Undergraduate Student Retention Activities: Challenges and Research Agenda

Gustavo Silva Gonçalves[1], Fernando Antonio Ribeiro Serra[2] (iD),
José Eduardo Storopoli[2], Isabel Cristina Scafuto[2],
and Diego Nogueira Rafael[3] (iD)

Abstract

Our study aims to identify effective activities to enhance student retention and promote student success in higher education institutions (HEIs) by reviewing the factors that affect student retention through a literature review. Our study used a systematic review with the bibliometric method to analyze 125 articles related to the retention of students in higher education from 2014 to 2022. We used PCA and network analysis to identify and describe three research fronts of activities to student retention in higher education, two of which are from the perspective of the higher education institution (HEI) and focus on actions for retention to reduce student dropout and activities developed for student success. The third research front is centered on the student, seeking to understand what can lead to persistence in finishing their course. Our bibliometric study enabled us to identify the works and themes that have influenced current research on retention in higher education. By analyzing the bibliographic coupling component, our study provides insights into the research streams in higher education and highlights areas that require further investigation.

Plain language summary

In our research, we explored how colleges can better support students so they remain in school and succeed academically. We carefully reviewed many articles written between 2014 and 2022 to understand why some students leave while others stay and complete their courses. By examining these articles, we identified key strategies colleges can use to help students, as well as the reasons some students persevere. Our findings offer a fresh look into the latest ideas researchers have about keeping students in college. Our hope is that this knowledge can guide colleges in providing better support for their students, ensuring more of them graduate and achieve their academic goals.

Introduction

Student retention in higher education has been considered a strategic theme for Higher education Institutions (HEIs) worldwide (Qvortrup & Lykkegaard, 2022). Retention strategies become essential due to the dimension of dropout in HEIs. In the 1980s, dropout in the USA was around 45% (Tinto, 1982) and remained constant for many years (OECD, 2019b; Schnepf, 2014). Authors also identified high and similar rates in studies in several countries in developed economies, for example, in England (Smith & Naylor, 2001; Vignoles & Powdthavee, 2009), in Germany (Heublein et al., 2017), and Australia (Morgan et al., 2001). Dropout is more

[1]Sharjah Research Technology and Innovation Park, United Arab Emirates
[2]Universidade Nove de Julho, São Paulo, Brazil
[3]Escola Superior de Propaganda e Marketing, São Paulo, Brazil

Corresponding Author:
Fernando Serra, Graduate Program of Business Administration and Graduate Program of Project Management, Universidade Nove de Julho, Rua Vergueiro, 239/245, São Paulo, 01525-000, SP Brazil.
Email: fernandorserra@gmail.com

than 50% in Latin America (Ferreyra et al., 2017). Higher education student dropout is closely related to student retention, as dropout is the opposite of persistence and student success. Student dropout refers to the act of leaving college before completing a degree, while student retention refers to the ability to persist and successfully complete a degree.

This study aimed to provide a comprehensive understanding of student retention as a significant strategic issue for HEIs due to the problem of student dropout (Qvortrup & Lykkegaard, 2022). Through a thorough literature review, we aim to identify the factors that affect student retention and highlight areas for future research and improvement. Our primary objective is to contribute to the development of effective strategies that can enhance student retention in higher education. By implementing activities that support student success and creating a positive institutional climate, we can promote student persistence and ultimately create a more equitable and inclusive higher education system that benefits all students.

Higher education student retention has been a topic of concern for many years, as colleges and universities face the challenge of improving student success and reducing dropout rates. With the increasing cost of higher education and the need for a highly educated workforce, the issue of student retention seems more important than ever. Despite the research volume and the length of time the topic has been researched, student dropout continues to be significant (Heritage et al., 2023). The low degree of student retention still remains, and the research remain with fragmented and ambiguous (Burke, 2019). Previous research in development of retention strategies indicates that is necessary to understand the reasons for dropout (Demeter et al., 2022). This research was mainly focused on student retention theoretic models concerned with the reaction of the students to specific factors, rather than the student's specific reasons to dropout (Aljohani, 2016). In this sense, Tinto's (1975) seminal work was fundamental for developing retention studies. The author proposed a longitudinal model to explain the aspects and processes influencing the students' decision to abandon their studies at colleges and universities: the integrated model of student attrition. Despite the importance of preventing student dropout, student retention is still a challenge regarding the research findings and theoretical developments (Qvortrup & Lykkegaard, 2022; Tinto, 2012b).

Student retention involves understanding the student abandonment movement throughout the course and the student dropout. Retention is considered a complex problem and depends on the context in which it occurs; see Tinto (1975, 1982, 1987, 1988) and other influential authors of the current research (Astin, 1975, 1984; Bean, 1980; Braxton et al., 1997; Pascarella, 1980). In general,

research on retention is related to dropout factors, the student's path throughout the course, and the individual and institutional aspects involved. However, there is a dispersion in literature, concepts, and contexts (Behr et al., 2020b).

Despite research progress, student dropout in higher education is still significant in developed and emerging countries (OECD, 2019a). It indicates the need to understand better what is being studied about student retention and set an objective future agenda with practical impact. Based on this need, we want to answer the following research questions: What is studied about student retention? What are the indicated paths for future research?

To answer these questions, we did a systematic review using the bibliometric method (Vogel & Güttel, 2013). Our final sample consists of 125 articles related to the retention of students in higher education. We used PCA in conjunction with network analysis to support the bibliometric study. We identified and described three research fronts of student retention in higher education. Two of these research fronts are oriented from the perspective of HEI. The first seeks to understand the actions for retention to reduce student dropout—the other activities developed for the student to succeed in his way. The distinct perspective is centered on the student, trying to understand what can lead to persistence to finish his course.

Our bibliometric study allowed us to identify the works and themes that have influenced current research on retention in higher education. The results of the study, represented by the bibliographic coupling component, offer valuable insights into the research streams in higher education and the areas that require further investigation. Although higher education classification varies according to the country, in this study, we considered undergraduate education under a US classification, divided into associate and bachelor. The associate includes colleges. We treated both colleges and universities indistinctively (Understanding U.S. Higher Education, available at https://educationusa.state.gov/foreign-institutions-andgovernments/understanding-us-higher-education).

This article is organized into six parts. Following this introduction, we present a literature review on student retention. We then explain the method and describe all the study procedures. The results section presents the bibliometric results. Then, we discuss the results considering higher education student retention and weave suggestions for future studies, closing with a conclusion.

Literature Review

Studies on retention in higher education began with the use of student demographics to assess their persistence in completing a course (Summerskill, 1962). Although Tinto's (1975) model was influential, structured research

on the subject began to emerge from other models and studies, such as Spady (1970), Astin (1984), and Pascarella (1980).

Tinto's (1975) study, "Student Integration Model (SIM) of Attrition," was fundamental for the development of research on retention in higher education. In his work, Tinto proposed that integrating the student into the academic and social communities of the educational institution would increase the students' involvement and sense of belonging in the HEI community, which could contribute to retention. Later, Tinto (1993) improved his model by adding the student's entry characteristics, commitment to the institution, and intention to complete the course as relevant factors for evaluating the possibility of retention. These studies encouraged more structured research on the subject, contributing to developing a more comprehensive approach to retention in higher education.

Braxton et al. (1997) expanded on Tinto's (1975, 1993) original model intending to provide recommendations for student retention. They argued that the theory needed more empirical support and that the student's social integration on the HEI campus was more critical for retention than academic integration. Subsequently, research on retention began to include other aspects such as student diversity, financial support and guidance, and cultural capital gained during the student journey. Other researchers made additions, such as Berger and Milem (1999) and Braxton et al. (2013), who expanded the theoretical framework of the original model by Tinto (1975, 1993) and incorporated new perspectives and situations for the study of retention in higher education.

Studies focused on student retention or persistence also consider psychological factors (Tinto, 1998). These factors are studied through the proposal of empirical or conceptual models (Bean, 1983; Bean & Eaton, 2000; Bean & Metzner, 1985, 1987; Cabrera et al., 1993; Montmarquette et al., 2001; Murtaugh et al., 1999; Reason, 2009; Robbins et al., 2004; Yorke, 1999), and address retention and persistence in online courses (Nash, 2005; Rovai, 2003). Theoretical approaches, such as self-efficacy (Bandura, 1977), are tested to evaluate aspects of persistence (Zajacova et al., 2005), as well as self-determination theory (Ryan & Deci, 2000) to assess intrinsic motivation to complete the course. Scholars also investigate factors such as high rates of student dropout in the first year (Herzog, 2005; Pascarella & Terenzini, 1980; Tinto, 1999; Yorke & Longden, 2008), first-generation college students (Ishitani, 2006) and institutional actions to prevent student dropout (Tinto, 2012b).

Studies investigating the effect of student dropout emphasize the importance of institutional actions and climate, as they both have causes and consequences (Lovitts, 2001). Scholars have examined the relationship between academic or social interaction throughout the course and student dropout (Bean, 1982; Pascarella & Terenzini, 1977, 1979), as well as student involvement and perception of integration (Berger & Milem, 1999). These factors are related to institutional conditions (Tinto, 2010), which may encompass educational practices (Kuh et al., 2008) and the institutional climate (Oseguera & Rhee, 2009).

Retention scholars have also been concerned with specific institutional aspects (Tinto, 2012a) related to student attrition throughout the course that should influence student retention, as academic and social experiences can be influenced by perceptions of prejudice and discrimination among underrepresented groups (John et al., 1996), teacher influences (Ehrenberg & Zhang, 2005; Umbach & Wawrzynski, 2005), infrastructure (Emmons & Wilkinson, 2011), financial pressure (Cabrera et al., 1992), and learning environment (Meeuwisse et al., 2010). To some extent, it could be said that an approach from rational choice theory seeks to explain student choice (Beekhoven et al., 2002). Some studies have also sought to understand persistence and dropout beyond the first year (Crisp & Nora, 2012; Ishitani & Desjardins, 2002).

Recent studies have been dedicated to identifying factors that contribute to student dropout. Aljohani (2016) compiled a list of variables that could be associated with dropout and suggested that the quality of the institutional experience and level of integration into academic and social systems of HEI are primary factors influencing it. Behr et al. (2020a) identified three determinants: national education system policies, HEI characteristics, and student-related factors, including pre-study and study-related aspects. Qvortrup and Lykkegaard (2022) expanded on Tinto's model by including institutional factors related to the study environment, such as social, academic, and teaching systems.

Although previous studies are essential for identifying factors that may hinder student retention in HEIs (Aljohani, 2016), it is also crucial to identify activities that can positively influence retention and prevent dropout. While we acknowledge that the reasons for retention may vary in different contexts (Boston & Ice, 2011) and are distinctive to each campus (Berger et al., 2012), activities can generally be adapted to specific situations.

It is important to review works and identify activities to improve student higher education in recent years because HEIs face ongoing challenges in retaining and supporting students. In today's fast-changing environment, students' needs and expectations are evolving, and the factors that affect student success and retention are changing. By reviewing recent works, HEIs can stay up-to-date on the latest research and best practices to address these challenges effectively (e.g., Swani et al., 2022).

