, Scopus, Web of Science and reference management software such as EndNote, RefWorks and RIS can be used to construct a bibliometric map of a specific field (Van Eck & Waltman, 2022; 2023).

FINDINGS

Descriptive Findings

Distribution of Publications by Year

The distribution of the publications in the study by year of publication within the scope of the study is shown in figure 2.

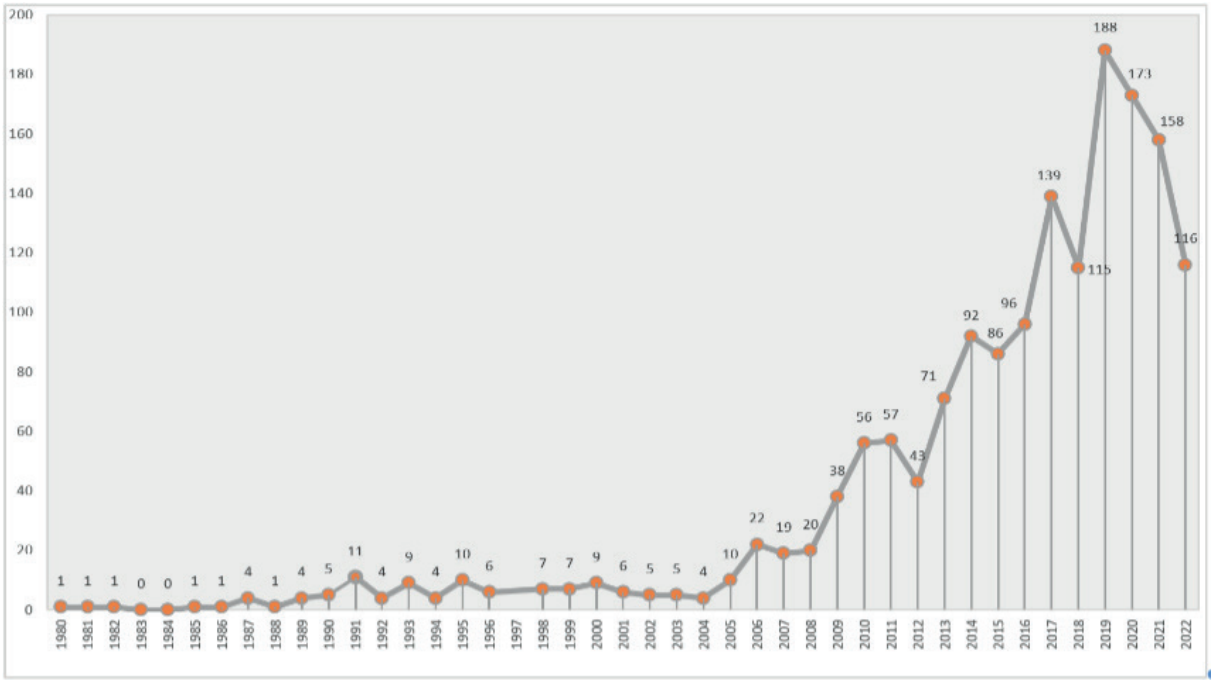

Figure 2. Distribution of Publications by Year

As can be seen in Figure 2, studies on dropout rates in open and distance learning were mainly carried out between 1980 and 2022. The studies show a relative upward trend. The first work on this subject was carried out in 1980 by Pascarella & Terenzini (1980). From 1980 to 2004, a period of linear growth without significant jumps was observed. The first significant increase in the number of publications occurred in 2006, when 22 studies were published. This was followed by 2010 (n= 56), 2014 (n= 92) and 2017 (n= 139). In

2019, the number of publications reached 188 studies. The year 2019 marked the peak in the number of publications. However, a decrease in the number of publications can be observed from 2020 to 2022. The reason for this decrease could be attributed to the COVID-19 pandemic. During this period, the adverse effects of the pandemic led to some journals being unable to publish, while others postponed their issues.

Distribution of Publications by WoS Indexes

The distribution of studies included in the review by WoS indexes is shown in Figure 3.

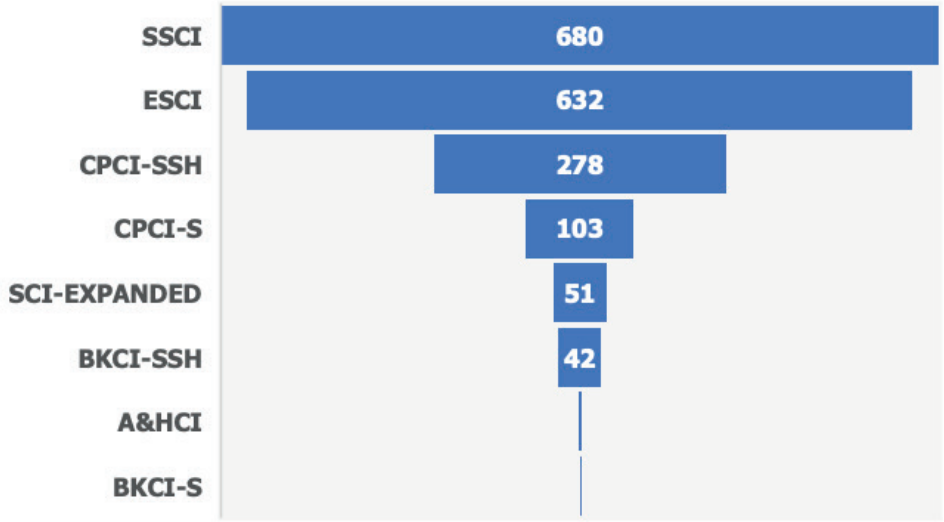

Figure 3. Distribution of Publications by WoS Indexes

According to the WoS indexes, the Social Sciences Citation Index (SSCI) has the highest number of publications with 680 (Figure 3). This is followed by the Emerging Sources Citation Index (ESCI) with 632 publications, the Conference Proceedings Citation Index-Social Sciences (CPCI-SHH) with 278 publications, the Conference Proceedings Citation Index-Science (CPCI-S) with 103 publications, the Science Citation Index Expanded (SCI-EXPANDED) with 51 publications and the Book Citation Index-Social Sciences & Humanities (BKCI-SSH) with 42 publications.

Evaluative Findings

Citation Analyses (Publication, Source and Country)

Citation analysis research has gained considerable attention in recent years. Such studies address issues such as author productivity, use of publications and the ageing of the literature. Citation analysis studies help to identify the most cited researchers, countries and publications in a given field, thus contributing to the development of library collections (Al & Tonta, 2004). These studies use a variety of techniques, the most common of which are "bibliographic coupling" and "co-citation". When two different sources cite the same publication, it's called "bibliographic coupling", and when one source cites two different publications, it's called "co-citation" (Garfield, 1980; Rehn et al., 2014; Tonta & Al, 2008).

Bibliographic coupling means that a series of scientific studies share one or more references, indicating a meaningful relationship between these studies. In other words, the reference lists of scientific studies reveal the academic network in which the author operates (Kessler, 1963; Arslan, 2022). On the other hand, co-citation analysis is an effective tool for identifying key studies in a particular field and understanding the intellectual structure of the research area (Khandelwal et al., 2022). In essence, "bibliographic coupling" and co-citation provide insight into the similarity between publications in terms of topics or other characteristics (such as authority) (Al, 2008). The VOSviewer software allows data on publication and citation counts, as well as total link strength, to be presented in bibliographic coupling analyses based on institutions and countries.

Bibliographic Coupling Analysis for Publications and Most Cited Studies

According to the VOSviewer manual, each link is associated with a positive numerical value that represents its strength. The higher this value, the stronger the link is considered to be (Pauna et al., 2019; Al Husaeni, 2022). In other words, the total link strength attribute expresses the cumulative strength of co-authorship links with other researchers for a given researcher.

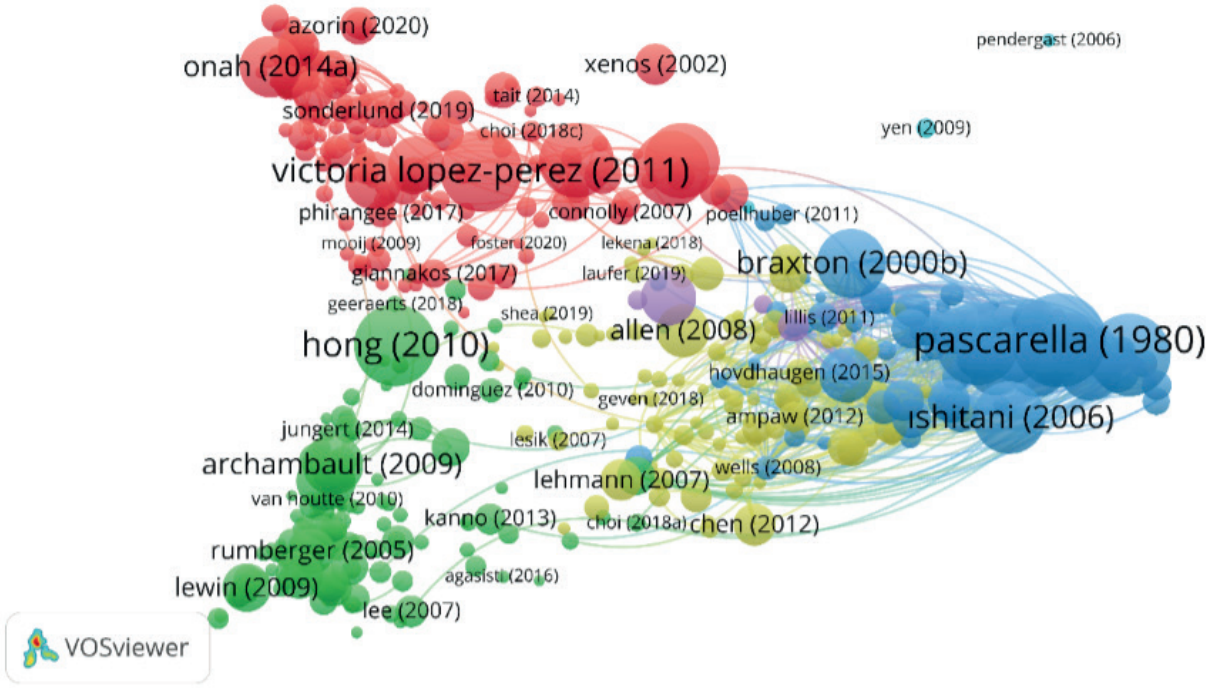

Figure 4. Bibliographic Coupling Links of Documents

Figure 4 shows the bibliographic coupling links between the studies. Based on the analysis carried out with 537 publications meeting the criterion of having at least 10 citations and having links between them, 6 clusters, 22.962 links and a total link strength of 45.629 were obtained.

