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An exploratory literature review on open educational practices

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ABSTRACT

This paper presents a review of peer-reviewed publications (2007–2017) on digital open educational practices (OEPs). It explores trends and patterns in this emerging area of study by examining paper abstracts and bibliographic data indexed in the Scopus database using a combination of descriptive statistics, text mining, social network analysis, and content analysis. Findings demonstrated two major strands of OEP research: those who discuss OEP in the context of open educational resources, mostly in terms of open educational resource creation, adoption and use, and those who discuss OEP in relation to other areas, including open scholarship, open learning, open teaching or pedagogy, open systems and architectures, and open source software. Based on the findings of this study and in the light of the broader literature on OEPs, we echo the calls for a need to conceptualize OEPs as a multidimensional and unifying construct.

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Introduction

There has been growing interest in digital open educational practices (OEPs) in recent years. Multiple reasons for this interest can be drawn from the recent literature on massive open online courses (MOOCs), open educational resources (OER), and open and networked scholarship. First, it has been argued that although access to resources and content is only part of the educational experience (Cormier & Siemens, 2010), there is "a tendency to view access to online material as the principal concern of the open education movement" (Knox, 2013, p. 21). Knox argued that there is a need to focus on "open processes" instead, which he framed as the "active engagement of learners in participation and dialogue, as well as further critical explorations of the relationships between technology and education" (p. 21).

A number of scholars have also argued for a need to focus on educational practice to improve engagement with OER (see Andrade et al., 2011; Alevizou, 2012; Atenas & Havemann, 2014; Ehlers, 2011a; Geser, 2007), as access alone is not a "sufficient condition" for successful OER use and adoption (Ehlers, 2011a, p. 1). A report by the Open Educational Quality (OPAL; Andrade et al., 2011) showed that issues with (1) "lack of institutional support," (2) "lack of technological tools," (3) "lack of skills and time of users;" (4) "lack of quality or fitness of OER,"

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and (5) "personal issues (lack of trust and time)" were significant barriers for engagement with OER (p. 8). It is evident that a better understanding of open processes is needed to improve learner engagement with open resources (Andrade et al., 2011; Ehlers, 2011a; Walz & Bekbalaeva, 2018) and to address issues with "policy development, rais[ing] awareness and capacity building" (Bossu & Stagg, 2018, p. 154).

Finally, there has been an increased awareness and understanding of different forms and dimensions of openness and open practice (e.g., Beetham, Falconer, McGill, & Littlejohn, 2012; Hodgkinson-Williams, 2014; Naidu, 2016). Cronin (2017), as we will discuss further in the following section, proposed that OEP is a broad concept that includes open and networked scholarship, which is also noted by Beetham et al. (2012), Naidu (2016), and Mishra (2017). Surprisingly, there is limited research on OEPs in the educational literature, particularly from this "expansive" perspective (Cronin & MacLaren, 2018, p.127). We conducted a literature review on trends and patterns on OEPs to contribute to this area of study. This study is significant as it is the first that provides an exploratory analysis of peer-reviewed OEP literature across different disciplines and can be used as a reference study for future research.

Through a combination of quantitative and qualitative data analysis methods, we addressed the following research questions:

- What are the trends and patterns in publications on OEPs?
- What patterns and meanings can be derived from a lexical and content analysis of paper abstracts?

Background

The earliest definition of OEPs (Cronin & MacLaren, 2018) goes back to the OLCOS project (Geser, 2007). In the project report, OEPs were framed as educational practices that "involve students in active, constructive engagement with content, tools and services in the learning process, and promote learners' self-management, creativity and working in teams" (Geser, 2007, p. 37). Furthermore, it was argued that OEPs "emphasise learners' own activities in developing competences, knowledge and skills" (p. 124). Similar with the OLCOS project, the collaborative OPAL initiative (Andrade et al., 2011) aligned OEPs with learner-centered and innovative teaching practices, yet in close connection with OER: "OEP are defined as practices which support the (re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path" (Andrade et al., 2011, p. 12).

Building on his work as part of the OPAL initiative, Ehlers (2011a) argued that the OER movement needed to move away from its heavy focus on access to process to address issues with quality and sustainability. Sustainability in particular meant that there ought to be a "culture of openness within institutions" (p. 2) nurtured by social and technical support. It also meant that the processes and products of open education had value for both teaching staff and learners. This was possible by transforming OER into something that is an actual part of the learning process. However, Ehlers (2011a) avoided positioning openness as an ultimate goal; rather, he drew attention to the diversity of educational practice within institutions:

> We believe that educational practices are never entirely closed or open and that, within educational organisations, patterns and configurations of educational practices exist which, taken together, constitute a diverse landscape. (p. 6)

The challenge now, Ehlers (2011a) noted, was to use "OER to improve learning experiences and innovate educational scenarios" (p. 3), while taking the teaching method and structure into consideration. Thus, as noted on the OER Commons website (https://www.oercommons.org/about), "The move to open education practice (OEP) is more than a shift in content, it is an immersive experience in collaborative teaching and learning." The OPAL report (Andrade et al., 2011) asserted that the move towards OEP signalled a shift to a second phase in the open education movement, which is about "[improving] the learning experience and innovate educational scenarios" (Ehlers, 2011a, p. 3). The report characterized phase 2 as follows: "builds on OER; goes beyond access into open learning architectures, focus [is] learning as construction [and] sharing, quality improvement through external validation, change of educational cultures, and OER as value proposition for Institutions" (Andrade et al., 2011, p. 12).

Mays (2017), in a multi-year project that "sought to understand how OER might be used as a catalyst for pedagogical transformation in African universities" (p. 387), argued that for meaningful student and staff engagement with OER, the "institutional vision, mission and values" (p. 396) should drive the creation and adaptation of learning resources. Considering the increasing demand on flexible learning opportunities and building on Downes (2007) and Ehlers (2011a), Mays (2017) argued that a working solution for institutions would be to make open and distance learning (ODL) a central business model and situate engagement with OER within an open ecology model. Mays argued that there is a need to address issues with openness at three levels: "at the micro level of individual learning resources, through to the meso level of open methods of teaching and learning, through to the macro-institutional level of an open educational practices culture" (p. 394). Furthermore, Mays noted that any discussion on resource should involve decisions about "what should be taught, how and when; how and when learning should be assessed; and how the curriculum should be resourced and supported" (p. 388).