Identifying effective activities that promote student success is essential for improving retention rates, enhancing the quality of the learning experience, and ultimately helping students achieve their academic and career goals. By identifying successful strategies and practices, HEIs can improve their policies, services, and resources to meet the needs of today's diverse student body. Furthermore, reviewing works and identifying effective activities can help HEIs to close achievement gaps, promote diversity, equity, and inclusion, and better serve underrepresented students. By understanding the challenges and opportunities for different student groups, HEIs can tailor their support programs and services to meet the needs of all students and promote student success.

Continued research on the topic is important, as mentioned, despite it having been around for nearly six decades (Aljohani, 2016; Qvortrup & Lykkegaard, 2022). This may indicate that student retention, as a response to the phenomenon of dropout in higher education, needs to be better understood. In this sense, this study conducts a semi-systematic review, with bibliometric pairing, to understand what is being studied in student retention in higher education and the possibilities for future research. Semi-systematic reviews are recommended for evaluating a research topic, with a qualitative/quantitative method, allowing the understanding of the themes related to this work on the study of retention, and proposing a research agenda (Snyder, 2019).

Method

Data Collection and Sample

The documents were collected in the Scopus database and WoS, considering all those available in the base journals in Social Sciences. For the selection, we only chose articles between 2014 and 2022, and the search expression was "student retention." The search took place in the title, abstract, and keywords. Our full sample can be retrieved by typing the following query in Scopus and WoS: "TITLE-ABS-KEY ("student retention") AND PUBYEAR > 2013 AND PUBYEAR < 2023 AND DOCTYPE(ar) AND SUBJAREA(SOCI)." Five hundred forty-one articles were initially selected.

Analysis

We used the Bibexcel software to capture and organize information about the articles, making it possible to generate the co-occurrence matrix (Bernard & Ryan, 2010; van den Besselaar & Heimeriks, 2006). In co-occurrence matrices, the rows and columns have the same labels in a square matrix. The matrix data represents a similarity measure (Bernard & Ryan 2010). These matrices enable the use of multivariate techniques to support qualitative

exploratory studies (Bazeley, 2013, p. 301). The co-occurrence matrix serves as the basis for the bibliographic coupling.

In the bibliographic coupling, pairs of articles share the same reference. In this case, it indicates similar lines of research that are taking place (Vogel & Güttel, 2013). To reach the articles that started to represent the research front in retention, at Bibexcel, we selected only articles that share at least one citation with themselves. This procedure reduced the sample from 541 to 360 articles left to compose the bibliographic coupling matrix, which corresponds to about 67% of the total sample. Our analysis was conducted by reading all articles to label and identify the components that emerged from the bibliographic coupling. We also superimposed the articles in a network analysis visualization.

A principal component analysis (PCA) was performed using the bibliographic coupling matrix, converted into a Pearson correlation matrix (Vogel & Güttel, 2013). The components were extracted using varimax rotation (Lin & Cheng, 2010) and Kaiser normalization. We kept only variable loads above or equal to absolute 0.4. Our final sample decreased to 125 articles. We used parallel analysis to calculate the number of components to extract (Hayton et al., 2004; Horn, 1965). The result of the parallel analysis for this work indicated that we should retain three components.

We also performed a network analysis. To make the analysis more robust and complement the PCA, we used the same bibliographic coupling matrix as an adjacency matrix, that is, support with another method (Vogel & Güttel, 2013). It allows viewing the structure of the field from a network diagram. The nodes in the diagram represent the publications. The edges represent the relationship between the publications in the case of a bibliometric article. We analyzed using the Ucinet software. We superimposed the PCA results onto the network. In the result section, we present the bibliographic coupling analysis results for the principal components analysis and the superimposed network.

The density and cohesion of the relationship network were also calculated (Vogel & Güttel, 2013). Density represents the extent to which the components define a frequent conceptual basis. The maximum value, 1, represents the exhaustion of the connections between the components references (Vogel & Güttel, 2013). The bibliographic coupling indicates that the articles use common references and clearly focus on grouping research. Cohesion, also a measure of density, represents the connection with other components, meaning the degree of interdependence between the components (Wasserman & Faust, 1994). The bibliographic coupling helps interpret the results, making it possible to understand how the research fronts are related.

We evaluated the influence of the primary references on each component's articles to assist in identifying the orientation of the components based on the organization of a table, comparing the accumulated influence of the references in the articles that made up the component. The influence was verified by reading two authors, not only by title and abstract but by organizing a table with the main topics of the components. Additionally, we verified the presence and influence of the main references identified in the texts. With the interpretation of cross-loads and the article network, this procedure made it possible to elaborate on the reference research streams in higher education retention.

To evaluate the relationship between the components, we assessed the cross loads that are in Table 1, the network metrics (Table 2), and the network (https://drive.google.com/file/d/1SqPElMxnyickqTbmGvI3zHljELv1x Cws/view?usp = share_link). This joint analysis enabled the organization of Figure 1, which we used to guide the discussion and future research agenda.

Results

Three components were identified by the PCA of bibliographic coupling (Table 1), with about 78% of the explained variance. The results of the principal components indicate that the components BC1 and BC3 are related, but component BC2 seems in opposition. The BC abbreviation means Bibliographic Coupling.

Table 2 shows all the loads of the PCA, including the cross-loads. We considered all component loads, the shape of the network with the identified components, the network metrics (Table 2), and the readings and interpretation of the predominance of references to interpret the results.

The cross-loads indicate that the components communicate, but it also seems to suggest, due to the number of negative charges of component BC2, about components BC1 and BC3, that there must be some aspect that tends to stand out. This is supported by cohesion values in Table 2 and density values indicating a research focus. The use of network visualization and metrics supported the construction of Figure 1 (https://drive.google.com/file/d/1SqPElMxnyickqTbmGvI3zHljELv1xCws/view?usp = share_link).

Higher Education Student Retention

Figure 1's research streams illustrate the current body of research on retention in higher education. On the one hand, the HEI perspective, and on the other, the student's perspective. The left part of Figure 1 lists the initiatives or characteristics of the HEI that impact student retention. Research from the perspective of HEI

has focused on retention activities, which seem to have derived activities aimed at improving student performance and success. Another perspective, derived from the more traditional approach of activities for the retention of HEI, is the research that seeks to investigate the student's perspective to understand their persistence to finish the course.

We described each of these perspectives in more detail below. A pertinent observation is that retention research, derived from the dropout phenomenon, is focused on practice; that is, it aims to bring solutions to minimize the effect of retention.

HEI Perspective—Activities for Student Retention (Component 1)

We grouped 48 articles considering this side of the perspective. Most articles deal with the institutional activities of the HEIs that can encourage students to continue their courses (Hinojosa et al., 2022; Tinto, 2017), and attenuate forces beyond students' immediate surroundings (Mendoza et al., 2015). To prevent dropouts, HEIs should consider the overlapping domains of a social system, an academic system, and teaching (Qvortrup & Lykkegaard, 2022), and increase their satisfaction with the HEI (Strahan & Credé, 2015).

In their 2019 study, Richards and Graber investigated how doctoral programs can prepare physical education teachers to perform retention functions. The faculty plays a significant role in delivering educational services, but other areas of the higher education institution (HEI) can also contribute to student support. To enhance support for students, some authors suggest that HEIs should implement regular programs of encouragement, awareness, and training for the entire team (Cara, 2015; Griffin et al., 2016; Kiser & Hammer, 2016; Lake et al., 2018; Roberts, 2018; Southwell et al., 2018).

Several actions can improve the academic performance of first-year students and increase their retention rates. These include analyzing students' performance before entering higher education (Behr et al., 2020a, 2020b; Marrero, 2016), offering introductory courses (Bloemer et al., 2017; Windham et al., 2014), consider student entry characteristics (Johnson et al., 2014; K. Walker & Okpala, 2017), administering tests with low levels of difficulty at the beginning to improve confidence (Meer & Chapman, 2014), monitoring complementary course schedules (Hansen et al., 2014), establishing performance goals (Lorch, 2014), providing academic support (García Villa & González y González, 2014; Kiser & Hammer, 2016; Lee & Matusovich, 2016), offering scholarships to financially restricted students (Mendoza et al., 2014), engaging in complementary activities (Crowe,

Table 1. Bibliographic Coupling Analysis.

Component	Reference	BC1	BC2	BC3
Component 1	Richards and Graber (2019)	0.958	−0.012	0.194
	Damkaci et al. (2017)	0.958	−0.012	0.194
	Carter and Yeo (2016)	0.958	−0.012	0.194
	Inkelaar and Simpson (2015)	0.943	0.002	0.192
	Oregon et al. (2018)	0.934	0.003	0.160
	Thompson-Ebanks (2017)	0.926	−0.027	0.207
	Lake et al. (2018)	0.925	−0.056	0.113
	Cara (2015)	0.914	0.027	0.176
	Windham et al. (2014)	0.913	0.039	0.192
	Lorch (2014)	0.909	0.014	0.198
	Perchinunno et al. (2021)	0.909	−0.016	0.047
	Griffin et al. (2016)	0.908	−0.077	0.127
	Mendoza et al. (2015)	0.903	−0.014	0.130
	Mendoza et al. (2014)	0.888	−0.080	0.086
	Crowe (2015)	0.877	−0.025	0.182
	Hansen et al. (2014)	0.876	0.006	0.118
	Roberts (2018)	0.873	−0.063	0.222
	Picton et al. (2018)	0.867	0.019	0.223
	Marrero (2016)	0.856	−0.055	0.057
	Meer and Chapman (2014)	0.853	0.009	0.216
	Piepenburg and Beckmann (2022)	0.855	0.05	0.260
	Lee and Matusovich (2016)	0.844	−0.076	0.153
	Kiser and Hammer (2016)	0.842	0.044	0.280
	Zając et al. (2019).	0.841	−0.021	0.305
	Bloemer et al. (2017)	0.822	−0.025	0.275
	Brawner et al. (2015)	0.821	−0.083	0.206
	García Villa and González y González (2014)	0.811	−0.076	0.179
	Johnson et al. (2014)	0.809	0.049	0.218
	Qvortrup and Lykkegaard (2022)	0.790	−0.021	0.390
	Novak et al. (2016)	0.784	−0.041	0.169
	Behr et al. (2020a)	0.781	0.073	−0.026
	Tinto (2017)	0.779	0.071	0.147
	Behr et al. (2020b)	0.771	0.219	0.000
	Southwell et al. (2018)	0.753	0.174	0.235
	Hinojosa et al. (2022)	0.731	−0.038	0.453
	K. Walker and Okpala (2017)	0.736	0.277	0.173
	Strahan and Credé (2015)	0.723	0.236	0.190
	Dewberry and Jackson (2018)	0.712	0.363	0.150
	Sass et al. (2018)	0.702	0.195	0.191
	Mah and Ifenthaler (2020)	0.685	−0.092	0.183
	Yu (2017)	0.638	0.380	0.481
	Krieb (2018)	0.604	0.087	0.194
	Maul et al. (2018)	0.550	0.122	−0.042
	Eng and Stadler (2015)	0.521	0.136	0.156
	Mah (2016)	0.497	0.472	0.180
	Ames et al. (2018)	0.439	0.390	−0.045
	Soria et al. (2014)	0.432	0.121	0.178
Component 2	Martín et al. (2018)	−0.185	0.944	−0.036
	McDonald and Robinson (2014)	−0.145	0.905	−0.050
	Shea and Bidjerano (2014)	−0.143	0.902	−0.053
	Fraser et al. (2018)	−0.130	0.898	0.120
	Miranda and Guzmán (2017)	−0.029	0.896	−0.077
	Gaytan (2015)	−0.183	0.888	−0.070
	Holt and Fifer (2018)	−0.135	0.882	−0.056
	Fong et al. (2018)	−0.166	0.874	−0.022
	Fussy (2018)	−0.090	0.873	0.036
	Witt et al. (2014)	−0.085	0.873	0.100
	Cotton et al. (2017)	−0.106	0.863	0.036
	Marczuk (2022)	0.100	0.862	0.010
	Licursi (2018)	−0.052	0.857	0.025
	Pokorny et al. (2017)	−0.160	0.824	−0.021
	Gray and Swinton (2017)	0.058	0.822	−0.027