In more detail, as can also be seen from Table 2, the top three publications in the bibliographic coupling analysis based on the number of citations are "Pascarella, E.T & Terenzini, P.T. (1980)" with 483 citations, "Nagda, B.A., Gregerman, S.R., von Hippel, W., & Lerner, J.S. (1998)" with 390 citations and "Cabrera, A.F., Nora, A., & Castaneda, M.B. (1993)" with 381 citations. In this context, the authors with the highest number of citations are E.T. Pascarella, B.A. Nagda, and A.F. Cabrera.

Table 2. Top 10 Most Cited Documents

Title of the Study	Author(s)	Year	Source	Number of Citations
Predicting freshman persistence and voluntary dropout decisions from a theoretical model	Pascarella, E.T & Terenzini, P.T.	1980	Journal of Higher Education	483
Undergraduate student-faculty research partnerships affect student retention	Nagda, B.A., Gregerman, S.R., …, & Lerner, J.S.	1998	Review of Higher Education	390
College persistence: Structural equations modeling test of an integrated model of student retention	Cabrera, A.F., Nora, A., & Castaneda, M.B.	1993	Journal of Higher Education	381
Pre-service and beginning teachers' professional identity and its relation to dropping out of the profession	Hong, J.Y.	2010	Teacher and Teaching Education	378

Blended learning in higher education: Students' perceptions and their relation to outcomes	Lopez-Perez, M.V., Perez-Lopez, M.C., & Rodriguez-Ariza, L.	2011	Computers & Education	377
Factors influencing adult learners' decision to drop out or persist in online learning	Park, J.H. & Choi, H.J.	2009	Educational Technology and Society	325
Comparing dropouts and persistence in e-learning courses	Levy, Y.	2007	Computers & Education	325
A review of online course dropout research: implications for practice and future research	Lee, Y. & Choi, J.	2011	ETR&D-Educational Technology Research and Development	318
Studying attrition and degree completion behavior among first-generation college students in the United States	Ishitani, T.T.	2006	Journal of Higher Education	301
The influence of active learning on the college student departure process: Toward a revision of Tinto's theory	Braxton, J.M., Milem, J.F., & Sullivan, A.S.	2000	Journal of Higher Education	278

Among the top three publications with the highest total link strength, "Gross, J.P.K., Torres, V., & Zerquera, D. (2013)" leads with 866 link strengths, followed by "Cabrera, A.F., Nora, A., & Castaneda, M.B. (1993)" with 824 link strengths and "Nora, A., Cabrera, A., Serra Hagedorn, L., & Pascarella, E.T. (1996)" with 794 link strengths (Table 2).

Bibliographic Coupling Analysis for Sources

In line with the research objectives, an analysis was carried out using 24 sources that met the criteria of having at least 10 publications from a source and each publication having at least 10 citations, in order to create a network map based on sources (journals, full-text conference papers, and books). The result of the analysis was 3 clusters, 263 links and a total link strength of 31.509. Figure 5 illustrates the bibliographic coupling links of publications.

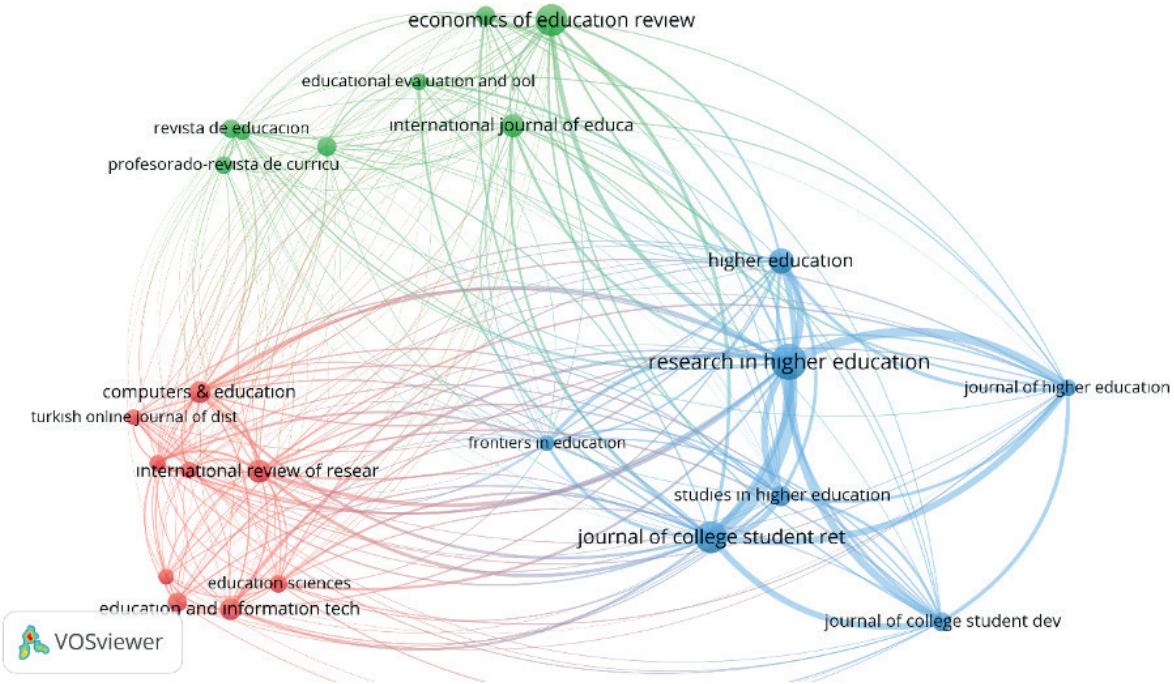

Figure 5. Bibliographic Coupling Links of Sources

In the bibliographic linkage analysis based on the number of journal publications, the top three sources are "Research in Higher Education" with 62 articles, "Journal of College Student Retention: Research, Theory & Practice (CSR)" with 48 articles and "Economics of Education Review" with 46 articles. In the analysis based on the number of journal citations, the top three positions are held by "Research in Higher Education" with 2.719 citations, "Journal of Higher Education" with 2.032 citations, and "Computers & Education" with 1.678 citations. The top three journals with the highest total link strengths are "Research in Higher Education" with a link strength of 15.777, "Journal of College Student Retention: Research, Theory & Practice (CSR)" with a link strength of 12.437, and "Journal of Higher Education" with 5.561 links.

Bibliographic Coupling Analysis for Countries

In order to create a network map related to the countries of publications on the research topic, an analysis was carried out using the criteria "at least 10 publications from a country" and "publications with at least 10 citations". The analysis was carried out on 35 countries that met these criteria and had links between them. The result of the analysis was 8 clusters, 593 links and a total link strength of 142.148. Figure 6 shows the bibliographic coupling links between countries.

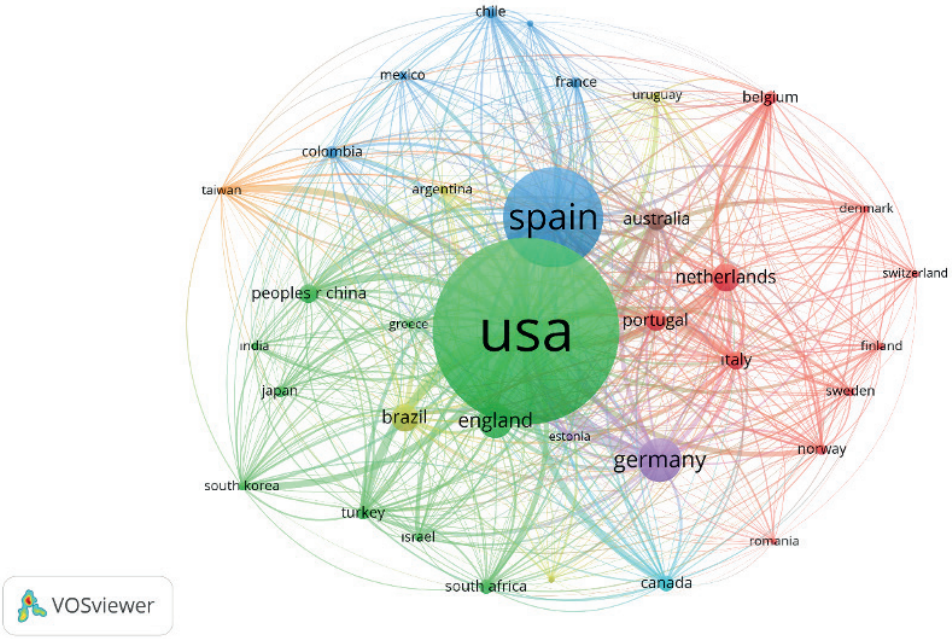

Figure 6. Bibliographic Coupling Links of Countries

In the analysis of the bibliographic coupling based on the number of publications from countries, the top three countries are as follows "USA" with 416 publications, "Spain" with 223 publications and "Germany" with 99 publications. In the analysis based on the number of citations to country publications, the top three countries are "USA" with 12.163 citations, "Spain" with 1.937 citations and "England" with 1.550 citations. The top three countries with the highest total link strengths are "USA" with 74.535 link strength, "Spain" with 24.953 link strength and "Germany" with 23.525 link strength.