The perspectives discussed above are significant in that they promote innovation in open education at multiple levels, including pedagogical (related to teaching methods and curriculum design) and institutional (related to organizational frameworks and policies) levels. They also remind us that there is a need to focus on the interaction between resources, pedagogy, learning architectures, culture, and available support mechanisms to improve the learning experience. Yet, it is important to further expand on the forms of open practice aided by digital technology in this discussion, because as the Cape Town Open Education Declaration (2007) states:

> Open education is not limited to just open educational resources. It also draws upon open technologies that facilitate collaborative, flexible learning and the open sharing of teaching practices that empower educators to benefit from the best ideas of their colleagues. (p. 4)

Although OEPs are not stated specifically in the declaration, the view is that there are many open practices that go beyond sharing an educational resource – practices that are facilitated by digital technologies.

Beetham et al. (2012) noted that using open and public pedagogy, open learning, practising open scholarship, open sharing of teaching practice, and use of open technologies were all examples for OEPs along with OER production, management, use and reuse. In line with this broad framing of OEP, Cronin (2017) defined OEPs as "collaborative practices that include the creation, use, and reuse of OER, as well as pedagogical practices employing participatory technologies and social networks for interaction, peer-learning, knowledge creation, and empowerment of learners" (p. 18). From this perspective, engaging with a learning network on Twitter, contributing to a class wiki, or writing and sharing an educational blog post can all be open practice. Similarly, Havemann (2016) also noted that "OEP consist not only of creating and reusing OER, but also of other forms of transparency around academic practice, such as blogging, tweeting, presenting, and debating scholarly and pedagogic activities, in ways that promote reflection, reusability, revision, and collaboration." Cronin and MacLaren (2018, p. 127) later referred to such broad conceptualizations of OEPs as "expansive" definitions of OEP, noting that OEP might be "inclusive of but not necessarily focused on OER."

Next, we present and discuss findings from an exploratory literature review on OEPs to shed light on existing trends and patterns in the OEP literature from an expansive perspective. Parts of the literature presented here are revisited later, in the Conclusion and implications section.

Methodology

Research method and design

For the purposes of the study, we used a systematic review approach (Gough, Oliver, & Thomas, 2012). As part of the review, social network analysis (SNA) (Hansen, Shneiderman, & Smith, 2010), content analysis (Given, 2008), and text mining (Hearst, 2003) approaches were used. The main reason for analyzing and interpreting data through these approaches was to triangulate the data to gain a multidimensional perspective (Foster, 1997) and increase the validity of the research. The overall research design is illustrated in Figure 1.

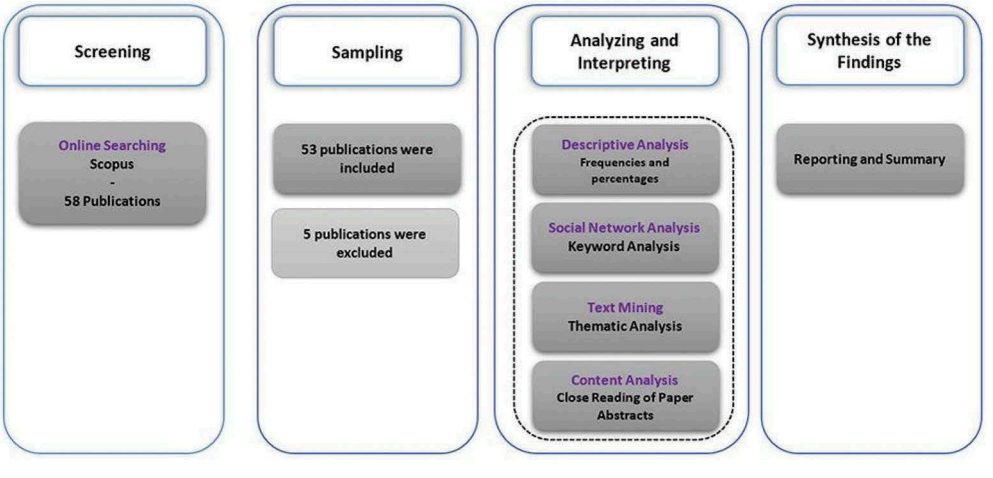

Figure 1. Overall research design.

Sampling

We used the Scopus database for sampling. The initial criteria for inclusion in the research are as follows: indexed in Scopus, has the search term *open educational practice(s)* in the title, abstract, or keywords, is written in English or has an abstract in English. We reached 58 papers in the initial screening. We then read all the paper abstracts, and full texts where needed, to identify the papers relevant to our research context and to remove any duplicate resources. Five publications were excluded from the research corpus at the end of this final screening. The final research corpus was composed of 53 papers published between 2007 and 2017.

Data collection and analysis

This research benefits from multiple approaches to data collection and analysis, as described below.

Round 1

First, we analyzed bibliographic data in sampled publications to identify existing research trends (Hsieh & Shannon, 2005) using the data provided by Scopus. We created descriptive tables showing time series, subject area, source type, source title, countrywide distribution, institutional affiliations, and keywords. In addition, we noted the research methods used in the papers and created a descriptive table to present research trends.

Round 2

Second, we used SNA, which is a novel technique for analyzing network structures through multiple levels (Hansen et al., 2010). In this round, keywords were analyzed according to their co-occurrence and then visualized using the Harel-Koren fast layout algorithm (Harel & Koren, 2000). The significance of the keywords was determined according to their betweenness centrality (BC) metrics (Newman, 2005).

Round 3

Third, text mining, which is an approach used to explore invisible patterns in a set of textual data (Hearst, 2003), was used to create a thematic concept map of paper abstracts and titles. In this research, Leximancer, which extracts and displays visual and statistical information through linguistic and lexical analysis of co-occurring data (Crofts & Bisman, 2010; Smith & Humphreys, 2006), was used to identify and explore textual paths.

Round 4

In this section, in line with the conventions of qualitative data analysis, we report how we interpreted qualitative data in connection with the method used. In this round, we did a close reading (Given, 2008) of paper abstracts to better understand findings from the SNA and lexical analysis in context. We first noted areas of interest arising from SNA and lexical analysis. We then asked: What does [X finding from SNA or lexical analysis] mean? How can we better understand the relationships shown by quantified data? This process was transparent (researchers worked

together on a collaborative online document) and discursive. We noted comments and created codes to help us make sense of and interpret textual data within and across studies. One example for this process is the finding that the keywords *OEP* and *OER* have the strongest BC metrics. In order to understand the context of the relationship between OER and OEP, we read all the paper abstracts and noted themes, as reported in the Text mining (lexical analysis) and content analysis section.