Table 1. (continued)

Component	Reference	BC1	BC2	BC3
	Thistoll and Yates (2016)	−0.073	0.808	0.154
	Müller and Klein (2022)	0.341	0.802	−0.062
	Harrison et al. (2018)	−0.083	0.789	0.013
	Wachen et al. (2018)	−0.071	0.776	0.078
	Murray (2015)	−0.034	0.763	−0.024
	Jilg and Southgate (2017)	0.060	0.751	0.205
	Bahi et al. (2015)	−0.068	0.738	−0.017
	Mckendry et al. (2014)	0.564	0.726	0.114
	Richardson (2015)	0.603	0.717	0.127
	Pleitz et al. (2015)	0.603	0.717	0.127
	McCluckie (2014)	0.441	0.715	0.057
	Amegbe et al. (2018)	0.594	0.710	0.116
	L. Walker (2016)	0.573	0.709	0.154
	Cochran et al. (2014)	0.426	0.706	0.099
	Heo and Lee (2016)	0.533	0.705	0.077
	Collings et al. (2014)	0.563	0.688	0.121
	Knapp et al. (2014)	−0.090	0.682	0.094
	Ahmed et al. (2015)	0.539	0.681	0.115
	Flanders (2017)	0.483	0.679	0.133
	Slanger et al. (2015)	0.414	0.647	0.109
	Pereira et al. (2015)	0.415	0.644	0.076
	Murray and Ireland (2017)	−0.120	0.640	0.013
	Forsman et al. (2015)	0.556	0.633	0.108
	Wood et al. (2015)	0.615	0.626	0.091
	Mertes (2015)	0.575	0.621	0.182
	Demetriou and Powell (2014)	0.468	0.616	0.140
	Boateng et al. (2016)	0.440	0.608	0.119
	Kocsis and Pusztai (2021)	0.456	0.606	0.091
	Forsman et al. (2014)	0.426	0.602	0.095
	Kerby (2015)	0.361	0.589	0.489
	Sutton (2014)	0.572	0.585	0.191
	Kocsis et al. (2022)	0.433	0.578	−0.123
Component 3	Bettinger and Long (2018)	0.014	−0.060	0.974
	Goomas (2014)	0.014	−0.060	0.974
	Reid et al. (2014)	0.036	0.095	0.917
	Zerquera et al. (2018)	0.082	−0.071	0.913
	Tudor (2018)	−0.028	0.034	0.885
	Ishitani (2016)	0.090	−0.054	0.840
	Mellado et al. (2018)	0.288	0.254	0.817
	Gallegos et al. (2018)	0.179	0.279	0.765
	Jacobson et al. (2017)	0.603	−0.050	0.758
	Mosley-Howard et al. (2016)	0.603	−0.050	0.758
	Gansemer-Topf et al. (2014)	0.593	−0.096	0.730
	James and Yun (2018)	0.590	−0.017	0.711
	Slade et al. (2015)	−0.120	0.619	0.708
	Borgen and Borgen (2016)	0.557	0.071	0.692
	Kruse et al. (2015)	0.607	−0.098	0.684
	Kimbark et al. (2017)	0.591	−0.054	0.681
	Thomas and Hovdhaugen (2014)	0.478	0.274	0.678
	Robertson and Pelaez (2016)	0.625	−0.070	0.675
	Bowman and Felix (2017)	0.523	−0.029	0.674
	Hoffman (2014)	0.416	0.505	0.665
	Marsh (2014)	0.567	0.055	0.663
	Hutto (2017)	0.474	0.410	0.659
	Luke et al. (2015)	0.437	0.482	0.642
	García-Ros et al. (2018)	0.544	−0.041	0.624
	Raelin et al. (2014)	0.599	0.104	0.623
	Mah and Ifenthaler (2018)	0.560	−0.036	0.614
	Mezick (2015)	0.173	0.307	0.598
	Xu (2017)	0.353	0.433	0.527
	Xu (2018)	0.505	0.376	0.520
	Xu and Webber (2018)	0.445	0.355	0.520

The shade entries represents the largest factor among the components.

Table 2. Bibliographic Coupling PCA and Network Metrics.

Bibliographic coupling	Articles	Density	Cohesion	% explained variance	% cumulated variance	KMO	Bartlett
BC1	48	I	0.59	36,77	36.77		
BC2	47	I	0.66	25.78	62.55		
BC3	30	I	0.66	15.62	78,17		
Total	125					0.80	0.000
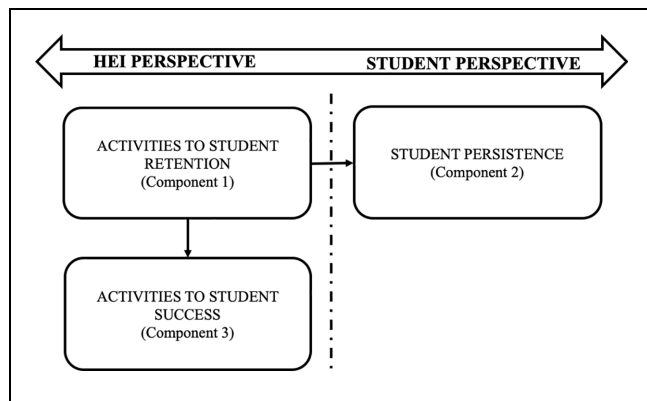
Figure 1. Higher education student retention works.

2015), and developing specific processes for students who experience difficulties (Carter & Yeo, 2016; Damkaci et al., 2017; Sass et al., 2018; Thompson-Ebanks, 2017; Windham et al., 2014). According to several authors (Novak et al., 2016; Picton et al., 2018; Perchinunno et al., 2021; Raju & Schumacker, 2015; Zając & Komendant-Brodowska, 2019), enhancing academic performance in the first few months of a course is a significant motivational factor for students and can increase their retention rates.

HEIs can take various steps to increase student retention rates. One such step is to provide face-to-face services on digital platforms with interaction through social media (Oregon et al., 2018). Other steps include sending motivational emails to students (Inkelaar & Simpson, 2015), offering online tutorials and classes (Maul et al., 2018), and providing remote access to the library collection (Ames et al., 2018; Eng & Stadler, 2015; Soria et al., 2014).

In addition to the benefits mentioned earlier, students' use of an institution's physical and digital infrastructure offers several advantages. For instance, digitally, students can access classes (Yu, 2017) and library collections (Krieb, 2018), interact with teachers and peers and use monitoring and control tools to minimize dropout rates. Moreover, Mah (2016) proposes a model that links student learning analysis with digital badges, which can be shared on professional social networks and enhance student retention rates in HEIs (Mah & Ifenthaler, 2020).

HEI Perspective—Activities for Student Success (Component 3)

The 31 articles in this component, from the perspective of HEIs, are predominantly focused on themes related to student success. The student individual level is recognized as important to the retention (Mellado et al., 2018). However, Component 3 differentiates itself by dealing primarily with activities that provide academic services to educational institutions. Academic support programs aimed at helping students during the pre-higher education transition (Kruse et al., 2015; Mezick, 2015; Raelin et al., 2014; Slade et al., 2015; Xu & Webber, 2018) and their first year (Borgen & Borgen, 2016; Mah & Ifenthaler, 2018; Reid et al., 2014; Robertson & Pelaez, 2016; Xu, 2017, 2018) can reduce stress during this critical period. HEIs must take care with the class sizes to avoid dropout (Bettinger & Long, 2018). Weekly sessions for students attending challenging courses (Goomas, 2014; Kimbark et al., 2017) are one such support measure. Additionally, HEIs must facilitate an adaptation process for transferred or exchange students, which includes conveying rules, values, and procedures to minimize the impact on their success (Jacobson et al., 2017; Mosley-Howard et al., 2016).

Measures aimed at supporting students during the pre-higher education transition (Slade et al., 2015) and their first year (Borgen & Borgen, 2016; Gallegos et al., 2018; García-Ros et al., 2018; Mah & Ifenthaler, 2018; Reid et al., 2014; Thomas & Hovdhaugen, 2014), as student affairs offices (Gansemer-Topf et al., 2014) can reduce stress during this critical period. One such measure is academic support programs, including weekly sessions for students attending traditionally tricky courses (Goomas, 2014; Kimbark et al., 2017). In cases where HEIs receive students who have permanently transferred or are going through an exchange period, an adaptation process that includes the transmission of rules, values, and procedures is necessary to minimize the impact on the success of the new student (Jacobson et al., 2017; Mosley-Howard et al., 2016).

Students who pursue higher education and receive a diploma and professional training expect to improve their job prospects, which is associated with their satisfaction levels (James & Yun, 2018; Luke et al., 2015),

and identity (Bowman & Felix, 2017). In this context, transforming academic advisors into career coaches (Tudor, 2018) to guide students in developing their academic and professional skills can enhance student success rates. Furthermore, creating pathways between students and potential employers is crucial for facilitating their transition to the job market.

Student Persistence (Component 2)

This component consists of 47 articles whose focus is on the student's perspective regarding permanence. Unlike Tinto's (1975, 1987) integrated student model approach, which focuses on the student's sociological aspects, most articles of this component approach Bean's (1980) student friction model approach that evolved the previous model including psychological aspects of the student.

Self-efficacy (Bandura, 1977, 1986) is a prominent approach in the academic context, often used to indicate students' confidence in their academic skills. Holt and Fifer (2018) showed that a teacher's self-efficacy in mentoring improved the mentee's performance and increased their retention. Fong et al. (2018) found that motivation and self-perception were associated with students' achievement and persistence in community colleges. Student motivation seems significant role in determining academic success and college persistence (Slanger et al., 2015). L. Walker (2016) found that implementing a course on successful strategies for nursing students improved their self-efficacy. Wood et al. (2015) showed that self-efficacy in mathematics benefited academic integration, promoting meetings between students, teachers, and academic advisors. Marczuk (2022) argues that a highly structured curriculum and practical activities may improve students' academic self-efficacy, reducing drop-out intention, but achievement norms have the opposite effect.

Another key factor, highlighted in the study by Bean and Eaton (2000), is that as students interact with the campus environment and its members, such as teachers, fellow students, and staff, they undergo psychological processes that evaluate their experiences and feelings, ultimately increasing their retention rates. Studies by Licursi (2018), Fussy (2018), Jilg and Southgate (2017), Flanders (2017), Collings et al. (2014) show that students who are oriented toward peer relationships have higher levels of integration into the university. Similarly, articles by Amegbe et al. (2018), Cotton et al. (2017), Boateng et al. (2016), Thistoll and Yates (2016), Richardson (2015), McDonald and Robinson (2014), Witt et al. (2014) reveal that the frequency and quality of interactions with teachers, both inside and outside the classroom, can clearly increase persistence.

