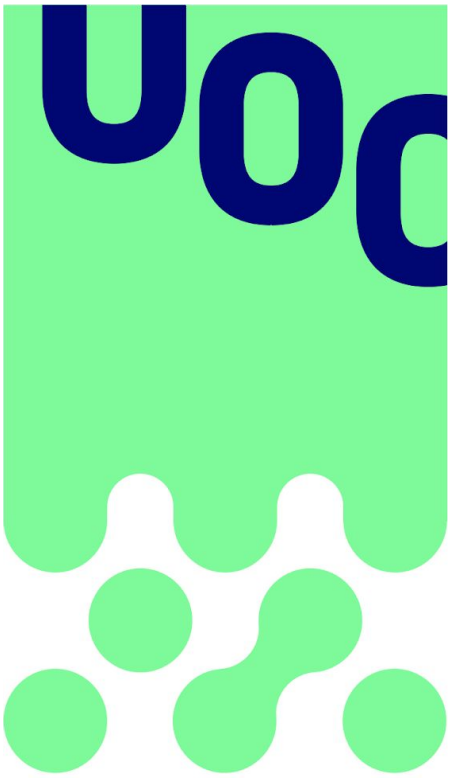
Dropout in Online Higher Education:

A scoping review from 2014 to 2018



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eLearn Center

Marlon Xavier
Julio Meneses

Universitat Oberta de Catalunya

Marlon Xavier and Julio Meneses

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eLearn Center
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Marlon Xavier [mxavier0@uoc.edu] is a PhD researcher in Education and ICT, Open University of Catalonia (UOC), Barcelona, Spain, and holds a PhD in Social Psychology (Universitat Autònoma de Barcelona, 2012). He is Adjunct Professor of Psychology at the University of Caxias do Sul (UCS), Brazil (on sabbatical leave). CV Lattes: lattes.cnpq.br/4669801821000584

Julio Meneses [jmenesesn@uoc.edu] is an Associate Professor of Research Methods at the Faculty of Psychology and Education Sciences of the Open University of Catalonia (UOC), Head of the Institutional Project Evaluation Unit (eLearn Center), and researcher of the Internet Interdisciplinary Institute (IN3). Academic site: femrecerca.cat/meneses

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Marlon Xavier
Julio Meneses
eLearn Center, Universitat Oberta de Catalunya

Abstract

Online higher education continues to grow, yet its high dropout rates remain a pressing and complex problem. This article presents a scoping review of the recent literature on the theme, focusing on dropout definitions, concepts, and models, study domains and themes, methodological approaches, and findings. A search of relevant databases yielded 138 articles and dissertations. Findings reveal a complex yet disorganized field, lacking standard definitions and models. The bulk of current research is focused on risk factors; the most important ones were course and program factors (student support), student factors (motivation, time management skills, and satisfaction), and environmental factors (time- and financial-related issues). Future research should strive to achieve greater consistency in terminology, methods, and measurement, develop new intervention strategies and produce reliable effectiveness information. Further implications of these findings for future dropout research and the limitations of the study are discussed.

Keywords

Dropout, Dropout factors, Retention, Literature review, Scoping review, Online education, Distance education, Higher education.

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1. Background: Conceptualizing dropout research in Online Higher Education

Definition

Dropout can be broadly defined as the student's failure to enroll for a definite number of successive semesters. However, there are many different definitions of dropout in the literature, usually related to a temporal conception, and the issue is controversial (Grau-Valldosera & Minguillón, 2014). A number of related concepts are often employed, some as synonymous –attrition, withdrawal, non-completion– and others as antonymous –retention, persistence, continuance, completion, and success; however, they largely suffer from the same imprecision. Inconsistent terminology is problematic because the ways dropout is defined determine how it is measured, tackled, and researched (Ashby, 2004). The main issue regards who to count as having dropped out (Nichols, 2010); a single course definition is prevalent, i.e. dropping out of a specific course, yet other authors have proposed a program perspective (Lehan, Hussey, & Shriner, 2018), i.e., not graduating in a program. However, the time frame is also problematic, as students may take a break (of several semesters) but eventually return and re-enrol.

Prevalence and importance of dropout

In higher education (HE), dropout rates have become a matter of utmost concern, as education authorities utilize them as a key parameter for evaluating HE quality and allocating resources. Dropout costs are considerable: it impacts the student's self-esteem, well-being, employability, and probability of earning a degree. For institutions, it may lead to loss of reputation, profit, and funding (Arce, Crespo, & Míguez-Álvarez, 2015).

Over the last 20 years, research on dropout in online higher education (OHE) has gained importance, as official online programs showed significantly higher student dropout rates than face-to-face (f2f) programs (Grau-Valldosera, Minguillón, & Blasco-Moreno, 2018). Early dropout is typical of OHE programs, sometimes reaching 50% of first-year students (Simpson, 2010). In open universities, dropping out is the norm and graduating is deviant (Woodley & Simpson, 2014), which makes dropout rates one of the greatest challenges faced by OHE educators and administrators (Lee & Choi, 2011). Hence, in-depth understanding of the phenomenon, early identification of at-risk students, and efficient prevention measures have become crucial. Nonetheless, there appears to be a tension between conceptions and studies of dropout in traditional, f2f settings (the origin of dropout models), and in online settings, as the latter present very different contexts, rates, stakeholders, and influencing factors. Hence, it is important to review models and definitions employed in recent years for OHE, and their friction with older f2f models. It is about ordering

a field that is clearly ample and somewhat disorganized, in order to better understand it and the phenomena it studies.

Dropout risk factors

Many studies (see reviews in Hart, 2012, and Tyler-Smith, 2006) have investigated the factors that influence dropout, retention, persistence, and success, and attempted to derive profiles of students most likely to dropout or persist in OHE. However, the literature presents an enormous multiplicity of predictive variables.

Reviewing the empirical literature, Lee and Choi (2011) identified 44 unique dropout factors. Among the most cited factors were student entry characteristics (e.g. skills), psychological attributes (e.g. satisfaction and motivation), and course design. A review (Holder, 2007) on persisters' profiles indicated that they are academically prepared and possess good time management skills and high levels of self-discipline and motivation. Time-related issues such as lack of time or time management difficulties (Ashby, 2004) are key factors for persistence and attrition, especially for the most typical students in OHE, *non-traditional learners*: mature-aged or adults with job and/or family responsibilities (Huggins, 2016). The large number of predictive factors point to the complexity of dropout phenomena (Kember, 1989).

Dropout models for distance education

Despite the complexity of dropout, many authors have tried to construct theoretical models of attrition in distance education (Aljohani, 2016; Tyler-Smith, 2006), progressively moving towards the specificities of *online* education. The first ones were typically influenced by models for traditional, f2f settings: the work of Tinto (1975, 1993), which focused on student social and academic integration with peers and institution, and the Non-traditional Student Attrition Model (Bean & Metzner, 1985), which gives more importance to environmental factors such as family commitments and working hours.

Kember (1989) proposed a complex, longitudinal-process dropout model, focusing on the specificities of distance education and mature learners. Integrating the models of Tinto (1993) and Bean and Metzner (1985), Rovai (2003) created a Composite Persistence Model with four categorical factors: student characteristics and skills prior to admission, and external and internal factors after admission. Berge and Huang (2004) advanced a holistic model for e-Learning retention, taking into account personal, institutional and circumstantial variables, and their interconnectedness. Park and Choi (2009) criticized the lack of attention given to external factors (e.g. family and organizational supports) in Berge and Huang's model, and proposed a framework focusing on such factors for adult dropout in online learning.

Lee and Choi (2011) developed a dropout model for online courses with 44 factors fitting three main categories: (a) student factors, (b) course/program factors, and (c) environmental

factors. Conceição and Lehman (2012) proposed the Persistence model for online student retention, emphasizing factors such as skills, motivational barriers, and issues of administrative, financial, and technical support. McClelland (2014) advanced a holistic model for OHE withdrawal, encompassing situational, dispositional, institutional, technological, and epistemological factors. Finally, Choi (2016) modified Park's (2009) model and added an outcome factor, creating a multivariate model for adult dropout in OHE including learner, external, internal, and outcome factors.

Previous reviews of dropout in Online Education

A few reviews on dropout and retention in online learning have been published in the last decades. Storrings's (2005) meta-analysis of attrition in distance education focused on the empirical literature and the effects of dropout. Park (2007) presented a review and a model on dropout, yet did not focus on OHE, but rather on corporate e-learning and adult learners. Simpson (2010) presented a comprehensive review of retention in OHE, encompassing ten years of publications and giving special attention to evidence-based research. Lee and Choi (2011) is arguably the most complete review to date, also presenting a comprehensive and detailed model. Bawa (2016) advanced a literature synthesis of retention in online courses; however, it is not a methodical review (i.e. it does not discuss how the articles were selected) and does not focus on OHE.