Limitations

The database used for this study has limitations that must be acknowledged. First, Scopus indexes publications written in English only (in abstracts or full text). Second, unlike other databases it includes only peer-reviewed materials such as book chapters, conference proceedings and journal articles. This means the literature published and shared via other means, such as blogs, reports, and white papers, is not included in the database. We included such publications in the Background section of this paper and in the discussion of findings; however, readers should bear in mind that they are not part of the study sample because they were not peer reviewed.

Findings and discussion

Quantitative content analysis

Time series

The first paper with a reference to digital OEPs was published in 2007 (n = 1), and peak publication points were reached in 2014 (n = 8), 2015 (n = 9), 2016 (n = 9) and 2017 (n = 8) with minor fluctuations, which suggests a slow but steady increase in papers related to OEPs (Figure 2). The biggest increase in publications was in 2012, which corresponds with a growing interest in OEPs in 2011, marked by the OPAL report (Andrade et al., 2011) and related studies (e.g., Camilleri & Ehlers, 2011; Ehlers, 2011a).

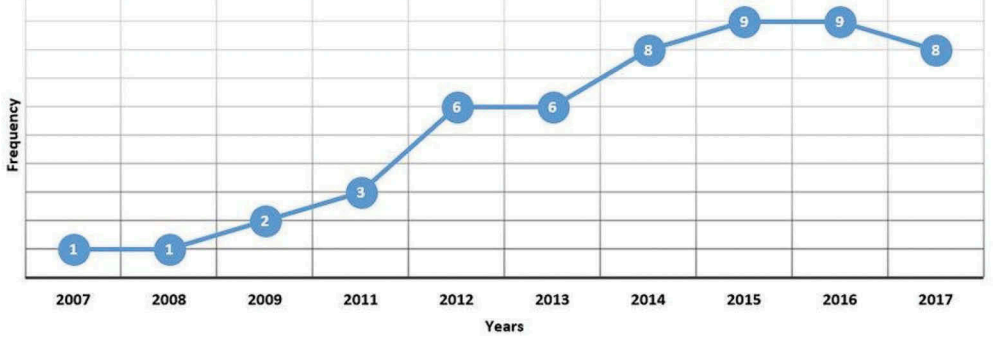

Figure 2. Time series of sampled papers (n = 53).

Subject Area	Frequency	Percentage
Social Sciences	48	55.2
Computer Science	26	29.9
Engineering	7	8.0
Arts and Humanities	4	4.6
Mathematics	2	2.3

*One publication can be classified in more than one subject area.

Figure 3. Subject areas of sampled publications.

Subject area

Content analysis of resources shows that social sciences lead the research on OEPs (55.2%; includes education as a sub-field of study) followed by computer science (29.9%) (Figure 3). Other notable subject areas that published on OEPs are engineering (8.0%), arts and humanities (4.6%), and mathematics (2.3%). This shows that the study of OEPs is multidisciplinary, but research is not distributed evenly among disciplines.

Source type

The source type for publications shows that traditional journal articles constitute the majority of publications (66%), followed by conference proceedings (20.8%), book chapters (5.7%), and reviews (5.7%) (Figure 4).

It was interesting to see that although the study of digital OEPs is quite new – the OLCOS project in 2007 (Geser, 2007) marks the beginning of it – there were more journal articles than conference papers in our sample. But on closer inspection, especially when we started the content analysis of paper abstracts, we observed that the majority of articles discuss OEPs in connection with OER, which is a more established field of study than open practice or OEP (Weller, Jordan, DeVries, & Rolfe, 2018).

Source title

Of the 36 journals in our data set, *RUSC Universities and Knowledge Society Journal* (title changed to *International Journal of Educational Technology in Higher Education* in 2016) was the leading journal publishing papers related to digital OEPs ($n = 6$; 11.3%) and the only journal available in two languages (Spanish and English). *Distance Education* (7.5%), the *International Review of Research in Open and Distributed Learning* (7.5%), and the *Journal of e-Learning and Knowledge Society* (7.5%) published 4 papers each. This was followed by the *Electronic Journal of e-Learning* (5.7%) and *Research in Learning*

Source Type	Frequency	Percentage
Article	35	66.0
Conference Paper	11	20.8
Book Chapter	3	5.7
Review	3	5.7
Editorial	1	1.9

Figure 4. Source types of sampled publications.

Source Title	F*	%	Country	Open Access
RUSC Universities and Knowledge Society Journal	6	11.3	Spain	Yes
Distance Education	4	7.5	Australia	Optional**
International Review of Research in Open and Distance Learning	4	7.5	Canada	Yes
Journal of e-Learning and Knowledge Society	4	7.5	Italy	Yes
Electronic Journal of e-Learning	3	5.7	UK	Optional**
Research in Learning Technology	3	5.7	UK	Yes
International Journal of Emerging Technologies in Learning	2	3.8	N/A	Yes
Others	27	50.9		

F: Frequency.*

***Optional: Authors can opt for open access for a fee.*

Figure 5. Source titles of sampled publications, their locations and access policies.

Technology (n = 2; 5.7%). Other journals with lower frequencies constituted 50.9% of our sample (Figure 5).

It is interesting to note that all of the journals noted above, except *Distance Education* and the *Electronic Journal of e-Learning*, are open access journals. We also would like to note that although OEP publications in our sample are disseminated and promoted predominantly in the Global North, some of the top contributors are from the Global South, as shown below in Figure 6.

Countrywide distribution and institutional affiliation

When institutional affiliations with a minimum occurrence of three are examined (Figure 6), we observe the following trend: scholars in the Open University (United Kingdom; n = 6) and the University of Southern Queensland (Australia; n = 5) take the lead, followed by University of La Sabana (Colombia; n = 5), the University of Tasmania (Australia; n = 4), the Technical University of Madrid (Spain; n = 3), and Universidad Tecnica Particular de Loja (Ecuador; n = 3). As the countrywide distribution also shows, institutions in the UK are the major contributors to OEP research; however, the difference in numbers between the top 12 institutions taking the lead is minor.