Other components that have been highlighted in the literature include consistent use of library services (Knapp et al., 2014; Murray, 2015; Murray & Ireland, 2017), scholarship programs (Harrison et al., 2018), summer bridge programs (programs that help incoming students integrate into US HEIs) (Wachen et al., 2018), the difference of online students (Fraser et al., 2018; Gaytan, 2015; Shea & Bidjerano, 2014; Slanger et al., 2015), and the analysis of receiver operating characteristics (ROC) (McCluckie, 2014). These components contribute to the development of positive psychological factors that can increase students' persistence and ultimately lead to course completion.

The impact of psychological issues on students is still being discussed in the evolution of existing theoretical and conceptual models (Demetriou & Powell, 2014). It reinforces the central role of trust in improving student loyalty, favoring their persistence (Heo & Lee, 2016). Students who do not feel that their social or institutional expectations have been met accurately are much less likely to return to the institution (Ahmed et al., 2015; Martín et al., 2018; Mckendry et al., 2014; Pleitz et al., 2015). Students from lower socioeconomic backgrounds have a higher risk of dropping out of higher education because they are concerned with the cost and benefits of higher education (Miranda & Guzmán, 2017; Müller & Klein, 2022). However, employed students may engage more with their courses and have a stronger identification with them (Kocsis & Pusztai, 2021; Kocsis et al., 2022; Pokorny et al., 2017).

However, despite surveys identifying the challenge of retaining students and recommending actions, institutionalized planning articles and structured initiatives for student retention in HEIs as a whole are lacking. Instead, there seem to be motivational initiatives implemented at the course or department level, which are not part of a comprehensive strategy for addressing the challenge of student retention. Student retention should be viewed as a student retention form a holistic perspective that considers its complexity (Forsman et al., 2014, 2015; Pereira et al., 2015).

Summary of Activities

Table 3 summarizes the actions proposed for addressing student retention from different perspectives. HEIs (Higher Education Institutions) develop retention activities that include academic support programs, activities to address student difficulties and motivation, and technology support. Activities that consider the student's perspective, particularly in addressing their difficulties and motivation, are also important for student success and retention.

Table 3. Summary of Activities by Perspective.

Perspective	Activities for ...	Example of activities	References
HEI	Student retention		
	Academic supporting activities and programs	Teachers and teams dedicated to student retention	Richards and Graber (2019); Lake et al. (2018); Roberts (2018); Southwell et al. (2018); Kiser and Hammer (2016); Griffin et al. (2016)
		Program to develop performance goals for students	Lorch (2014)
		Academic support	García Villa and González y González (2014); Lee and Matusovich (2016); Kiser and Hammer (2016)
		Analyze students previous performance	Marrero (2016); Behr et al. (2020a, 2020b)
	Supporting students' difficulties and motivation	Scholarships for students with financial restrictions	Mendoza et al. (2014)
		Develop specific processes for students who have difficulties	Windham et al. (2014); Carter and Yeo (2016); Damkaci et al. (2017)
		Motivational emails for students	Inkelaar and Simpson (2015)
		Offering of introductory courses	Windham et al. (2014); Bloemer et al. (2017)
		Low level of difficulty at the Beginning to improve student confidence	Meer and Chapman (2014)
		Monitoring in their complementary course schedule	Hansen et al. (2014)
	Technological supporting activites	Making available all their face-to-face services on digital platforms with interaction through social media	Oregon et al. (2018)
		Improving academic performance in the first months of the course	Raju and Schumacker (2015); Picton et al. (2018); Perchinunno et al. (2021); Zając and Komendant-Brodowska (2019)
		Tutorials and permanent online classes	Maul et al. (2018)
		Remote access to the library collection	Soria et al. (2014); Eng and Stadler (2015); Ames et al. (2018); Krieb (2018)
		Digital access to classes	Yu (2017)
		Digital badges	Mah (2016); Mah and Ifenthaler (2020)
	Student success		
	Academic supporting activities and programs	Supporting students in the pre-higher education transition	Slade et al. (2015)
		STEM - invest in a favorable learning environment, emphasizing quality teaching, and friendly academic advice; more structured family background receive more support to find the right information and support on campus to help them succeed	Xu (2018); Kruse et al. (2015)
		Link between satisfaction and getting a job; academic assistant into a career coach	James and Yun (2018); Tudor (2018)
		Class size increases, dropout rates also increase	Bettinger and Long, 2018
	Supporting students' difficulties and motivation	Supporting students during their first year	Reid et al. (2014); Borgen and Borgen (2016); Mah and Ifenthaler (2018)
		Academic support programs have weekly sessions for students who attend traditionally difficult courses	Goomas (2014); Kimbark et al. (2017)
		Students transferred or going through an exchange period, there must be an adaptation process	Mosley-Howard et al. (2016); Jacobson et al. (2017)

(continued)

Table 3. (continued)

Perspective	Activities for ...	Example of activities	References
		Non-traditional students, teachers and managers will have to act to transform norms and structures to provide consistent support to increase student success	Zerquera et al. (2018)
Students	Student persistence Supporting activities and programs	The teacher's self-efficacy in mentoring improved the mentee's performance and, consequently, increased his permanence	Holt and Fifer (2018)
		Highly structured curriculum and practical activities may improve students' academic self-efficacy lowering dropout intention, but achievement norms have an opposite effect	Marczuk (2022)
		Constancy in the use of library services	Murray and Ireland (2017); Murray (2015); Knapp et al. (2014)
		Scholarship program	Harrison et al. (2018)
		The summer bridge programs (programs that integrate the incoming student in the US HEI)	Wachen et al. (2018)
		Analysis of the receiver's operating characteristics - ROC	McCluckie (2014)
		Motivation and self-perception were associated with students' achievement and persistence from community colleges	Fong et al. (2018)
		Improvement in students' self-efficacy occurred after implementing a course on successful strategies for nursing students	L. Walker (2016)
		Self-efficacy in mathematics offered benefits for academic integration in college, promoting meetings between students, teachers, and academic advisors	Wood et al. (2015)
	Supporting students' difficulties and motivation	Peer-oriented individuals showed higher levels of integration into the university	Licursi (2018); Fussy (2018); Jilg and Southgate (2017); Flanders (2017); Collings et al. (2014)
		The frequency and quality of interaction with teachers, inside and outside the classroom, clearly increase persistence	Amegbe et al. (2018); Cotton et al. (2017); Boateng et al. (2016); Thistoll and Yates (2016); Richardson (2015); McDonald and Robinson (2014); Witt et al. (2014)
		Trust plays an important and central role in improving student loyalty, favoring their permanence	Heo and Lee (2016)
		Students who do not feel that their social or institutional expectations have been met accurately are much less likely to return to the institution	Pleitz et al. (2015)
		Especially students with lower socioeconomic backgrounds have a higher risk of dropping out of higher education because they are concerned with the rewards, cost, and benefits of higher education	Müller and Klein, 2022
		Employed students may engage and have more identification with their courses	Kocsis and Pusztai (2021); Kocsis et al. (2022)

The focus of the articles in Component 1 is on preventing student dropouts in higher education institutions (HEIs) by considering the overlapping domains of a social system, an academic system, and teaching. The articles discuss various actions that HEIs can take, such as analyzing students' performance before entering HEIs, offering introductory courses, providing academic support, and using digital platforms and services to increase student retention rates. The articles also emphasize the importance of faculty and institutional support, including regular programs of encouragement, awareness, and training for the entire team.

The 31 articles in Component 3 primarily focus on academic services provided by HEIs, whereas those related to student success primarily appear in other components. Supporting students during the pre-higher education transition and their first year is critical, and academic support programs, such as weekly sessions for students taking challenging courses, can be effective. An adaptation process is necessary to ensure that transferred or exchange students receive the information they need to succeed. Transforming academic advisors into career coaches can help students develop both academic and professional skills and enhance success rates. Creating pathways between students and potential employers is essential for facilitating their transition to the job market.

The articles in Component 2 suggest that student retention in higher education is affected by psychological factors, such as self-efficacy, interactions with campus members, and meeting social and institutional expectations. Other factors, such as the use of library services, scholarship programs, and summer bridge programs, also contribute to positive psychological development that increases student persistence. HEIs need to develop comprehensive strategies to address the challenge of student retention, including academic support programs, technology support, and activities that consider the student's perspective. However, current institutional planning and initiatives for student retention lack a comprehensive approach.

We classified each article of the components in Table 3 into one of three categories: academic supporting activities and programs, supporting students' difficulties and motivation, and technological supporting activities. Academic supporting activities and programs are activities and programs designed to help students succeed academically, such as tutoring, academic advising, study skills workshops, and academic support centers. Supporting students' difficulties and motivation are activities and programs designed to address students' personal and emotional challenges, such as mental health counseling, financial aid support, and career counseling. They also aim to motivate and engage students in their academic journey by providing them with opportunities for personal growth and leadership development. Technological supporting activities are activities and programs that use technology to support students' academic and personal success, such as online learning platforms, digital tools for organization and time management, and social media platforms for communication and collaboration with peers and faculty.

Discussion

The present study provides a comprehensive overview of research on retention in higher education from both the institutional and student perspectives. The research from the institutional perspective focuses on identifying retention initiatives and characteristics that impact student persistence, as well as activities that enhance student success. Our study groups articles into two components - Component 1 deals with activities for student retention, Component 3 deals with activities for student success - to provide a comprehensive understanding of the retention landscape, and Component 2 deals with student persistence – understanding the student perspective.

Previous literature reviews have identified a significant evolution of research on student retention, moving from Tinto's model to a more inclusive and nuanced theoretical framework that considers individual and institutional factors. Institutional actions and climate are crucial in affecting student retention, but recent research has not provided clear guidance on how to improve it. Hence, our study conducted a semi-systematic review to identify research gaps and propose a research agenda for future studies on student retention.

Our primary objective is to contribute to the development of effective strategies that can enhance student retention in higher education. By understanding the factors that affect student retention and implementing activities that support student success, we can create an environment that fosters positive institutional climate and supports student persistence. Ultimately, this can lead to a more equitable and inclusive higher education system that benefits all students.

Our bibliometric study allowed us to identify the works and themes that have influenced current research on retention in higher education. The results of the study, represented by the bibliographic coupling component, offer valuable insights into the research streams in higher education and the areas that require further investigation (Figure 1).

Student Retention and Context - HEI and Cultural

Retaining students in higher education has been a priority for university managers for more than six decades as a response to high dropout rates (Aljohani, 2016; Qvortrup & Lykkegaard, 2022). Despite ongoing efforts,

the number of students who drop out remains high and stable, with rates around 50% across regions, countries, and types of institutions. This is an etic phenomenon that needs to be understood in its specific context (Marsh, 2014). Therefore, standardized approaches may not be effective, and retention strategies should be tailored to individual institutions and student populations.

The studies analyzed in this research show a predominant focus on higher education institutions in the United States, with some representation from European institutions, but a lack of research on institutions in less developed countries and economies. However, it is essential to consider the context of the HEI and the region in which it is located. For instance, when examining Latin America, the ethnic and minority factors present in North American studies may not be relevant (Aguinis et al., 2020). Additionally, Latin America faces significant economic and social challenges that may impact student retention (e.g., Slade et al., 2015). The region also offers a large number of distance learning courses, including 2-year and 4-year non-integral programs. Therefore, to advance our knowledge of student retention, it is essential to consider the context of different countries and regions, not only to benefit these countries but also to enable cross-cultural comparisons and improve our understanding of the factors that impact student retention globally (Lazzarini, 2012).

