

# A Contemporary Review of Research Methods Adopted to Understand Students' and Instructors' Use of Massive Open Online Courses (MOOCs)

Ruiqi Deng and Pierre Benckendorff

**Abstract**—This study reviews research methods commonly adopted in scholarly literature on students' and instructors' experiences of using Massive Open Online Courses (MOOCs), published from January 2014 to April 2016. 53 articles were identified through a search of four electronic databases. The findings show that surveys, interviews, and log files extracted from MOOC platforms were the most frequently adopted methods for data collection. The use of other qualitative research methods such as diary studies and focus groups was less common. The majority of identified articles adopt a single research method. Methodological triangulation is observed in studies which collect data from multiple sources. For studies which adopted methodological triangulation, it is observed that surveys are often triangulated with interviews and log files. The ways in which MOOC scholars use the key research methods are discussed, and future research avenues based on the research results are provided.

**Index Terms**—MOOC, research method, student, review, online course.

## I. INTRODUCTION

Massive Open Online Courses (MOOCs) are claimed to have brought major transformations in the delivery of education because of their unique strengths in providing high-quality online learning resources to a massive number of students and removing key obstacles to education such as tuition fees and formal qualifications. Compared with distance education and technology-enhanced learning, the history of MOOCs is relatively new. The concept of a MOOC was first applied to a 12-week 'Connectivism and Connective Knowledge' facilitated by Stephen Downes and George Siemens at the University of Manitoba in 2008 [1]. In this course, learning was co-created by both students and instructors. Participants were asked to generate, share, and build on each other's ideas, and instructors facilitated discussions by reviewing, synthesising, and reflecting on students' activities [2]. Such a learning approach which emphasises networked and discussion-based learning and deemphasises the instructor as the sole source of content is referred to as cMOOC, in which 'c' stands for connectivism and has its root in connectivism theory of learning [3], [4]. cMOOCs have been criticised by scholars for not providing clear learning pathways and an overreliance on charismatic network leaders [1].

Manuscript received May 6, 2016; revised July 18, 2016.

R. Deng and P. Benckendorff are with UQ Business School, the University of Queensland, 39 Blair Dr, St Lucia, Queensland, Australia (e-mail: r.deng@uq.edu.au, p.benckendorff@uq.edu.au).

Another type of MOOC is xMOOC, in which 'x' stands for exponential. The concept of xMOOC was popularised by scholars from Harvard University, Stanford University, and MIT, and exemplified by 'Introduction to Artificial Intelligence' facilitated by Sebastian Thrun and Peter Norvig in 2011 which attracted more than 160,000 participants worldwide [5]. The structure of xMOOCs is more in the mode of traditional university courses which usually have a highly-structured curriculum and clear learning objectives, and typically consists of video lectures, reading materials, assessments, discussion forums, live video sessions, and other activities [6], [7]. Despite receiving criticism from academics for limited interaction between students and instructors and a lack of learning support, most contemporary MOOCs have adopted the xMOOC delivery mode [8]. Research suggested that edX, Coursera, Udacity, and FutureLearn were MOOC platforms that received the most attention from the media [9] and the public [10], [11].

Following this introduction, this study will discuss previous reviews of MOOC publications and explain why the current review is conducted. The next section of the paper presents the purpose of this study. After that, the choice of research design and data analysis is justified. The study results are then presented, and the adoption of a variety of research methods in recent MOOC literature is discussed. The study finishes with a discussion and conclusion. Based on the findings, future research avenues are suggested. For reasons of convenience, both cMOOC and xMOOC will be referred to as MOOC in the current study.

## II. PREVIOUS REVIEWS ON MOOC LITERATURE

There were four review articles published from 2013 to 2015 which aimed to discover trends in MOOC research. The first review was done in 2013 and identified 45 articles published from 2008 to 2012. The review made a contribution by dividing published MOOC articles into eight themes: introductory, concept, case studies, educational theory, technology, participant focused, provider focused, and other [12]. In 2014, the review of 25 scholarly articles published during the period 2009-2013 showed that MOOC research was shifting from the study of engagement and creativity in cMOOCs to learning analytics and assessments in xMOOCs [13]. Later on, the review of 60 papers published from 2008 to 2014 identified nine research categories based on research aims of each article, and concluded that the field of MOOC studies heavily relied on theoretical research and was just beginning to identify appropriate research methods to deal

with large cohorts of participants, huge amounts of data, and innovative approaches of learning [14]. More recently, the review of 183 articles published during the period 2013-2015 revealed that MOOC studies had become more interdisciplinary than research pieces published from 2008 to 2012 [15].

The existing review articles seem to suggest that research topics on MOOCs are diverse [12], [14], and the research trend is continually evolving [13]-[15]. Among many topics investigated by MOOC scholars, teaching and learning has received increasing scholarly attention [14], [16]. Researchers have systematically reviewed students' and instructors' use of MOOCs, particularly their motivations and challenges [17]. However, no research has been done to understand the wide range of research methods employed by MOOC scholars to capture students' experience of studying MOOCs and instructors' experience of teaching MOOCs. In view of this, there is a need for a review of relevant articles to gain a better understanding of the phenomenon.