Similar to the trend in institutional affiliations, which solely shows institutional contribution at a meso level, the countrywide distribution shows the overall contribution

Affiliation	Country	Frequency	Percentage
Open University	United Kingdom	6	7.7
University of Southern Queensland	Australia	5	6.4
University of La Sabana	Colombia	5	6.4
University of Tasmania	Australia	4	5.1
Technical University of Madrid	Spain	3	3.8
Universidad Tecnica Particular de Loja	Ecuador	3	3.8
Charles Darwin University	Australia	2	2.6
University of Auckland	New Zealand	2	2.6
University of Salford	United Kingdom	2	2.6
University College London	United Kingdom	2	2.6
Open University of the Netherlands	The Netherlands	2	2.6
University of Leicester	United Kingdom	2	2.6
Others		40	51.3

**Affiliations of all co-authors in a publication are counted.*

Figure 6. Institutional affiliations within sampled publications.

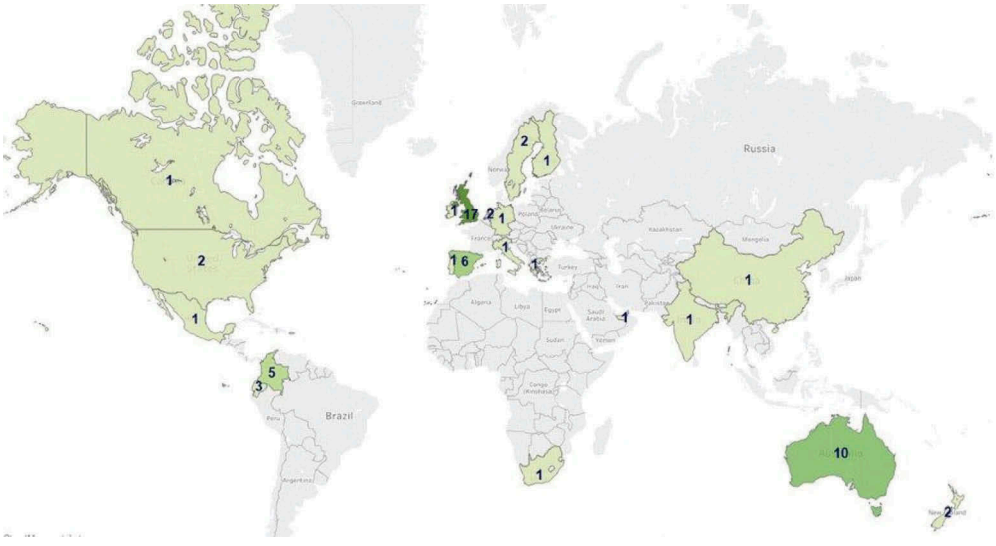

Figure 7. Countrywide distribution of sampled publications.

from countries at a macro level. The countrywide distribution graph illustrates that the UK is the leading contributor (n = 1 7), followed closely by Australia (n = 10), and then Spain (n = 6) and Colombia (n = 5) (Figure 7). It is also noteworthy that there is a dominance of countries, which have been the leading contributors to the openness movement in education and the prime mover of open universities in this figure, such as the UK, Australia and Spain (Peters, 2008). It is interesting to note in these graphs (Figures 6 and 7) the limited reference to OEPs in publications from the United States and Canada despite the growing interest in open textbooks and open pedagogy (Cronin & MacLaren, 2018). This might indicate that, as a descriptor, *open educational practice* is not as widely adopted in North America as in the UK or Australia or Colombia.

The trends in institutional and countrywide distributions can be further explained with Roger's (2003) diffusion of innovations theory. Based on this model, individuals at a micro level, institutions at a meso level and countries at a macro level can be referred to as *innovators, early adopters* or *early majority* in this emerging area of research. The next stage of the study of OEP could be the *implementation* and *confirmation* stage, depending on the extent it is rejected as a research paradigm or adopted overall. As such, strategic decisions and policies on OEPs are important at this preliminary stage.

Research methods used

Conceptual and descriptive papers constitute the majority of our sample. Literature review was the most common method used in this category (n = 15) (book chapters and journal articles that provide an overview of topic or topics related to OEPs are also included in this category). Qualitative methods were most preferred, in particular through the use of case studies (n = 11). These were followed by reports (n = 4) and surveys (n = 3). Data mining and analytics were the least used methods (n = 1). The full list of the research methods used in the study sample is provided in Table A1.

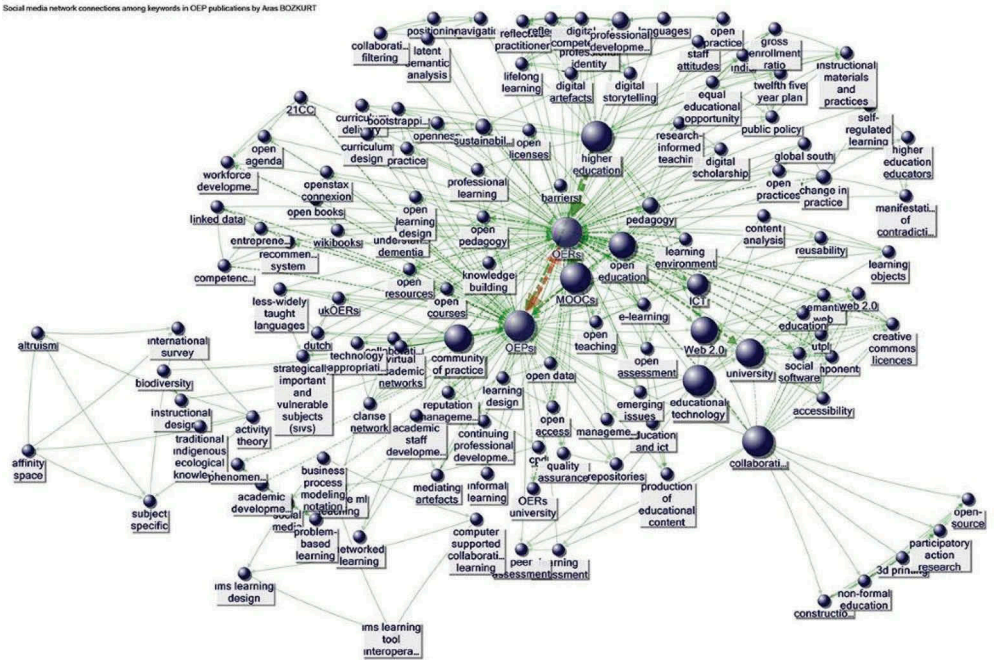

Figure 8. Keyword network analysis of sampled keywords.