The significant volume of both quantitative and qualitative studies conducted on student retention in higher education suggests that more systematic reviews are necessary to synthesize and compare existing research evidence. Meta-analysis and meta-synthesis studies should be considered, as they can explore various aspects of student performance and assess the effects of different retention initiatives. By examining the dimensioning of the effect, we can evaluate what is common across different contexts (Snyder, 2019). Systematic reviews can provide an objective assessment of the evidence and help identify effective strategies for student retention. Therefore, it is crucial to continue conducting systematic reviews to advance knowledge in this area.

Freshmen, Senior, and Others

A considerable proportion of the literature focuses on first-year students, given that 60% of dropouts occur in the first 2 years of study, with most happening in the first year (Ross et al., 2012). Nonetheless, it is necessary to gain a better understanding of dropout across both 2-year and 4-year courses. Even if we exclude the dropout that happens in the first year, retention rates significantly decrease until the end of the course, with up to 20% of students dropping out (Ross et al., 2012). Longitudinal studies are necessary to improve our understanding of dropout across the course. It is also crucial to examine dropout beyond the first year, as the factors that influence students' persistence appear to be distinct, and involve psychological and social aspects beyond institutional factors and student characteristics (Ross et al., 2012).

While many studies indicate that the majority of students who drop out are under 25 years of age, it is important to consider that in less developed countries, there may be many older and working students, as well as gender differences, that could be significant factors in dropout rates. Future research should consider these distinctions and the use of subgroups, such as people with similar behaviors in a given context, and the evolution of these subgroups over time to better understand the factors that contribute to dropout (Picton et al., 2018).

Focus from the Student

To increase retention in higher education, future research should consider the actions, activities, and services provided by HEIs from the student's perspective and with the goal of promoting persistence and success. Most HEIs seem to focus on reducing dropout, but they should also consider the broader context of retention as a strategic issue that requires integration between sectors and levels of the university. Surprisingly, only a few studies have examined the impact of the curriculum and teaching techniques and technologies on retention. It is essential to consider both psychological and social aspects in retention research, with a focus on the student's perspective (Dewberry & Jackson, 2018; Gray & Swinton, 2017).

Offer Mode - Face-to-Face, Hybrid, or Distant Learning

Traditionally, HEI studies deal with face-to-face and distance learning courses. Some papers also examine graduate courses. Despite the importance of face-to-face and distance learning, the future indicates the growth of hybrid courses and skills development for the job market. Distance learning courses, for example, present problems of social integration and direct relationship with the teacher, which have been identified as necessary for retention (Hoffman, 2014). Face-to-face courses, on the other hand, do not incorporate available technology to increase their value. With the emergence of hybrid courses, the challenge remains to understand better the type of on-site courses for distance learning as a continuum, regardless of HEI's position. This understanding involves investigating aspects of price, cost, teaching methodologies, standardization, or not of curriculum and adoption of technological innovations.

Table 4. Future Research Agenda.

Group	Research questions	Future agenda
Student retention and context - HEI and cultural	How do student retention strategies differ across diverse cultural contexts, especially in less developed countries? What unique challenges does Latin America face regarding student retention, and how do these challenges compare to other regions? Are there universally applicable retention strategies, or should all strategies be context-specific? How do ethnic and minority factors in retention research differ across global contexts?	Conduct cross-cultural comparative studies to understand global retention nuances. Develop tailored retention strategies for specific regions, especially less-represented ones. Conduct meta-analysis to understand the global landscape of student retention research.
Freshmen, senior and others	What specific factors contribute to student dropouts beyond the first year? How do dropout rates and reasons differ between 2-year and 4-year courses? What unique challenges do older students face, especially in less developed countries, that contribute to dropout?	Conduct longitudinal studies that follow student cohorts throughout their academic journey. Investigate the significance of age, gender, and working status in relation to dropout rates. Delve deeper into psychological and social aspects influencing student retention beyond the first year.
Focus from the student	How do different curriculum designs and teaching techniques impact student retention? What services and supports do students feel are most beneficial to their persistence and success? How can HEIs strike a balance between dropout prevention and a broader strategic focus on retention?	Conduct qualitative research capturing the student perspective on retention strategies. Investigate the direct impact of curriculum and pedagogical techniques on retention rates. Develop strategies that promote a holistic approach to student, emphasizing both prevention and strategic integration.
Offer mode - Face-to-face, Hybrid or distant learning	How do retention rates compare between face-to-face, hybrid, and distance learning modes? What specific challenges do hybrid courses present concerning student retention? How can technology be best used to enhance retention across different course modes? What are the specific challenges and opportunities posed by MOOCs concerning traditional HEIs, especially in the context of skills development for the job market?	Examine the long-term effects of the COVID-19 pandemic on retention rates across various learning modes. Investigate the role of engagement and quality control in distance and hybrid learning. Understand how HEIs can better cater to skills development, especially in less developed countries, through technological interventions.

Adopting teaching technologies has been highlighted, but the effects on retention are not in the studies we have evaluated. Due to the novelty of the theme, it seems to be a need for qualitative studies that evaluate experiments and their impacts on students' persistence and success. It was clear from the effect of COVID-19 on higher education the many possibilities that technology can bring through remote education (Tang et al., 2021). However, there are challenges to understanding the engagement and quality control of courses in these circumstances, which opens up significant possibilities for postgraduate and other offer levels.

The least developed countries' challenges are significant in guaranteeing skills development for the labor market. These challenges also exist in developed countries (Govindarajan & Srivastava, 2020). Traditionally, despite the existence of MOOCs (massive open online course), HEIs do not take advantage of this need, nor do professional certifications, which institutes of practitioners usually offer. It appears to be a strategic challenge for long-term sustainability to be considered and investigated, not only because of the long-term reduction in the stock of eligible students and young people but also the continuing education that smaller consulting companies have explored.

Future Research Agenda Summary

Below we present more explicitly the future agenda based on the analysis of research in student retention. Some possible research questions and explicit future research agenda topics are presented in Table 4.

Research on student retention has predominantly focused on higher education institutions in developed regions like the United States (Aljohani, 2016). To achieve a holistic understanding of retention challenges

and strategies, it is imperative to consider institutions in less developed economies (Aguinis et al., 2020). The varying cultural, economic, and social contexts, like those in Latin America, underscore the importance of region-specific research (Lazzarini, 2012; Slade et al., 2015).

The spotlight on first-year dropouts, given the majority occur during this period, risks overlooking the significant number that continue throughout the course (Ross et al., 2012). To truly combat dropout rates, research must venture beyond the freshman year and delve into diverse age groups, especially since factors influencing persistence can differ greatly with progression (Picton et al., 2018).

Universities tend to emphasize dropout reduction, but a broader, more strategic focus is essential (Dewberry & Jackson, 2018; Gray & Swinton, 2017). This involves examining retention from the student's perspective, considering both psychological and social aspects, and evaluating the impact of curriculum modifications and evolving teaching techniques.

With the future hinting at the rise of hybrid courses, it becomes crucial to decipher the unique retention challenges they present (Hoffman, 2014). COVID-19 unveiled the untapped potential of remote education (Tang et al., 2021), but the nuances of engagement and quality assurance in such modes remain underexplored. Furthermore, the response of HEIs to the demands of the job market, especially in less developed regions, needs attention (Govindarajan & Srivastava, 2020).

Conclusion

In our pursuit to understand and enhance student retention within HEIs, we embarked on a comprehensive journey through recent literature spanning from 2014 to 2022. By employing a systematic review coupled with the bibliometric method, we thoroughly analyzed 125 pertinent articles related to student retention in higher education. This deep dive revealed three distinct research fronts that have been central to the discourse.

Two of these fronts are from the institutional perspective, emphasizing the pivotal role of HEIs in developing and implementing strategies not just to mitigate dropout rates but also to promote student success. These findings underscore the importance of proactive institutional actions that holistically cater to student needs. Simultaneously, the third research front illuminated the student's side of the equation, emphasizing the myriad factors contributing to their persistence in course completion.

By leveraging PCA and network analysis, our study has successfully mapped the current contours of the retention research landscape. It not only identifies influential works and themes but also delineates critical research streams in higher education. Our findings, particularly those drawn from the bibliographic coupling component, serve as a beacon, spotlighting specific domains that demand further exploration.

In essence, our study underscores the multifaceted nature of student retention in HEIs and paves the way for future research, laying the foundation for crafting more effective retention strategies and nurturing an environment conducive to student success.

The study has limitations due to its bibliometric method and the use of a specific keyword, but the researchers included Scopus and WoS (Web of Science) databases to mitigate this issue. However, due to the broad nature of the theme, further research is needed to understand contextual issues. It would be interesting to replicate the study in different contexts and perform meta-analysis and meta-synthesis to better understand the effects. The researchers also verified complementary keywords and used a method to mitigate other possible limitations.

ORCID iDs

Fernando Serra (iD) https://orcid.org/0000-0002-8178-7313
Diego Nogueira Rafael (iD) https://orcid.org/0000-0002-5676-1314

Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

References

Aguinis, H., Villamor, I., Lazzarini, S. G., Vassolo, R. S., Amorós, J., & Allen, D. (2020). Conducting management research in Latin America: Why and what's in it for you? *Journal of Management*, *46*(3), 1–22.

Ahmed, N., Kloot, B., & Collier-Reed, B. (2015). Why students leave engineering and built environment programs when they are academically eligible to continue. *European Journal of Engineering Education*, *40*(2), 128–144.

Aljohani, O. (2016). A comprehensive review of the major studies and theoretical models of student retention in higher education. *Higher Education Studies*, *6*(2), 1–18.

Amegbe, H., Hanu, C., & Nkukpornu, A. (2018). A study on improving employees' behaviour towards increasing students' loyalty: The mediating role of need understanding,

service quality, and intimacy among students in Kenya. *Management Science Letters*, 8(8), 819–834.

Ames, C., Berman, R., & Casteel, A. (2018). A preliminary examination of doctoral student retention factors in private online workspaces. *International Journal of Doctoral Studies*, 13, 79–107.

Astin, A. (1975). *Preventing students from dropping out*. Jossey-Bass Publishers.

Astin, A. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25(4), 297–308.

Bahi, S., Higgins, D., & Staley, P. (2015). A time hazard analysis of student persistence: A US university undergraduate mathematics major experience. *International Journal of Science and Mathematics Education*, 13(5), 1139–1160.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.

Bazeley, P. (2013). *Qualitative data analysis: Practical strategies*. Sage.

Bean, J. (1980). Dropouts and turnover: The synthesis and test of a causal model of student dropout. *Research in Higher Education*, 12(2), 155–187.

Bean, J. (1982). Student dropout, intentions, and confidence: Interaction effects in a path model. *Research in Higher Education*, 17(4), 291–320.

Bean, J. (1983). The application of a model of turnover in work organizations to the student dropout process. *The Review of Higher Education*, 6(2), 129–148.

Bean, J., & Eaton, S. (2000). A psychological model of college student retention. *Reworking the Student Departure Puzzle*, 1, 48–61.

Bean, J., & Metzner, B. (1985). A conceptual model of nontraditional undergraduate student dropout. *Review of Educational Research*, 55(4), 485–540.

