Part 2: Role media exposure on MOOC development

**Story of MOOCs in the Irish Media: Hold the Front Page**
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**MOOCs in the News: A European Perspective**
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Abstract

This paper reports a study of how the MOOC story has been reported in Irish media. A brief description of previous research on MOOCs in the international media is provided and the Irish story is then described framed around a number research questions: Who is telling the MOOC story and why? What story is being told? How is the story being told? Whose story is not being told? Specifically, in the tradition of critical discourse analysis the study is designed to investigate how MOOCs as a relatively new phenomenon have been portrayed in established Irish newspapers. An outline of the research protocol is given before reporting the main findings, including a number of unique developments in the Irish context. In telling the Irish story set against the wider European context the paper contributes to the debate over whether MOOCs will be harnessed in the service of truly opening up education or rather co-opted by established actors to maintain the status quo. The key message arising from the research is that the MOOC movement is not on an independent trajectory and must be understood as part of social practice.

Keywords

MOOCs, Media, Newspapers, Discourse Analysis, Ireland

1 Introduction

Claims about the promises and the pitfalls that the MOOC movement may herald for education have their roots in old debates (Krause & Lowe, 2014). As Daniel (2012) points out there is a long list of previous educational technologies that have announced themselves with bold claims to revolutionise the form and shape of education. The arguable difference with MOOCs however, is the prominent attention that major platform providers have garnered in mainstream media channels. This level of attention has in turn stoked wider public interest and fuelled intense debates ranging from doom to denial (Sherrock, 2015). The disruptive narrative over the future of higher education has brought MOOCs onto and up the agendas of academic leaders, politicians and policy-makers.

While MOOCs evolve and look to find a longer-term niche in the education eco-system, they continue to reflect a kaleidoscope of competing and co-existing discourses with very different agenda (Brown, 2015). Weller (2015) provocatively argues that we should be ready to do battle over some of the agendas attempting to exert influence over the wider openness movement. If we do not critique the deeper change forces associated with the MOOC movement, then we may be left with an image of education as “broken” with the only possible remedy emerging from Silicon Valley (Watters, 2014).
Although this line of critique overlooks major open learning initiatives elsewhere in the world, MOOCs have been posited as a solution to rising costs, opening access to traditional forms of higher education, and concerns about the private and public returns on investment, as the great disruptor. The power of scalable education through new global online learning platforms may, through their long reach, open up hitherto inaccessible opportunities for learners. Equally the MOOC movement may promote the neo-liberal goal of an unrestricted global market for higher education (Peters, 2013), along with neo-colonialism (Altbach, 2014) and the domination of particular cultural, linguistic and other Western forms of knowledge at the expense of local educational solutions.

This paper, set against the backdrop of these contrasting narratives and macro-level perspectives, briefly reviews the literature on how MOOCs have been portrayed through popular media, including newspaper stories in Australia, United Kingdom and the United States. It then describes the methodology and findings of an Irish case study of the story of MOOCs in the media, and discusses the significance of a number of particularly unique local factors, which give rise to an interesting paradox. Finally, the paper reflects on key messages emerging from this line of research, including the major threats and opportunities from a European perspective, and concludes that the MOOC movement is part of a larger, complex constellation of change forces facing the future of education.

2 MOOCs in the Media

The first study of the portrayal of MOOCs in the traditional media undertaken by Bulfin, Pangrazio and Selwyn (2014) analysed 457 newspaper articles published between 2011 and 2013 in Australia, United Kingdom and the United States. This critical discourse analysis found that MOOCs were mainly portrayed according to themes of the ‘massification, marketization and monetization of higher education’ (Selwyn, Bulfin & Pangrazio, 2015, p.175). By contrast the authors noted little debate or critique of either ‘technological’ or ‘educational’ issues and no real examination of pedagogical or learning design issues (Bulfin, Pangrazio & Selwyn, 2014).

Notably, the research team concluded that the most common theme associated with the portrayal of MOOCs was in terms of a source of change. A range of metaphorical images was presented to position MOOCs as a digital agent of change, including a fast moving ‘juggernaut’, ‘online train’ and ‘rocket ship’ (Bulfin, Pangrazio & Selwyn, 2014, p.8). In contrast, in another group of media stories, MOOCs were equated with the dismantling of the university as a physical form—that is, the end for the Ivory Tower. Although the free nature of MOOCs was highlighted, the discourse analysis of media stories pointed to a lack of real examination of business models.

The major conclusion was that during the initial rise to prominence of the MOOC the media coverage portrayed a number of contradictory messages. On the one hand MOOCs are claimed to circumvent traditional models of higher education, whereas on the other hand their legitimacy as an educational innovation is primarily derived from their association with elite universities (Bulfin, Pangrazio & Selwyn, 2014). Notably, the long history of research in online and distance learning does not feature in the media. Instead the MOOC appears to reinforce the message through a virtual shop window that a real education takes place at face-to-face institutions. Thus, Selwyn, Bulfin and Pangrazio suggest that the lay-reader is likely to view MOOCs as a relatively safe new educational innovation that, in turn, reinforces long-standing status differences between universities. In this respect the media is complicit in reinforcing reputational hierarchies of top universities.