Keyword network analysis

To better understand the keyword patterns, all keywords (n = 130) were imported to NodeXL (SNA software). Keywords were laid out using the Harel-Koren fast multiscale layout algorithm (Harel & Koren, 2000) and their positions were defined by using the BC metric, which in this study refers to each keyword's ability to bridge one another. Keyword co-occurrences were interpreted as relationships (Figure 8). The full list of keyword BC metrics are provided in Table A3. The frequency of use is reported in Table A2.

The top 10 keywords with the highest BC values in order were: *OERs* (BC: 8516.8), *OEPs* (BC: 3953.4), *collaboration* (BC: 1237.8), *higher education* (BC: 378.4), *MOOCs* (BC: 98.8), *educational technology* (BC: 86.2), *university* (BC: 65.1), *community of practice* (BC: 59.7), *Web 2.0* (BC: 58.4), and *open education* (BC: 66.6). Some of the findings are discussed in context below.

Text mining (lexical analysis) and qualitative content analysis

This section provides findings derived from a lexical analysis (Figure 9) of paper abstracts and titles and is discussed in context through a close reading of paper abstracts, and full texts where needed. We highlight three paths that emerged from the lexical analysis below.

Connection between OER and OEP (path: OER – OEP)

The close connection between OER and OEP firmly emerged in this study through multiple data analysis methods. This is not surprising as this connection is also widely

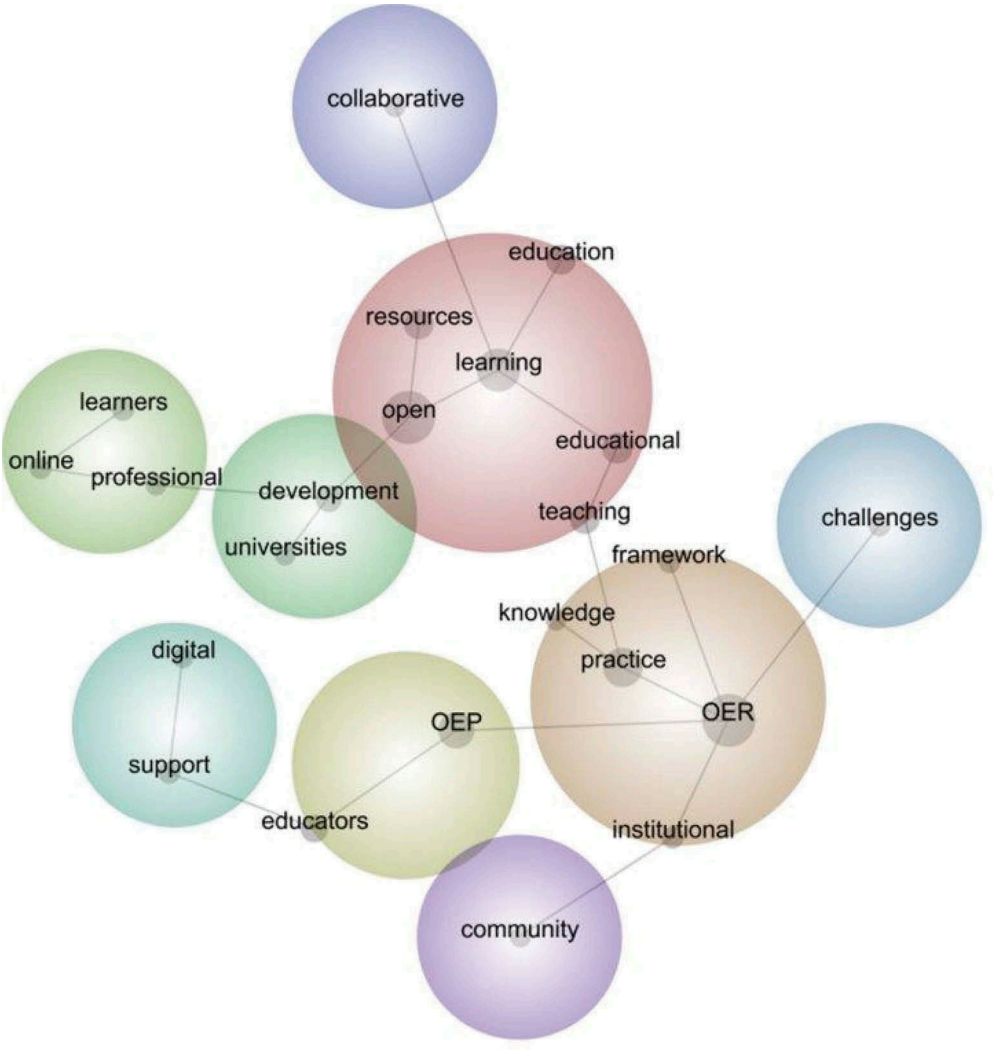

Figure 9. Thematic concept map derived from a lexical analysis of paper abstracts and titles.

documented in the literature on OEPs (see Ehlers, 2011a; Karunanayaka, Naidu, Rajendra, & Ratnayake, 2015). In a citation network analysis, Weller et al. (2018) observed that the study of open practice stands "at the intersection of social media, open access publishing and OER" (p. 117). In our sample, OER had the most weight in the lexical analysis of paper titles and abstracts (Figure 9) and also in the SNA analysis (Figure 8).

A close reading of paper abstracts and full texts showed that the majority of research papers discussed OEP in the context of OER, mostly in terms of OER adoption, creation and use. However, OEP was also examined in relation to other areas including open assessment of learning, open learning, open teaching/pedagogy, MOOCs, open source software, open educational resource university (OERu), open systems and architectures (including repositories of OER), and open source software. One interesting area of study was "a particular open educational practice: the open production of educational

content," which focused on "the open experience of producing a digital educational material" (Laverde & Arias, 2015, p. 312). Except for two papers, these studies mentioned OER in full texts; however, their focus was not solely on issues around open access to resources. We also observed that OER were often discussed in close connection with multiple dimensions of open practice. For example, Czerniewicz, Deacon, Glover, and Walji (2017) "focused on the relationship between OER, MOOC design and the development of open practices" (p. 95). In another study on open teaching, Chiappe and Lee (2017) noted that "the most common means to implement Open Teaching as an ICT-based practice are derived from the use of OER and via Massive Open Online Courses" (p. 369). Findings confirm Cronin and MacLaren (2018, p. 127), who argued that OEP might be "inclusive of but not necessarily focused on OER." It is also interesting to note that there were no references to OpenCourseWare (OCW) in our sample.