Other reviews focused on different concepts or populations. Tyler-Smith (2006) reviewed the dropout literature focusing on first-time, adult e-Learners, although his is not a methodical review either. Persistence was the focus of the reviews by Castles (2004), which concentrated on adult learners in open university settings but did not employ a systematic method, and by Hart (2012), studying articles on the facilitators and barriers to persistence in OHE. Other authors produced reviews on success and satisfaction in online learning, such as Kauffman (2015), who did not focus on HE and did not mention a review method; and Banks (2018), focusing on perceived barriers to success for adult e-Learners.

A scoping review of dropout in Online Higher Education

Building on the previous reviews mentioned, this article presents a scoping review of dropout in OHE. Scoping reviews can be defined as a method of research synthesis that seeks to map the relevant literature on a specific topic or research area, identifying and clarifying key concepts (Peters et al., 2017), research gaps, and types and sources of evidence to inform policymaking, practice, and research (Daudt, Van Mossel, & Scott, 2013). The scoping method was chosen because it is best designed for cases in which the body of literature exhibits a large, complex, and heterogeneous nature (Khalil et al., 2016), and when its key concepts are less well defined in advance (Gough & Thomas, 2016). While systematic reviews typically answer a focused, narrow research question and assess formally the quality of studies, scoping reviews answer broader questions and do not include a quality

assessment of included studies or weight of evidence (Armstrong, Hall, Doyle, & Waters, 2011). Scoping reviews seek to explore and summarize data, rather than analyze and report (Aromataris, 2017). As argued, there are many difficult issues in the field of dropout studies, mainly stemming from the transition from f2f models and research to the peculiarities of OHE. Hence a scoping review is needed so as to map broadly what has been academically produced on the subject recently.

2. Method

This scoping review followed the framework proposed by Arksey and O'Malley (2005), consisting of five stages: (1) identifying the research questions; (2) identifying relevant studies; (3) study selection; (4) charting the data; and (5) collating, summarizing, and reporting the results. Our proposal differs from previous reviews in that the timeframe is recent (2014–2018), encompassing empirical, theoretical, and grey literature.

Identifying the Research Questions

Our approach here is concerned with two of the main *purposes* of a scoping review (Arksey and O'Malley, 2005): to map and synthesize a broad research topic (dropout), clarifying key definitions and concepts, and to identify literature gaps in research from an ample range of study methods and designs (Peters et al., 2017). Such purposes are linked to a broad *research question*:

- What are the characteristics of the scientific literature examining dropout in OHE, and what research gaps can be identified in it?

The following generative sub-questions are also advanced:

- What were the most examined domains and themes?
- How was dropout (and related concepts) defined in recent OHE dropout research?
- What factors appeared as influencing student dropout, and what theoretical models were employed or developed?
- What were the main findings?

Identifying relevant studies

In order to cover literature in a comprehensive way and answer the broad research question, the search strategy should include diverse sources and broadly defined search terms (Arksey & O'Malley, 2005). Studies were searched and selected from four main sources: two databases (Web of Science and Education Database); hand-searching of eight key journals (*British Journal of Educational Technology*; *Computers & Education*; *Distance Education*; *Educational Technology Research and Development*; *European Journal of Open and*

Distance Learning; *International Review of Research in Open and Distance Learning*; *Internet and Higher Education*; *Journal of College Student Retention: Research, Theory & Practice)*; Google Scholar, for the first 200 results (not including patents, sorted by relevance), aiming to identify grey literature; and key papers reference lists, adopting a snowball technique (reviewing references in the selected key papers for additional studies).

Key search terms (Table 1) were selected based on key concepts found in dropout studies, and adapted to capture all relevant studies in OHE, regardless of typology (online, blended learning, etc.). The authors chose not to include “success” and “stop-out” as key words due to their imprecision. The search was performed in November 2018.

Table 1. Search strings.

Concept	Search terms
Dropout	(dropout OR drop-out OR drop out OR retention OR persistence OR attrition OR withdrawal OR non-completion OR non-continuation OR non-completer OR non-persister OR retained OR persister OR continuance) AND
OHE	((online education OR online learning OR e-learning OR eLearning OR open university OR distance education OR distance learning OR eLearner OR web based OR blended learning) NOT "MOOC*")

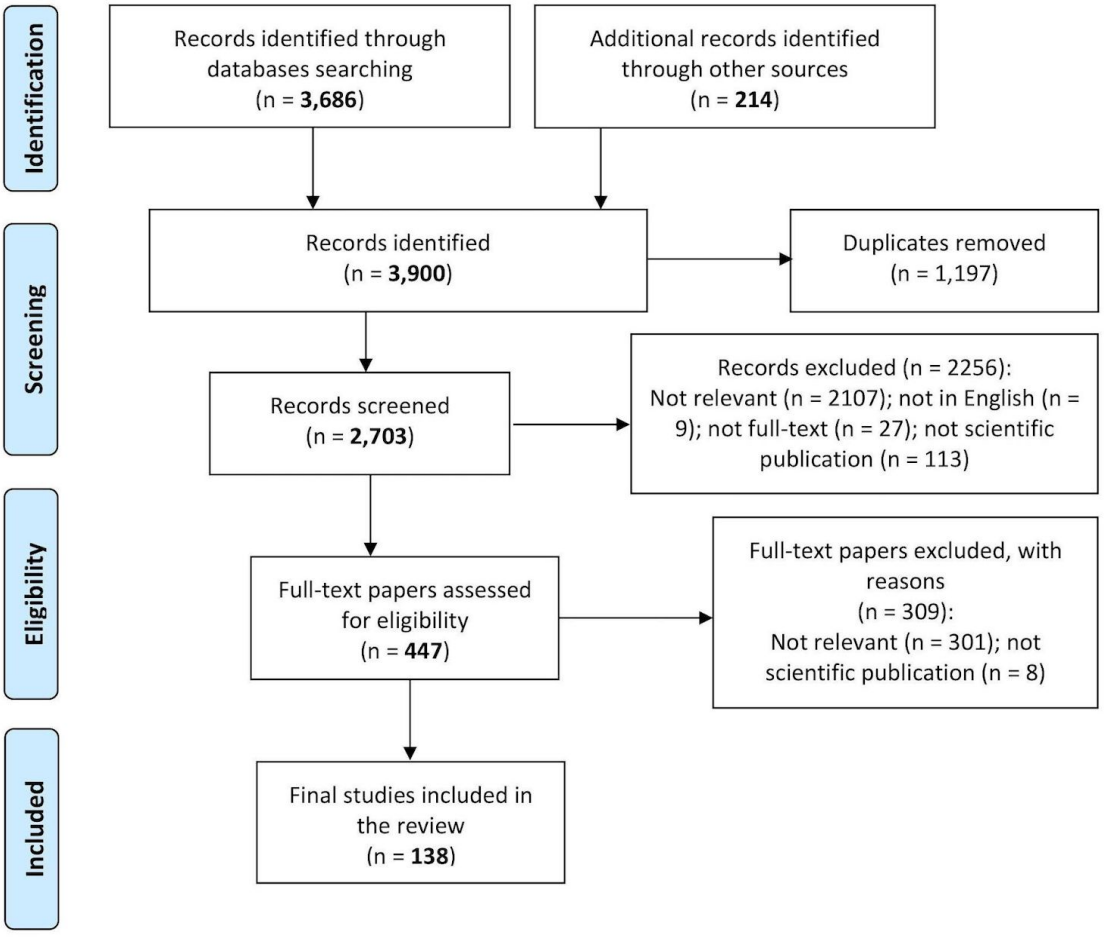
Studies were eligible for inclusion if they were in English and published after 2013, having academic dropout or related subjects (persistence, completion, etc.) in OHE as main research subject, and if their full text was available. Exclusion criteria included not researching or studying OHE (i.e. either not *online* distance education, or not *higher* education, e.g. MOOCs); and not being a scientific publication (e.g. in a newspaper or magazine).

Study selection

Employing the search strings, databases search generated 3,686 publications. The other three parallel search strategies yielded 214 additional studies, totaling 3,900 records. From these, 1,197 duplicates were removed, leaving a sample of 2,703 publications for screening by title and abstract relevance. A large number of papers was deemed not relevant or not scientific publications (e.g. opinion or theoretical papers in magazines). Thus 2,256 papers

were discarded, reducing the sample to 447 studies, whose eligibility was assessed through reading the full published text. Applying the same inclusion criteria, 309 publications were excluded. A total of 138 publications were thus included in this review. The process of searching and selecting papers followed the PRISMA Statement (Moher, Liberate, Tetzlaff, Altman, & The PRISMA Group, 2009); it was concluded in March 2019. Figure 1 illustrates the search strategies and the selection process with a PRISMA flowchart.

Figure 1. PRISMA flowchart.