A second larger study included data up until mid-2014 and analysed 3598 articles from 591 news sources from around the world (Kovanović, Joksimovic, Gašević, Siemens & Hatala, 2015). The search strategy generated a dataset almost nine times larger than the abovementioned research. An
added feature of the methodology was use of the Google Trends service to confirm the dataset’s validity and check the popularity of specific MOOC-related news articles. Methods used in the analysis involved automated topic map generation—an attempt to essentially induct themes from the raw data.

It is noteworthy that only three articles in the dataset were written before 2012. Two appear in the first quartile of 2009 and one in the third quartile of 2010. What is means is that almost all newspaper articles referring to MOOCs in English speaking publications were written between 2012 and 2014 (Kovanović, Joksimovic, Gaševic, Siemens & Hatala, 2015).

A major finding of this study was that coverage of MOOCs in public media appears to be rapidly decreasing. The second major takeaway was that the focus of newspaper articles is changing around MOOCs. During 2012 and 2013 most stories focused on MOOC providers, announcements of new partnerships, and million dollar investments. According to the authors in the past year there appears to be a shift to more strategic and government level discussions focused on the macro position of MOOCs (Kovanović, Joksimovic, Gaševic, Siemens & Hatala, 2015).

Two other studies warrant brief consideration. Firstly, White, Leon and White (2015) report findings from a study on the representation of MOOCs in 2014 in 106 articles in three higher education magazines: Times Higher Education, Inside Higher Education and Chronicle of Higher Education. Notably, the overwhelming majority of articles (n=57) in the sample relate to teaching practice. They found frequent articles reporting perceived pedagogical benefits for institutions when engaging in MOOCs. The theme of MOOCs as catalysts of change, especially in terms of work dynamics, was also frequently cited, with discussion of business models the third most frequent theme.

Secondly, the analysis of traditional media is now being complimented by research into discussions about MOOCs through social media. For example, Zhang, Perris, Zheng and Chen (2015) recently published a study on the public response to MOOCs on the Sina Weibo microblogging network in China. They present analytics on 95,015 postings from 62,074 users that reference MOOCs in posts between 2010 and 2015. Of particular note is that this study demonstrates the potential in the future of being able to add another layer to research on MOOCs in the media through segment analysis of big data.

In summary, the above literature has contributed greatly to raising consciousness of the media’s role in shaping the MOOC debate. A gap in the literature exists, however, as there is a paucity of more detailed country-specific information. As individual regions and countries will have unique characteristics, including distinct socio-economic, educational and cultural imperatives, research is needed to better understand MOOC discourses at the local level. Therefore, the remainder of this paper presents the findings of a local case study of the positioning of MOOCs in the Irish media.

3 Research questions

The study sought to answer the following overarching question: How have MOOCs been portrayed in the traditional newspaper media in Ireland? A secondary question asked what trends are apparent over time in the portrayal of MOOCs in the Irish media? Following the critical tradition of this line of research the study was framed around a number of more critical questions on the understanding that “A story is never just a story – it is a statement of belief and of morality” (Pinar, 2014, p.12).

- Who is telling the MOOC story?
- What story is being told?
- How is the story being told?
• Whose story is not being told?
• Whose interests are being served by the story?

4 Methodology

Discourse Analysis was chosen as the most appropriate methodology for answering the above research questions. This methodology has a long history in media-related studies and draws on critical literature from social sciences, social linguistics and educational research (Rogers, 2011).

4.1 Data Collection

The Lexus Nexus database was identified as our search repository as it indexes all UK and Irish newspaper publications. Searches were performed using the keyword “MOOCs” and “Massive Open Online Course” on all Irish media stories. These were limited to Irish publications only (including both the Republic and Northern Ireland). No filter was applied to either the start or end date of stories, with the end date being current at the time of the research (i.e. end of July 2015). An initial review of these articles resulted in the removal of duplicates resulting in a dataset of 74 articles from ten different Irish news media outlets from the time period of 2012 to end June 2015. Meta-data about each article was downloaded, such as date of publication, media outlet, author etc. and the full text of each article was also extracted. These data were held in a spreadsheet to help with the analysis process.

4.2 Procedures and Analysis

A research protocol was developed to help analyse each story by drawing on the literature, in particular existing studies in this area and specifically the type of critical interpretation provided by Bulfin, Pangrazio and Selwyn (2014). A draft protocol was piloted on a randomized sample of data and the research team discussed these findings. From this initial analysis it was clear that: (a) many of the articles portrayed in the media were highly descriptive; (b) industry links was an important theme missing from the protocol; and (c) the drivers for MOOC initiatives were not always stated and when implicit they appear to reflect differing perspectives (i.e., institution, platform, author, student and industry as consumer). Accordingly, the protocol was revised with some new codes to account for these emergent themes and simplified in light of the relatively descriptive nature of MOOC stories. The revised protocol was then used by a Research Assistant to analyse each article, which a member of the team later validated through secondary analysis.