Co-Authorship Analysis (Authors, Institutions and Countries)

Co-authorship analysis uncovers and illustrates the social network within the field by measuring the centrality of actors (authors, institutions, and countries). This measure can identify the most significant actors in the network. Centrality is a proportional measure of an actor's total possible ties relative to their number of

direct ties. The degree centrality scores within a defined social network are higher when the focal actor is connected to a larger number of actors (Hollenbeck & Jamieson, 2015; Zupic & Cater, 2015). Additionally, technical research co-authorship is significant as it involves two or more authors or organizations (Hebebci & Ozer, 2023; Kumar, 2015).

Co-Authorship Analysis for Authors

A network map was created based on the co-authorship analysis of authors related to the research topic, using the criteria of at least one publication and one citation. Figure 7 displays the bibliographic matching links of the authors.

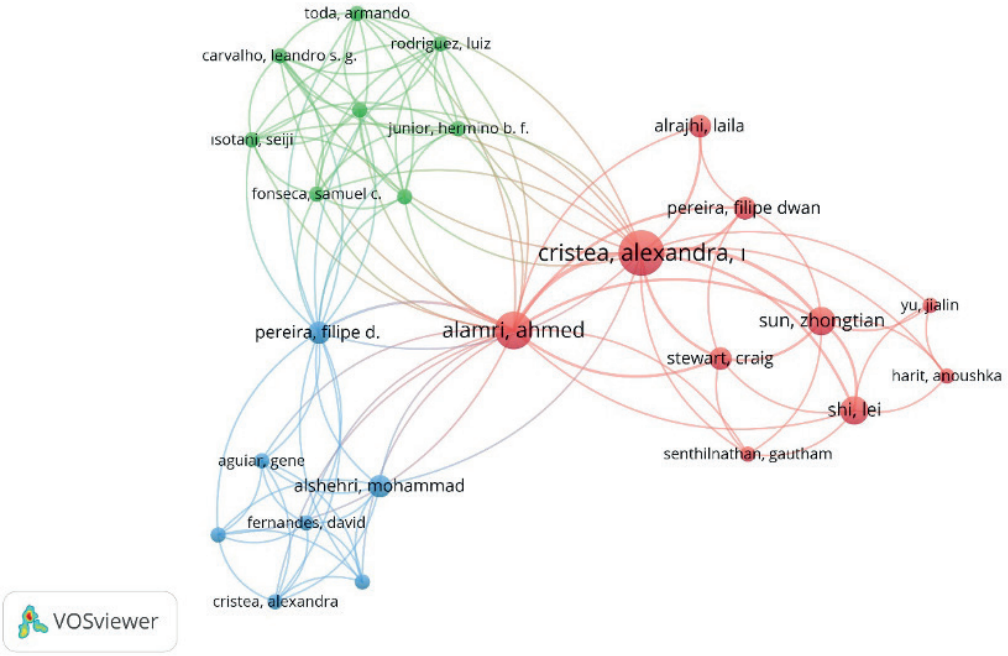

Figure 7. Co-Authorship Analysis of the Authors

The analysis revealed three clusters, 111 links, and a total link strength of 126 among the authors. Filipe D. Pereira (Brazil, Federal University of Roraima) had the highest number of links, with a total link strength of 30, out of the 25 authors. The social network in the career field is centered around two scientists, Ahmed Alamri (UK, Durham University) and Alexandra I. Cristea (UK, Durham University), who have 29 and 28 total link strengths, respectively. They contribute significantly to the formation of the social structure of the field and facilitate the flow of information within it. Upon analyzing Pereira's works on Google academic page (https://scholar.google.com.br/citations?user=UCv3rJQAAAAJ&hl=eng), it was found that the author has produced 79 publications, primarily articles, in the fields of machine learning, data science, artificial intelligence, learning analytics, and educational data mining. Alamri's academic page (https://scholar.google.co.uk/citations?user=zHrHsRYAAAAJ&hl=en) indicates that he specializes in Computer Science and has produced 30 publications, mostly articles. His publications on MOOCs have been widely cited. On Cristea's academic page, which ranks third in terms of total link strength after Pereira and Alamri (https://scholar.google.ca/citations?user=jQMxCKYAAAAJ&hl=en), the author's research interests include user modelling, learning analytics, web science, artificial intelligence in education, and personalization. Cristea has published 420 articles, mostly in the form of articles.

The reviewed studies, published mainly as articles after 2000, focus on the e-learning model that utilizes technology to make learning independent of time and space. The aim of these studies is to enhance the open and distance learning process and increase satisfaction levels of all stakeholders, particularly students.

Research has shown that there is an attempt to adapt models based on "dropout" or "persist", which are indicators of stakeholder satisfaction, to current conditions using computer-based tools, methods and techniques. To minimize dropout rates, various tools, methods, and techniques are employed, including computer-based prediction methods, personalization, gamification, motivation, learning analytics, machine learning, educational data mining, artificial intelligence, semantic web, educational adaptive hypermedia, multifaceted open social learner modelling, MOOCs, Adaptive hypermedia and web-based systems, collaborative learning standardization, and open social learner modelling.

Co-Authorship Analysis for Institutions

The co-authorship relations formed by the institutions to which authors are affiliated were analyzed as part of the research. The analysis included institutions with "at least 2 publications and 2 citations" in the research context. The analysis of 25 institutions resulted in 3 clusters, 111 links and a total link strength of 126. The co-authorship network for collaboration between institutions is shown in Figure 8.

Figure 8. Co-Authorship Analysis of the Institutions

In the co-authorship analysis based on the number of institutional publications, the top three universities are "Universitat Autònoma de Barcelona" with 19 publications, followed by "Vanderbilt University" with 15 publications and "University of Minnesota" with 15 publications. In terms of citations of institutional publications, the top three positions are held by "University of Michigan" with 814 citations, "State University of New York at Albany" with 681 citations and "University of Illinois" with 676 citations. The institutions with the highest total link strengths are "University of Michigan" with 18 link strengths, followed by "Maastricht University" and "University of Pennsylvania".

Co-Authorship Analysis of Countries

In order to create a network map of citations received by authors based on their countries within the scope of the research, an analysis was carried out on 53 countries that had published at least 5 articles and received at least 5 citations from each country. The analysis revealed 10 clusters, 179 links and a total link strength of 306. The network of co-authorship between countries is shown in Figure 9.

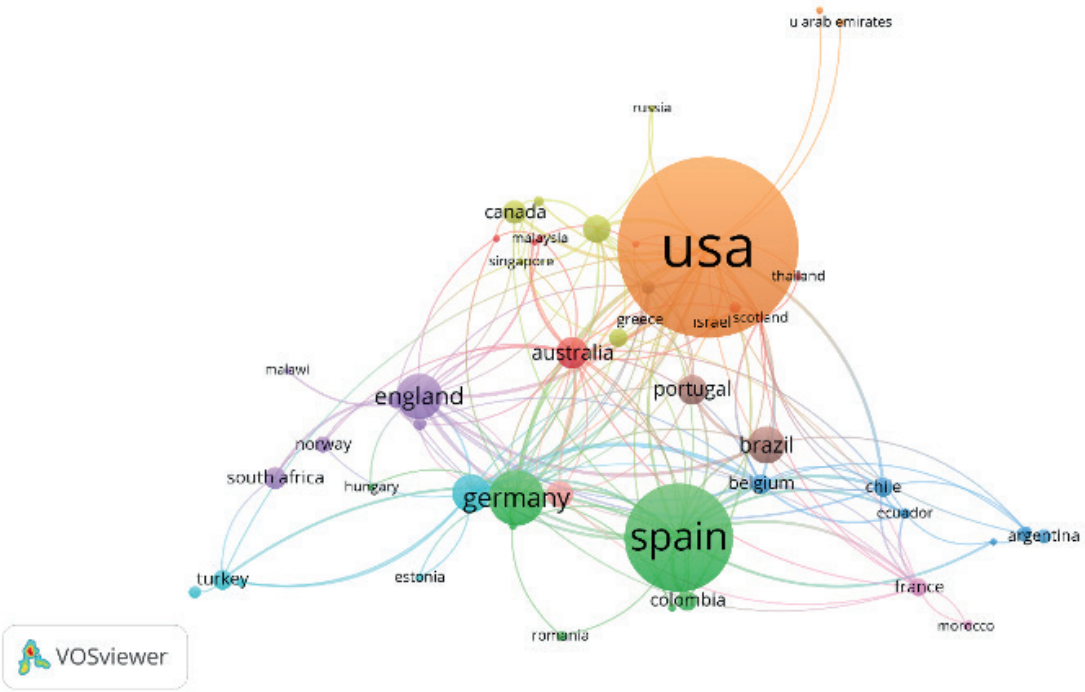

Figure 9. Co-Authorship Analysis of the Countries

In the joint authorship analysis based on the number of publications by countries, the top three countries are "USA" with 416 publications, "Spain" with 223 publications, and "Germany" with 99 publications. In the analysis based on the citation counts of publications, the top three positions are held by "USA" with 12.163 citations, "Spain" with 1.937 citations, and "England" with 1.550 citations. The top three countries with the highest total link strengths are "USA" with 78 link strengths, "Spain" with 55 link strengths, and "England" with 44 link strengths.

Co-Citation Analysis (Authors)

Co-citation analysis is a form of document matching that measures the relationships between co-cited papers. For a robust co-citation analysis, multiple authors must have previously been co-cited together. In this context, co-citation focuses on jointly cited authors, terms, sources or documents. Co-authorship analysis is considered a measure of collaboration in scientific publications, indicating a strong social network. Furthermore, co-authorship analysis can reveal collaborations between institutions and countries by using bibliographic data, including authors' affiliations and geographical regions (Noyons, 2004; Small, 1973; Zupic & Cater, 2015).