### III. PURPOSE OF STUDY

The current study aims to provide a contemporary review of research methods adopted to understand students' and instructors' use of MOOCs. The focus is on empirical research which aims to understand students' learning experience and instructors' teaching experience before, during, and after a MOOC takes place, including but not limited to MOOC users' personal characteristics, motivations, attitudes, perceptions, patterns of engagement, and learning outcomes. This study also aims to promote awareness of methodological issues in this topic area, which can suggest avenues for future research. Specifically, this study will present the diversity of research methods adopted by MOOC scholars in recent literature, discuss the most frequently adopted research methods, and look for evidence for triangulation of research findings.

### IV. RESEARCH METHODS

Article search strategies are shown in Fig. 1. Primary literature was obtained by searching electronic databases for recent peer-reviewed journal articles, conference papers, book chapters, and unpublished theses and dissertations. Scholarly contributions included in this review are limited to empirical studies published in English and completed from January, 2014 to April, 2016. Such a timeframe was imposed because MOOC studies published between 2008 to 2013 heavily relied on theoretical research [14] and had a relatively small sample size [17].

To ensure the relevance of the review, the following selection criteria were applied. First, students' and/or instructors' experience of using MOOCs had to be the primary focus. Studies that explored students and/or instructors who had no previous experience of using MOOCs were excluded from the review. Articles which focused on stakeholders other than students and instructors, such as employers, software engineers, and librarians, were also excluded. Second, non-empirical observations of students'

and instructors' use of MOOCs, such as editorials and conceptual papers, were not included. These articles were nevertheless reviewed and used for the background literature where relevant. Third, the studies had to be recent scholarly contributions, from 2014 onwards. No restrictions were placed on sample size or the length of articles.

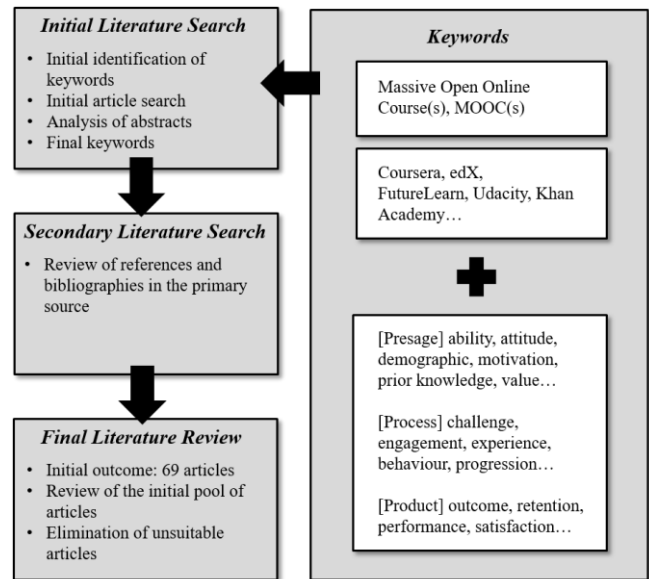


Fig. 1. Article search strategies.

The four databases used were ERIC, Scopus, ProQuest, and Web of Science. Keywords were identified through screening titles, abstracts, and keywords of the literature. For this review, 'Massive Online Open Course(s)' 'MOOC(s)' and names of leading MOOC platforms were paired with key learning-related factors outlined in Biggs (1993)'s Presage-Process-Product (3P) Model of Teaching and Learning [18], [19]. Such article search strategies ensured that studies which looked into both general MOOC users and the individuals using specific platforms were considered, and their learning and teaching experiences taking place before, during, and after a MOOC were captured. After the initial literature search, secondary literature was acquired by inspecting the references and bibliographies in the primary source. The same selection criteria were borne in mind when the secondary literature search was carried out by the authors. The initial and secondary literature search identified 69 articles suitable for the final review.

After eliminating unsuitable articles, 53 studies were retained for data analysis. Each article identified was the basic unit of analysis. To perform data analysis, an overview synthesis table was produced after reading all the articles. The table contained information of all studies on a variety of dimensions, such as author, year of publication (or completion), article type, and details about research methods adopted. After the synthesis table was produced, the selected articles were organised according to the type of research methods adopted. Similarities and differences among the studies using the same methodological approach were observed and noted. Thematic analysis was conducted to interpret the table and key groupings. Patterns across the datasets were examined and presented in the following section.