5 Findings

While Mooney (2011) wrote a story in The Irish Times about MIT’s Open Courseware initiative in 2011, the first use of the term MOOC in the media (Casey, 2012) appears in May the following year. This is the only mention given to MOOCs in the Irish media in 2012, which is somewhat surprising given the New York Times described this as the ‘year of the MOOC’ (Pappano, 2012). A second story referring to MOOCs was published in January 2013 (Boran, 2013) in response to the UK Open University’s intention to launch the FutureLearn initiative. The third piece in the media to raise the issue of MOOCs was published the following month (Flynn, 2013) where The President of Dublin City University (DCU) called for a National digital learning strategy.
Overall the number of MOOC stories appearing in the Irish media in 2013 (n=24) continued to grow in 2014 (n=39), and as depicted in Figure 1 by the middle of 2015 there is evidence of only a gradual reduction of news coverage (n=12).

An analysis of the stance portrayed in the media towards MOOCs indicates an overwhelmingly positive perspective (77%). As depicted in Figure 2, very few articles reflect a negative perspective (4%), with the next largest grouping classified as relatively neutral (19%). Further analysis of articles by institution type confirms the trend for media sources to focus on reporting initiatives within elite institutions (73%), which in an all-Ireland context are dominated by stories about Trinity College Dublin (TCD) and Queen’s University Belfast (QUB). In many respects this finding is hardly surprising as both universities generated considerable media coverage from their own press releases when they joined FutureLearn and offered their first courses the following year. In many respects, the local profile of ALISON, an Irish-based platform, which Forbes Magazine describes as the world’s first MOOC, might have been expected to generate a higher proportion of non-elite stories (21%) in the media.
A more detailed analysis of the media data, which is beyond the space available in this paper, served to highlight three factors. Firstly, the majority of articles (70%) published in the Irish media were highly descriptive in nature. Secondly, the drivers for MOOCs are rarely explicitly stated and those stories that do mention them present a range of perspectives or underlying rationale. Lastly, industry partners need to be seen as an important stakeholder in the MOOC movement, which is something not given a great deal of attention in previous media research on the MOOC movement.

6 Discussion

The following discussion expands on the above analysis by explaining a number of unique local developments in the story being told about MOOCs in Irish higher education.

We start this section with a media story that was not reported in Ireland but rather appeared in May 2014 in the Times Higher Education (Powell, 2014). This story reports the National University of Ireland’s (NUI) invitation to tender for a study to assess the feasibility of a collaborative National online education initiative in the Irish university sector. The article, entitled “Irish bid for a tiger share of online market”, states:

*The new organisation, which would include Irish universities outside the NUI group, may begin by offering a series of MOOCs showcasing Irish education. Depending on the level of public interest, the organisation could then move into profitable accredited programmes (Powell, 2014, P.6).*

While the tender closed in September 2014, and a written report was expected within three months of the project getting underway, there has yet to be any public statement in response to this initiative. However, just before the tender closed a particularly interesting development occurred in the Irish context, with high-profile media coverage of a visiting delegation from Tata Consulting Services (see Figure 3).

Founded by Jamsetji Tata in 1868, the Tata Group ‘is part-owned by Pallonji Mistry, the richest Irish citizen alive, and run by his son’ (McCabe, 2014, P.1). The Tata Consulting Group is a global enterprise headquartered in India, with operations in more than 100 countries employing over 500,000 people worldwide. In the last quarter of 2014 a high-level delegation from the Tata Group met with senior Irish politicians and institutional presidents with the objective of making Ireland the centre of the world for online degrees (Brown, 2015). The aim, as reported by the Independent newspaper, was to negotiate ‘a deal to transform Ireland into the world’s first stop for e-learning and earn millions for the country’s floundering universities’ (McCabe, 2014, P.1).
Following the Tata delegation’s visit, in early December 2014, the Irish Government’s Joint Committee for Education and Social Protection held a special meeting to discuss the future of online learning. DCU was one three institutions invited to prepare a written submission and Professor Mark Brown, Director of the National Institute for Digital Learning (NIDL) gave a short presentation to the Joint Committee. Notably, DCU’s submission (Brown, 2014) drew heavily on the Porto Declaration on European MOOCs (EADTU, 2014), which was developed as part of the European Commission funded HOME Project [http://home.eadtu.eu]. The submission noted that:

*The movement is poorly defined and MOOCs are just the latest development in a long history of the use of new technologies in higher education. In many cases this history is littered with old ideas being harnessed to the latest new technologies with limited transformative advantage* (Brown, 2014, P.2).

While the story of the Tata Group in Ireland is still playing out, in April 2015 a National Roadmap was published for enhancing teaching and learning in higher education in a digital world (National Forum for the Enhancement of Teaching and Learning, 2015). Surprisingly, the Roadmap makes very few references to MOOCs with this term completely absent from the Executive Summary and high-level recommendations. This omission suggests a disconnection between official policy developments and what popular media is reporting about the potential of MOOCs to change and transform higher education. Notably, there has been little or no media coverage of the National Roadmap. Moreover, to a large extent the Roadmap focuses on enhancing the traditional campus-based experience and is largely silent in terms of online, off-campus provision (Brown, 2015). Arguably, the Roadmap does little to address a major barrier to the growth of online delivery as a result of Ireland’s restrictive funding model for part-time students studying off-campus.