Charting the data

Each paper in the sample was thematically analyzed according to the model advanced by Levac, Colquhoun, and O'Brien (2010) and coded in terms of year of publication; authors; keywords; type of publication; dropout (or related) concepts or definitions employed; dropout factors and models; type of OHE, online course or program structure and subject; unit of

analysis (sample); research purposes; research domains and themes; methodological approach; method; data collection; findings; and strategies proposed to overcome dropout.

The methodological approaches were coded according to the model proposed by Leung and Chen (2018): quantitative methods (e.g., survey, experiment), qualitative methods (e.g., case study, interviews), non-empirical methods (including theoretical and/or literature review papers), and mixed methods. Based on the main concept(s) used, prevailing goal, and research direction of each study, papers were categorized in terms of their domains: attrition, completion, continuance, dropout, persistence, retention, stop-out, success, throughput, and withdrawal. The ten domains were not mutually exclusive and sometimes overlapped. Also based on their research aim and findings, the studies were further classified into eight main themes: factors (predictive of dropout-related phenomena); interventions; theoretical or literature review (for non-empirical papers); measures (mensuration); theoretical models; comparison between modes of delivery; recommendations, strategies or best practices; and research methods and instruments. Thus, each domain may be represented by different research themes. Dropout factors were classified based on the model by Lee and Choi (2011): student factors, course/program/institution factors, and environmental factors. Their model was chosen because it was the most complete, and to allow for comparison with their findings to observe what has changed in the literature in terms of factors. Finally, the findings were coded following the main theme(s) of each paper.

A trial of the data-charting form was done with the first 20 papers, to check whether the approach to data extraction was consistent with the research questions (Levac et al., 2010). The complete spreadsheet with coded papers is available in the Appendix[1].

Summarizing and reporting findings

The final stage of Arksey and O'Malley's (2015) framework consists in summarizing and reporting findings, which is the subject of the next section.

3. Results

In this section we summarize our findings so as to provide a general overview of what has been produced in the dropout literature in OHE since 2014, situated in the context of current research and practice.

Study characteristics

Table 2 presents the general characteristics of the studies selected. Over the review period there were between 20 and 30 papers published per year, with a surprising decline in the

[1] Appendix available at http://hdl.handle.net/10609/114826

number of publications from 2017 onwards. Most papers were peer-reviewed articles; however, one third of our sample was constituted by doctoral dissertations (grey literature). The majority of papers (in particular doctoral dissertations) were produced in the United States, followed by continental Europe (especially in Spain, Greece, and Germany). Many papers also came from Australia, New Zealand, and Asian countries such as Bangladesh, China, and Korea. Some papers (10%) did not provide information on their provenance, and few (3%) investigated multiple countries. Provenance alludes to the authors' place of work or where the empirical study was conducted.

Table 2. Study general characteristics.

Characteristic	***n***	**%**
Year of publication		
2014	33	23.91
2015	32	23.19
2016	30	21.74
2017	22	15.94
2018	21	15.22
Type of publication		
Book chapter	2	1.45
Conference presentation	7	5.07
Doctoral dissertation	46	33.33
Governmental project report	1	0.72
Master's thesis	1	0.72
Peer-reviewed article	81	58.7
Geographical location		
Asia (Bangladesh, China, Indonesia, Iran, Korea, Turkey)	9	6.52
Australia and New Zealand	9	6.52
Brazil	2	1.45
Canada	2	1.45
Europe (continental)	12	8.7
United Kingdom and Ireland	5	3.62
United States	82	59.42
Multiple countries	4	2.9
Not Applicable (N/AP)	13	9.42

Type of higher education investigated		
Online	88	63.77
Blended/hybrid	17	12.32
Distance education in general	1	0.72
(Comparison) Online and f2f	18	13.04
(Comparison) Online and blended	9	6.52
(Comparison) Online and blended and f2f	3	2.17
(Comparison) Hybrid and f2f	1	0.72
Not Provided (N/P)	1	0.72
Methodological approach		
Qualitative	29	21.01
Quantitative	79	57.25
Mixed	16	11.59
Theoretical (non-empirical)	13	9.42
Method		
Case study	13	9.42
Correlational	7	5.07
Delphi study	1	0.72
Experimental or quasi-experimental	12	8.7
Literature review	6	4.35
Others	25	18.12
Phenomenological	9	6.52
Statistical analyses	32	23.19
Survey	27	19.57
N/AP	10	7.25
N/P	3	2.17
Data collection		
Academic/institutional databases	66	47.83
Focus groups	4	2.9
Interviews	33	23.91
Publications (literature)	7	5.07
Scales	5	3.62
Survey/questionnaire	49	35.51
Others	8	5.8
N/AP	6	4.35
N/P	4	2.9

Focus of empirical research		
Undergraduate course(s)	66	47.83
Undergraduate program(s)	28	20.29
Master's program(s)	10	7.25
Doctoral program(s)	7	5.07
University(ies)	19	13.77
Unit of analysis (sample)		
Undergraduate students	73	52.9
Graduate students	15	10.87
Non-traditional or adult students	22	15.94
First-semester or first-year students	8	5.8
Faculty	17	12.32
Literature	4	2.9
N/AP	10	7.25
N/P	7	5.07

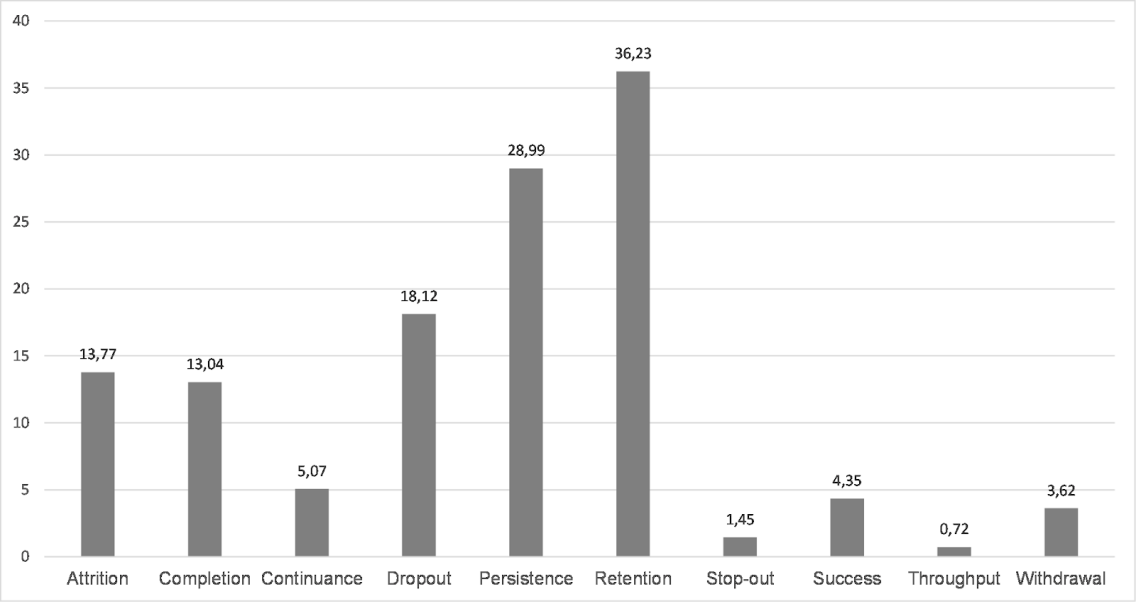
Regarding the type of HE investigated, most papers (65%) researched online settings, followed by studies on blended or hybrid HE, and studies comparing different modes of delivery (especially between online and f2f modes). The majority of our sample (57%) employed quantitative methodological approaches; one fifth used qualitative ones, 12% mixed-method approaches, and 10% were purely theoretical. That is reflected in the methods chosen: almost half of the sample employed quantitative methods such as statistical analyses and surveys, while 16% utilized eminently qualitative methods, such as the phenomenological method and case studies. Only 9% used experimental or quasi-experimental methods. There is great variety in the field in this regard, which can also be seen in the use of other miscellaneous methods by 16% of our papers. Theoretical studies that were not literature reviews – e.g., discussing best practices – were counted as "not applicable" (9%). Almost half of the studies relied on academic or institutional databases for data collection; the other half employed surveys and/or questionnaires or interviews (usually semi-structured). Some papers used more than one method (i.e. a mixed-method approach) and were double- or triple-counted. Scales were seldom utilized.

Half of the studies focused their empirical research on undergraduate course(s), while one fifth studied undergraduate programs. There were not many studies of dropout in graduate degrees (13%). More complex studies (14%) studied the entire university or college or made a comparison between different universities. Accordingly, more than half of our papers studied undergraduate students. There appears to be a growing focus on non-traditional, adult students, who constituted the sample of 16% of our studies. In comparison, there is a scarcity of studies on first-year students (6%) and faculty (12%). Some studies investigated more than one sample category.