## V. DISCUSSIONS

The basic information about 53 articles is depicted in Table I. It is clear that more articles regarding students' and instructors' use of MOOCs were published or completed in 2015. However, it should be noted that the current study only included articles which were published or completed and made available online before the end of April, 2016. It is expected more articles in this topic area will be published in 2016. The statistics of country is based on the first author's country of origin. It can be seen that most of the articles were completed by scholars from western countries, such as the United States ( $n = 28$ ), the United Kingdom ( $n = 6$ ), Canada ( $n = 5$ ), and Australia ( $n = 3$ ). Only a small number of articles were completed by scholars from Hong Kong ( $n = 2$ ), South Korea ( $n = 2$ ), Taiwan ( $n = 2$ ), Germany ( $n = 1$ ), and Switzerland ( $n = 1$ ). Approximately three fourths of the scholarly contribution are peer-reviewed journal articles.

TABLE I: BASIC INFORMATION ABOUT ARTICLES ( $N = 53$ )

|                                       | Frequency | Per cent |
|---------------------------------------|-----------|----------|
| <i>Year of Publication/Completion</i> |           |          |
| 2014                                  | 14        | 26.4     |
| 2015                                  | 32        | 60.4     |
| 2016                                  | 7         | 13.2     |
| <i>Country</i>                        |           |          |
| United States                         | 28        | 52.8     |
| United Kingdom                        | 6         | 11.3     |
| Canada                                | 5         | 9.4      |
| Australia                             | 3         | 5.7      |
| Israel                                | 3         | 5.7      |
| Others                                | 8         | 15.1     |
| <i>Type of Article</i>                |           |          |
| Journal article                       | 40        | 75.5     |
| Thesis/dissertation                   | 9         | 17.0     |
| Conference proceeding                 | 3         | 5.7      |
| Book chapter                          | 1         | 1.8      |

Journal articles identified in the current study were selected from 21 different journals. The majority of them are education journals, with a heavy focus on educational technology and online learning (Table II). More than half of the identified articles are published in Computers and Education ( $n = 7$ ), British Journal of Educational Technology ( $n = 5$ ), International Review of Research in Open and Distance Learning ( $n = 5$ ), Distance Education ( $n = 3$ ), and Educational Media International ( $n = 3$ ).

TABLE II: INFORMATION ABOUT JOURNAL ARTICLES ( $N = 40$ )

| Journal  | h-index | Frequency | Per cent |
|--|---------|-----------|----------|
| Computers & Education  | 93      | 7         | 17.5     |
| British Journal of Educational Technology                      | 55      | 5         | 12.5     |
| International Review of Research in Open and Distance Learning | 33      | 5         | 12.5     |
| Distance Education   | 25      | 3         | 7.5      |
| Educational Media International                                | 7       | 3         | 7.5      |
| Others   |         | 17        | 42.5     |

From Table III, it is clear that an overwhelming number of articles adopted the perspective of students ( $n = 48$ ). Less than 10% of identified articles either adopted the perspective of instructors ( $n = 4$ ) or both students and instructors ( $n = 1$ ).

The majority of the articles reviewed in this study employed a single research method (Table IV). Among these, it was observed that surveys ( $n = 18$ ), interviews ( $n = 6$ ), and log files ( $n = 5$ ) were primary avenues for data collection. The

use of mixed methods research and methodological triangulation was also observed in a number of studies. The findings indicate that fifteen articles adopted two research methods in the data collection process. Typically, articles adopting two research methods combined the use of surveys with interviews [20]-[25] or with log files extracted from MOOC platforms [26]-[30]. Beyond that, very few articles adopted three or more research methods for data collection. In studies which adopted at least three research methods, data were collected from multiple sources such as through observation notes, email responses, journal entries, and written documents [31], [32].

TABLE III: PERSPECTIVE OF THE ARTICLE ( $N = 53$ )

| Perspective                 | Frequency | Per cent |
|-----------------------------|-----------|----------|
| Student                     | 48        | 90.6     |
| Instructor                  | 4         | 7.5      |
| Both student and instructor | 1         | 1.9      |

TABLE IV: NUMBER OF RESEARCH METHODS USED FOR DATA COLLECTION ( $N = 53$ )

| Number of Research Methods Used | Frequency | Per cent |
|---------------------------------|-----------|----------|
| One                             | 36        | 67.9     |
| Two                             | 15        | 28.3     |
| Three or above                  | 2         | 3.8      |

The authors observed that surveys ( $n = 31$ ), interviews ( $n = 14$ ), and log files ( $n = 12$ ) were the most frequently used methods for data collection (Table V). Other qualitative data collection methods such as diary studies ( $n = 3$ ), focus group ( $n = 2$ ), observation ( $n = 2$ ), and virtual ethnography ( $n = 1$ ) were also occasionally employed by researchers to explore students' and instructors' experiences of using MOOCs.