In this analysis, publications with a minimum of 20 citations within the scope of the study were selected, resulting in an analysis involving 205 authors. The results showed a total of 5 clusters, 7.634 links and a total link strength of 52.580. The network of collaborative authorship between authors is shown in Figure 10.

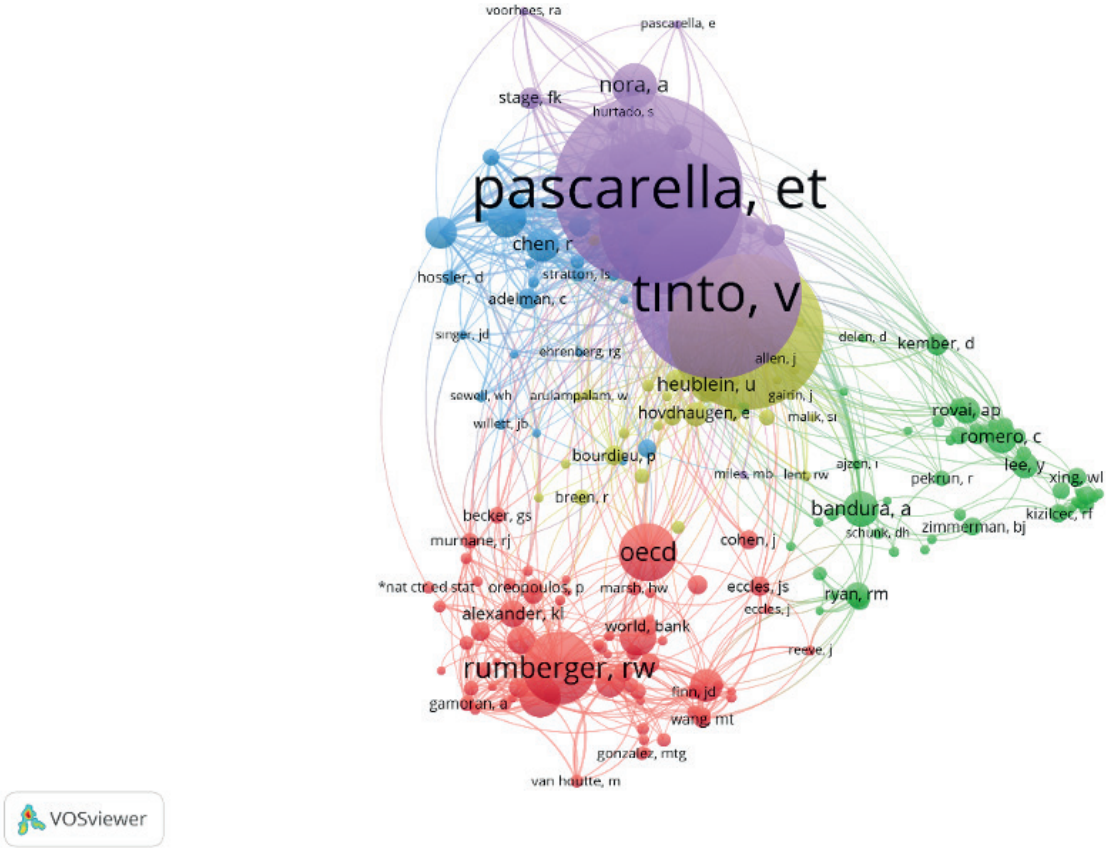

Figure 10. Co-Citation Analysis of Authors

According to Figure 10, the authors who have received the highest number of citations for their work are "E.T. Pascarella" with 531 citations, followed by "V. Tinto" with 473 citations and "J.P. Bean" with 395 citations. The authors with the highest total link strength in the network are "E.T. Pascarella" with 7.085 link strength, "J.P. Bean" with 6.040 link strength and "V. Tinto" with 5.463 link strength.

Co-Occurrence of Keyword Analysis

Co-occurrence of keywords analyses reveal connections between concepts (words or themes) that appear together in keywords or abstracts. In addition, thematic networks or clusters created from the results of co-occurrence analysis have the potential to synthesize and organize existing knowledge in the field, thus providing insights for identifying potential future research directions (De Bakker et al., 2005). Common keyword analysis can be based on document titles, keywords or abstracts (Ozturk, 2021).

In this analysis, instead of using titles and abstracts, the most frequently used keywords were used. In this context, the "co-occurrence" type of analysis was selected in VOSviewer, with "author keywords" as the unit of analysis. Of the 3.340 terms extracted from the author keywords section of the 1.615 documents obtained from the literature search, 171 keywords were identified that were repeated at least 5 times. As a result of the analysis, 10 clusters, 1.251 links and a total link strength of 2.088 were obtained. The network structure showing the relationships between the keywords is shown in Figure 11.

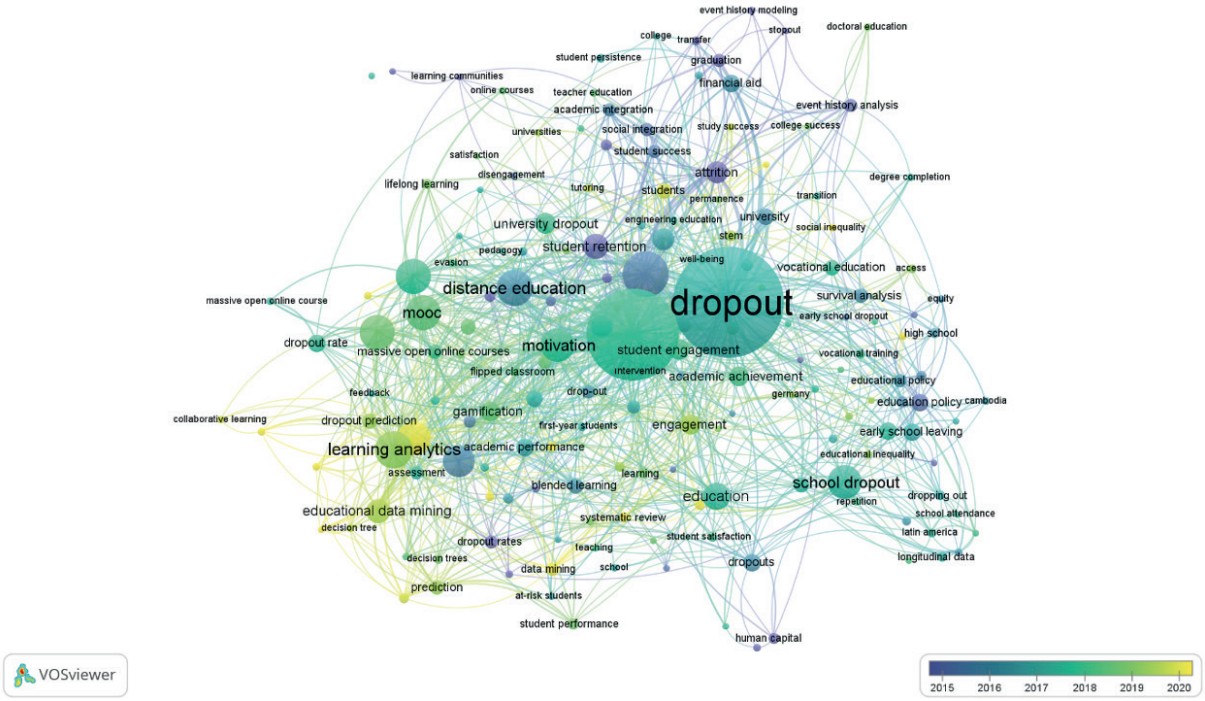

Figure 11. Layer Map of the Most Used Terms in Keywords

Figure 11 shows the results of the layer visualization, where the most commonly used keywords are hierarchically categorized based on the publication year. The figure also demonstrates that concepts such as "dropout", "student engagement", "learning analytics", "distance education", "school dropout", "motivation" "massive open online course", and "dropouts" are frequently used. From 2015 to 2018, it was noted that these concepts were favored over standard terms such as "distance education", "student retention", "well-being", "attrition", "early school leaving", and "education". After 2019, the keywords have transformed into concepts such as "learning analytics", "educational data mining", "systematic review" "engagement", "drop prediction", "decision tree", "student performance", "gamification", "massive open online course-MOOC", and "artificial intelligence".

DISCUSSIONS

Open and Distance Learning (ODL) institutions embrace the principle of global accessibility, aiming to provide educational opportunities beyond the constraints of time and space, thus serving as a mission to reach millions of people. While these institutions have the potential to have a profound impact on lives and societies, they have also been the subject of legitimate criticism regarding their effectiveness. At the heart of these criticisms is the remarkably low completion rates of open and distance education institutions on a global scale (Lee & Choi, 2011). For example, when looking at dropout times and rates at institutions such as the Open University, it has been found that approximately 14% of students drop out before the start of the course and a further 18% drop out before the first assignment is due. In addition, 14% drop out informally before assignments, 12% fail exams where resits are allowed, 3% have the opportunity to resit exams but don't, and 1% are removed from the register for persistent poor performance and another 1% for non-payment of registration fees. These are the statistics that manifest themselves as different reasons for student attrition in the context of The Open University and similar institutions. While open and distance learning institutions hold the promise of widening access to education, addressing the challenges that lead to such attrition rates remains an ongoing concern. In this context, it can be noted that the dropout rate of students is quite significant, reaching up to 67%. Similarly, Anadolu University Open Education System, which has a significant position in the world, has a total of 3,550,945 students enrolled in the 2020-2021 academic year as of December, and only 32% of them continue to attend classes (Anadolu University, 2022).