Bean, J., & Metzner, B. (1987). The estimation of a conceptual model of nontraditional undergraduate student dropout. *Research in Higher Education*, 27(1), 15–38.

Beekhoven, S., De Jong, U., & Van Hout, H. (2002). Explaining academic progress via combining concepts of integration theory and rational choice theory. *Research in Higher Education*, 43(5), 577–600.

Behr, A., Giese, M., Kamdjou, H., & Theune, K. (2020a). Early prediction of University Dropouts – A random forest approach. *Jahrbücher für Nationalökonomie und Statistik*, 240(6), 743–789.

Behr, A., Giese, M., Kamdjou, H., & Theune, K. (2020b), Dropping out of university: A literature review. *Review of Education*, 8(2), 614–652.

Berger, J., & Milem, J. (1999). The role of student involvement and perceptions of integration in a causal model of student persistence. *Research in Higher Education*, 40(6), 641–664.

Berger, J. B., Ramirez, G. B., & Lyons, S. (2012). A historical look at retention. In A. Seidman (Ed.), College student retention: Formula for student success (2nd ed., pp. 7–34). Maryland: Rowman & Littlefield.

Bernard, H., & Ryan, G. (2010). *Analyzing qualitative data: Systematic approaches*. Sage.

Bettinger, E., & Long, B. (2018). Mass instruction or higher learning? The impact of college class size on student retention and graduation. *Education Finance and Policy*, 13(1), 97–118.

Bloemer, W., Day, S., & Swan, K. (2017). Gap analysis: An innovative look at gateway courses and student retention. *Online Learning*, 21(3), 5–14.

Boateng, K., Plopper, B. L., & Keith, D. (2016). Shared faculty–student lifestyle habits and their implications for college student retention. *Journal of College Student Retention: Research, Theory & Practice*, 18(3), 310–332.

Borgen, S., & Borgen, N. (2016). Student retention in higher education: Folk high schools and educational decisions. *Higher Education*, 71(4), 505–523.

Boston, W. E., & Ice, P. (2011). Assessing retention in online learning: An administrative perspective. *Online Journal of Distance Learning Administration*, 14(2), 1–12.

Bowman, N., & Felix, V. (2017). It's who I am: Student identity centrality and college student success. *Journal of Student Affairs Research and Practice*, 54(3), 235–247.

Brawner, C., Lord, S., Layton, R., Ohland, M., & Long, R. (2015). Factors affecting women's persistence in chemical engineering. *International Journal of Engineering Education*, 31(6A), 1431–1447.

Braxton, J., Doyle, W., Hartley, H., III, Hirschy, A., Jones, W., & McLendon, M. (2013). *Rethinking college student retention*. John Wiley and Sons.

Braxton, J., Sullivan, A., & Johnson, R. (1997). Appraising Tinto's theory of college student departure. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. XII, pp. 107–164). Agathon Press.

Burke, A. (2019). Student retention models in higher education: A literature review. *College and University*, 94(2), 12–21.

Cabrera, A., Nora, A., & Castaneda, M. (1992). The role of finances in the persistence process: A structural model. *Research in Higher Education*, 33(5), 571–593.

Cabrera, A., Nora, A., & Castañeda, M. (1993). College persistence: Structural equations modeling test of an integrated model of student retention. *The Journal of Higher Education*, 64(2), 123–139.

Cara, C. (2015). Can you hear me? Student decision making. *Management Education: An International Journal*, 14(1), 11–27.

Carter, S., & Yeo, A. (2016). Students-as-customers' satisfaction, predictive retention with marketing implications: The case of Malaysian higher education business students. *International Journal of Educational Management*, 30(5), 635–652.

Cochran, J., Campbell, S., Baker, H., & Leeds, E. (2014). The role of student characteristics in predicting retention in online courses. *Research in Higher Education*, 55(1), 27–48.

Collings, R., Swanson, V., & Watkins, R. (2014). The impact of peer mentoring on levels of student wellbeing, integration and retention: A controlled comparative evaluation of residential students in UK higher education. *Higher Education*, 68(6), 927–942.

Cotton, D., Nash, T., & Kneale, P. (2017). Supporting the retention of non-traditional students in Higher education using a resilience framework. *European Educational Research Journal*, 16(1), 62–79.

Crisp, G., & Nora, A. (2012). *Hispanic student participation and success in developmental education* [White paper]. Hispanic

Association of Colleges and Universities. HispanicStudent-Participation.pdf

Crowe, D. (2015). Retention of college students and freshman-year music ensemble participation. *Journal of College Student Retention: Research, Theory & Practice*, 17(3), 373–380.

Damkaci, F., Braun, T., & Gublo, K. (2017). Peer mentor program for the general chemistry laboratory designed to improve undergraduate STEM retention. *Journal of Chemical Education*, 94(12), 1873–1880.

Demeter, E., Dorodchi, M., Al-Hossami, E., Benedict, A., Walker, L., & Samil, J. (2022). Predicting first-time-in-college students' degree completion outcomes. *Higher Education*, 84, 589–609.

Demetriou, C., & Powell, C. (2014). Positive youth development and undergraduate student retention. *Journal of College Student Retention: Research, Theory & Practice*, 16(3), 419–444.

Dewberry, C., & Jackson, D. (2018). An application of the theory of planned behavior to student retention. *Journal of Vocational Behavior*, 107, 100–110.

Ehrenberg, R., & Zhang, L. (2005). Do tenured and tenure-track faculty matter? *Journal of Human Resources*, 40(3), 647–659.

Eng, S., & Stadler, D. (2015). Linking library to student retention: A statistical analysis. *Evidence Based Library and Information Practice*, 10(3), 50–63.

Ferreyra, M., Avitabile, C., Álvarez, J., Paz, F., & Urzúa, S. (2017). *At a crossroads: Higher education in Latin America and the Caribbean*. The World Bank.

Flanders, G. (2017). The effect of gateway course completion on freshman college student retention. *Journal of College Student Retention: Research, Theory & Practice*, 19(1), 2–24.

Fong, C., Acee, T., & Weinstein, C. (2018). A person-centered investigation of achievement motivation goals and correlates of community college student achievement and persistence. *Journal of College Student Retention: Research, Theory & Practice*, 20(3), 369–387.

Forsman, J., Linder, C., Moll, R., Fraser, D., & Andersson, S. (2014). A new approach to modelling student retention through an application of complexity thinking. *Studies in Higher Education*, 39(1), 68–86.

Forsman, J., van den Bogaard, M., Linder, C., & Fraser, D. (2015). Considering student retention as a complex system: A possible way forward for enhancing student retention. *European Journal of Engineering Education*, 40(3), 235–255.

Fraser, J., Fahlman, D. W., Arscott, J., & Guillot, I. (2018). Pilot testing for feasibility in a study of student retention and dropout in online undergraduate programs. *International Review of Research in Open and Distributed Learning*, 19(1), 260–278.

Fussy, D. (2018). The status of academic advising in Tanzanian universities. *KEDI Journal of Educational Policy*, 15(1), 81–98.

Gallegos, J. A., Campos, N. A., Canales, K. A., & González, E. N. (2018). Factores Determinantes en la Deserción Universitaria. Caso Facultad de Ciencias Económicas y Administrativas de la Universidad Católica de la Santísima Concepción (Chile). *Formación Universitaria*, 11(3), 11–18.

Gansemer-Topf, A., Zhang, Y., Beatty, C., & Paja, S. (2014). Examining factors influencing dropout at a small, private, selective liberal arts college. *Journal of Student Affairs Research and Practice*, 51(3), 270–285.

García-Ros, R., Pérez-González, F., Cavas-Martínez, F., & Tomás, J. M. (2018). Social interaction learning strategies, motivation, first-year students' experiences and permanence in university studies. *Educational Psychology*, 38(4), 451–469.

García Villa, C., & González y González, E. M. (2014). Women students in engineering in Mexico: Exploring responses to gender differences. *International Journal of Qualitative Studies in Education*, 27(8), 1044–1061.

Gaytan, J. (2015). Comparing faculty and student perceptions regarding factors that affect student retention in online education. *American Journal of Distance Education*, 29(1), 56–66.

Goomas, D. (2014). The impact of supplemental instruction: Results from an urban community college. *Community College Journal of Research and Practice*, 38(12), 1180–1184.

Govindarajan, V., & Srivastava, A. (2020). What the shift to virtual learning could mean for the future of higher ed. *Harvard Business Review*, 31(1), 3–8.

Gray, J., & Swinton, O. H. (2017). Non-cognitive ability, college learning, and student retention. *Journal of Negro Education*, 86(1), 65–75.

Griffin, K., Muniz, M., & Smith, E. (2016). Graduate diversity officers and efforts to retain students of color. *Journal of Student Affairs Research and Practice*, 53(1), 26–38.

Hansen, M., Trujillo, D., Boland, D., & MaCkinnon, J. (2014). Overcoming obstacles and academic hope: An examination of factors promoting effective academic success strategies. *Journal of College Student Retention: Research, Theory & Practice*, 16(1), 49–71.

Harrison, N., Davies, S., Harris, R., & Waller, R. (2018). Access, participation and capabilities: Theorising the contribution of university bursaries to students' well-being, flourishing and success. *Cambridge Journal of Education*, 48(6), 677–695.

Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational research methods*, 7(2), 191–205.

Heo, C. Y., & Lee, S. (2016). Examination of student loyalty in tourism and hospitality programs. *Journal of Hospitality, Leisure, Sport and Tourism Education*, 18, 69–80.

Herzog, S. (2005). Measuring determinants of student return vs. dropout/stopout vs. transfer: A first-to-second year analysis of new freshmen. *Research in Higher Education*, 46(8), 883–928.

Heritage, B., Ladeira, C., & Steele, A. (2023). The development and pilot of the university student embeddedness (USE) scale for student retention within universities: Validation with an Australian student sample. *Higher Education*, 85, 27–54.

Heublein, U., Ebert, J., Hutzsch, C., Isleib, S., König, R., Richter, J., & Woisch, A. (2017). *Zwischen Studienerwartungen und Studienwirklichkeit: Ursachen des Studienabbruchs, beruflicher Verbleib der Studienabbrecherinnen und Studienabbrecher und Entwicklung der Studienabbruchquote an deutschen Hochschulen*. DZHW.

Hinojosa, M., Derpich, I., Alfaro, M., Ruete, D., Caroca, A., & Gatica, G. (2022). Procedimento de agrupamento de alunos de acordo com o risco de evasão para melhorar a gestão estudantil no ensino superior. *Texto Livre*, 15, e37275.

Hoffman, E. (2014). Faculty and student relationships: Context matters. *College Teaching*, 62(1), 13–19.

Holt, L., & Fifer, J. (2018). Peer mentor characteristics that predict supportive relationships with first-year students:

Implications for peer mentor programming and first-year student retention. *Journal of College Student Retention: Research, Theory & Practice*, 20(1), 67–91.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30*, 179–185.

Hutto, P. (2017). The relationship between student retention in community college courses and faculty employment status. *Community College Journal of Research and Practice*, 41(1), 4–17.

Inkelaar, T., & Simpson, O. (2015). Challenging the 'distance education deficit' through 'motivational emails'. *Open Learning: The Journal of Open, Distance and e-Learning*, 30(2), 152–163.