Barriers to overcome (path: OEP – OER – challenges)

A focus on OEP to address challenges in opening up education emerged as a strong theme in the analysis. Most barriers mentioned in paper abstracts were related to OER adoption and use in adult professional development and higher education settings. One paper presented a unique challenge: ethical issues in curating and disseminating traditional knowledge (Funk, Guthadjaka, & Kong, 2015).

This theme is in line with earlier studies that argue that access alone does not lead to successful use and adoption of OER. We mentioned in the Background section a report that showed that issues with institutional support, limited or lack of resources (both human and non-human) and quality were significant barriers for engagement with OER (Andrade et al., 2011). Similarly, a report by The William and Flora Hewlett Foundation highlighted that sustainability, curation and preservation of access, object granularity and format diversity, intellectual property issues, content quality assessment and enhancement, computing and communication infrastructure, and scale-up and deepening impact in developing countries are barriers to overcome for use and adoption of OER (Atkins, Brown, & Hammond, 2007). It is interesting to note that studies in our sample identified more social factors that might increase engagement with OER and open teaching and learning, such as "sharing for the benefit of others and collective collaboration with other peers," and "authentic learning in groups" (Nerantzi & Gossman, 2015, p. 2), "greater flexibility and a focus on the process of collaborative learning" (Stylianakis, Moumoutzis, Arapi, Mylonakis, & Christodoulakis, 2014, p. 252), and "creating a sense of community, visibility and communication in social networks" (Laverde & Arias, 2015, p. 313). Collaboration and learning in communities of practice were also prominent themes in the SNA.

Open practices as professional growth (path: education – learning – open – development – professional)

As we noted above, two keywords with high BC values in the SNA were *higher education* and *university*. Content analysis showed that OEP was discussed predominantly in the context of adult professional development and teacher education. Some examples from our sample are Kaatrakoski, Littlejohn, and Hood (2017), who discussed "OER [use] and adoption of education practice" as a way for "challeng[ing] educators to change their practice" (p. 599); Challinor, Marín, and Tur (2017), who discussed "the use of digital

storytelling to support the development of reflection and digital skills in professional education" (p. 186), and Gallardo, Heiser, and Arias McLaughlin (2017), who examined "[higher education] teachers' engagement with collaborative and open educational practices to develop their pedagogical expertise" (p. 518).

This is a desirable finding, as Ehlers (2011b) notes that, for sustainable open practices, "an educational professional or learner [should embrace] their role as open educational practitioners" (p. 6). Open practices are about capacity building (Bossu & Stagg, 2018), and ignoring this factor can restrain the adoption of OEPs (Bossu, Brown, & Bull, 2014), and thus it is very critical for the future of OEPs (Karunanayaka, Naidu, Rajendra, & Ariadurai, 2018).

Conclusion and implications

We analyzed a decade of research (2007–2017) that referenced OEPs in their title, abstract and/or keywords. Through a combination of descriptive statistics, SNA, text mining, and content analysis of paper abstracts, we identified trends and patterns in sampled publications. Findings revealed that there is an increasing trend in the number of peer-reviewed publications, which is likely to continue in the near future with a growing awareness of the importance of open processes, which might include the experience of learning and teaching with OERs, in open courses, networks, and platforms, and with open source technologies. Although a majority of publications in our sample examined OEPs in relation to OER, particularly as a means to overcome barriers in the use and adoption of open resources, we observed that the field is rich in scope and multidisciplinary. Open scholarship, open teaching (including teaching in MOOCs), open assessment of learning, engagement with open online problem-based learning tasks, using open source software, the design of open platforms and architectures were some areas of OEP research in our study. We also observed that different dimensions of open practice were often times discussed together because of their interrelated nature (e.g., designing an open access resource as part of teaching an open online course). One striking finding was that studies that looked at barriers in OEPs highlighted social factors that might increase engagement with OER and with open teaching and learning.

Theoretical implications

We would like to draw attention to one editorial in our sample which discussed OEP in the context of openness in education. In this editorial, Naidu (2016) noted:

> OEP comprises a lot more than free and open access to educational resources, and that it would be useful to see open educational practice as an omnibus term covering many dimensions of openness, namely: open access, open scholarship, open learning. (p. 1)

This was indeed what we observed in this research; that is, although historically OEP emerged from the study of OER, it is now a multidimensional construct with fuzzy boundaries. As Naidu (2016) suggests, *open educational practice* is a useful umbrella term to bring all the different dimensions of openness in education under one roof, with a focus on the processes of education.

How can we, then, conceptualize the relationship between open education, OER and OEPs? Figure 10 illustrates our response to this question based on findings and in the light of the broader educational discourse on OEPs.

We have found Mays (2017) open ecology model helpful in describing how OEP can be conceptualized in relation to the philosophies of openness and movements and initiatives in open education. Mays discussed open ecology in the context of OER use in African universities, as explained in the Background section of this paper. In our study, we examine OEP in a different context, as an interdisciplinary research paradigm. We also refrain from focusing on a particular educational approach or pedagogical model (e.g., OER). Instead, we aim to capture the rich scope of OEP as evidenced in this study, and its relationship to bigger movements and visions and ideals.

In the framework in Figure 10, the inner circle represents the core values and visions that drive open education initiatives and movements. Although the general view is that openness should embrace diversity, inclusivity, transparency and open sharing of educational practice, it is important to note that openness is a pluralistic concept as there are, and will be, many visions and values that shape open practices, intentionally or unintentionally. It is beyond the scope of this paper to set a shared vision for openness across different disciplines and practices; however, our view is that a social justice orientation to openness is much needed to engage in and develop approaches that are ethical and have transformative power.