Under the principles of open universities, students have the right to continue or interrupt their education whenever they wish. However, the fact that only around 32% of students continue to attend classes in the open education system, while the remaining large proportion of around 68% either do not return to the system or have unpredictable completion rates among those who do, raises questions about the efficiency of the system. Similar situations are observed when looking at other universities offering open and distance education. The percentage of graduates among students at these institutions is as follows 5.3% at Athabasca University in Canada, 2.5% at the Open University in the Netherlands, 14% at Ambedkar University in India and 6% at the University of South Africa (Simpson, 2010).

In this study, the bibliometric profile of publications on the reasons for dropping out of school, which is an important issue in ODL, between the years 1980 and 2022 was examined under the headings of descriptive and evaluative findings. When examining the distribution of publications by years in the descriptive analysis findings of the study, it was observed that the number of research papers within the scope of the study generally remained stable between 1980 and 2004. The period from 2004 to 2018 shows significant fluctuations in the number of publications. On the contrary, there was a peak in the number of publications in 2019, with 188 research papers. It is noteworthy, however, that there was a decrease in the number of publications between 2020 and 2022. The reason for this decline can be attributed to the COVID-19 pandemic. During this period, due to the adverse effects of the pandemic, some journals were unable to publish, while others chose to postpone their issues. However, the stages of stay-at-home orders during the COVID-19 pandemic led to distance learning becoming the global norm in 2020 (Williamson et al., 2020). From this perspective, it can be said that research on dropout in ODL may increase even further after 2022. Moreover, it can be predicted that future studies will focus on the development of more predictive methods using artificial intelligence technologies.

The evaluative analysis process of the study includes; citation analyses & bibliographic coupling analyses by publications, sources and countries, co-authorship analyses of authors, institutes and countries, co-citation analysis of authors, and finally co-occurrence of keyword analysis.

In the bibliographic coupling analysis carried out on the publications included in the study, the most cited research is the article entitled "Pascarella, E.T. & Terenzini, P.T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education*, *51*(1), 60-75" with 483 citations. This study stands out with its 78.5% correct prediction of students' persistence/voluntary withdrawal decisions (Pascarella & Terenzini, 1980). This highlights the importance of using scientific methods to predict outcomes in dropout research, as it can effectively contribute to the determination of preventive measures. This analysis also revealed that the article titled "Gross, J.P.K., Torres, V., & Zerquera, D. (2013). Financial aid and student achievement in a state with changing demographics. "*Research in Higher Education*, 54(4), 383-406." has the highest link strength with a value of 866. This situation suggests that, despite having only 15 citations and not being in the top 10 in terms of citations, the strong co-authorship networks of J.P.K. Gross with other researchers are prominent.

In the field of ODL, the standout source in terms of citation counts for dropout studies is the journal "Research in Higher Education", with a remarkable 42.3 citations per publication and a link strength of 15.777. The journal, which began publication in 1970, serves as a premier outlet and leading source for scholarly endeavors aimed at improving the effectiveness and productivity of colleges and universities (Volkwein et al., 1988). The journal's official website reports a 5-year impact factor of 3.5 for 2022 (Research and Higher Education, 2023). Looking at the distribution of publications by country, the most prolific contributor is the USA with 416 articles. This phenomenon can be explained by the fact that the USA has a history of early implementations of distance education dating back to the 1870s. Thus, with an impressive 12.163 citations and a link strength of 24.953, the country tends to stand out more than others in studies of dropouts in the context of ODL.

Based on the co-authorship analysis of the authors, three names emerge with the strongest connections among 25 authors. The author with the highest total connection strength (30) is Filipe D. Pereira, followed by Ahmed Alamri (29) and Alexandra I. Cristea (28). These authors closely follow current developments in their areas of interest, are at the center of the social network in their career fields, make significant contributions to the formation of the social structure in the field, and regulate the flow of information in the field.

In the analysis of inter-institutional co-authorship, based on citation and total link strength (814 citations and a link strength of 18), the "University of Michigan" emerges as the most productive institution. In terms of number of publications, the "Universitat Autònoma de Barcelona" stands out with 19 publications. Founded in 1814, the University of Michigan is a prominent state university in the USA (University of Michigan, 2023). The fact that it has the highest number of citations and the strongest links with other institutions can be interpreted as an indication of its strong tendency to stand out from other institutions. When analyzing co-authorship between countries, the USA stands out as the leading country with 416 publications, 12.163 citations and a link strength 78. This can be explained by the USA' support for research capacity and the tendency of authors to develop collaboratively rather than competing individually (Tynan & Garbett, 2007; Hebebci & Ozer, 2023), reflecting a commitment to mutual progress.

Keyword analysis in scientific publications aims to reveal thematic developments and topics that have been studied to varying degrees in the relevant literature, with the aim of providing guidance for future research (Sevim & Iscan, 2012). In the context of open and distance education systems, flexibility and support for social and individual differences play an important role in ensuring students' persistence in schools or programs. In 21st-century school dropout research, it is observed that the keywords used are directed towards these specific functions. Especially in the early years of research, keywords like "student engagement", "learning analytics", "academic achievement", "social exclusion", and "self-efficacy" took prominence, while in later years, they were replaced by terms such as "learning analytics", "educational data mining", "systematic review", "engagement"," "drop prediction", "decision tree", "student performance", "gamification", "massive open online course-MOOC", and "artificial intelligence".

Given the large number of students involved, the high dropout rate in universities offering open and distance education is one of the major challenges in the field. Identifying the reasons why students drop out of open and distance education is therefore of paramount importance. In the coming years, predicting students at risk of dropping out before they reach that point could be a fundamental step in taking the necessary measures to prevent them from leaving the system. The results of this research may also be useful for studies aimed at identifying and predicting groups at high risk of dropping out. Even a 1% improvement in dropout rates could mean thousands of people receiving the education and training they need to meet national and university targets. Therefore, a thorough analysis of the dropout situation is crucial for improving the efficiency of open and distance universities (Agus, 2019). In this context, it can be said that research on dropout in open and distance education is influenced by technological and social developments.

CONCLUSIONS

Open and distance learning has become the fastest-growing area in education in terms of the number of students and the market revenue of the related industry. However, there is a growing concern about the significantly higher student dropout rates compared to traditional education. Research on distance learning suggests that students who drop out of school may experience a reduction in their confidence in learning, leading to disappointment. Such failures can result in social isolation and economic losses. Therefore, it is necessary to establish a framework to identify trends, prominent studies, and institutions related to dropout in higher education in the field of open and distance learning. This study employs bibliometric analysis methods to examine academic research on 'dropout in open and distance education' in higher education between 1980 and 2022. The analysis identifies and examines the leading studies, researchers, institutions, and countries in research on dropout in open and distance learning in higher education.

Suggestions

Academic research conducted on ODL has the potential to contribute to the understanding of the phenomenon, analyze its societal impacts, develop strategic approaches, and create prevention and intervention strategies. These studies provide knowledge and analyses based on scientific foundations, thereby assisting stakeholders in the 21st century in understanding the challenges they face in distance education and in generating strategies to address these challenges. These strategies can include policy recommendations

aimed at identifying the reasons for dropout and implementing necessary measures to ultimately reduce dropout rates. In light of the research findings and information gathered from the literature, below are some recommendations for researchers planning to work from a bibliometric perspective on dropout in ODL:

- This study is based on the Web of Science database. A more comprehensive study can be conducted using data from global databases such as Scopus, ERIC (The Education Resource Information Center), and Google Scholar, or from national databases such as Dergipark and the Higher Education Board National Thesis Center.
- The bibliometric analysis method was used in this research. A more comprehensive analysis can be conducted by using one or more different analysis techniques together, such as meta-analysis, descriptive scanning, mixed scanning, critical scanning, scope/map scanning, qualitative systematic scanning, umbrella scanning, theoretical and realistic scanning.
- Although bibliometric analysis has many advantages for literature, it also has some weaknesses. To address these weaknesses, focus can be directed towards web-based measurements called "Altmetric" as suggested by Bornmann (2014). Altmetric involves measurements conducted through social media to mitigate some of these limitations.
- Studies may be conducted in more specific areas. For example, research on socio-cultural factors, which are one of the important factors influencing dropout, or studies on students' information-seeking behavior can be examined to obtain more detailed results.
- This research includes studies on dropout in higher education. Other studies may examine research conducted at different levels of education.
- This study focuses primarily on students. More comprehensive analytical studies can be carried out based on research related to academics, administrators of educational institutions who play an important role in ODL, and senior bureaucrats responsible for education policy in countries.
- Bibliometric analyses comparing different periods (e.g., pre-and post-COVID-19) can be carried out.
- In this study the VOSviewer software was used for data analysis. In other studies, other software such as CiteSpace, Biblioshiny and Pajek may be preferred.

Limitations

This research has some limitations, which can be outlined as follows:

- The publications examined in this study were obtained from the WoS database, which includes qualified peer-reviewed journals. Therefore, one of the most critical limitations is that the publications obtained are only from a specific database.
- Bibliometric studies often lack detailed information about relevant studies and their results as they typically focus on a large number of documents. It is important not to overlook these benefits. However, as noted by Gulmez et al. (2020), the bibliometric method offers valuable contributions, such as analyzing thousands of studies together, revealing authorship, keyword, and citation relationships, and utilizing high-level visual mapping.
- Another limitation is the use of VOSviewer software in the analysis of the data obtained.
- The research excludes the 2023 data from WoS because the study began in August 2023 and the year has not yet been completed.
- The research data is limited to the query sentence entered in the topic field on the advanced search page. The search terms used were TS=((“dropout*” or “drop-out*” or “school dropout*” or “dropping out*” or “open learn*” or “open edu*” or “open learn*” or “distance edu*” or “distance learn*) and (“higher edu*”))”.