Ishitani, T. (2006). Studying dropout and degree completion behavior among first-generation college students in the United States. *Journal of Higher Education*, 77(5), 861–885.

Ishitani, T. (2016). Time-varying effects of academic and social integration on student persistence for first and second years in college: National data approach. *Journal of College Student Retention: Research, Theory & Practice*, 18(3), 263–286.

Ishitani, T., & Desjardins, S. (2002). A longitudinal investigation of dropout from college in the United States. *Journal of College Student Retention: Research, Theory & Practice*, 4(2), 173–201.

Jacobson, T., Delano, J., Krzykowski, L., Garafola, L., Nyman, M., & Barker-Flynn, H. (2017). Transfer student analysis and retention: A collaborative endeavor. *Reference Services Review*, 45(3), 421–439.

James, M., & Yun, D. (2018). Exploring student satisfaction and future employment intentions: A case study examination: Is there a link between satisfaction and getting a job? *Higher Education, Skills and Work-Based Learning*, 8(2), 117–133.

Jilg, T., & Southgate, M. (2017). Students helping students: A learning partnership initiative for distance language learners. *The Language Learning Journal*, 45(2), 245–262.

John, E. P., Paulsen, M. B., & Starkey, J. B. (1996). The nexus between college choice and persistence. *Research in Higher Education, 37*(2), 175–220.

Johnson, D., Wasserman, T., Yildirim, N., & Yonai, B. (2014). Examining the effects of stress and campus climate on the persistence of students of color and White students: An application of Bean and Eaton's psychological model of retention. *Research in Higher Education*, 55(1), 75–100.

Kerby, M. (2015). Toward a new predictive model of student retention in higher education: An application of classical sociological theory. *Journal of College Student Retention: Research, Theory & Practice*, 17(2), 138–161.

Kimbark, K., Peters, M. L., & Richardson, T. (2017). Effectiveness of the student success course on persistence, retention, academic achievement, and student engagement. *Community College Journal of Research and Practice*, 41(2), 124–138.

Kiser, M., & Hammer, E. (2016). Need to increase enrollment: A successful academic provisionary program. *Journal of College Student Retention: Research, Theory & Practice*, 18(2), 217–233.

Knapp, J., Rowland, N., & Charles, E. (2014). Retaining students by embedding librarians into undergraduate research experiences. *Reference Services Review*, 42(1), 129–147.

Kocsis, Z., Alter, E., & Pusztai, G. (2022). The role of student employment in persistence and efficiency in STEM higher education. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 10(4), 831–848.

Kocsis, Z., & Pusztai, G. (2021). Learning or earning: Impact of student employment on student careers in the Eastern Region of the European higher education area. *The New Educational Review*, 65, 149–161.

Krieb, D. (2018). Assessing the impact of reference assistance and library instruction on retention and grades using student tracking technology. *Evidence Based Library and Information Practice*, 13(2), 2–12.

Kruse, T., Starobin, S., Chen, Y., Baul, T., & Santos Laanan, F. (2015). Impacts of intersection between social capital and finances on community college students' pursuit of STEM degrees. *Community College Journal of Research and Practice*, 39(4), 324–343.

Kuh, G., Cruce, T., Shoup, R., Kinzie, J., & Gonyea, R. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. *The Journal of Higher Education*, 79(5), 540–563.

Lake, E., Koper, J., Balayan, A., & Lynch, L. (2018). Cohorts and connections: Doctoral retention at a mid-Atlantic comprehensive institution. *Journal of College Student Retention: Research, Theory & Practice*, 20(2), 197–214.

Lazzarini, S. (2012). Leveraging the competitive advantage of Iberoamerican scholars. *Management Research: Journal of the Iberoamerican Academy of Management*, 10(1), 64–73.

Lee, W., & Matusovich, H. (2016). A model of co-curricular support for undergraduate engineering students. *Journal of Engineering Education*, 105(3), 406–430.

Licursi, S. (2018). Graduation after time and peer tutoring. *Italian Journal of Sociology of Education*, 10(2), 90–109.

Lin, T.-Y., & Cheng, Y.-Y. (2010). Exploring the knowledge network of strategic alliance research: a co-citation analysis. *International Journal of Electronic Business Management, 8*(2), 152–160.

Lorch, T. (2014). Goal development of Latina/o students in a developmental learning community at a community college. *Community College Journal of Research and Practice*, 38(4), 323–336.

Lovitts, B. (2001). *Leaving the ivory tower: The causes and consequences of departure from doctoral study*. Rowman & Littlefield Publishers, Inc.

Luke, C., Redekop, F., & Burgin, C. (2015). Psychological factors in community college student retention. *Community College Journal of Research and Practice*, 39(3), 222–234.

Mah, D. (2016). Learning analytics and digital badges: Potential impact on student retention in higher education. *Technology, Knowledge and Learning*, 21(3), 285–305.

Mah, D., & Ifenthaler, D. (2018). Students' perceptions toward academic competencies: The case of German first-year students. *Issues in Educational Research*, 28(1), 120–137.

Mah, D., & Ifenthaler, D. (2020). What do first-year students need? Digital badges for academic support to enhance student retention. *Journal of Applied Research in Higher Education*, 12(1), 86–96.

Marczuk, A. (2022). Is it all about individual effort? The effect of study conditions on student dropout intention. *European Journal of Higher Education*, 13(4), 509–535.

Marrero, F. (2016). Pre-entry doctoral admission variables and retention at a Hispanic serving institution. *International Journal of Doctoral Studies*, 11, 269–284.

Marsh, G. (2014). Institutional characteristics and student retention in public 4-year colleges and universities. *Journal of College Student Retention: Research, Theory and Practice*, *16*(1), 127–151. https://doi.org/10.2190/CS.16.1.g

Martín, M., Arnaudo, M., & Morresi, S. (2018). Inclusión y desempeño: el efecto de políticas educativas en Educación Superior. Un estudio aplicado a la Universidad Nacional del Sur (Argentina). *Revista Complutense de Educacion*, *29*(3), 699.

Maul, J., Berman, R., & Ames, C. (2018). Exploring the psychological benefits of using an emerging video technology to coach and retain doctoral learners. *International Journal of Doctoral Studies*, *13*, 49–78.

McCluckie, B. (2014). Identifying students 'at risk' of withdrawal using ROC analysis of attendance data. *Journal of Further and Higher education*, *38*(4), 523–535.

McDonald, J., & Robinson, R. (2014). Enhancing first year undergraduate student engagement via the school of biological sciences tutorials module. *Bioscience Education*, *22*(1), 54–69.

Mckendry, S., Wright, M., & Stevenson, K. (2014). Why here and why stay? Students' voices on the retention strategies of a widening participation university. *Nurse Education Today*, *34*(5), 872–877.

Meer, N., & Chapman, A. (2014). Assessment for confidence: Exploring the impact that low-stakes assessment design has on student retention. *The International Journal of Management Education*, *12*(2), 186–192.

Meeuwisse, M., Severiens, S., & Born, M. (2010). Learning environment, interaction, sense of belonging and study success in ethnically diverse student groups. *Research in Higher education*, *51*(6), 528–545.

Mellado, F., Orellana, M., & Gabrie, A. (2018). Student retention and dropout in Higher education in Latin America and the Caribbean: A systematic review. *Education Policy Analysis Archives*, *26*, 61.

Mendoza, P., Malcolm, Z., & Parish, N. (2015). The ecology of student retention: Undergraduate students and the great recession. *Journal of College Student Retention: Research, Theory & Practice*, *16*(4), 461–485.

Mendoza, P., Villarreal, P., & Gunderson, A. (2014). Within-year retention among Ph. D. students: The effect of debt, assistantships, and fellowships. *Research in Higher education*, *55*(7), 650–685.

Mertes, S. (2015). Program of study and social integration. *Community College Journal of Research and Practice*, *39*(12), 1170–1181. https://doi.org/10.1080/10668926.2015.1021405

Mezick, E. (2015). Relationship of library assessment to student retention. *The Journal of Academic Librarianship*, *41*(1), 31–36.

Miranda, M., & Guzmán, J. (2017). Análisis de la deserción de estudiantes universitarios usando técnicas de minería de datos. *Formación universitaria*, *10*(3), 61–68.

Montmarquette, C., Mahseredjian, S., & Houle, R. (2001). The determinants of university dropouts: A bivariate probability model with sample selection. *Economics of Education Review*, *20*(5), 475–484.

Morgan, M., Flanagan, R., & Kellaghan, T. (2001). *A study of non-completion in undergraduate university courses*. Higher Education Authority Dublin.

Mosley-Howard, G., Baldwin, D., Ironstrack, G., Rousmaniere, K., & Burke, B. (2016). Niila Myaamia (I Am Miami) identity and retention of Miami tribe college students. *Journal of College Student Retention: Research, Theory & Practice*, *17*(4), 437–461.

Müller, L., & Klein, D. (2022). Social inequality in dropout from higher education in Germany. Towards combining the student integration model and rational choice theory. *Research in Higher Education*, *64*(2), 300–330.

Murray, A. (2015). Academic libraries and high-impact practices for student retention: Library deans' perspectives. *portal: Libraries and the Academy*, *15*(3), 471–487.

Murray, A., & Ireland, A. (2017). Communicating library impact on retention: A framework for developing reciprocal value propositions. *Journal of Library Administration*, *57*(3), 311–326.

Murtaugh, P., Burns, L., & Schuster, J. (1999). Predicting the retention of university students. *Research in Higher Education*, *40*(3), 355–371.

Nash, S. (2005). Learning objects, learning object repositories, and learning theory: Preliminary best practices for online courses. *Interdisciplinary Journal of E-Learning and Learning Objects*, *1*(1), 217–228.

Novak, H., Paguyo, C., & Siller, T. (2016). Examining the impact of the Engineering Successful/Unsuccessful Grading (SUG) Program on student retention: A propensity score analysis. *Journal of College Student Retention: Research, Theory & Practice*, *18*(1), 83–108.

OECD. (2019a). *Education at a glance 2019: OECD indicators*. Organisation for Economic Co-operation and Development.

OECD. (2019b). *OECD data collection programme: Education and training*. http://stats.oecd.org/

Oregon, E., McCoy, L., & Carmon-Johnson, L. (2018). Case analysis: Exploring the application of using rich media technologies and social presence to decrease dropout in an online graduate program. *Journal of Educators Online*, *15*(2), n2.

Oseguera, L., & Rhee, B. (2009). The influence of institutional retention climates on student persistence to degree completion: A multilevel approach. *Research in Higher Education*, *50*(6), 546–569.

Pascarella, E. (1980). Student-faculty informal contact and college outcomes. *Review of Educational Research*, *50*(4), 545–595.

Pascarella, E., & Terenzini, P. (1977). Patterns of student-faculty informal interaction beyond the classroom and voluntary freshman dropout. *The Journal of Higher Education*, *48*(5), 540–552.

Pascarella, E., & Terenzini, P. (1979). Interaction effects in Spady and Tinto's conceptual models of college dropout. *Sociology of Education*, *52*, 197–210.

Pascarella, E., & Terenzini, P. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education*, *51*(1), 60.

Perchinunno, P., Bilancia, M., & Vitale, D. (2021). A statistical analysis of factors affecting higher education dropouts. *Social Indicators Research*, *156*, 341–362.