This funding problem, which *The Irish Times* notes in a story related to the launch of Ireland’s first Horizon Report for higher education (Humphreys, 2015), is somewhat ironic, especially given the Country’s self-proclaimed status of the ‘Silicon Valley of Europe’. Importantly, the need for inclusive funding models that help to open up education, develop more flexible modes of delivery, and diversify student populations is a central tenet of recent high-level reports on the modernisation of European higher education (High Level Group on the Modernisation of Higher Education, 2014).
An interesting paradox emerges from this brief case study of MOOCs in the Irish media, which has wider significance in the European context. Despite positive reports about the value of MOOCs and wider national and European efforts to harness the potential economic and pedagogical affordances of new digital technologies, there is almost ‘no understanding of the private and social benefits of distance and online education in comparison with those of face-to-face education’ (Rumble, 2014, p.208). Put another way, beyond personal narratives and institutional hype little is known in a quantitative sense about the wider societal benefits of investing in new online models of teaching and learning. The disconnection between what popular media and major platform providers report about the benefits of MOOCs, and the current gap in the research literature on the wider societal benefits of online education, may potentially threaten more serious efforts to invest in new models of teaching and learning. If the MOOC movement is to find a more permanent place in the education eco-system, then we need to better understand the public and private returns on investing in new models of online learning, especially as global media interest appears to be shifting to strategic policy and government level discussions.

7 Conclusion

This paper has shown that the study of MOOCs in the media is a serious line of research. It has briefly reviewed the emerging literature in this area, and reported a country specific case study and in so doing discussed the significance of particular MOOC stories within the Irish context. While a more detailed report of our analysis in response to the overarching research questions will be included in a lengthier journal article, the paper contributes to our understanding of how the MOOC movement is inherently political and needs to be understood as part of wider social practice. Despite MOOCs not having proven to be as disruptive as originally claimed, the growth of digital education and the wider openness movement are central to debates about the future of higher education. In this respect we need to “hold the front page” for deeper discussions about MOOCs framed around the question: What type of education system do we want new and emerging models of teaching and learning to serve? This question illustrates that the MOOC should be in the service big ideas rather than being the big idea in itself (Brown & Costello, 2015). There is a danger in both the US and European contexts that discussions about MOOCs have yet to engage us in thinking about the bigger challenges facing education in uncertain times.

References


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MOOCs in the News: A European Perspective
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Abstract

The Recent development of Massive Open Online Courses (MOOCs) commenced unprecedented interest of the general public. To leverage from the attention given to MOOCs, understanding of public discourse is essential, as it can give critical insights into the important domains of biggest societal interests. Previous research showed the great need for understanding specifics of MOOC adoption around the world and the necessity to better cater to the needs of different markets. With this in mind, this paper presents a study that looked specifically at the Europe-related MOOC discourse between 2008 and 2015. We identified important themes in the MOOC public discourse and evaluated their changes over time. Further implications of our findings are also discussed.

Keywords

MOOCs, MOOC public discourse, topic modeling, MOOCs in Europe

1 Introduction

Although there have been many advances in the educational technology field over the years, the recent development of Massive Open Online Courses (MOOCs) is particularly interesting given its large coverage in the mainstream media (Stewart, 2013a). From a small initiative by a small group of educational technology researchers, MOOCs become one of the most prominent educational technology topics (Siemens, 2012), often described as disruption or revolution in education (Hennessy, 2012). This high interest by the general public is likely due to the combination of different social, political, and economical reasons (Bates, 2014) including involvement of elite universities and Silicon Valley companies, and the overall economic climate after the 2008 financial crisis.

Although MOOCs were significantly covered by the mainstream media since the announcement of the first Stanford MOOCs, the tone and focus of those media reports changed substantially. Initially, MOOCs were presented as a revolution in education (Friedman, 2012; Hennessy, 2012), with the famous New York Times article labeling 2012 as the “year of the MOOCs” (Pappano, 2012). Later on, the discussion became more critical, with some suggesting that MOOCs failed to reach their promises (Adams, 2013; Stober, 2015), whereas others suggest that passing of the “MOOC hype” brings more productive conversation regarding the position of MOOCs in the broader landscape of education (Lewin, 2013; Muldowney, 2015; Oxenham, 2015; Stewart, 2013b). Given the large adoption of online and distance education, it is important to understand these changes in the MOOC media image in order to capitalize on the present momentum that MOOCs have brought to the educational technology domain.