TABLE V: TYPE OF RESEARCH METHODS USED FOR DATA COLLECTION ( $N = 69$ )

| Type of Research Methods Adopted | Frequency | Per cent |
|----------------------------------|-----------|----------|
| Surveys                          | 31        | 44.9     |
| Interviews                       | 14        | 20.3     |
| Log files                        | 12        | 17.4     |
| Other qualitative methods        | 12        | 17.4     |

The findings indicate that surveys were the most frequently adopted research method. The majority of such studies either surveyed participants ( $n = 28$ ) or instructors ( $n = 2$ ). The only exception is one research piece which addressed both participants' and instructors' perceptions of quality design of MOOCs [33]. The sample size in a single study ranges from 49 students [21] to more than 50,000 participants [26].

The ways in which surveys are used can be very different. There are studies which administered the survey before a MOOC was started. Such studies can be useful for understanding course participants' demographics [28], motivation for enrollment [26], [34]-[36], intended study behaviour [26], [36], [37], and pre-course attitudes [38]. Additionally, there are researchers who carried out the survey by the end of a MOOC. Research of this type was often more interested in looking at students' post-course attitudes [29], [39], [40], self-reported engagement patterns [27], and perceived learning outcomes [41]. Beyond that, a few studies conducted the survey during the course. These studies typically intended to poll participants about their patterns of engagement, particularly behavioural engagement [23], [37]. Additionally, there are a few studies which adopted surveys to

capture MOOC participants' personal characteristics before the course, their patterns of engagement during the course, and learning outcomes after the course was completed. Such studies can be either descriptive [37] or correlational [42].

The majority of research pieces reviewed in this study adopted a cross-sectional design. This even holds true for a study which the primary objective was to capture participants' attitudinal changes [41]. In a few cases, both pre- and post-course surveys were administered in a single study. However, results of pre- and post-course surveys are often presented separately and tend to be descriptive in nature. In such studies, the entry-survey was to obtain participants' demographics and motivation, and the exit-survey was to capture their perceptions of course experience [37], [43]. Researchers seem to have made little effort to associate results of entry-surveys with that of exit-surveys. An exception is a study which measured participants' motivational differences by administering a motivation survey before and after the MOOC [31]. In future research, the use of pre-test/post-test design will be critical to gain a better understanding of how MOOCs influence participants, and what benefits can learners gain by participating in MOOCs.

The findings show that interviews were the second most often adopted research method. This review suggests that MOOC scholars either interviewed course participants ( $n = 10$ ) or instructors ( $n = 4$ ). The number of interviewees in a single study ranges from 4 [32] to 60 [44]. No study has interviewed both students and MOOC instructors. Interviews were typically conducted with participants by the end of a MOOC. Participants were requested to reflect on a part or the whole of their study experience, most particularly their motivation [21]-[23], [44]-[46], engagement [20], [45]-[47], perceived benefits and gains [32], [44], [46], and perceptions of everyday learning experience [22], [48]. Beyond that, interviews were also conducted with instructors who had MOOC teaching experience. Research of this type reported instructors' motivation to develop MOOCs [24], [49] and attitudes towards the use of MOOCs [24], [25], [50].

Triangulation of interviews and surveys has been applied in a number of studies in order to provide more unique perspectives on students' and instructors' use of MOOCs. Interviews are typically conducted after surveys in order to probe more deeply into the answers of survey respondents. Using both survey and interview methods, researchers have explored students' motivation [22], [23], engagement [20], [23], and perceptions of learning experience [21], [22], and instructors' motivation [25] and attitudes [24], [25].

The findings indicate that log files were the third most frequently adopted strategy to understand students' use of MOOCs. Log files in this research are defined as files that record events and user interaction occurred on a MOOC platform. Examples of this could be clicks on specific course resources and records of forum activities. Log files have been either used on their own ( $n = 6$ ) or in combination with other research methods ( $n = 6$ ). There are researchers who used log files alone to understand course participants' patterns of social, emotional, and behavioural engagement. Specifically, MOOC scholars have observed students' social engagement through monitoring the frequency of communication and

interaction of each student, such as the number of initiated forum posts and total discussion participation [51]. Researchers have observed emotional engagement through calculating the frequency of affective expression such as the number of upvotes in the discussion forums [51]. Additionally, MOOC scholars have explored participants' behavioural engagement by documenting student activities, including but not limited to clickstream logs, completion of activities, and participation in discussion forums [52]-[55].

Log files also appeared to be used with other research methods ( $n = 7$ ). It is not uncommon for researchers to perform statistical analysis using data retrieved from both MOOC platforms and surveys. Data retrieved from MOOC platforms are typically participants' grades and patterns of engagement. In a correlational study which explored possible relationships between student performance and prior knowledge, researchers extracted course grades from the platform to be used as a dependent variable and captured students' prior knowledge in a survey to be used as independent variables [27]. In another correlational study which examined the relationship between engagement and motivation gains, the number of posts was used as an independent variable, and motivation gains were measured in surveys administered before and after the MOOC [31]. Beyond that, information retrieved from log files was used as a variable in a Structural Equation Model (SEM). In a study which explored the theoretical relation underlying students' motivation, engagement, and retention in a MOOC, motivation was retrieved in a pre-course survey, whereas student engagement and retention were obtained by extracting the course data, such as the number of lecture videos watched, threads posted, and assignments completed, from the MOOC platform [30]. However, not all studies analysed log files in close conjunction with results from pre- or post-course surveys. In a number of studies, log files and survey results were presented and analysed separately to allow for a more comprehensive view on a topic [28], [29]. Although clickstream data retrieved from MOOC platforms can be used as a proxy for engagement, such data should be interpreted with caution because they are inferred rather than queried.