Pereira, A., Carneiro, T., Brasil, G., & Corassa, M. (2015). The effects of prolonged higher education: A study on the Federal University of Espírito Santo. *Ensaio: Avaliação e Políticas Públicas em Educação*, *23*(89), 1015–1039.

Picton, C., Kahu, E., & Nelson, K. (2018). 'Hardworking, determined and happy': First-year students' understanding and experience of success. *Higher Education Research and Development*, 37(6), 1260–1273.

Piepenburg, J., & Beckmann, J. (2022). The relevance of social and academic integration for students' dropout decisions. Evidence from a factorial survey in Germany, *European Journal of Higher Education*, 12(3), 255–276.

Pleitz, J., MacDougall, A., Terry, R., Buckley, M., & Campbell, N. (2015). Great expectations: Examining the discrepancy between expectations and experiences on college student retention. *Journal of College Student Retention: Research, Theory & Practice*, 17(1), 88–104.

Pokorny, H., Holley, D., & Kane, S. (2017). Commuting, transitions and belonging: The experiences of students living at home in their first year at university. *Higher Education*, 74(3), 543–558.

Qvortrup, A., & Lykkegaard, E. (2022). Study environment factors associated with retention in higher education. *Higher Education Pedagogies*, 7(1), 37–64.

Raelin, J., Bailey, M., Hamann, J., Pendleton, L., Reisberg, R., & Whitman, D. (2014). The gendered effect of cooperative education, contextual support, and self-efficacy on undergraduate retention. *Journal of Engineering Education*, 103(4), 599–624.

Raju, D., & Schumacker, R. (2015). Exploring student characteristics of retention that lead to graduation in higher education using data mining models. *Journal of College Student Retention: Research, Theory & Practice*, 16(4), 563–591.

Reason, R. (2009). Student variables that predict retention: Recent research and new developments. *NASPA Journal*, 46(3), 482–501.

Reid, K., Reynolds, R., & Perkins-Auman, P. (2014). College first-year seminars: What are we doing, what should we be doing? *Journal of College Student Retention: Research, Theory & Practice*, 16(1), 73–93.

Richards, K., & Graber, K. (2019). Chapter 7: Retention in PETE: Survey results and discussion. *Journal of Teaching in Physical Education*, 38(1), 53–60.

Richardson, A. (2015). To be, or not to be, trained. *Journal of Higher Education Policy and Management*, 37(6), 682–688.

Robbins, S., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, 130(2), 261.

Roberts, J. (2018). Professional staff contributions to student retention and success in higher education. *Journal of Higher education Policy and Management*, 40(2), 140–153.

Robertson, D., & Pelaez, M. (2016). Behavior analytic concepts and change in a large metropolitan research university: The graduation success initiative. *Journal of Organizational Behavior Management*, 36(2–3), 123–153.

Ross, T., Kena, G., Rathbun, A., KewalRamani, A., Zhang, J., Kristapovich, P., & Manning, E. (2012). *Higher education: Gaps in access and persistence study* (Statistical Analysis Report. NCES 2012-046). National Center for Education Statistics.

Rovai, A. (2003). In search of higher persistence rates in distance education online programs. *The Internet and Higher Education*, 6(1), 1–16.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist,* 55(1), 68.

Sass, D., Castro-Villarreal, F., Wilkerson, S., Guerra, N., & Sullivan, J. (2018). A structural model for predicting student retention. *The Review of Higher Education*, 42(1), 103–135.

Schnepf, S. (2014). *Do tertiary dropout students really not succeed in European labour markets?* (IZA Discussion Paper No. 8015). IZA.

Shea, P., & Bidjerano, T. (2014). Does online learning impede degree completion? A national study of community college students. *Computers & Education*, 75, 103–111.

Slade, J., Eatmon, D., Staley, K., & Dixon, K. (2015). Getting into the pipeline: Summer bridge as a pathway to college success. *Journal of Negro Education*, 84(2), 125–138.

Slanger, W., Berg, E., Fisk, P., & Hanson, M. (2015). A longitudinal cohort study of student motivational factors related to academic success and retention using the college student inventory. *Journal of College Student Retention: Research, Theory & Practice*, 17(3), 278–302.

Smith, J., & Naylor, R. (2001). Dropping out of university: A statistical analysis of the probability of withdrawal for UK university students. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 164(2), 389–405.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339.

Soria, K., Fransen, J., & Nackerud, S. (2014). Stacks, serials, search engines, and students' success: First-year undergraduate students' library use, academic achievement, and retention. *The Journal of Academic Librarianship*, 40(1), 84–91.

Southwell, K., Whiteman, S., MacDermid Wadsworth, S., & Barry, A. (2018). The use of university services and student retention: Differential links for student service members or veterans and civilian students. *Journal of College Student Retention: Research, Theory & Practice*, 19(4), 394–412.

Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1(1), 64–85. https://doi.org/10.1007/BF02214313

Strahan, S., & Credé, M. (2015). Satisfaction with college: Re-examining its structure and its relationships with the intent to remain in college and academic performance. *Journal of College Student Retention: Research, Theory & Practice*, 16(4), 537–561.

Summerskill, J. (1962). Dropouts from College. In N. Sanford (Ed.), *The American college: A psychological and social interpretation of the higher learning* (pp. 627–657). John Wiley & Sons Inc.https://doi.org/10.1037/11181-019

Sutton, R. (2014). Unlearning the past: New foundations for online student retention. *Journal of Educators Online*, 11(3), n3.

Swani, K., Wamwara, W., Goodrich, K., Schiller, S., & Dinsmore, J. (2022). Understanding business student retention during Covid-19: Roles of service quality, college brand, and academic satisfaction, and stress. *Services Marketing Quarterly*, 43(3), 329–352.

Tang, Y., Chen, P., Law, K., Wu, C., Lau, Y., Guan, J., He, D., & Ho, G. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers & Education*, 168, 104211.

Thistoll, T., & Yates, A. (2016). Improving course completions in distance education: An institutional case study. *Distance Education*, 37(2), 180–195.

Thomas, L., & Hovdhaugen, E. (2014). Complexities and challenges of researching student completion and non-completion of HE programs in Europe: A comparative analysis between England and Norway. *European Journal of Education*, 49(4), 457–470.

Thompson-Ebanks, V. (2017). Leaving college prematurely: The experiences of nontraditional-age college students with depression. *Journal of College Student Retention: Research, Theory & Practice*, 18(4), 474–495.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45(1), 89–125. https://doi.org/10.3102/00346543 045001089

Tinto, V. (1982). Limits of theory and practice in student dropout. *The Journal of Higher Education*, 53(6), 687. https://doi.org/10.2307/1981525

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student dropout*. ERIC.

Tinto, V. (1988). Stages of student departure. *The Journal of Higher education*, 59(4), 438–455.

Tinto, V. (1993). *Leaving college rethinking the causes and cures of student dropout*. University of Chicago Press.

Tinto, V. (1998). Colleges as communities: Taking research on student persistence seriously. *The Review of Higher Education*, 21(2), 167–177.

Tinto, V. (1999). Taking retention seriously: Rethinking the first year of college. *NACADA Journal*, 19(2), 5–9. https://doi.org/10.12930/0271-9517-19.2.5

Tinto, V. (2010). From theory to action: Exploring the institutional conditions for student retention. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 51–89). Springer.

Tinto, V. (2012a). *Completing college: Rethinking institutional action*. University of Chicago Press.

Tinto, V. (2012b). Enhancing student success: Taking the classroom success seriously. *The International Journal of the First Year in Higher Education*, 3(1), 1–8.

Tinto, V. (2017). Through the eyes of students. *Journal of College Student Retention: Research, Theory & Practice*, 19(3), 254–269.

Tudor, T. (2018). Fully integrating academic advising with career coaching to increase student retention, graduation rates and future job satisfaction: An industry approach. *Industry and Higher Education*, 32(2), 73–79.

Umbach, P., & Wawrzynski, M. (2005). Faculty do matter: The role of college faculty in student learning and engagement. *Research in Higher Education*, 46(2), 153–184.

van den Besselaar, P., & Heimeriks, G. (2006). Mapping research topics using word-reference co-occurrences: A method and an exploratory case study. *Scientometrics*, 68, 377–393.

Vignoles, A., & Powdthavee, N. (2009). The socioeconomic gap in university dropouts. *The B.E. Journal of Economic Analysis & Policy*, 9(1), 1–36.

Vogel, R., & Guättel, W. (2013). The dynamic capability view in strategic management: A bibliometric review. *International Journal of Management Reviews*, 15(4), 426–446.

Wachen, J., Pretlow, J., & Dixon, K. (2018). Building college readiness: Exploring the effectiveness of the UNC academic summer bridge program. *Journal of College Student Retention: Research, Theory & Practice*, 20(1), 116–138.

Walker, K., & Okpala, C. (2017). Exploring community college students' transfer experiences and perceptions and what they believe administration can do to improve their experiences. *The Journal of Continuing Higher Education*, 65(1), 35–44.

Walker, L. (2016). A bridge to success: A nursing student success strategies improvement course. *Journal of Nursing Education*, 55(8), 450–453.

Wasserman, S., & Faust, K. (1994). Social network analysis: Methods and applications.

Windham, M., Rehfuss, M., Williams, C., Pugh, J., & Tincher-Ladner, L. (2014). Retention of first-year community college students. *Community College Journal of Research and Practice*, 38(5), 466–477.

Witt, P., Schrodt, P., Wheeless, V., & Bryand, M. (2014). Students' intent to persist in college: Moderating the negative effects of receiver apprehension with instructor credibility and nonverbal immediacy. *Communication Studies*, 65(3), 330–352.

Wood, J., Newman, C., & Harris, F., III. (2015). Self-efficacy as a determinant of academic integration: An examination of first-year Black males in the community college. *Western Journal of Black Studies*, 39(1), 3–17.

Xu, Y. (2017). Localizing college retention efforts: The distance between theoretical orientation and institution-specific needs. *Innovative Higher Education*, 42(1), 49–63.

Xu, Y. (2018). The experience and persistence of college students in STEM majors. *Journal of College Student Retention: Research, Theory & Practice*, 19(4), 413–432.

Xu, Y., & Webber, K. (2018). College student retention on a racially diverse campus: A theoretically guided reality check. *Journal of College Student Retention: Research, Theory & Practice*, 20(1), 2–28.

Yorke, M. (1999). *Leaving early: Undergraduate non-completion in higher education*. Psychology Press.

Yorke, M., & Longden, B. (2008). *The first-year experience in higher education in the UK: final report*. The Higher education Academy. http://www.heacademy.ac.uk/assets/documents/resources/publications/exchange/FYEFinalReport.pdf

Yu, H. (2017). Factors associated with student academic achievement at community colleges. *Journal of College Student Retention: Research, Theory & Practice*, 19(2), 224–239.

Zając, T., & Komendant-Brodowska, A. (2019). Premeditated, dismissed and disenchanted: Higher education dropouts in Poland. *Higher Education Management*, 25, 1–16.

Zajacova, A., Lynch, S., & Espenshade, T. (2005). Self-efficacy, stress, and academic success in college. *Research in Higher Education*, 46(6), 677–706.

Zerquera, D., Ziskin, M., & Torres, V. (2018). Faculty views of "nontraditional" students: Aligning perspectives for student success. *Journal of College Student Retention: Research, Theory & Practice*, 20(1), 29–46.