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REFERENCES

Agus, F.S. (2019). *Acik ve uzaktan egitimde ogrencilerin okulu birakma nedenleri: Anadolu Universitesi Acikogretim Sistemi uzerine bir arastirma [Reasons for student dropout in open and distance education: A study at Anadolu University Open Education System].* [Unpublished master's thesis]. Anadolu University, Eskisehir, Turkiye. Retrieved July 10, 2023 from https://www-proquest-com.offcampus.anadolu.edu.tr/docview/2673999281?pq-origsite=summon

Al Husaeni, D.F., Nandiyanto, A.B.D., & Maryanti, R. (2022). Bibliometric analysis of educational research in 2017 to 2021 using VOSviewer: Google scholar indexed research. *Indonesian Journal of Teaching in Science*, *3*(1), 1-8. https://doi.org/10.17509/ijotis.v3i1

Al, U. (2008). Turkiye'nin Bilimsel yayin politikasi: Atif dizinlerine dayali bibliyometrik bir yaklasim [Scientific publication policy of Turkey: A bibliometric approach based on citation indexes]. [Unpublished master's thesis]. Hacettepe University, Ankara, Turkiye. Retrieved Juin 20, 2023 from https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Al, U. & Tonta, Y. (2004). Atif analizi: Hacettepe Universitesi Kutuphanecilik Bolumu tezlerinde atif yapilan kaynaklar [Citation analysis: Sources cited in dissertations completed at Hacettepe University Department of Librarianship]. *Information World*, *5*(1), 19-47. Retrieved Juin 20, 2023 from https://bd.org.tr/index.php/bd/article/view/497/493

Aldowah, H., Al-Samarraire, H., Alzahrani , A.I. & Alalwan, N. (2020). Factors affecting student dropout in MOOCs: A cause and effect decision-making model. *Journal of Computing in Higher Education, 32*(2), 429-454. https://doi.org/10.1007/s12528-019-09241-y

Anadolu University. (2022). 2020-2021 ogretim yili Aralik ogrenci sayilari *[Student Numbers of Open Education System*]. Retrieved July 15, 2023 from https://www.anadolu.edu.tr/universitemiz/sayilarla-universitemiz/ogrenci-sayilari/2020-2021/2020-aralik

Arslan, E. (2022). Sosyal Bilim arastirmalarinda VOSviewer ile bibliyometrik haritalama ve ornek bir uygulama [Bibliometric mapping in Social Sciences research using VOSviewer and an Implementation]. *Anadolu University Journal of Social Sciences*, *22*(2), 34-56. Retrieved July 21, 2023 from https://dergipark.org.tr/tr/download/article-file/2864384

Bean, J.P. (1983). The application of a model of turnover in work organizations to the student attrition process. *The Review of Higher Education*, *6*(2), 129-148. Retrieved Juin 14, 2023 from https://eric.ed.gov/?id=EJ276678

Bean, J.P., & Metzner, B. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research*, *55*(4), 485-65. https://www.jstor.org/stable/1170245

Behr, A., Glese, M., Herve, D.T.K. & Katja, T. (2020). Dropping out from higher education in Germany an empirical evaluation of determinants for bachelor students. *Open Education Studies*, 2, 126-148. https://doi.org/10.1515/edu-2020-0104

Billsberry, J., & Alony,I. (2023). The MOOC post-mortem: bibliometric and systematic analyses of research on massive open online courses (MOOCs), 2009 to 2022. *Journal of Management Education, August* (7), 1-37. https://doi.org/10.1177/10525629231190840

Birkle, C. Pendlebury, D.A., Schnell, J., & Adams, J. (2020). Web of Science as a data source for research on scientific and scholarly activity. *Quantitative Science Studies*, *1*(1), 363-376. https://doi.org/10.1162/qss_a_00018

Bornmann, L. (2014). Do altmetrics point to the broader impact of research? An overview of benefits and disadvantages of altmetrics. *Journal of Informetrics, 8*(4), 895-903. https://doi.org/10.1016/j.joi.2014.09.005

Bozkurt, A. (2014). Ag toplumu ve ogrenme: Baglanticilik [Network society and learning: Connectivism]. In M. Akgul, U. Caglayan, E. Derman & A. Ozgit (Eds.), *XVI. Akademik Bilisim Konferansi Bildirileri [Academic Informatics Conference papers] (pp. 609-614)* Mersin, Turkiye: Mersin Universitesi.

Bozkurt, A. (2020). From distance education to open and distance learning: a holistic evaluation of history, definitions, and theories. In S. Sisman-Ugur, & G. Kurubacak (Eds.), *Handbook of Research on Learning in the Age of Transhumanism* (pp. 252-273). Hershey, Pennsylvania: IGI Global. DOI: 10.4018/978-1-5225-8431-5. Retrieved Juin 12, 2023 from https://www-igi-global-com.offcampus.anadolu.edu.tr/gateway/book/217946

Borner, K., Chen, C., & Boyack, K. W. (2005). Visualizing knowledge domains. *Annual Review of Information Science and Technology*, *37*(1), 179-255. https://doi.org/10.1002/aris.1440370106

Cabrera, A.F., Castaneda, M.B., Nora, A., & Hengstler, D. (1992). The convergence between two theories of college persistence. *The Journal of Higher Education*, *63*(2), 143-164. https://doi.org/10.2307/1982157

Cabrera, A.F., Nora, A., & Castaneda, M.B. (1993). College persistence: Structural equations modeling test of an Integrated Model of Student Retention. *The Journal of Higher Education*, *64*(2), 123-139. https://doi.org/10.2307/2960026

Chen, C. (2017). Science mapping: a systematic review of the literature. *Journal of Data and Information Science*, *2*(2), 1-40. https://doi.org/10.1515/jdis-2017-0006

Clarivate. (September 2023). *Resources for librarians and researchers*. Retrieved Juin 15, 2023 from https://clarivate.libguides.com/librarianresources

De Bakker F.G.A, Groenewegen P., & Den Hond F (2005) A bibliometric analysis of 30 years of research and theory on corporate social responsibility and corporate social performance. *Business & Society, 44*(3), 283-317. https://doi.org/10.1177/00076503052780

Dede, E. & Ozdemir, E. (2022). Mapping and performance evaluation of mathematics education research in Turkey: A bibliometric analysis from 2005 to 2021. *Journal of Pedagogical Research, 6*(4), 1-19. https://doi.org/10.33902/JPR.202216829

Dirik, D., Eryilmaz, I., & Erhan, T. (2023). Post-truth kavrami uzerine yapilan calismalarin VOSviewer ile bibliyometrik analizi [A Bibliometric analysis using VOSviewer of publications on post-truth]. *Sosyal Mucit Academic Review*, *4*(2), 164-188. Retrieved Juin 23, 2023 from https://dergipark.org.tr/tr/download/article-file/3036932

Downes, S. (2012) *Connectivism and connective knowledge: Essays on meaning and learning networks*. Canada: National Research Council. Retrieved July 13, 2023 from https://www.downes.ca/files/books/Connective_Knowledge-19May2012.pdf

Ekren, G. & Kumtepe-Genc, E. (2018). Yuksekogrenim duzeyinde uzaktan egitimde "aciklik" kavramina yonelik icerik analizi [Content analysis of concept of the "openness" in higher distance education]. *Acikogretim Uygulamalari ve Arastirmalari Dergisi*, *4*(2), 112-128. Retrieved Juin 10, 2023 from https://dergipark.org.tr/tr/download/article-file/465589

Elibol, S., & Bozkurt, A. (2023). Student dropout as a never-ending evergreen phenomenon of online distance education. *European Journal of Investigation in Health, Psychology and Education, 13*(5), 906-918. https://doi.org/10.3390/ejihpe13050069

Ertem, H. Y. & Aypay, A. (2023). Bibliometric analysis of research on the first-year experiences of university students. *TUBA Higher Education Research/Review (TUBA-HER), 13*(1), 131-142. DOI: 10.2399/yod.23.1186245. https://doi.org/10.2399/yod.23.1186245

Esgice, M. (2015). *Acik ve uzaktan egitim ogrencilerinin okul birakma sebepleri [Causes of students drop out in open and distance education students*]. [Unpublished master's thesis]. Ataturk University, Erzurum, Turkiye. Retrieved July 23, 2023 from https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Falagas, M.E., Pitsouni, E.I., Malietzis, G.A., & Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: Strengths and weaknesses. *The FASEB Journal*, *22*(2), 338-342 https://doi.org/10.1096/fj.07-9492LSF

Ferrandiz-A.D. (2021). Analysis of university dropout in Spain: a bibliometric study. Publicaciones, *51*(2), 265-285. https://orcid.org/0000-0003-4924-1334

Fingerman, S. (2006). Web of Science and Scopus: Current features and capabilities. *Issues in Science and Technology Librarianship*, 48. https://doi.org/10.29173/istl2081

Garfield, E. (1980). Bradford's Law and related statistical patterns. *Current Contents*, 19, 5-12. Retrieved July 11, 2023 from http://www.garfield.library.upenn.edu/essays/v4p476y1979-80.pdf

Gross, J.P.K., Torres, V., & Zerquera, D. (2013). Financial aid and attainment among students in a state with changing demographics. *Research in Higher Education*, *54*(4), 383-406. Retrieved August10, 2023 from https://www.jstor.org/stable/23470968

Gulmez, D., Ozteke, I, & Gumus, S. (2020). Uluslararasi dergilerde yayimlanan Turkiye kaynakli egitim arastirmalarinin genel gorunumu: Bibliyometrik analiz [An overview of educational research from Turkey published in international journals: A bibliometric analysis]. *Egitim ve Bilim, 46*(206), 213-239. http://dx.doi.org/10.15390/EB.2020.9317

Gunduz & Karaman. (2020). Open Education Faculty and distance education students' dropout reasons: the Case of a Turkish State University. *Open Praxis, 12*(1), 7-25. https://dx.doi.org/10.5944/openpraxis.12.1.970