Even though the use of surveys, interviews, and log files dominated in scholarly contribution reviewed in this study, other research methods should not be overlooked. It is observed that diary studies ( $n = 3$ ), focus groups ( $n = 2$ ), observation ( $n = 2$ ), and other qualitative methods ( $n = 5$ ) have also been adopted by MOOC scholars. Diaries were either used by itself [56], or with other data sources [32], [48]. When used standalone, diaries were analysed to illuminate commonalities and differences in MOOC participants' learning experiences [56]. Additionally, diaries were used with interviews to capture lived experience of course participants [48], and with recordings, interviews, goal setting sheets, and observation notes to illustrate instructors' facilitation process and participants' perceived gains [32]. However, it is important to note that even though these studies appeared to adopt the same research method, the methodologies which informed the choice of research methods can be different. This difference lies in the fact that two studies adopting the same research method can have their roots in different methodologies: a study which aimed to

provide detailed, pre-reflective, lived experience of learning adopted a phenomenological stance [48], whereas another study which sought to retrospectively and selectively describe and analyse personal experience was based on the ethnographic inquiry [56], even if both articles used diary studies as a part of the research approach.

Apart from diary studies, other qualitative research approaches have also been adopted by MOOC scholars. Focus groups were either adopted on their own [57], or with other qualitative research methods [32] to probe participants' motivation and experience. Researchers' reflection notes did not serve as the main data source, but were used in combination with both quantitative [58] and qualitative [32] methods to triangulate findings. Threads posted by course participants in discussion forums can be useful for understanding patterns of engagement during the learning process. Researchers have adopted this strategy in qualitative studies to explore students' social [59] and emotional engagement [60]-[62]. Social generated 'big data' has also been used by MOOC scholars for data analysis. In a mixed methods study, more than 4300 MOOC-related events were analysed to explore participants' motivation and engagement patterns for organising face-to-face meetings [63]. Additionally, it is observed that a qualitative study adopted visual ethnographic methods and narrative inquiry to interpret individuals' perceptions of MOOC learning experience [64].

## VI. CONCLUSIONS

This review indicates that surveys, interviews, and log files were the most frequently adopted research methods to understand students' and instructors' use of MOOCs. Researchers also collected data through other avenues, typically diary studies, focus groups, observation notes, and discussion forum posts. In addition, the analysis of email responses, messages, reviews, events, and photos was observed but much less frequently used by MOOC scholars. Approximately two thirds of the studies employed a single research method. With a few exceptions, the studies lack methodological innovation and sophistication. In a few studies which adopted more than one research method, methodological triangulation was observed. For studies which adopted methodological triangulation, it is observed that surveys were often triangulated with interviews and log files.

There are a number of research avenues which could be explored based upon the findings of this study. First, additional research strategies should be considered to understand students' and instructors' experience of using MOOCs. Descriptive and cross-sectional design may be able to provide a snapshot of dynamics of MOOC participants and instructors. More complex research questions are likely to be solved through implementing other types of design, such as pre-test/post-test design. Second, triangulation of a wider range of research methods and data sources should be undertaken. Beyond triangulation of surveys and interviews or log files, MOOC scholars are encouraged to combine other research methods to triangulate findings, such as diary studies and focus groups. They are also encouraged to use evidence from different types of data sources, such as interviewing both

students who took the MOOC and instructors who offered the MOOC in the same session. This will facilitate the development of a more comprehensive view of learning and teaching in the context of MOOCs. Third, there are a range of research topics which are needed to understand students' and instructors' use of MOOCs. For instance, research has depicted students' behavioural, emotional, and social engagement, yet evidence about their cognitive engagement is scarce. It would be useful to explore the influence that cognitive engagement has on student engagement and learning outcomes. Additionally, this study reveals that only a small number of research pieces explored MOOC teaching and learning from the perspective of instructors. Past research has suggested that teaching context is critical to successful student learning [65]. It is suggested that future research is undertaken to explore the influence that different teaching contexts (e.g. area of study, course level, length of study) have on the student learning process in the context of MOOCs.