The goal of this paper is to investigate the public discourse surrounding MOOCs since the first offerings of the MOOCs to the present day. Building on our previous study (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015) that investigated global trends in MOOC public discourse, the
focus of this paper is particularly on the European perspective of MOOC media coverage. Through a systematic search of news reports, we identified 915 news reports between January 2008 and November 2015 related to MOOCs in Europe. We conducted an automated topic modeling analysis using Latent Dirichlet Allocation (LDA) technique which produced 43 distinctive topics. In this paper, we focus on top twenty most prominent topics and also investigate their change over time. The interpretation of the findings and their implications are further discussed.

2 Background

2.1 Analysis of MOOC research literature

Although MOOCs are still in early days of their development, there have been several attempts to examine current literature related to MOOC research and practice. Analysis by Liyanagunawardena, Adams, and Williams (2013) looked at the published MOOC research literature and revealed a strong focus on students’ learning experience and institutional adoption opportunities and challenges. Despite various learning and social media platforms being used by the learners, researchers typically focus only on a small portion of the data coming from a single platform – as collecting and linking data from different software platforms is often very challenging – which limits the understanding of the MOOC learning processes (Liyanagunawardena et al., 2013). Furthermore, a study by Gašević, Kovanović, Joksimović, and Siemens (2014) looked at the state of the MOOC research as reflected by the submissions to the MOOC Research Initiative (MRI) (MOOC Research Initiative, 2013), revealing a fragmentation in the MOOC research community – one group of mostly educational researchers gathered around MRI initiative, and the second group of predominantly computer-science researchers gathered around ACM Learning@Scale conference. Gašević et al. (2014) results also revealed five important areas of MOOC research: i) student engagement and learning success, ii) MOOC design and curriculum, iii) self-regulated learning and social learning, iv) social network analysis and networked learning, and v) motivation, attitude and success criteria.

2.2 Analysis of MOOC public media

Besides investigation of MOOC research literature, there have been several studies looking explicitly at the public media discourse relating to MOOCs. The analysis by Selwyn, Bulfin, and Pangrazio (2015) and Bulfin, Pangrazio, and Selwyn (2014) of 457 MOOC-related news reports reveal the focus on marketization, monetization, and massification aspects of MOOCs, rather than the debate on the pedagogical or technological aspects of MOOC course design or student learning experience. The primary themes in MOOC public discourse are related to i) MOOCs bringing change to education landscape, ii) MOOCs being free of charge, and iii) MOOCs being large scale (Bulfin et al., 2014).

In their analysis of 4024 MOOC-related news articles from around the world, Kovanović et al. (2015) identified important themes in MOOC public discourse and their change over time. Kovanović et al. (2015) study revealed a rapid decrease in MOOC news coverage and the move from provider-focused discussions to more productive discussions centered around the position of MOOCs in the global educational landscape, the use of big data and analytics, and government-related regulations. The focus of current criticism of MOOCs is primarily on the failure of MOOCs to bring “the revolution” to the field of education (Kovanović et al., 2015). Finally, there has been a growing number of topics related to MOOC adoption around the world, showing the need to better cater MOOCs to the needs of different markets. With this in mind, the goal of this paper is to examine MOOC media coverage in Europe and identify prominent themes in the discourse, and their changes over time.
3 Method

3.1 Dataset

Similarly to our previous work (Kovanović et al., 2015), the data for this study is obtained through Factiva (Dow Jones & Company, 2014), which is a business information retrieval tool developed by Dow Jones & Company and Reuters news agency. Factiva is one of the largest databases of news articles, containing millions of both free and licensed news articles from around the world (Dow Jones & Company, 2014). We conducted a search for news articles written in English and containing “MOOC(s)” or “Massive Open Online Course(s)” keywords. To remove irrelevant results, we limited our search to the Europe-related news articles published between Jan 1, 2008, and Nov 15, 2015. In total, we obtained 974 search results which were then downloaded and further examined. As Factiva also contains different types of documents besides news articles, we manually examined the search results and removed the irrelevant documents which resulted in 915 articles being finally included in our dataset.

3.1 Analysis procedure

To analyze our dataset, we used Latent Dirichlet Allocation (LDA) (Blei, Ng, & Jordan, 2003), a popular probabilistic topic modeling technique used to identify prominent themes in the document corpora. We implemented our analysis in R programming language (R Core Team, 2013) and topicmodels LDA library (Grun & Hornik, 2014). LDA works by looking at the co-occurrence of words in the dataset, finding groups of words that are frequently used together and represent a distinct topic in the corpora. It is often used for analysis of large bodies of text in social sciences and humanities (Cohen et al., 2012), including the analyses of news articles (Wei & Croft, 2006; Yang, Torget, & Mihalcea, 2011).