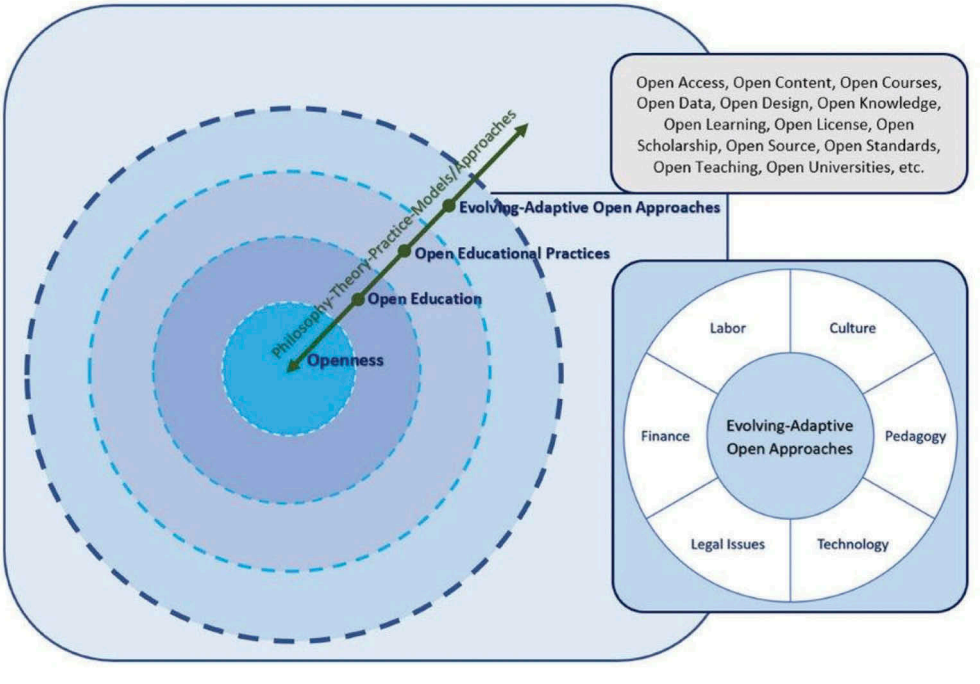

Figure 10. A framework for OEP. In addition to the dimensions noted by Hodgkinson-Williams and Gray (2009) and Hodgkinson-Williams (2014), *labor* (the production process) is added to the framework as an important research dimension to consider in many open practices.

The next circle, *open education*, refers to formal and informal educational opportunities and initiatives that are built upon the ideals of openness. The *open educational practices* circle emphasizes the focus on the process as opposed to product or outcome in education. Here, we define OEP ideally as a broad range of practices that are informed by open education initiatives and movements and that embody the values and visions of openness. In line with Cronin and MacLaren's (2018, p. 127) argument on "expansive definitions of OEP," this framework allows for "multiple entry points to, and avenues of, openness" through the use of OEP, which might include, but are not limited to, the creation, use, and adoption of OER, open scholarship, open teaching, open assessments and using open source software. These practices are represented in the outer layer of the framework: *evolving-adaptive approaches*. Each approach could be further examined along the dimensions of *culture, pedagogy, technology, legal issues, finance* (Hodgkinson-Williams, 2014; Hodgkinson-Williams & Gray, 2009) and *labor* (the production process), which might include practices that are not entirely open. Hodgkinson-Williams (2014, p. 9) presents the dimensions of culture, pedagogy, technology, legal issues, and finance as "factors that might influence the 'degrees of ease' with which various 'open' materials and/or processes can be adopted;" however, these dimensions, and in addition the dimension of *labor*, show the complexity in openness and are useful concepts to consider in the analysis and development of any open practice.

As a complex ecological system, the model in Figure 10 is adaptive and flexible; that is, it is subject to evolution. Some open approaches may disappear when they complete their cycles, and similarly, new concepts may appear as the ecology needs them to sustain its existence. We also note that, although the concepts in Figure 10 are illustrated in separate circles, all of them can connect and intersect with one another in many ways.

Notes on pedagogy

We see OEP as a process-oriented approach that has many dimensions and opportunities for teaching, research and development. Going to back to the argument by Knox (2013), a process-oriented approach to open education should ideally involve "the active engagement of learners in participation and dialogue, as well as further critical explorations of the relationships between technology and education" (p. 21). Although it is important to note that the way one goes about OEP is heavily informed by pedagogical skills and values, the academic discipline, and the specific issue or topic that is explored, as well as by the way openness is understood and exercised on, a process-oriented approach should always take contextual factors that shape learning and teaching into consideration. As such, it is important to recognize that embracing openness in educational practices may not necessarily lead to meaningful learning. There is a need to think deeply and critically about the learning experience and teaching methods used for pedagogical innovations at multiple levels as Ehlers (2011a) suggested. In addition, as Mays (2017) noted, the learning ecology – the complex interaction between educational resources, methods of teaching, the institutional culture, available support mechanisms, and so on – no doubt shapes the process as well as the outcome.

Practical implications

This study might be helpful for those who wish to have a broad understanding of the peer-reviewed OEP literature across different disciplines of study, but in particular from an educational perspective. Those who wish to research OEPs might be interested in exploring understudied areas of OEPs such as cultural and social dimensions of OEPs, open assessment of learning, open online problem-based learning, and open production of educational content, as well as ethical issues in designing and disseminating OER (e.g., the dissemination of indigenous knowledge).

Finally, we emphasize the need to build collective knowledge in the efforts towards opening up education. With the use of OEPs as a common descriptor for diverse open practices, we can at least establish a shared understanding of where research is at within the field of education and across disciplines and academic communities.

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Appendix

Table A1. The research methods used in sampled publications.

Paradigm					
Method	**F***	**%**	**Model/Design**	**F***	**%**
Quantitative	3	5.7	Survey	3	5.7
			Correlational	0	0.0
			Experimental	0	0.0
			Meta-analysis	0	0.0
			Causal comparative	0	0.0
Qualitative	20	37.7	Descriptive	2	3.8
			Case study	11	20.8
			Ethnography	0	0.0
			Phenomenology	2	3.8
			Grounded theory	3	5.7
			Narrative	0	0.0
			Content analysis	0	0.0
			Meta-synthesis	2	3.8
			Delphi	0	0.0
			Historical	0	0.0
			Heuristic	0	0.0
			Discourse analysis	0	0.0
Mixed	3	5.7	Explanatory sequential	2	3.8
			Exploratory sequential	1	1.9
			Convergent parallel	0	0.0
			Embedded	0	0.0
			Multiphase	0	0.0
			Transformative	0	0.0
Conceptual / Descriptive / Other	25	47.2	Literature review**	15	28.3
			Position paper	1	1.9
			Opinion paper	0	0.0
			Report	4	7.5
			Field notes	0	0.0
			Comparative	1	1.9
			Reflection paper	1	1.9
			Systematic review	2	3.8
			Technical papers	1	1.9
Data Mining and Analytics	1	1.9	Log analysis	0	0.0
			Social network analysis	1	1.9
			Learning analytics	0	0.0
			Text mining	0	0.0
			Internet and traffic ranks	0	0.0
Practice Based	1	1.9	Design-based research	1	1.9
			Action research	0	0.0
Total				53	100.0

**F: Frequency*

***Book chapters that provide an overview of a topic or topics related to OEPs are coded as literature review.*

Table A2. The list of keywords used in sampled publications and their frequency of use.