Guzman, A., Barragan, S., & Vitery, F.C. (2021). Dropout in rural higher education: A systematic review. *Frontiers in Education*, 6, 727833. Retrieved July 27, 2023 from https://www.researchgate.net/publication/354446252_Dropout_in_Rural_Higher_Education_A_Systematic_Review

Hebebci, M.T. (2021). The bibliometric analysis of studies on distance education. *International Journal of Technology in Education* , *4*(4), 796-817. https://doi.org/10.46328/ijte.199

Hebebci, M. T., & Alan, S. (2021). Gamification in education: An overview of the literature. In A. Csiszarik-Kocsir & P. Rosenberger (Eds.), *Current Studies in Social Sciences 2021* (pp. 174–194). ISRES Publishing. Retrieved August 15, 2023 from https://www.researchgate.net/publication/357538935_Gamification_in_Education_An_Overview_of_the_Literature

Hebebci, M.T. & Ozer, N. (2023). Blended learning in higher education: A bibliometric analysis. *Turkish Online Journal of Distance Education*, *24*(3), 93-116. https://doi.org/10.17718/tojde.1143832

Kara, M., Erdogdu, F., Kokoc, M., & Cagiltay, K. (2019). Challenges faced by adult learners in online distance education: A literature review. *Open Praxis*, *11*(1), 5-52. https://doi.org/10.5944/openpraxis.11.1.929

Karasozen, B, Bayram, O.G, & Zan B.U. (2011). WoS ve Scopus veri tabanlarinin karsilastirmasi [Comparison of the WoS and Scopus Databases]. *Turkish Librarianship*. 2011; *25*(2), 238-260. Retrieved July 13, 2023 from https://dergipark.org.tr/en/download/article-file/812045#:~:text=T%C3%BCm%20konu%20ba%C5%9Fl%C4%B1klar%C4%B1%20dikkate%20al%C4%B1nd%C4%B1%C4%9F%C4%B1nda,51%20konu%20ba%C5%9Fl%C4%B1%C4%9F%C4%B1n%C4%B1n%20bulundu%C4%9Fu%20g%C3%B6r%C3%BClmektedir

Kember, D. (1989). A longitudinal-process model of drop-out from distance education. *The Journal of Higher Education*, *60*(3), 278-301. https://doi.org/10.2307/1982251

Kember, D. (1995). *Open learning for adults: A model of student progress*. New Jersey: Educational Technology Pub.

Kessler, M.M. (1963). Bibliographic coupling between scientific papers. *American Documentation*, *14*(1), 10-25. Retrieved June 21, 2023 from https://onlinelibrary.wiley.com/doi/10.1002/asi.5090140103

Khandelwal, C., Kumar, S., & Sureka, R. (2022). Mapping the intellectual structure of corporate risk reporting research: A bibliometric analysis. *International Journal of Disclosure and Governance*, *19*(2), 129-143. https://doi.org/10.1057/s41310-022-00141-9

Kilian, P., Loose, F., & Kelava, A. (2020). Predicting math student success in the initial phase of college with sparse information using approaches from statistical learning. *Frontiers in Education*, 5, 502698. https://doi.org/10.3389/feduc.2020.502698

Kirdar, E., & Benlï, A. (2020). Ulusal Tez Merkezi'nde bulunan sosyal guvenlik alaninda yazilmis tezlerin bibliyometrik analizi [Bibliometric analysis of theses written in the field of social security in the National Thesis Centre]. *Bilgi: Sosyal Bilimler Dergisi*, *22*(1), 95-109. Retrieved June 11, 2023 from https://dergipark.org.tr/tr/download/article-file/1174848

Kumar, S. (2015). Co-authorship networks: A review of the literature. *Aslib Journal of Information Management, 67*(1), 55-73. https://doi.org/10.1108/AJIM-09-2014-0116

Kushairi, N., & Ahmi, A. (2021). Flipped classroom in the second decade of the Millenia: a Bibliometrics analysis with Lotka's law. *Education and Information Technologies,* 26, 4401–4431. https://doi.org/10.1007/s10639-021-10457-8

Latchem, C., Ozkul, A.E., Aydin, C.H., & Mutlu, M.E. (2006). The Open Education System, Anadolu University, Turkey: E-transformation in a mega-university. *Open Learning: The Journal of Open, Distance and e-Learning*, *21*(3), 221-235. https://doi.org/10.1080/02680510600953203

Lee, Y. & Choi, J. (2011). A review of online course dropout research: Implications for practice and future research. *Educational Technology Research and Development*, *59*(5), 593-618. https://doi.org/10.1007/s11423-010-9177-y

Lee, Y., Choi, J., & Kim, T. (2013). Lee, Y., Choi, J., & Kim, T. (2013). Discriminating factors between completers of and dropouts from online learning courses. *British Journal of Educational Technology, 44*(2), 328-337. https://doi.org/10.1111/j.1467-8535.2012.01306.x

Levitz, R.S., Noel, L., & Richter, B.J. (1999). Strategic moves for retention success. *New Directions for Higher Education*, *1999*(108), 31-49. http://dx.doi.org/10.1002/he.10803

McGivney, R.J. (2009). *Adult student persistence in online education: Developing a model to understand the factors that affect adult student persistence in a course* [Unpublished doctoral dissertation], University of Massachusetts, Amherst, USA. https://doi.org/10.7275/5647045

Muljana, P.S. & Luo, T. (2019). Factors contributing to student retention in online learning and recommended strategies for improvement: A systematic literature review. *Journal of Information Technology Education: Research*, 18, 19-57. https://doi.org/10.28945/4182

Nagda, B.A., Gregerman, S.R. Jonides, J., von Hippeel, W., & Lerner, J.S. (1998). Undergraduate student-faculty research partnerships affect student retention. *The Review of Higher Education*, *22*(1), 55-72. Retrieved July 10, 2023 from https://muse.jhu.edu/article/30062

Nicholas, D. & Ritchie, M. (1978). *Literature and bibliometrics*. Hamden, Connecticut, USA: Linnet Books.

Nora, A., Cabrera, A., Serra Hagedorn, L., & Pascarella, E.T (1996). Differential impacts of academic and social experiences on college-related behavioral outcomes across different ethnic and gender groups at four-year institutions. *Research in Higher Education*, *37*(4), 427-451. Received August 24 from https://www.researchgate.net/publication/227287680_Differential_Impacts_of_Academic_and_Social_Experiences_on_College-Related_Behavioral_Outcomes_Across_Different_Ethnic_and_Gender_Groups_at_Four-Year_Institutions

Noyons, C.M. (2004). Science maps within a science policy context: Improving the utility of science and domain maps within a science policy and research management context. In H.F. Moed, W. Glanzel, & U. Schmoch (Eds.), *Handbook of quantitative science and technology research: The use of publication and patent statistics in studies of S&T Systems* (pp. 237-255). NY: Kluwer Academic Publishers.

Okur, M.R., Bas, P.D., & Gunes, E.P.U. (2019). Acik ve uzaktan ogrenmede ogrenimi birakma sebeplerinin incelenmesi [Examination of dropout causes in open and distance learning]. *Yuksekogretim ve Bilim Dergisi*, 9(2), 225-235. DOI: 10.5961/jhes.2019.324. Retrieved June 11, 2023 from https://dergipark.org.tr/tr/download/article-file/1712181

Osareh, F. (1996). Bibliometrics, citation analysis and co-citation analysis: A review of literature I. *Libri*, *46*(3), 149-158. Retrieved August 11, 2023 from https://www.researchgate.net/publication/249945876_Bibliometrics_Citation_Analysis_and_Co-Citation_Analysis_A_Review_of_Literature_I

Ozkul, A.E. & Aydin, C.H. (2013). Ogrenci adaylarinin acik ve uzaktan ogrenmeye yonelik gorusleri [Teacher Candidates' Views on Open and Distance Learning]. In M. Akgul, U. Caglayan, E. Derman, A. Ozgit, S. Guven and K. Karaman (Eds.). *XIV. Akademik Bilisim Konferansi bildirileri [Academic Informatics Conference papers]* (pp. 169-176). Usak, Turkiye: Usak University Press.

Ozturk, O. (2021). Bibliometric review of resource dependence theory literature: An overview. *Management Review Quarterly*, *71*(3), 525-552. https://doi.org/10.1007/s11301-020-00192-8.

Pare, G., Trudel, M-C., Jaana, M., & Kitsiou, S. (2015). Synthesizing information systems knowledge: A typology of literature reviews. *Information & Management*, *52*(2), 183-199. https://doi.org/10.1016/j.im.2014.08.008

Park, J-H. (2007). Factors related to learner dropout in online learning. In F. M. Nafukho, T. H. Chermack, & C. M. Graham (Eds.), *Proceedings of the 2007 Academy of Human Resource Development Annual Conference* (pp. 1-8). Academy of Human Resource Development. Retrieved June11, 2023 from https://eric.ed.gov/?id=ED504556

Pascarella, E.T. & Terenzini, P.T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education*, *51*(1), 60-75. https://doi.org/10.2307/1981125

Pauna, V.H., Buonocore, E., Renzi, M., Russo, G.F., & Franzese, P.P. (2019). The issue of microplastics in marine ecosystems: A bibliometric network analysis. *Marine Pollution Bulletin*, 149, 110612. https://doi.org/10.1016/j.marpolbul.2019.110612

Prioteasa, A-L., Ciocoiu, C.N., Lazăr L., & Minciu, M. (2023). E-Learning in higher education during the COVID-19 Pandemic: A bibliometric *Analysis. Proceedings of the International Conference on Business Excellence, 17*(1), 1858-1872. https://doi.org/10.2478/picbe-2023-0164

Racherla, P. & Hu, C. (2010). A social network perspective of tourism research collaborations. *Annals of Tourism Research*, *37*(4), 1012-1034. https://doi.org/10.1016/j.annals.2010.03.008

Radovan, M. (2019). Should I stay, or Should I go? Revisiting Student retention models in distance education. *Turkish Online Journal of Distance Education*, *20*(3), 29-40. Retrieved September 23, 2023 from https://dergipark.org.tr/tr/download/article-file/773216

Rehn, C., Gornitzki, C., Larsson, A., & Wadskog, D. (2014). Bibliometric handbook for Karolinska Institutet. Stockholm, Sweden: Karolinska Institutet University Library Publications.