Domains and themes

Figure 2 displays the study domains and shows the great variety of research directions (and concepts) in dropout studies. The most popular domains have a long-standing tradition: retention (36%) and persistence (29%), which is expected given that OHE institutions and researchers seek to understand both phenomena and improve their rates. For that, however, they also need to comprehend and prevent dropout and attrition, which were the third (18%) and fourth (14%) most studied domains. It seems these domains are not as popular as in the days of Tinto (1975, 1993); more "positive" domains (and concepts) such as completion (13%), retention, and persistence appear to have taken the lead in publications. Other related domains (continuance, success, withdrawal, stop-out, and throughput) were less studied, representing 15% of our sample. However, as our search strings did not include the terms success, stop-out, and throughput, this percentage must be taken with caution.

Figure 2. Domains.



Note: Articles that studied multiple domains of dropout were double counted or triple counted.

In order to clarify such distribution, it may be useful to group distinct domains according to their similarity. Certain domains are very similar, or even indistinguishable in some cases (e.g., "attrition" is often used as a synonym for "dropout"). Thus, we clustered the domains into five main groups, which are interrelated yet distinct:

1. Attrition, dropout, withdrawal, and non-enrolment (which focus on non-enrolment and/or withdrawing from a course, program, or institution);

2. Persistence and perseverance (which deal with persisting in the studies, in general –concepts more focused on individual psychological variables);
3. Retention and continuance (reflecting student retention or continuance in a course, program, or institution);
4. Success and completion (a more heterogeneous group, for “success” can mean completion –of course or program– but also grades, performance, achievement, etc.);
5. Stop-out (which deals with the unique phenomenon of withdrawing from a course or program but returning later).

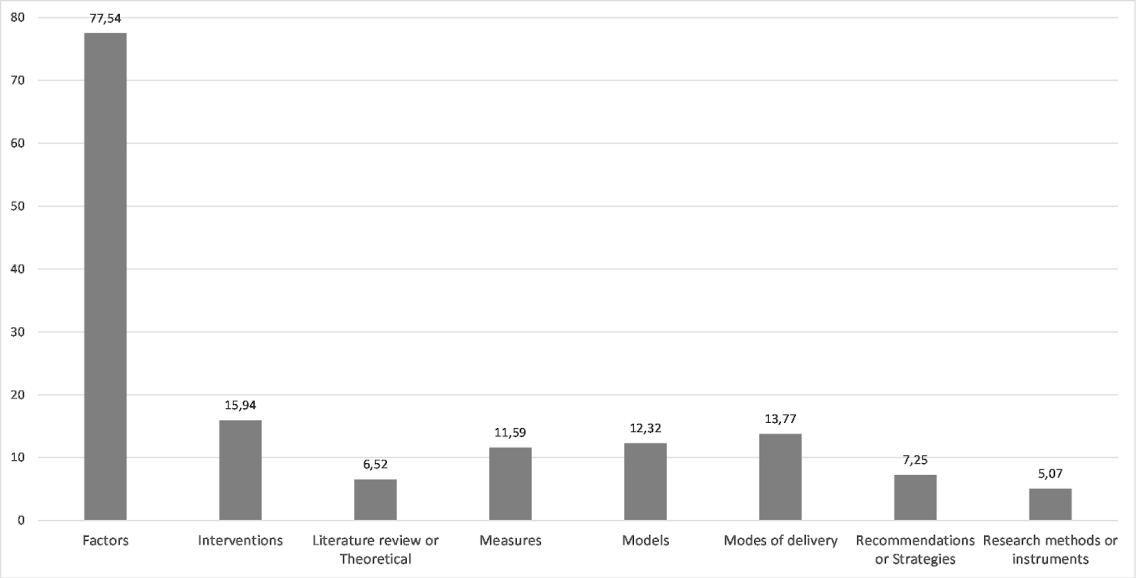
The study that focused on throughput was categorized as pertaining to groups 1 and 4, as it alludes to dropout, withdrawal, and completion rates.

The Venn diagram (Heberle, Meirelles, da Silva, Telles, & Minghim, 2015) in Figure 3 illustrates the resulting distribution of domain groups and their overlapping. Thus grouped, the domains present a different picture. The literature seems more equally distributed among group 3 (retention and continuance), with 54 papers, group 1 (attrition, dropout, withdrawal), with 48 papers, and group 2 (persistence), with 39 papers. Group 4 (success and completion) appears as the fourth most popular. However, many papers researched more than one domain group. Papers dealing with the retention domain group often investigated themes pertaining to the persistence and success groups – which is understandable, given that both persistence and success are interrelated with retention in the literature; and three papers focused on both retention and attrition. The attrition group presented a significant overlap with the success and completion domain group, with seven papers; whereas four papers that focused on persistence also pertained to the attrition domain group. In the success / completion domain, more than half of the published literature also belonged to other domain groups, especially dropout and persistence (i.e., papers that focus on issues of success and completion tend to focus on other domains as well). Both papers that investigated stop-out also dealt with attrition and continuance. The resulting picture suggests that, while the majority of papers (81%) can be classified as pertaining to one domain group, many (19%) pertained to more than one.

Figure 3. Venn diagram of domain groups.

We also identified eight main themes in the dropout literature. As shown in Figure 4, the theme of factors that influence or predict dropout (or related phenomena) was by far the most popular, appearing in 77.5% of our sample. Other themes appeared less frequently (11-16%) but are still relevant: research on interventions to ameliorate dropout rates, measures of dropout-related rates, construction of theoretical or statistical models, and comparison of dropout rates between different delivery modes. Many papers that focused on the theme of factors also studied some other theme(s). Ten papers provided recommendations and strategies to reduce dropout, nine papers focused on theoretical issues or literature reviews, while seven studies were dedicated to discussing research methods and/or instruments for the field.

Figure 4. Themes.



Note: Articles that studied multiple themes of dropout were double counted or triple counted.

Definitions and concepts

Table 3 presents the definitions and concepts employed in the dropout literature. The most salient fact is that the majority of papers did not provide any definition of the central concepts employed; 78% of the studies that used the concept of withdrawal, 70% of the ones that employed dropout, and 63% of the ones using retention did not define such concepts, taking them for granted. Other concepts such as persistence and completion received definitions more often (in 65% and 56% of the studies that employed them, respectively).

Table 3. Concepts and definitions.

Concepts and definitions	*n*	%	Shared characteristics / Selected references
Attrition			
From author(s)	9	18.37	• Attrition as failing (depending on grades) or withdrawing from *course or program* was prevalent (Dews-Farrar, 2018; Glazier, 2016; Zimmerman & Johnson, 2017). • Three papers defined attrition as leaving the *university* (Figueira, 2015; Hart, 2014; York, 2014). • Most employed other concepts (dropout, completion, withdrawal, retention) to define attrition (Figueira, 2015; Knestrick et al., 2016; Nadasen, 2016).
From literature (Ali & Leeds, 2009; Angelino & Natvig, 2009; Angelino, Williams, & Natvig, 2007; Berger, Ramirez & Lyons, 2012; Hart, 2012; Haydarov, Moxley, & Anderson, 2012; Kyger, 2008; Lee & Choi, 2011; Martinez, 2003; NCES, 2008; Seidman, 2005; Soen & Davidovitch, 2008; Tinto, 2013)	15	30.61	• Most common definition was failing to complete, or not continuing, *course or program* (Burgess, 2017; Huggins, 2017; Lucey, 2018; Wright, 2015). • Two papers defined attrition as leaving the *institution* (Moore, D., 2014; Nuesell, 2016). • Only one paper mentioned a specific timeframe (Hannah, 2017). • Two papers (Strebe, 2016; Struble, 2014) defined attrition as a synonym of dropout, and one as the antonym of retention (Johnson, C., 2015). • Martinez (2003) was the most employed author for definitions (Lucey, 2018; Russo-Gleicher, 2014; Wright, 2015).