The main input to LDA is the document-term matrix (DTM) which is a matrix indicating how many times each unique word appears in all documents in the corpora. Before running LDA algorithm, we preprocessed the data by i) removing stop-words (i.e., very frequently occurring words such as ‘a’, ‘the’, ‘be’, ‘of’ etc.), ii) removing numbers and URLs, iii) removing short words (i.e., less than 3 characters long), and iv) word lemmatization (i.e., reducing words to their base forms, for example ‘walking’ to ‘walk’) . This resulted in 15,882 unique terms being extracted. However, given that most words only appear in a tiny fraction of documents, we removed all terms (i.e., columns) that appear in less than 5% of the documents (i.e., rows). This resulted in reducing the number of extracted terms down to 1,114 terms which improved the quality of the extracted topics as the data scarcity negatively impacts topic extraction procedure (Hong & Davison, 2010). Finally, after removing very rare terms, we also removed frequent, but non-important words that are not useful for topic extraction procedure. In a similar manner as in the Kovanović et al. (2015) study, we removed words with their TF-IDF score below 0.95 of the median TF-IDF value. This further reduced down our number of terms to 732 terms.

Besides document-term matrix, LDA requires the number of topics to be defined in advance. Since we do not know how many topics are in the data, we evaluated all LDA models with 2 to 100 topics and used maximum likelihood method described by Ponweiser (2012) to select the optimal number of topics. Given that this requires an evaluation of a large number of LDA models, we used randomly selected 20% of the data as input to LDA procedure. After the optimal number of topics is extracted, the new model on the full data is fitted and analyzed.
4 Results

4.1 Data collection results

Table 1 shows the number of articles across the covered years (2008-2015). We can see that before 2012, there were only 2 news articles related to MOOCs in 2009. Thus, in the remainder of this paper, we focus our investigation only on articles published between 2012 and 2015. With respect to article length, Figure 1 shows the number of words per article. The distribution of article lengths reasonably follows the normal distribution, with only a longer tail on the right (as article length cannot be negative). The average number of words per article is 716 words, and that majority of articles have between 400 and 900 words. This is very similar to the average article length of 765 reported by Kovanović et al. (2015) and not much different from the average news article length of 800 words, as reported by Project for Excellence in Journalism (2004).

Table 1: Numbers of articles per year for the period covered by the study

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<th>Year</th>
<th>Article count</th>
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<td>2014</td>
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<td>2015 (up to Nov 15)</td>
<td>200</td>
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<td>Total</td>
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Figure 1: Number of words across all news articles. Mean(SD)=716(475) words; Median(Q1,Q3)=613(406,914) words.

Looking at sources of Europe-related MOOC news articles (Table 2), we see that news publishers from the UK were most dominant, which is not surprising given our focus on news articles written in English. Aligned with Kovanović et al. (2015) results, we find that most news source published between one and three MOOC-related articles. The most articles (99) were published by Times Higher Education Supplement, which is twice as much as the number of articles (49) published by Financial Times, the second most frequent news source. As expected, the biggest interest in MOOCs is shown by education-related publications and large national newspapers from the UK. Interestingly, the several US and Australian news agencies covered European MOOC-related news. We also see interest in MOOCs by news publishers focused primarily on business and finance (i.e.,
Financial Times, Mena Report, Australian Financial Review) which is the trend also witnessed in the previous studies (Kovanović et al., 2015).

4.2 Topic modeling results
In order to select the optimal number of topics, we evaluated all topic modeling solutions having between two and hundred topics (Figure 3). Our analysis identified a solution with 43 topics as the optimal one, which was the one that was used in the remainder of this paper. We used 43 topics to fit the model on the all 915 articles and assigned each article to one of the 43 identified topics, based on the assigned log-likelihoods (Figure 4). In rare cases where it was equally likely that a given article belongs to two or more topics, we assigned a given article to all of the most likely topics found.

Looking at Figure 4, we can see the steep decline after the top three topics – indicating that they were significantly more covered in the news than other topics – while the remaining topics show a much more monotonic decrease in the coverage. With the goal of covering as many relevant themes as possible in the limited space, in the remainder of this paper, we focused on the top twenty most prominent topics. Overall, top twenty topics cover just slightly below two-thirds of the 915 articles in our dataset. To describe each of the topics, we looked at the assigned documents and the list of words mostly associated with each of the topics.

Table 2: Twenty most prominent news sources

<table>
<thead>
<tr>
<th>#</th>
<th>Source</th>
<th>Articles</th>
<th>#</th>
<th>Source</th>
<th>Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Times Higher Ed. Supp.</td>
<td>99</td>
<td>11</td>
<td>The Irish Times</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Financial Times (FT.Com)</td>
<td>49</td>
<td>12</td>
<td>The Sunday Times</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>The Guardian</td>
<td>47</td>
<td>13</td>
<td>PR Newswire (U.S.)</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Financial Times</td>
<td>31</td>
<td>14</td>
<td>PR Newswire Europe</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>The Telegraph Online</td>
<td>30</td>
<td>16</td>
<td>The Independent</td>
<td>13</td>
</tr>
<tr>
<td>7</td>
<td>M2 Presswire</td>
<td>23</td>
<td>17</td>
<td>The Times</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>ENP Newswire</td>
<td>22</td>
<td>18</td>
<td>Independent Online</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>Education Letter</td>
<td>21</td>
<td>19</td>
<td>Australian Financial Review</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>Guardian.co.uk</td>
<td>18</td>
<td>20</td>
<td>Sundaytimes.co.uk</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure 2: Number of articles across all news sources included in the study. Mean(SD)=9(9) articles; Median(Q1, Q3)=1(1,3) articles.
Figure 3: Log-likelihood of different topic solutions.