Rovai, A.P. (2003). In search of higher persistence rates in distance education online programs. *Internet and Higher Education*, *6*(1), 1-16. https://doi.org/10.1016/S1096-7516(02)00158-6

Selelo, M. E., & Manamela, M. G. (2022). Coining Online Teaching and Learning in Higher Education: Reference to COVID-19 Pandemic in South Africa. *International Journal of Social Sciences and Educational Studies*, *9*(2), 53-62. https://doi.org/10.23918/ijsses.v9i2p53

Sevim, O. & Iscan, A. (2012). Turkcenin egitimi ve ogretimi alaninda yapilan yuksek lisans tezlerinde gecen anahtar kelimelere donuk bir icerik analizi [A content analysis of keyword of theses in the field of Turkish education and technology]. *Turkish Studies*, *7*(1), 1863-1873. Retrieved July 25, 2023 from https://turkishstudies.net/DergiTamDetay.aspx?ID=3202

Siemens, G. (2005). Connectivism: a learning theory for the digital age. *International Journal of Instructional Technology & Distance Learning*, *2*(1), 1-8. Retrieved September 23, 2023 from http://www.itdl.org/Journal/Jan_05/article01.htm

Simpson, O. (2003). *Student retention in online open and distance learning*. London: Routledge.

Simpson, O. (2010). 22%-can we do better? In *The CWP Retention Literature Review: Final Report*, 47. UK: The Open University. Retrieved July 12, 2023 from https://www.researchgate.net/profile/Ormond-Simpson/publication/342338625_'22_-can_we_do_better'-The_CWP_Retention_Literature_Review_'/links/5eee5005458515814a6f6652/22-can-we-do-better-The-CWP-Retention-Literature-Review.pdf

Simpson, O. (2013). Student retention in distance education: Are we failing our students? *Open Learning: The Journal of Open, Distance and e-Learning*, 28, 105-119. https://doi.org/10.1080/02680513.2013.847363

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for Information Science*, *24*(4), 265-269. https://doi.org/10.1002/asi.4630240406

Spady, W.G. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange,* 1, 64-85. Retrieved August 20, 2023 from https://link.springer.com/article/10.1007/BF02214313

Spady, W.G. (1971). Dropouts from higher education: Toward an empirical model. *Interchange*, *2*(3), 38-62. https://doi.org/10.1007/BF02282469

Stephen, J.S., Rockinson-Szapkiw, A.J., & Dubay, C. (2020). Persistence model of non-traditional online learners: Self-efficacy, self-regulation, and self-direction. *American Journal of Distance Education*, *34*(4), 306-321. https://doi.org/10.1080/08923647.2020.1745619

Talan, T. (2021). Augmented reality in STEM education: Bibliometric analysis. *International Journal of Technology in Education (IJTE)*, *4*(4), 605-623. https://doi.org/10.46328/ijte.136

Tinto, V. (1975). Dropout in higher education: A theoretical synthesis of recent research. *Review of Educational Research*, *45*(1), 89-125. https://doi.org/10.2307/1170024

Tonta, Y., & Al, U. (2008). Turkce makalelerin dergilere dagilimi ve Bradford Yasasi [Scatter of Turkish Articles to Journals and the Bradford Law], *Information World*, *9*(1), 41-66. Retrieved August 21, 2023 from https://bd.org.tr/index.php/bd/article/view/327/324

Tynan, B.R., & Garbett, D.L. (2007). Negotiating the university research culture: Collaborative voices of new academics. *Higher Education Research & Development*, *26*(4), 411-424. https://doi.org/10.1080/07294360701658617

University of Michigan (September, 2023). About UMICH. Retrieved September 11, 2023 from https://umich.edu/about/

Utami, S., Winarni, I., Handayani, S.K., & Zuhairi, F.R. (2020). When and who dropouts from distance education? *Turkish Online Journal of Distance Education*, *21*(2), 141-152. https://doi.org/10.17718/tojde.728142

Van Eck, N.J. & Waltman, L. (2018). *VOSviewer Manual: Version 1.6.8*. The Netherlands: Universiteit Leiden. Retrieved September 23, 2023 from https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.8.pdf

Van Eck, N.J. & Waltman, L. (2022). *VOSviewer Manual: Version 1.6.18*. The Netherlands: Universiteit Leiden. Retrieved August 12, 2023 from https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.18.pdf

Van Eck, N.J. & Waltman, L. (2023). *VOSviewer Manual: Version 1.6.19*. The Netherlands: Universiteit Leiden. Retrieved August 12, 2023 from https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.19.pdf

Van Leeuwen, T. (2004). Descriptive versus evaluative bibliometrics. In H.F. Moed, W. Glanzel, & U. Schmoch (Eds.), *Handbook of quantitative science and technology research: The use of publication and patent statistics in studies of S&T Systems* (pp. 373-388). NY: Kluwer Academic Publishers.

Venegas-Muggli, J.I. (2020). Higher education dropout of non-traditional mature freshmen: The role of sociodemographic characteristics. *Studies in Continuing Education*, *42*(3), 316-332. https://doi.org/10.1080/0158037X.2019.1652157

Vieira, K.M., Bender Filho, R., Junior, E.D.S.C., & Santos G.M. (2023). Determinants of distance education dropout: Evidence for Open University of Brazil/Federal University of Santa Maria courses. *Turkish Online Journal of Distance Education*, *24*(1), 162-184. https://doi.org/10.17718/tojde.954673

Volkwein, J.F., Carbone, D.A., & Volkwein, E.A. (1988). Research in higher education: Fifteen years of scholarship. *Research in Higher Education*, *28*(3), 271-280. Retrieved July 12, 2023 from https://link.springer.com/content/pdf/10.1007/BF00992235.pdf

Wang, R., Cao, J., Xu, Y., & Li, Y. (2022). Learning engagement in massive open online courses: A systematic review. *Frontiers in Education,* 7, 1-17. Retrieved June 11, 2023 fromhttps://www.researchgate.net/publication/366477153_Learning_engagement_in_massive_open_online_courses_A_systematic_review

Wang, W., Zhao, Y., Wu, Y.J., & Goh, M. (2023). Factors of dropout from MOOCs: A bibliometric review. *Library Hi Tech*, *41*(2), 432-453. https://doi.org/10.1108/LHT-06-2022-0306

White, E.C. (1985). Bibliometrics: From curiosity to convention. *Special Libraries*, *76*(1), 35-42. Retrieved June 12, 2023 from https://eric.ed.gov/?q=Bibliometrics%3a+From+curiosity+to+convention&ft=on&pg=4

Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency. *Learning, Media and Technology*, *45*(2), 107-114. https://doi.org/10.1080/17439884.2020.1761641

Yildiz, A. (2022). Bir arastirma metodolojisi olarak sistematik literatur taramasina genel giris [Overview of systematic literature review as a research methodology]. *Anadolu University Journal of Social Sciences*, *22*(2), 367-386. Retrieved August 10, 2023 from https://dergipark.org.tr/en/download/article-file/2864548

Yilmaz, A. (2020). *Acik ve uzaktan egitim ogrencilerinin ogrenimi birakma ve ogrenime devam nedenlerinin incelenmesi [Why do open and distance education student's dropout or persist?].* (Doctoral dissertation, Gazi University, Ankara, Turkiye). Retrieved August 11, 2023 from https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Yilmaz-Bagriacik, A. & Karatas, S. (2022). Why do open and distance education students drop out? Views from various stakeholders. *International Journal of Educational Technology in Higher Education, 19*(1), 1-22. https://doi.org/10.1186/s41239-022-00333-x

Yilmaz, M. (2019). Bibliyometriye elestirel bir bakis [A Critical View on Bibliometrics]. *Turkish Librarianship*, *33*(1), 43-49. Retrieved July, 17, 2023 from https://dergipark.org.tr/tr/download/article-file/719613

Yilmaz, T. (2020). *Universite terki: Bir durum calismasi [University dropout: A case study].* [Unpublished doctoral dissertation], Aydin Adnan Menderes University, Aydin, Turkiye. Retrieved July, 2023 from https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Yukselturk, E. & Inan, F.A. (2006). Examining the factors affecting student dropout in an online certificate program. *Turkish Online Journal of Distance Education*, *7*(3), 76-88. Retrieved June 23, 2023 from https://dergipark.org.tr/en/pub/tojde/issue/16925/176660

Yuzer, V.T. (2013). *Uzaktan ogrenmede etkilesimlilik: Ortaya cikisi, kullanilan teknolojiler ve bilgi akisi [Interactivity in distance learning: Its emergence, used technologies and information flow].* Ankara: Kultur Ajans Pub.

Zuhairi, A, Karthikeyan, N, & Priyadarshana, S.T. (2020). Supporting students to succeed in open and distance learning in the Open University of Sri Lanka and Universitas Terbuka Indonesia. *Asian Association of Open Universities Journal, 15*(1), 13-35. Retrieved June 10, 2023 from https://www.researchgate.net/publication/337866287_Supporting_students_to_succeed_in_open_and_distance_learning_in_the_Open_University_of_Sri_Lanka_and_Universitas_Terbuka_Indonesia

Zupic, I., & Cater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods*, *18*(3), 429-472. https://doi.org/10.1177/1094428114562629