Not Provided	25	51.02	• Many papers simply did not provide any definition (Ali & Smith, 2015; Bawa, 2016). • Two papers did not provide a definition but employed the concept specifically in relation to courses (Cochran, Campbell, Baker, & Leeds, 2014; Greenland & Moore, 2014).
Total	49	100	
Completion			
From author(s)	13	48.15	• 6 articles: completing and obtaining a *degree* in a time period (usually 6 years) (Allen, 2017; Brock, 2014; Shea & Bidjerano, 2018). • 4 articles: completing a *course*, which depends on grades (Nadasen, 2016; Strebe, 2016).
From literature (Rust, 2006; Tinto, 2012)	2	7.41	• The first referred to course completion (pass), the second to graduation in a program (Heald, 2018; Moore, D., 2014).
Not Provided	12	44.44	• Three papers did not provide a definition but employed the concept specifically in relation to courses (Gardner, 2016; Murphy & Stewart, 2017). • And two papers specifically in relation to a degree (Rashid, Jahan, Islam, & Ratna, 2015; Sweeney, 2017).
Total	27	100	
Dropout			

From author(s)	11	22.45	• Definitions varied wildly; some focused on dropout from an institution or program in a time period (2-4 semesters) (Brock, 2014; Gregori, Martínez, & Moyano-Fernández, 2018). • Others focused on dropout from course(s), depending on sitting exams (Deschascht & Goeman, 2015; Tan & Shao, 2015).
From literature (Abbad, Carvalho, & Zerbini, 2006; Botsch & Botsch, 2012; Lee & Choi, 2011; Levitz, Noel, & Rizter, 1999)	4	8.16	• Definitions varied wildly; some focused on graduating or not, voluntarily or involuntarily; others on withdrawing from courses, depending also on grades (Franko, 2015; Gangaram, 2015; Grau-Valldosera & Minguillon, 2014; Seabra, Henriques, Cardoso, Barros, & Goulão, 2018).
Not Provided	34	69.39	• Three papers did not provide a definition but employed the concept specifically in relation to *courses* (Burgos et al., 2018; Croxton, 2014; Mahmodi & Ebrahimzade, 2015). • Others mentioned *course or program* (Yang, Baldwin, & Snelson, 2017; Yukselturk, Ozekes, & Türel, 2014), or *course or institution* (Sanz, Vírseda, García, & Arias, 2018; Woodley & Simpson, 2014).
Total	49	100	
Persistence			
From author(s)	16	33.33	• Continuous enrolment (in the next course or semester) was the most common definition (Allen, 2017; Bettinger, Doss, Loeb, Rogers, & Taylor, 2017). • Some employed a time frame (enrolment for 3-4 consecutive

			semesters) (Arifin, 2016; Dexter, 2015).
From literature (Barnett, 2011; Berger et al., 2012; Escobedo, 2007; Hart, 2012; Kemp, 2002; Libby, & Catherine, 2008; Levitz et al., 1999; Martinez, 2003; Street, 2010; Tinto, 2012, 2013)	15	31.25	• Martinez (2003) was the most employed author (to remain enrolled or complete a course or program) (Budash, 2015; Nuesell, 2016; Verdinelli & Kutner, 2015). • Most studies defined it as completion of degree or program (Duckett, 2014; Johnson, C., 2015; Struble, 2014). • Intention to continue, or continuation itself in HE (Tinto) (Adams, 2017; Mitchell, 2015). • Antonym of dropout, indicator of performance (Franko, 2015).
Not Provided	17	35.42	(Banks, 2017; Bornschlegl & Cashman, 2018; Choi & Kim, 2017)
Total	48	100	
Retention			
From author(s)	13	18.57	• Continuous enrolment (in the next year) was the most common definition (Chiyaka et al., 2016, mentioned "in the same institution") (Allen, 2017; Chiyaka, Sithole, Manyanga, Mccarthy, & Bucklein, 2016; James, Swan, & Daston, 2016; Macy, 2015). • Graduation or completion of a program/degree (Banks, 2017; Gazza & Hunker, 2014; Knestrick et al., 2016; Wright, 2015). • Completion of course and / or degree; opposite of attrition (Dews-Farrar, 2018; Nadasen, 2016). • Intention or attempt to complete courses (González, 2015; Harris, 2015).

From literature (Ali & Leeds, 2009; Bawa, 2016; Berger & Lyon, 2007; Berger, Ramirez & Lyon, 2012; Fowler & Luna, 2009; Hewitt & Rose-Adams, 2012; Hongwei, 2015; Koehnke, 2013; Martinez, 2003; Pascarella & Terenzini, 2005; Reason, 2009; Tinto, 1975, 2013)	13	18.57	• Student progress or continuous enrolment from the institution perspective (Adams, 2017; Johnson, C., 2015; Strebe, 2015; Vadell, 2016). • Ability of an institution to retain a student through graduation (Duckett, 2014; Giannaris, 2016; Moore, D., 2014). Hannah (2017) mentions a time-period. • Number of online students who complete online courses (Heald, 2018; Marshall, 2017; Struble, 2014).
Not Provided	44	62.86	(Armstrong et al., 2018; Sorensen & Donovan, 2017; Stone, 2017)
Total	70	100	
Success			
From author(s)	7	33.33	• Course grades or grade point average (GPA) (Dexter, 2015; Gardner, 2016; Harris, 2015; Levy & Ramim, 2017). • Course grades and retention rates (Glazier, 2016). • Different definitions –at the institutional level (retention and graduation rates), program level (retention and program completion), and course level (completion of courses) (Nadasen, 2016).
From literature (Burns, 2013; Cuseo, Fecas, & Thompson, 2010)	2	9.52	• Students who display persistence throughout courses, measured by grades (Marshall, 2017; Wright, 2015).
Not Provided	12	57.14	(Andrews & Tynan, 2014; Banks, 2017; Winger, 2016)

Total	21	100	
Withdrawal			
From author(s)	2	22.22	• Voluntary or involuntary removal from a *course* prior to completion (Lim, 2016; McClelland, 2014).
From literature	0	0	• No definitions from the literature were employed.
Not Provided	7	77.78	• Most papers did not provide a definition but two employed the concept in relation to courses (Greenland & Moore, 2014; Murphy & Stewart, 2017).
Total	9	100	
Other concepts			
Continuance intention			
From author(s)	2	100	• To continue studies after one or more periods of non-enrollment (stop-out) (Grau-Valldosera et al., 2018). • Enrolling in at least one course at the university in the next period (Rodríguez-Ardura & Meseguer-Artola, 2016a).
From literature	0	0	• No definitions from the literature were employed.
Not Provided	0	0	
Total	2	100	
Stop-out			

From author(s)	5	100	• Most studies defined it as not enrolling for a period of time (from one semester up to 5 years) (Brock, 2014; Grau-Valldosera & Minguillon, 2014; Nuesell, 2016). • Returning to course within one year (Shefsky, 2014).
From literature	0	0	• No definitions from the literature were employed.
Not Provided	0	0	
Total	5	100	
Throughput			
From author(s)	1	100	• Aggregate of three variables – drop rates, withdrawal rates, and C or better rates (Hilton III, Fischer, Wiley, & William, 2016).
From literature	0	0	• No definitions from the literature were employed.
Not Provided	0	0	
Total	1	100	

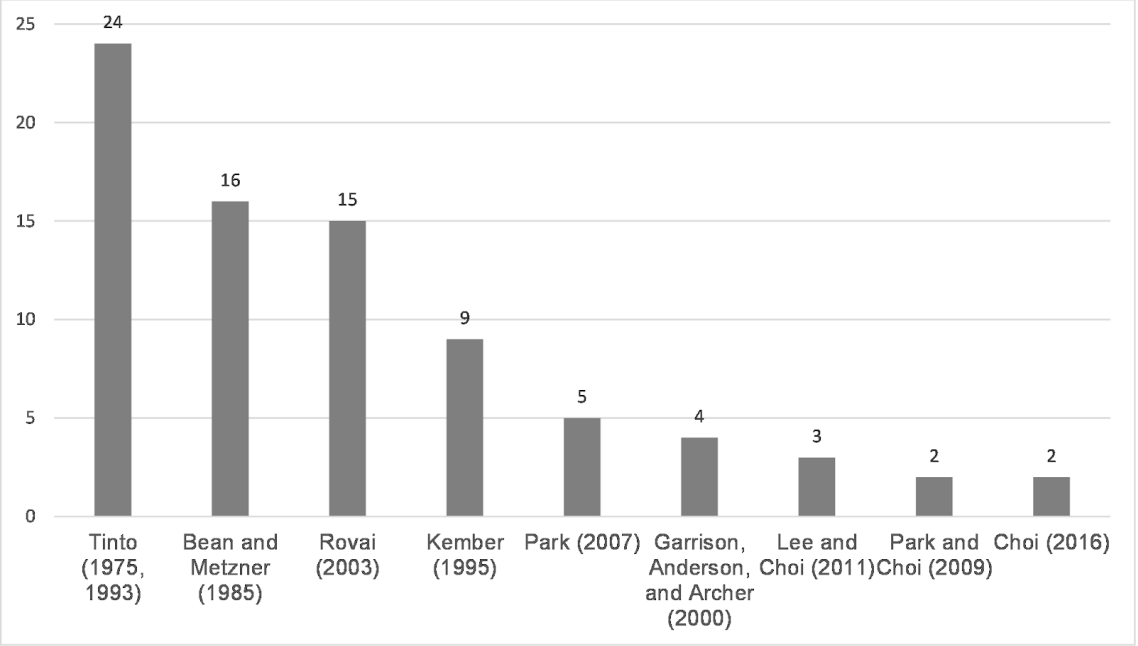
Completion seems to be a clearer, less controversial concept, usually alluding to completion of course or program; very few authors employed completion definitions from the body of literature. Many papers defined concepts such as attrition, persistence, and success employing other related concepts, sometimes without defining the latter (e.g., retention and persistence as completion; success as retention; etc.). Definitions of dropout varied wildly but centered upon dropping out from either institution or program or course, during a certain time period, and depending on grades or sitting exams. Comparatively few papers drew definitions from previous published literature (with the exception of papers that employed attrition, persistence, and retention, in which case half of the definitions came from other authors). The other concepts –continuance intention, stop-out, and throughput–, which are far less common in our sample, received clear definitions, all of them produced by the authors themselves (and not extracted from previous literature).