Figure 4: Number of documents per each topic.

Table 3 shows the list of top ten most relevant terms for the twenty most prominent topics. Based on the identified terms and associated news articles, we defined labels for each of the twenty topics. Looking at the Table 3, we can see that three topics that were mostly covered in published news sources are related to i) FutureLearn, a UK-based MOOC platform supported by the Open University UK, ii) business and management (MBA) MOOC offerings, and iii) the “MOOC revolution” led by the Coursera, Udacity, EdX and elite institutions such as Stanford University. Besides these three topics, commonly discussed topics are related to:

- Use of MOOCs for K-12 education (i.e., primary and secondary education),
- Changes in university funding due to wide availability of MOOC courses,
- MOOCs in Ireland,
- Announcements of different MOOC courses,
- The impact of MOOCs on the global educational market
- Press releases related to openSAP, the MOOC platform developed by SAP,
- MOOC signup figures, primarily related to UK universities,
- Introductions to MOOC courses and mechanics of online education,
- Articles discussing different research reports related to MOOC space,
- MOOC in France,
- Development of books and written materials for MOOC contexts,
- Use of MOOC for workplace training,
- Changes in the private educational sector caused by MOOCs,
- Announcements of British Council MOOC for teaching The English language,
- MOOC market,
- Different European initiatives related to MOOCs, and
- Announcements of MOOC-related conferences.

Table 3: Ten most relevant terms for the twenty most prominent topics

<table>
<thead>
<tr>
<th>#</th>
<th>Topic Label</th>
<th>Articles</th>
<th>Distinctive Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FutureLearn</td>
<td>53</td>
<td>futurelearn, nelson, partner, leed, warwick, bbc, learner, simon, east, bristol</td>
</tr>
<tr>
<td>2</td>
<td>Business and Management MOOCs</td>
<td>51</td>
<td>business, school, mba, management, dean, finance, ma1ster, prof, manager, case</td>
</tr>
<tr>
<td>3</td>
<td>MOOC revolution</td>
<td>51</td>
<td>coursera, stanford, credit, udacity, sign, certificate, completion, venture, enrol</td>
</tr>
<tr>
<td>4</td>
<td>MOOCs for K-12 education</td>
<td>37</td>
<td>school, teacher, pupil, lesson, child, computing, resource, curriculum, classroom, secondary</td>
</tr>
<tr>
<td>5</td>
<td>MOOCs and university funding</td>
<td>36</td>
<td>government, funding, tuition, sector, pound, loan, overseas, fall, private, target</td>
</tr>
<tr>
<td>6</td>
<td>MOOCs in Ireland</td>
<td>36</td>
<td>distance, irish, ireland, trinity, postgraduate, dublin, tutor, history, qualification, law</td>
</tr>
<tr>
<td>7</td>
<td>MOOC course announcements</td>
<td>33</td>
<td>vice, chancellor, david, bean, minister, willett, martin, sir, december, widen</td>
</tr>
<tr>
<td>8</td>
<td>MOOCs and global educational market</td>
<td>30</td>
<td>china, profit, american, campus, elite, america, accord, emerge, expand, mass</td>
</tr>
<tr>
<td>9</td>
<td>openSAP press releases</td>
<td>29</td>
<td>com, www, http, press, visit, newswire, release, solution, announce, business</td>
</tr>
<tr>
<td>10</td>
<td>MOOC signup figures for UK universities</td>
<td>29</td>
<td>london, edinburgh, join, sign, oxford, king, principal, australium, september, vice</td>
</tr>
<tr>
<td>11</td>
<td>Explaining MOOC course structure</td>
<td>27</td>
<td>video, forum, website, peer, assignment, exam, grade, youtube, user, quiz</td>
</tr>
<tr>
<td>12</td>
<td>MOOCs research reports</td>
<td>27</td>
<td>news, report, accord, additional, contact, editor, obtain, article, journal, learner</td>
</tr>
<tr>
<td>13</td>
<td>MOOCs in France</td>
<td>25</td>
<td>edx, platform, france, french, national, source, october, january, announce, massachusetts</td>
</tr>
<tr>
<td>14</td>
<td>MOOCs &amp; books</td>
<td>24</td>
<td>book, story, claim, tell, hour, read, word, history, predict, educate</td>
</tr>
<tr>
<td>15</td>
<td>MOOCs for training</td>
<td>24</td>
<td>skill, training, employer, career, qualification, professional, scheme, workplace, employee, national</td>
</tr>
<tr>
<td>16</td>
<td>MOOCs &amp; changes in educational sector</td>
<td>24</td>
<td>per, cent, service, face, sector, survey, process, average, march, office</td>
</tr>
<tr>
<td>17</td>
<td>British council MOOCs</td>
<td>23</td>
<td>british, council, library, museum, futurelearn, debate, english, announce, activity, cultural</td>
</tr>
<tr>
<td>18</td>
<td>MOOC market</td>
<td>23</td>
<td>market, industry, report, trend, investment, sector, analysis, growth, company, product</td>
</tr>
</tbody>
</table>
Besides identifying most frequently discussed topics, we examined the dynamics of their coverage over time. Figure 5 shows the changes in coverage for the top twenty topics across the 2012-2015 period. Interestingly, for many topics we see the steep decline in their coverage, in particular for the top three most discussed topics in our corpus. In contrast, some topics – such as the coverage of MOOC reports, university funding, openSAP, use of books, use of MOOCs for training, and MOOC market show an increase over time.