## REFERENCES

- [1] R. Boyatt, M. Joy, C. Rocks, and J. Sinclair, "What (use) is a MOOC?" *The 2nd International Workshop on Learning Technology for Education in Cloud*, London: Springer, 2014, pp. 133-145.
- [2] F. M. Hollands and D. Tirthali, *MOOCs in Higher Education*, New York, NY: Palgrave and Macmillan, 2015.
- [3] G. Siemens, "Connectivism: A learning theory for the digital age," *International Journal of Instructional Technology & Distance Learning*, vol. 2, pp. 3-10, 2005.
- [4] D. Cormier and G. Siemens, "Through the open door: Open courses as research, learning, and engagement," *EDUCAUSE Review*, vol. 45, pp. 31-39, 2010.
- [5] S. I. Freitas, J. Morgan, and D. Gibson, "Will MOOCs transform learning and teaching in higher education? Engagement and course retention in online learning provision," *British Journal of Educational Technology*, vol. 46, pp. 455-471, 2015.
- [6] M. H. Baturay, "An overview of the world of MOOCs," *Procedia - Social and Behavioral Sciences*, vol. 174, pp. 427-433, 2015.
- [7] C. H. Major and S. J. Blackmon, "Massive Open Online Courses: Variations on a new instructional form," *New Directions for Institutional Research*, vol. 2015, pp. 11-25, 2016.
- [8] T. Brahimi and A. Sarirete, "Learning outside the classroom through MOOCs," *Computers in Human Behavior*, vol. 51, pp. 604-609, 2015.
- [9] V. Kovanović, S. Joksimović, D. Gašević, G. Siemens, and M. Hatala, "What public media reveals about MOOCs: A systematic analysis of news reports," *British Journal of Educational Technology*, vol. 46, pp. 510-527, 2015.
- [10] D. Kernohan, "MOOCs," *Digital futures: Expert Briefings on Digital Technologies for Education and Research*, Oxford: Chandos, 2015, pp. 1-6.
- [11] S. Porter, *To MOOC or not to MOOC: How Can Online Learning Help to Build the Future of Higher Education?* Oxford: Chandos, 2015.
- [12] T. R. Liyanagunawardena, A. A. Adams, and S. A. Williams, "MOOCs: A systematic study of the published literature 2008-2012," *International Review of Research in Open and Distance Learning*, vol. 14, pp. 202-227, 2013.
- [13] M. Ebben and J. S. Murphy, "Unpacking MOOC scholarly discourse: A review of nascent MOOC scholarship," *Learning, Media and Technology*, vol. 39, pp. 328-345, 2014.
- [14] J. E. Raffaghelli, S. Cucchiara, and D. Persico, "Methodological approaches in MOOC research: Retracing the myth of Proteus," *British Journal of Educational Technology*, vol. 46, pp. 488-509, 2015.
- [15] G. Veletsianos and P. Shepherdson, "Who studies MOOCs? Interdisciplinarity in MOOC research and its changes over time," *International Review of Research in Open and Distributed Learning*, vol. 16, pp. 1-17, 2015.
- [16] C. R. Glass, M. S. Shiokawa-Baklan, and A. J. Saltarelli, "Who takes MOOCs?" *New Directions for Institutional Research*, vol. 2015, pp. 41-55, 2016.
- [17] K. F. Hew and W. S. Cheung, "Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges," *Educational Research Review*, vol. 12, pp. 45-58, 2014.