Dropout models

From the 13 papers that produced quantitative or conceptual predictive models, most focused on dropout/attrition, based on various predictor variables such as grades, age, and social isolation (e.g. Burgos et al., 2018; Knestrick et al., 2016; Laing & Laing, 2015; McClelland, 2014; Tan & Shao, 2015). Some other models investigated persistence (Shea & Bidjerano, 2014), including doctoral persistence (Rockinson-Szapkiw et al., 2016) and persistence in students with disabilities (Verdinelli & Kutner, 2015). Other models focused on completion (Zimmerman & Johnson, 2017), continuance (Rodríguez-Ardura & Meseguer-Artola, 2016a, 2016b), success (Nadasen, 2016), and stop-out (Shefsky, 2014). Quite a few papers (e.g. Bornschlegl & Cashman, 2018) employed multiple factors, classified under categories analogous to models, with student, environmental, and program factors.

A number of studies employed models from the literature, or discussed them at length, as shown in Figure 5. The most popular model was the one by Tinto (1975, 1993), probably the most famous author (and model) in the field, which appeared in 24 papers; followed by the models offered by Bean and Metzner (1985), Rovai (2003), and Kember (1995). Although it is not a dropout model per se, the Community of Inquiry framework (Garrison, Anderson, & Archer, 2000) was employed as such in four papers. By the number of different models employed one can see that there is ample variety in the field in that regard. Many papers (e.g. Budash, 2015; Nadasen, 2016) employed more than one model. Eighteen other models appeared just once (i.e. each model was employed in one single paper only).

Figure 5. Dropout models from previous literature.



Dropout factors

The overwhelming majority (77.5%) of studies focused their research on specific variables. The variety of factors, given the size of our sample, is impressive; so, many factors that appeared less often (e.g. privacy and loyalty) are not analyzed here. To classify them, we used the categories advanced by Lee and Choi (2011): student factors, course / program / institutional factors, and environmental factors. The three main categories contain a total of 12 factors (see details in Table 4). Many studies mentioned factors that pertained to more than one category, and thus were counted more than once.

Course / program / institutional factors (studied in 76% of our papers) were mentioned most often, followed by student factors (72%) and environmental factors (35%). This is a surprising result, given that Lee and Choi (2011) found that 55% of their identified dropout factors belonged to the student factors category, while only 20% of the variables were classified as course or program factors, and 24% as environmental factors. This seems to point that course / program / institutional factors have become more prevalent in the literature.

Student dropout factors mentioned in our sample followed more or less the patterns seen in Lee and Choi (2011), yet with certain differences. Demographic characteristics (which were excluded by Lee & Choi, 2011) appeared as an important factor, for many papers studied variables such as age, gender, and being a non-traditional student. This last variable seems to have acquired more prominence in the literature, which is logical considering its importance (and that non-traditional students are the majority in OHE). Skills like self-regulation and time management, and psychological attributes such as motivation, engagement, and satisfaction also appeared more often.

Table 4. Dropout factors.

Factors	*n*	%	Factors most studied / Selected references
Student factors	100	72.46	
Academic background			• Most relevant factors were prior GPA (Hachey, Wladis, & Conway, 2014; Macy, 2015) and academic preparedness (Gangaram, 2015; Knestrick et al., 2016).

Demographic characteristics			• Age (James, Swan, & Daston, 2016; Shefsky 2014); gender (Macy, 2015; Mitchell, 2015; Stone & O'Shea, 2018); being a non-traditional student (Grau-Valldosera & Minguillón, 2014; Huggins, 2016; Stoessel, Ihme, Barbarino, Fisseler, & Stürmer 2014).
Relevant experiences			• Prior experience and performance (Faulconer, Griffith, Wood, Acharyya, & Roberts, 2018; Strebe, 2016); no high school diploma (Shea & Bidjerano, 2016).
Skills			• Self-regulation, self-management or self-discipline (Gaytan, 2015; Shaw, Burrus, & Ferguson, 2016; Van Hunnik, 2015); time management skills and procrastination (Andrews & Tynan, 2014; Giannaris, 2016; Lim, 2016); digital literacy / technology (Burmester, Metscher, & Smith, 2014; Maye, 2015); learning and research skills (Levy & Ramim, 2017); technological constraints or challenges (Bawa, 2016; Burgess, 2017).
Psychological attributes			• Motivation (González, 2015; Hart, 2014; Lucey, 2018); engagement (Dexter, 2015; Nadasen, 2016; Poll, Widen, & Weller, 2016); satisfaction (Bianchi-Laubsch, 2014; Garratt-Reed, Roberts, & Heritage, 2016; Vakoufari, Christina, & Mavroidis, 2014); learning style (Hannah, 2017; Heidrich et al., 2018; Moore, D., 2014); self-efficacy / resilience

			(Tucker, 2014; Verdinelly & Kutner, 2015).
Course / Program / Institution factors	105	76.09	
Assessment			• Activity grades and outcome (GPA) (Burgos et al., 2018; Choi & Kim, 2017).
Course design			• Instructional design (e.g. class size/learning materials or resources) (Estes, 2016; Glazier, 2016; Snyder, 2014); course design and difficulty (Harris, 2015; Winger, 2016); program / instruction quality (Banks, 2017; Shea & Bidjerano, 2018); workload (Burgess, 2017; Calvert, 2014).
Delivery mode			• Online, blended, or f2f (Chavez-Toivanen, 2017; Deschascht & Goeman, 2015; Faulconer et al., 2018; Swan, 2016).
Institutional factors			• Student support (Arifin, 2018; Gangaram, 2015; Heald, 2018; Huggins, 2016); instructors/faculty characteristics or behavior (Bawa, 2016); learning management systems (Boton & Gregory, 2015); orientation (Marshall, 2017; Robichaud, 2016); tutorial attendance (Tower et al., 2015).

Interactions			• Social interaction or integration (Figueira, 2015; Rockinson-Szapkiw et al., 2016; Thistoll & Yates, 2016); Community of Inquiry factors (Miner, 2014; Snyder, 2014; Traver et al., 2014); faculty interaction with students (Gaytan, 2015; Lee, Lee, & Kim, 2018; Mahmodi & Ebrahimzade, 2015; Maye, 2015); inter-student interaction (Cambruzzi, Rigo, & Barbosa, 2015; Mahmodi & Ebrahimzade, 2015); sense of community (Laing & Laing, 2015; Lowe-Madkins, 2016; Mitchell, 2015); sense of isolation or belonging (Stone, 2017; Thomas, Herbert, & Teras, 2014).
Environment factors	48	34.78	
Work / time commitments			• Employment status (Calvert, 2014; Johnson, A. B., 2017; Sanz et al., 2018); time issues or lack of time (Inkelaar & Simpson, 2015; Johnson, C., 2015); work / life / family commitments (Franklin, 2015; Shea & Bidjerano, 2016).
Supportive environments			• Financial problems or aid (Rockinson-Szapkiw et al., 2016); life events (Sorensen & Donovan, 2017); support from family, work, friends (Thistoll & Yates, 2016).

To the category course/program dropout factors were added “institutional” factors as well, to account for variables such as student support and faculty characteristics or behavior that, being typical of an OHE institution, extend across multiple courses and programs. The variable assessment (activity grades and outcome) was also added, given its frequency in our sample, and to discern it from prior GPA. Another difference is that there were many studies comparing delivery modes (online, blended, or f2f) as regards to dropout rates and related phenomena.

Regarding environmental dropout factors, we have added the variable time commitments, given its ubiquity in our sample. Indeed, this seems important since time issues, lack of time, and other life and family commitments appear often as important dropout variables.

Main findings

Table 5 summarizes the relevant findings of the literature studied. The factors that were found to be most correlated with dropout were demographic characteristics; time- and financial-related issues; self-regulation skills; motivation; and student support. Other reviews or investigations found the same key factors (Bawa, 2016; Castles, 2004; Lee & Choi, 2011), but not the emphasis on demographic characteristics. The correlation of students' background characteristics such as age and gender with dropout or persistence goes against the grain of previous research; there was not a consensus among researchers about the importance of such factors (Lee, Choi, & Kim, 2012). However, numerous other factors (e.g. satisfaction and previous distance experience) were found to be correlated, but less often. Additionally, many studies found no correlation between the factors chosen (e.g. faculty behavior, technological factors) and dropout phenomena.

Table 5. Main findings.