5 Limitations
There are several limitations related to our study. First of all, we used the data that was available on the Factiva information retrieval platform, which – despite being one of the largest databases available – is still not a complete set of MOOC-related articles. This is particularly true for the articles published in 2015, as the Factiva database is slightly lagging behind the actual news publishers. Next, although the use of fully automated analysis procedure has many advantages including the ability to analyze hundreds of news articles in a quick and easy manner, the level of sophistication that can be achieved by the expert researcher is still higher. Thus, similarly to Kovanović et al. (2015) study, we argue that combination of smaller but more detailed analysis – such as the ones by Bulfin et al. (2014) and Selwyn et al. (2015) – and the automated analysis like the one presented here provide necessary insights to the complex nature of MOOC public discourse. The adopted procedure also depends on the several preprocessing steps and algorithm parameters, the primary one being number of topics to extract which both can have an important impact on the final results of the analysis.

Figure 5: Change in coverage of top twenty topics over the 2012-2015 period.
Finally, although having the focus on the whole Europe, we used only articles that were written in English, which distorts a final image to more UK- and Ireland-related topics. In our future work, we plan on investigating articles written in other European languages to provide a more comprehensive overview of the European MOOC public discourse. One promising direction is to use automated translation services such as Google Translate to translate all articles to English before running topic modeling procedure. Although not perfect, those automated translation services could provide a translation which is accurate enough so that an accurate document-term matrix could be extracted.

6 Discussion
Looking at the results of our analysis, we see many similarities with the previous results reported by Kovanović et al. (2015). As expected, a large portion of public discourse has been about “MOOC revolution” and the anticipated changes in the educational domain. Also, given the large amounts of money being raised by MOOC companies, we also witness many financial and business-oriented publications reporting extensively on MOOCs affairs. This also explains why MOOC providers and business and management MOOCs are extensively covered in the public media. This focus on financial aspects of MOOC triggers a question of how much research in online learning is underpinning the development in MOOC space, and how much it is driven by the marketability, particularly in the case of for-profit MOOC providers (Kovanović et al., 2015).

We also see the decreasing trend in MOOC coverage over time, albeit to the lesser extent than reported by Kovanović et al. (2015). One likely reason is the slightly slower adoption of MOOCs in Europe which resulted in peek of “MOOC hype” cycle being shifted. Thus, based on results of this study and Kovanović et al. (2015) study to continue to see a declining trend in MOOC coverage in Europe in the following years. We also see a number of topics related to MOOC use in UK, Ireland, and France, which is aligned with the results by Selwyn et al. (2015) and Kovanović et al. (2015). We also see large coverage of smaller MOOC platforms, such as openSAP from non-English speaking countries, which is also an indicator of the importance of MOOC adoption to the different user populations, markets, and economies.

Although a large number of topics saw a decline in their coverage, a certain number of topics show a trend of rising coverage over time. For instance, changes in university funding due to the introduction of MOOCs saw a decline between 2013 and 2014 but saw a second increase during 2015. As MOOCs became more mature, there has also been an increase in the number of MOOC-related reports, development of different MOOC books and learning materials, and discussions related to the use of MOOCs in the context of workplace training. This indicates that the public discourse of MOOCs is moving towards more productive analysis of instructional aspects of MOOCs and the positions that MOOCs might play in the overall educational landscape and the need for current universities to adjust to this new market organization.

7 Conclusions
This paper presents a study that looked at the Europe-related MOOC public discourse. We analyzed 915 English language news articles obtained through Factiva platform using automated topic modeling technique previously used by Kovanović et al. (2015). Unsurprisingly, the most MOOC-related articles (99) have been published by Times Higher Education Supplement. Besides education-focused publications, several financial and business newspapers extensively reported on European MOOC affairs. Alongside several UK daily and weekly newspapers, we see large coverage of European MOOC news is the US and Australian newspapers. Using Latent Dirichlet Allocation (LDA), we found 43 distinct topics in our dataset. Aligned with Kovanović et al. (2015) results, we see a move from
broad discussion of MOOCs and MOOC providers to more constructive discussion related to MOOC adoption and their position in the educational field. The three most prominent topics were related to FutureLearn MOOC platform, Business and Management MOOCs, and “MOOC revolution”, which all suffered a large drop in the coverage in the last two years. In contrast, we see an increase in coverage of some other topics, such as the discussion of MOOC research reports, analysis of MOOC markets, use of MOOCs in primary and secondary education, and changes to university funding initiated by MOOCs.

References