- [18] J. B. Biggs, "From theory to practice: A cognitive systems approach," *Higher Education Research & Development*, vol. 12, pp. 73-85, 1993.
- [19] J. B. Biggs, *Teaching for Quality Learning at University*, 2nd ed. Maidenhead: Open University Press, 2003.
- [20] L. M. Daniels, C. Adams, and A. McCaffrey, "Emotional and social engagement in a Massive Open Online Course: An examination of Dino 101," *Emotions, Technology, and Learning*, San Diego: Academic Press, 2016, pp. 25-41.
- [21] W. Abeer and B. Miri, "Students' preferences and views about learning in a MOOC," *Procedia - Social and Behavioral Sciences*, vol. 152, pp. 318-323, 2014.
- [22] K. Li, "Motivating learners in massive open online courses: A design-based research approach," Doctoral dissertation, Ohio University, Athens, United States, 2015.
- [23] A. Littlejohn, N. Hood, C. Milligan, and P. Mustain, "Learning in MOOCs: Motivations and self-regulated learning in MOOCs," *The Internet and Higher Education*, vol. 29, pp. 40-48, 2016.
- [24] S. Evans and J. G. Myrick, "How MOOC instructors view the pedagogy and purposes of massive open online courses," *Distance Education*, vol. 36, pp. 295-311, 2015.
- [25] J. Gerber, "MOOCs: Innovation, disruption and instructional leadership in higher education," Doctoral dissertation, University of California, Los Angeles, Los Angeles, United States, 2014.
- [26] J. Campbell, A. L. Gibbs, H. Najafi, and C. Severinski, "A comparison of learner intent and behaviour in live and archived MOOCs," *International Review of Research in Open and Distance Learning*, vol. 15, pp. 235-262, 2015.
- [27] T. Phan, S. G. McNeil, and B. R. Robin, "Students' patterns of engagement and course performance in a Massive Open Online Course," *Computers & Education*, vol. 95, pp. 36-44, 2016.
- [28] A. C. Robinson, J. Kerski, E. C. Long, H. Luo, D. DiBiase, and A. Lee, "Maps and the geospatial revolution: Teaching a massive open online course (MOOC) in geography," *Journal of Geography in Higher Education*, vol. 39, pp. 65-82, 2015.
- [29] T. Soffer and A. Cohen, "Implementation of Tel Aviv University MOOCs in academic curriculum: A pilot study," *International Review of Research in Open and Distributed Learning*, vol. 16, pp. 80-97, 2015.
- [30] Y. Xiong, H. Li, M. L. Kornhaber, H. K. Suen, B. Pursel, and D. D. Goins, "Examining the relations among student motivation, engagement, and retention in a MOOC: A structural equation modeling approach," *Global Education Review*, vol. 2, pp. 23-33, 2015.
- [31] M. Barak, A. Watted, and H. Haick, "Motivation to learn in massive open online courses: Examining aspects of language and social engagement," *Computers & Education*, vol. 94, pp. 49-60, 2016.
- [32] Y.-H. Chen and P.-J. Chen, "MOOC study group: Facilitation strategies, influential factors, and student perceived gains," *Computers & Education*, vol. 86, pp. 55-70, 2015.
- [33] A. M. F. Yousef, M. A. Chatti, U. Schroeder, and M. Wosnitza, "What drives a successful MOOC? An empirical examination of criteria to assure design quality of MOOCs," in *Proc. 2014 IEEE 14th International Conference on Advanced Learning Technologies (ICALT)*, Athens, Greece, 2014, pp. 44-48.
- [34] C. W. Stokes, A. C. Towers, P. V. Jinks, and A. Symington, "Discover dentistry: Encouraging wider participation in dentistry using a massive open online course (MOOC)," *British Dental Journal*, vol. 219, pp. 81-85, 2015.
- [35] Y. Wang and R. Baker, "Content or platform: Why do students complete MOOCs?" *Journal of Online Learning and Teaching*, vol. 11, pp. 17-30, 2015.
- [36] J. A. Greene, C. A. Oswald, and J. Pomerantz, "Predictors of retention and achievement in a Massive Open Online Course," *American Educational Research Journal*, vol. 52, pp. 925-955, 2015.
- [37] P. Moskal, K. Thompson, and L. Futch, "Enrollment, engagement, and satisfaction in the BlendKit faculty development open, online course," *Online Learning*, vol. 19, pp. 1-12, 2015.
- [38] L. Schmid, K. Manturuk, I. Simpkins, M. Goldwasser, and K. E. Whitfield, "Fulfilling the promise: Do MOOCs reach the educationally underserved?" *Educational Media International*, vol. 52, pp. 116-128, 2015.
- [39] G. Salmon, J. Gregory, K. Lokuge Dona, and B. Ross, "Experiential online development for educators: The example of the Carpe Diem MOOC," *British Journal of Educational Technology*, vol. 46, pp. 542-556, 2015.
- [40] M. Liu, J. Kang, M. Cao, M. Lim, Y. Ko, R. Myers *et al.*, "Understanding MOOCs as an emerging online learning tool: Perspectives from the students," *American Journal of Distance Education*, vol. 28, pp. 147-159, 2014.
- [41] W. R. Watson, W. Kim, and S. L. Watson, "Learning outcomes of a MOOC designed for attitudinal change: A case study of an Animal Behavior and Welfare MOOC," *Computers & Education*, vol. 96, pp. 83-93, 2016.
- [42] N. M. Stefanic, "Creativity-based music learning: Modeling the process and learning outcomes in a Massive Open Online Course," Doctoral dissertation, University of South Florida, Tampa, United States, 2014.
- [43] T. R. Liyanagunawardena, K. Ø. Lundqvist, and S. A. Williams, "Who are with us: MOOC learners on a future learn course," *British Journal of Educational Technology*, vol. 46, pp. 557-569, 2015.
- [44] Y.-L. Lin, H.-W. Lin, and T.-T. Hung, "Value hierarchy for Massive Open Online Courses," *Computers in Human Behavior*, vol. 53, pp. 408-418, 2015.
- [45] I. L. Morris, "An exploratory analysis of motivation and engagement in Massive Online Open Courses (MOOCs)," Masters dissertation, University of California, Riverside, Riverside, United States, 2014.
- [46] A. J. Hill, "Social learning in Massive Open Online Courses: An analysis of pedagogical implications and students' learning experiences," Doctoral dissertation, University of California, Los Angeles, Los Angeles, United States, 2015.
- [47] G. Velestianos, A. Collier, and E. Schneider, "Digging deeper into learners' experiences in MOOCs: Participation in social networks outside of MOOCs, notetaking and contexts surrounding content consumption," *British Journal of Educational Technology*, vol. 46, pp. 570-587, 2015.
- [48] C. Adams, Y. Yin, L. F. Vargas Madriz, and C. S. Mullen, "A phenomenonology of learning large: The tutorial sphere of xMOOC video lectures," *Distance Education*, vol. 35, pp. 202-216, 2014.
- [49] H. Najafi, C. Rolheiser, L. Harrison, and S. Håklev, "University of Toronto instructors' experiences with developing MOOCs," *International Review of Research in Open and Distributed Learning*, vol. 16, pp. 233-255, 2015.
- [50] S. Haavind and C. Sisteck-Chandler, "The emergent role of the MOOC instructor: A qualitative study of trends toward improving future practice," *International Journal on E-Learning*, vol. 14, pp. 331-350, 2015.
- [51] E. Cheung, "Analyzing student engagement and retention in Georgetown's first MOOC: Globalization's winners and losers: Challenges for developed and developing countries," Masters dissertation, Georgetown University, Washington, United States, 2014.
- [52] A. Loya, A. Gopal, I. Shukla, P. Jermann, and R. Tormey, "Conscientious behaviour, flexibility and learning in Massive Open On-Line Courses," *Procedia - Social and Behavioral Sciences*, vol. 191, pp. 519-525, 2015.
- [53] P. Diver and I. Martinez, "MOOCs as a massive research laboratory: Opportunities and challenges," *Distance Education*, vol. 36, pp. 5-25, 2015.
- [54] B. J. Evans, R. B. Baker, and T. S. Dee, "Persistence patterns in Massive Open Online Courses (MOOCs)," *Journal of Higher Education*, vol. 87, pp. 206-242, 2016.
- [55] L. W. Perna, A. Ruby, R. F. Boruch, N. Wang, J. Scull, S. Ahmad *et al.*, "Moving through MOOCs: Understanding the progression of users in massive open online courses," *Educational Researcher*, vol. 43, pp. 421-432, 2014.
- [56] Y. Park, I. Jung, and T. C. Reeves, "Learning from MOOCs: A qualitative case study from the learners' perspectives," *Educational Media International*, vol. 52, pp. 72-87, 2015.
- [57] E. Longstaff, "How MOOCs can empower learners: A comparison of provider goals and user experiences," *Journal of Further and Higher Education*, pp. 1-14, 2015.
- [58] K. F. Hew, "Promoting engagement in online courses: What strategies can we learn from three highly rated MOOCs," *British Journal of Educational Technology*, vol. 47, pp. 320-341, 2015.
- [59] S. B. Kellogg, "Patterns of peer interaction and mechanisms governing social network structure in two massively open online courses for educators," Doctoral dissertation, North Carolina State University, Raleigh, United States, 2014.
- [60] D. K. Comer, R. Baker, and Y. Wang, "Negativity in Massive Online Open Courses: Impacts on learning and teaching and how instructional teams may be able to address it," *InSight: A Journal of Scholarly Teaching*, vol. 10, pp. 92-113, 2015.
- [61] D. K. Comer, C. R. Clark, and D. A. Canelas, "Writing to learn and learning to write across the disciplines: Peer-to-peer writing in introductory-level MOOCs," *International Review of Research in Open and Distance Learning*, vol. 15, pp. 26-82, 2014.