Themes	*n*	%	Main findings / Selected references
Factors	85	61.59	• Factors that were most associated to dropout: time management, procrastination, and work/family commitments; gender, age, and GPA; motivation; financial issues; and student support (Arifin, 2016; Budash, 2015; Burgess, 2017; Burmester et al., 2014; Gaytan, 2015; Johnson, A. B., 2017; Lim, 2016; Thistoll & Yates, 2016). • Many studies found numerous student, course / program, and environmental factors that correlated with dropout (Calvert, 2014; Choi & Kim, 2017; Lucey, 2018). • Many papers found no significant association between the factors they studied and dropout / persistence / retention (Allen, 2017; Armstrong et al., 2018; Dexter, 2015; Traver et al., 2014).

Interventions	17	12.32	• Many interventions, mostly based on forms of support and orientation, increased retention just a little (Burgos et al., 2018; Inkelaar & Simpson, 2015; Shaw et al., 2016; Tower et al., 2015). • Interventions with the highest impact on retention and dropout were done in postgraduation settings (Gregori et al., 2018; Sutton, 2014). • Different types of interventions had no effect on retention, persistence, or dropout rates (Franko, 2015; Hannah, 2017; Heald, 2018; Miner, 2014; Sullivan, 2016).
Literature review / theoretical	9	6.52	• Literature reviews focused on the fields of dropout and retention (Bawa, 2016; Travers, 2016), or on specific issues such as strategies and best practices (Gazza & Hunker, 2014; Poll et al., 2014). • Theoretical findings mostly developed definitions and frameworks (Grau-Valldosera & Minguillon, 2014; Seabra et al., 2018).
Measures	20	14.49	• Most papers measured *degree* or *institution* dropout (not graduating) and found very high rates (Brock, 2014; Inkelaar & Simpson, 2015). • Other authors measured *course* dropout, with much lower rates (Burgos et al., 2018; Cambruzzi et al., 2015; Greenland & Moore, 2014). • Difficult to interpret / compare measures due to imprecise terminology.

Models	17	12.32	• From the papers that produced models, most focused on dropout / attrition (Burgos et al., 2018; Knestrick et al., 2016; Laing & Laing, 2015; Tan & Shao, 2015; Thistoll & Yates, 2016; Vogel et al., 2018). • Other models focused on persistence (Rockinson-Szapkiw et al., 2016; Shea & Bidjerano, 2014) and success (Nadasen, 2016; Woodley & Simpson, 2014). • Models on course completion (Zimmerman & Johnson, 2017), continuance intention (Rodríguez-Ardura & Meseguer-Artola, 2016b), retention (Slade & Prinsloo, 2015) and stop-out (Shefsky, 2014) were less common.
Modes of delivery (comparison between)	21	15.22	• Most papers found that online courses have a negative impact on degree completion (Huntington-Klein, Cowan, & Goldhaber, 2017; Nuesell, 2016); withdrawal rates are significantly higher in fully online courses (Ali & Smith, 2015; Murphy & Stewart, 2017; Struble, 2014; Wladis et al., 2015). • Other authors found small or no statistically significant differences regarding persistence or degree completion comparing online, blended, and f2f modes (Chavez-Toivanen, 2017; Dexter, 2015; Faulconer et al., 2018; Gangaram, 2015; James, Swan, & Daston, 2016). • However, in other studies participating in online courses was also associated with higher retention, success, and probability of graduating (Deschascht & Goeman, 2015; Macy, 2015; Shea & Bidjerano, 2014, 2016, 2018).

Recommendations / Strategies	10	7.25	• Most recommendations addressed instructional / course design and student support (Robichaud, 2016; Van Hunnik, 2015). • Others focused on feedback issues and social presence / sense of community (Bissonette, 2017; Estes, 2016; Poll et al., 2014). • Some authors found numerous possible strategies or best practices (Sánchez-Elvira Paniagua & Simpson, 2018; Stone, 2017; Travers, 2016).
Research methods / instruments	10	7.25	• Most papers produced database learning analytics approaches to predict dropout (Adams, 2017; Cambruzzi et al., 2015; Yukselturk et al., 2014). • Others developed persistence or attrition scales (Hart, 2014; York, 2014). • Standardized instruments that can be used for dropout assessment (faculty course evaluation and e-learning skills) were also developed (Harris, 2015; Levy & Ramim, 2017).

Note: Papers whose findings alluded to more than one theme were counted more than once.

Papers that assessed different interventions to address dropout –e.g. additional academic support and motivational emails– found that they reduced dropout slightly (between 2-11%). The most effective intervention was student tutoring plans, which increased retention by 14% (Burgos et al., 2018). Interventions in graduate settings were significantly more efficient, which is probably due to their different context and target population. Several interventions –e.g. offering students coaching services, synchronous support, and text reminders– had no effect on dropout.

The findings of literature reviews are particularly difficult to summarize. Most dealt with dropout and retention; however, a few focused on reviewing literature on strategies and best practices, presenting a huge collection of recommendations. As for purely theoretical findings, some papers provided theoretical frameworks for attrition (Laing & Laing, 2015) and permanence (Seabra et al., 2018); only one paper delved into providing a new definition of dropout (Grau-Valldosera & Minguillón, 2014).

Measure findings focused on statistical estimates of dropout. Most papers measured *degree* or *institution* dropout (not graduating) and found very high rates, ranging from 45% (Choi & Kim, 2017; Choi & Park, 2018) to 85% (Brock, 2014; Inkelaar & Simpson, 2015). That is in line with Woodley and Simpson (2014), who mention that the UK Open University's graduation rate is 22%. Papers that found low dropout rates (8-25%) measured course dropout (Burgos et al., 2018; Tan & Shao, 2015; Zimmerman & Johnson, 2017) or persistence (Allen, 2017). However, it is particularly difficult to interpret and compare measures due to imprecise terminology.

Findings regarding dropout models were already discussed above.

Regarding modes of delivery and dropout rates, the findings seem to be inconclusive –most papers found that taking online courses impacted negatively on completion and withdrawal; yet other papers found no impact, or no difference in rates between different modes (online, blended, or f2f); while others found higher retention and graduation in online courses. That is surprising, since the literature usually postulates that dropout rates are much higher in OHE (Wladis et al., 2015).

Most recommendations in the literature addressed changes in learning design (assessments, increasing interactivity) and providing different forms of student support (academic advising). However, some also addressed feedback issues and social presence or sense of community (Bissonette, 2017; Poll et al., 2014), which is reminiscent of Tinto's (1993) strong influence on the field. Strategies were quite numerous and varied so we refer the reader to the Appendix[2], where all the strategies given by each paper are summarized.

Finally, regarding research methods and instruments, relying on learning analytics (academic databases) was prevalent for predicting dropout. Few standardized scales for persistence or attrition (Hart, 2014; York, 2014) were produced; as were some scales to assess faculty course evaluation and student e-learning skills (Harris, 2015; Levy & Ramim, 2017).

4. Discussion

In this section we summarize our findings to provide a panoramic overview of dropout literature in the period (2014-2018) and highlight some of its prominent gaps, drawing implications and recommendations to advance the field. Although we did not find any major general trend (apart from a strong focus on the study of dropout *factors*), specific tendencies and findings are compared to the ones found in previous reviews.

[2] Appendix available at http://hdl.handle.net/10609/114826

General overview of characteristics

Overall, recent dropout studies present a very complex landscape, with some specific tendencies and problems. Scientific production (in English) in the field comes mainly from western countries, with most papers coming from the US and Europe – which have different contexts and definitions of dropout and policies, usually of an institutional (governmental) nature. Another context that should be taken into consideration in dropout studies is the type of OHE investigated. The field still seems to suffer a huge influence of models and theories designed for f2f settings. Face-to-face settings (and also hybrid settings) are very different from open, fully online settings, in terms of learning design, demographics, student preparation and previous experience, among other factors (Patterson & McFaden, 2009). Open OHE usually has no entry academic requirements, and few or none permanence requirements. It seems that in the last decades the field has been slowly adapting to such specificities, developing new models, resources, and theories that take them into full account.

Dropout studies are characterized by methodological diversity, in accord with the diverse range of themes studied. However, most (57%) of the papers analyzed here employed quantitative methods. That represents a major change in the field, if compared with findings by Simpson (2010), who found an emphasis on qualitative data in his review and criticized their dependence on surveys of student opinion. Employing experimental designs with control groups, which is important for the evaluation of interventions, is rare (Lee & Choi, 2011; Simpson, 2010). Lee and Choi (2011) complained that evidence of intervention effectiveness was rare, yet in our review several papers presented such evidence; however, they usually rely on relatively small samples. Overall, the impression is of poor or medium methodological rigor in the field; thus, findings might have been heavily influenced by the methods chosen. Also, the data collected are often of a limited, institutional nature –as they are easily obtainable–, focused on applying learning analytics to databases, centering on quantitative factors (e.g. grades and previous experience). However, dropout phenomena are largely qualitative and complex. Dropout studies thus tend to lack information on important sociopsychological causes and contingencies (e.g. personal experiences, workload, and family commitments).