#	Keyword	F*	%	#	Keyword	F*	%	#	Keyword	F*	%
1	OERs	34	18.4	51	Affinity Space	1	0.5	101	Gross Enrollment Ratio	1	0.5
2	OEPs	32	17.3	52	Altruism	1	0.5	102	Higher Education Educators	1	0.5
3	Education	9	4.9	53	Animals	1	0.5	103	Higher Education Institutions	1	0.5
4	Higher Education	9	4.9	54	Australia	1	0.5	104	Hybrid Materials	1	0.5
5	Open Education	5	2.7	55	Barriers	1	0.5	105	IMS Learning Design	1	0.5
6	Collaboration	4	2.2	56	Biodiversity	1	0.5	106	IMS Learning Tool Interoperability	1	0.5
7	E-learning	4	2.2	57	Bootstrapping	1	0.5	107	Inclusive ML Teaching	1	0.5
8	Academic Development	3	1.6	58	Business Process Modeling Notation	1	0.5	108	India	1	0.5
9	Communities Of Practice	3	1.6	59	Business Process Modeling Notations	1	0.5	109	Informal Learning	1	0.5
10	ICT	3	1.6	60	CLARISE Network	1	0.5	110	Information Systems	1	0.5
11	MOOC	3	1.6	61	CPD	1	0.5	111	Innovative Learning	1	0.5
12	Open Access	3	1.6	62	Change In Practice	1	0.5	112	Instructional Design	1	0.5
13	Phenomenography	3	1.6	63	Changing Practices	1	0.5	113	Instructional Materials And Practices	1	0.5
14	Problem-based Learning	3	1.6	64	Collaborative And Open Educational Practices	1	0.5	114	Integrated Project	1	0.5
15	Semantics	3	1.6	65	Collaborative Filtering	1	0.5	115	Internal Representation	1	0.5
16	Students	3	1.6	66	Collaborative Learning	1	0.5	116	International Survey	1	0.5
17	Teaching	3	1.6	67	Community Of Practice	1	0.5	117	Interoperability	1	0.5
18	Computer Software	2	1.1	68	Competence Development	1	0.5	118	Interoperability Modeling	1	0.5
19	Creative Commons Licences	2	1.1	69	Competences	1	0.5	119	Knowledge Building	1	0.5
20	Educational Technology	2	1.1	70	Component	1	0.5	120	Languages	1	0.5
21	Knowledge Management	2	1.1	71	Computer Aided Instruction	1	0.5	121	Latent Semantic Analysis	1	0.5
22	Learning Design	2	1.1	72	Computer Supported Collaborative Learning	1	0.5	122	Learning Assessment	1	0.5
23	Learning Environments	2	1.1	73	Constructionism	1	0.5	123	Learning Environment	1	0.5
24	MOOCs	2	1.1	74	Content Analysis	1	0.5	124	Learning Objects	1	0.5
25	Online Searching	2	1.1	75	Continuing Professional Development	1	0.5	125	Learning Process	1	0.5
26	Open Education Resources	2	1.1	76	Creative Commons	1	0.5	126	Learning Tool	1	0.5
27	Open Educational Resource University (OERu)	2	1.1	77	Critical Component	1	0.5	127	Less-widely Taught Languages	1	0.5
28	Open Pedagogy	2	1.1	78	Curriculum Delivery	1	0.5	128	Life-long Learners	1	0.5
29	Openness	2	1.1	79	Curriculum Design	1	0.5	129	Lifelong Learning	1	0.5
30	Privatization	2	1.1	80	Design	1	0.5	130	Linked Data	1	0.5
31	Professional Development	2	1.1	81	Digital Artefacts	1	0.5	131	Linked Datum	1	0.5
32	Reusability	2	1.1	82	Digital Competence	1	0.5	132	Management	1	0.5
33	Semantic Web	2	1.1	83	Digital Scholarship	1	0.5	133	Manifestations Of Contradictions	1	0.5
34	Social Media	2	1.1	84	Digital Storytelling	1	0.5	134	Mediating Artefacts	1	0.5
35	Social Software	2	1.1	85	Distance Education	1	0.5	135	Motivation	1	0.5
36	Societies And Institutions	2	1.1	86	Dutch	1	0.5	136	Navigation	1	0.5
37	Surveys	2	1.1	87	E-Learning	1	0.5	137	Networked Learning	1	0.5
38	Tellurium Compounds	2	1.1	88	Economic Growths	1	0.5	138	Non-formal Education	1	0.5
39	UTPL	2	1.1	89	Economics	1	0.5	139	Northern Territories	1	0.5
40	University	2	1.1	90	Education And Ict	1	0.5	140	Online Systems	1	0.5
41	Web 2.0	2	1.1	91	Education Computing	1	0.5	141	Open Agenda	1	0.5
42	World Wide Web	2	1.1	92	Emerging Issues	1	0.5	142	Open Assessment	1	0.5
43	21st Century Competences (21CC	1	0.5	93	Employment	1	0.5	143	Open Books	1	0.5
44	3-D Printing	1	0.5	94	End Users	1	0.5	144	Open Content	1	0.5
45	3D Printers	1	0.5	95	Entrepreneurship	1	0.5	145	Open Courses	1	0.5
46	3D Printing	1	0.5	96	Equal Educational Opportunity	1	0.5	146	Open Data	1	0.5
47	Academic Staff Development	1	0.5	97	European Commission	1	0.5	147	Open Learning Design	1	0.5
48	Accessibility	1	0.5	98	European Project	1	0.5	148	Open Licenses	1	0.5
49	Activity Coefficients	1	0.5	99	Global South	1	0.5				
50	Activity Theory	1	0.5	100	Graphical Representations	1	0.5				

*F=Frequency

Table A3. BC metrics of top 20 keywords in sampled publications.

Keyword	Betweenness Centrality
OERs	8516.8
OEPs	3953.4
collaboration	1237.8
higher education	378.4
MOOCs	98.8
educational technology	86.2
university	65.1
community of practice	59.7
Web 2.0	58.4
open education	55.6
ICT	32.2
professional development	16.0
pedagogy	13.7
sustainability	12.7
change in practice	9.0
openness	6.0
e-learning	5.1
open pedagogy	4.7
open access	4.0
learning design	4.0