- [62] C. Y. Cheng, "An exploratory study of emotional affordance of a Massive Open Online Course," *European Journal of Open, Distance and e-learning*, vol. 17, pp. 43-55, 2014.
- [63] M. Bulger, J. Bright, and C. Cobo, "The real component of virtual learning: Motivations for face-to-face MOOC meetings in developing and industrialised countries," *Information, Communication & Society*, vol. 18, pp. 1200-1216, 2015.
- [64] J. L. Loizzo, "Adult learners' perceptions of MOOC motivation, success, and completion: A virtual ethnographic study," Doctoral dissertation, Purdue University, West Lafayette, United States, 2015.
- [65] J. B. Biggs and C. S. Tang, *Teaching for Quality Learning at University*, 3rd ed. Maidenhead: Open University Press, 2011.

**Ruiqi Deng** is a PhD candidate at UQ Business School, the University of Queensland, Australia. He received a master of science in education (research design and methodology) from the Department of Education, University of Oxford, and a bachelor of international hotel and tourism

management (honours) from UQ Business School, the University of Queensland. He has published in leading tourism journals and attended academic conferences in Australia and New Zealand. His research interests include web-based education, educational technology, and visitor behaviour.

**Pierre Benckendorff** is an associate professor at UQ Business School, the University of Queensland, Australia. He has more than 15 years experience in education and research in the tourism field. His passion for travel and tourism has taken him to some of the world's leading theme parks and airports, the major cities of Europe and North America, the African Savannah and the bustling streets of Asia. He has also travelled extensively throughout Australia and New Zealand. His research interests include visitor behaviour, tourism information technologies, and tourism education and training. He has authored over 80 publications in these areas in leading international journals and is a regular speaker at tourism research conferences.