Therefore, more qualitative studies are needed so as to probe the actors' (students, faculty, institution) experience and the multiplicity of factors, as the lived experiences of e-Learners and faculty remain somewhat ignored by the literature (O'Shea, Stone, & Delahunty, 2015). Most studies usually focus on the behavior of students who persist –but it is crucial to study the ones who withdraw. However, qualitative information on OHE students who drop out is more difficult to collect; such studies tend to focus on very specific contexts or courses, and their generalizability is limited. Therefore, more quantitative studies with standardized scales and large samples should also be considered, to complement the more qualitative studies. Ideally, the field would benefit from the employment of complex mixed-method designs with large samples, although that is particularly difficult with dropout students.

In addition, researchers should dedicate more studies to whole universities, or to the comparison of different universities; and to graduate degrees. Although the unit of analysis is usually constituted by undergrad students, the study of non-traditional, adult learners is a growing, important focus of research. In contrast with the small number of studies (less than 8%) on non-traditional students found by Lee and Choi (2011) and Tyler-Smith (2006), 16% of the papers in our sample focused on such student population; prevention and interventions should address its specificities. Efforts should also be dedicated to more studies on first-year students (as dropout is typical in that period: Simpson, 2010), first-time e-Learners (Tyler-Smith, 2006), and faculty (as the institutional stakeholders that can influence student retention the most). Research should also address when dropout occurs (e.g. beginning of course, before the first assessment), which is important for the design of early interventions.

A complex phenomenon without a clear definition

Dropout-related phenomena are complex and thus require clear definitions. However, the field is almost chaotic in that regard. The vast majority of the papers studied did not provide any definition; when they did, usually they did not employ previous definitions available in the literature. Also, some definitions are narrow, others very broad and vague; and most are used interchangeably. Another problem is that most definitions are designed as institutional indicators (e.g. retention as completion of a course or program) that do not take into account the students' desires and expectations. In OHE many students do not plan to graduate, or even complete their courses (Woodley & Simpson, 2014). Definitions are still "shaped by theories that view student retention through the lens of institutional action and ask what institutions can do to retain their students" (Tinto, 2015, p. 254). Usually they do not consider factors such as transfer to another institution (Ashby, 2004), which imply that students continue their HE studies yet are regarded as dropouts. Thus, stakeholders and policy makers have little accurate and reliable information about dropouts (Grau-Valdossera & Minguillón, 2014), which affects monitoring and comparing interventions. Hence, results are often not comparable across courses, programs, institutions, and countries.

Inconsistent terminology is crucial, for dropout definitions determine how it is measured, confronted, and researched (Ashby, 2004). Therefore, developing common standard definitions and data collection procedures would benefit the field and impact policy and retention strategies. Tinto (1975) stressed that the field suffered from "inadequate attention given to questions of definition", requiring the development of "theoretical models that seek to explain, not simply to describe, the processes" (p. 89) that lead to dropout. The field has changed little since Tinto (1982), still studying f2f settings, warned that "dropout research is in a state of disarray, in large measure because we have been unable to agree about what behaviors constitute an appropriate definition of dropout" (p. 3).

That constitutes a major challenge for OHE dropout studies: in theoretical-empirical terms, they need generalizable, ample, and precise definitions; but they also demand context-dependent, flexible definitions to address situated interventions. Given the variability

of contexts (different university systems, countries and OHE models), it seems this impasse is central to the field. The only answer to that question in our sample was given by Grau-Valldosera and Minguillón (2014), who formulated a program- and context-dependent definition based on learning analytics. However, it seems very difficult to operationalize in large studies, as it is very specific.

Multiple and interchangeable domains and themes

Dropout studies investigate manifold and often interchangeable domains. When dropout domains are clustered, the literature seems to be well distributed between them. Unfortunately, it is impossible to compare the present scenario with previous ones, for prior reviews did not map the field in the same way. Two recommendations seem apropos: to complement studies on dropout and retention domains with studies on persistence (which have a more psychological nature); and to develop more studies on stop-out and its relationships with attrition and continuance, as stop-out behavior often leads to dropout (Grau-Valldosera & Minguillón, 2014).

As regards the themes researched, the overwhelming majority of our sample studied dropout factors. More attention should be paid to research on interventions and strategies, preferably with cost-benefit analysis, which the field lacks (Simpson, 2010), and rigorous measurement of effects; to theoretical developments such as dropout models, and new concepts and definitions; to the development of research methods and instruments; and to the integration of the different themes into a robust theoretical and empirical corpus.

Numerous causal factors and lack of unified theories and models

The study of predictor variables of dropout was the only general trend found in the field: 77.5% of the studies selected were dedicated to researching a multiplicity of factors. As such our sample is in agreement with previous literature: student dropout is caused by a complex set of factors and is context specific; there is a lack of consensus regarding the number of, and what should be considered as, valuable predictor factors (Storrings, 2005). As a result, studies showed a lack of unified theories on dropout factors. The very complex nature of dropout phenomena renders the development of a unified theory or model almost impossible, or utopic (Kember, 1989).

More attention was given to course / program / institutional factors, and that trend should continue, for such variables are more amenable to interventions and change, as institutions have little influence on student factors. However, future studies ought to give more consideration to time-related factors (time management and availability, and procrastination). Reviewing the most common reasons for withdrawal, Ashby (2004) found that the most important one was difficulty in juggling studies, work, and life demands, and concluded that

time is clearly a major issue for open university students. However, although time-related factors appear to be most important –especially for part-time, non-traditional students– they were not the main focus of research in any of the papers studied. Future studies should also address the differences between undergraduate and graduate degrees, and the different open OHE models, as regards dropout phenomena.

Thirteen studies sought to produce predictive models, integrating a variety of factors, which is laudable. However, when the literature employs previous models, they are usually quite outdated. Tinto's (1975, 1993) social integration model is still the most used one, but it is not without its critics. It needs extensive remodeling to adapt to OHE, wherein social integration does not seem to be a crucial variable (Figueira, 2015), and should integrate faculty factors and other student factors. That illustrates what is perhaps one of the main problems in the field: the transference of (old) concepts and approaches from f2f literature and context to the very different context of OHE. Conventional definitions and approaches are much more difficult to apply to fully OHE, and that should always be considered. Therefore, future dropout research should try to develop more holistic and encompassing models which may guide more effective interventions.

Findings: Five years of progress, and now what?

Future dropout research should pay special consideration to the factors that correlated the most with dropout: demographic characteristics, time- and financial-related issues, motivation, and student support. However, it is typical of dropout studies that while one research finds significant correlations, others do not; ideally, metanalyses ought to be conducted to verify with more accuracy which factors are most important. As current interventions tend to reduce dropout by just a little or else have no effect, future strategies should address the factors mentioned and be tailored differently to undergraduate and graduate programs. New forms of intervention should also be tried. More studies on the evidence of intervention effectiveness with quantitative methods and large samples are also needed.

The field needs to develop new theories that are more adequate to the evolving landscape of OHE. New, more holistic frameworks to the main domains should be built, grounded on studies on definitions – differentiating clearly concepts such as dropout and withdrawal, and developing both situated and general definitions with precise terminology. Measuring dropout phenomena would benefit from consensual general definitions, making comparisons between different studies possible.

Regarding methods and instruments, the heavy reliance on learning analytics (which does not capture the students' context and experiences) should be complemented by more qualitative and mixed-method research. Future studies should also try to develop new standardized scales for the assessment of dropout proneness, persistence, and related factors. The field also needs further context-situated research comparing modes of delivery

and dropout rates. It is not at all clear that online courses always present higher rates, and that is important for policy and the offer of more online (or blended) options.

Limitations

This review may possibly have missed some relevant studies due to database selection, time constraints, and exclusion of studies that were not in English. Due to the nature of scoping reviews, breadth of analysis was emphasized rather than depth, and we did not assess the quality of research and evidence in depth.

5. Conclusion

This review mapped and synthesized the last five years of research in OHE dropout studies. As an overall conclusion, findings suggest that the field is complex, dynamic, and sort of chaotic. It seems to have changed little in the last 20 years. Storring's (2005) conclusion is still valid: "research seems to be going in many different directions simultaneously while also producing a high number of contradictory reports" (p. 340). It appears as a newly developed field – still trying to adapt f2f models and theories to the specific context of OHE, while also developing new approaches. Therefore, many efforts are still needed to develop the field, which have been pointed here. Its main research gaps include theorization, precise definitions and measurement, new models, and a need for stronger evidence on the effectiveness of strategies and early interventions. However, possibly the field will remain as varied and complex as the phenomena it studies: after all, "[t]here is no simple formula that ensures student persistence" (Rovai, 2003, p. 12), nor its understanding.

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