The International Journal of Management Education 19 (2021) 100544

Contents lists available at ScienceDirect

The International Journal of Management Education

journal homepage: www.elsevier.com/locate/ijme

The online marketplace for business education: An exploratory study

Najib A. Mozahem

College of Business and Economics, Qatar University, P.O. Box: 2713, Qatar

ARTICLE INFO

Keywords:
Online education
The sharing economy
Udemy
e-learning

ABSTRACT

The Internet has had a vast and pervasive impact on the education industry, one of which is the creation of an online educational marketplace. This study investigates the online marketplace for business courses by viewing it as part of the platform economy. Data pertaining to 9064 business courses was collected from the Udemy website using a web scraper tool. The analysis of the data reveals that the demand for MOOCs in business is great, with an average of 3169 students enrolled in each course, with some courses surpassing 100,000 students. The demand varies between categories, with business & data analytics, and entrepreneurship being among the most popular categories. The results also show that course enrollment in courses is highly skewed, giving support for the notion that power asymmetries that seem to arise in such decentralized markets. Finally, the analysis reveals that not all participants in the online marketplace for business education benefit equally. Specifically, the study found that courses tended to have a higher enrollment rate when the course provider was male. Finally, the analysis showed that despite increasing academic interest in online education, academics have been slow to enter the digital marketplace as service providers.

1. Introduction

The Internet has had a vast and pervasive impact on many industries, including higher education (de Freitas, Morgan, & Gibson, 2015; Deng, Benckendorff, & Gannaway, 2019). Of specific interest to this study is using the Internet to deliver online courses, or what has come to be known as Massive Open Online Courses (MOOCs). MOOCs are courses that are taught by faculty members via the Internet using a vast array of tools such as video recorded lectures, discussion forums, online assessments, and in some cases, live video chats.

MOOCs have been the focus of research as a tool used by educational institutes to increase their global reach and offer distinct advantages to students with a lack of access to traditional educational resources (Mangan, 2013). Faculty members have entered the picture as the individuals who are responsible for delivering MOOCs. As such, researchers have focused on the perspective of students as opposed to the perspective of faculty members, since ultimately, MOOCs are viewed as a new tool used by institutions to allow more options for a more diverse set of students (Zhu, Sari, & Lee, 2018).

While the Internet has allowed the delivery of free online courses, it has also impacted education in another way, which is through the creation of an educational marketplace. This online marketplace is part of a more general phenomenon, which has been called the sharing economy. Like interest in MOOCs, the interest in the sharing economy has increased significantly over the past few years

E-mail addresses: Najib.mozahem@qu.edu.qa, najib.mozahem@gmail.com.

https://doi.org/10.1016/j.ijme.2021.100544
Received 14 December 2020; Received in revised form 28 June 2021; Accepted 20 July 2021
Available online 24 July 2021

(Cheng, 2016), with promises of entrepreneurial freedom and economic benefits for service providers who are "motivated by a need for income to easily match their skills/assets with those who are willing to pay for them" (Benoit, Baker, Bolton, Gruber, & Kandampully, 2017, p. 223).

This study seeks to connect the two fields by exploring the digital platform Udemy, the largest educational online marketplace. Part of the sharing economy has been referred to as the platform economy, where digital platforms connect providers and consumers. These digital platforms, which act as an educational marketplace (Rustam & van der Weide, 2016), have the potential to allow course creators access to the theorized benefits of the sharing economy, i.e., entrepreneurial freedom and a possible source of income. The study will focus on the marketplace for business education, which makes up one of 13 categories on Udemy. The focus on business education is due to two reasons. First, online business education is more popular than online education for other disciplines (Friedman, 2016). Second, interest in online business education has been increasing over the last decade (Kumar, Kumar, Palvia, & Verma, 2019).

2. Literature review

2.1. massive open online courses

In general, MOOCs are classified into two categories. The first category, xMOOC, refers to courses that are structured in a similar manner to traditional courses with content that is predetermined by the instructor. These courses typically consist of a syllabus, course content description, readings, online forum discussions, graded assignments and projects, and pre-recorded video lectures (Hew & Cheung, 2014). The second category, cMOOC, relies on course materials and content that is derived from students during the course as opposed to relying on predetermined course content (Hew & Cheung, 2014). This is because these courses were inspired by the philosophy of connectivism (Rodriguez, 2012). As a result, in these courses, students are encouraged to create their own learning environments. By and large, of these two types, xMOOCs have been favored by administrators and policymakers alike (Rhoads, Camacho, Toven-Lindsey, & Lozano, 2015). One reason for this is that the nature of cMOOCs which focus on self-learning and social learning was more difficult to scale and institutionalize. The xMOOCs, on the other hand, were easier to scale and institutionalize because they acted as a more automated and digitized version of traditional university courses (Rhoads et al., 2015). Such courses have gained a lot of attention from both researchers and practitioners (Bulfin, Pangrazio, & Selwyn, 2014). This interest is reflected in the considerable number of literature reviews written about the topic (Gasevic, Kovanovic, Joksimovic, & Siemens, 2014; Liyanagunawardena, Adams, & Williams, 2013; Veletsianos & Shepherdson, 2016; Zhu et al., 2018).

The interest in MOOCs has been primarily educational, i.e., they have been studied as educational tools, with discussions revolving around the effectiveness of these courses (Al-Atabi & DeBoer, 2014; Israel, 2015), teaching styles and quality (Margaryan, Bianco, & Littlejohn, 2015), student assessment (Admiraal, Huisman, & van de Ven, 2014), engagement (Hew, 2016; Jung & Lee, 2018), and retention (Hone & El Said, 2016). A smaller number of studies have investigated the macro-level impact of MOOCs, such as their impact on the deskilling of the workforce, the democratization of education (Mangan, 2013), and the funding of public educational institutes (Rhoads et al., 2015). A review of the literature reveals that MOOCs are viewed in two different ways. First, from the perspective of higher education institutes, MOOCs are viewed as a paradigm shift and an evolution (Lucas, 2013). Thus, they must be adopted by universities if they wish to survive in the new world. As such, more and more universities are venturing into this brand new world by offering students courses and even whole programs using the MOOC format (Shah, 2018). Given that this is a relatively new world into which the universities are stepping, it is expected that they will run into problems. Solving these problems is part of engaging in this new technology. For example, universities are trying to solve the problem of the high dropout rate that MOOCs seem to suffer from (Breslow et al., 2013) by offering a certificate of completion upon successful completion of the course. Some universities are also experimenting with assigning credits to completed online courses (Sandeen, 2013). Top universities are also looking into leveraging their strong brands in order to increase their online appeal (Holdaway & Hawtin, 2013).

Second, when viewed from the perspective of faculty members, the literature reveals that MOOCs are more or less viewed as a nuisance for faculty members. Preparing an online course takes up a considerable amount of time and energy (Evans & Myrick, 2015), and faculty members fail to see the benefit of investing their already limited time into something that may eventually be a mere line item in a teaching portfolio (Head, 2013). In addition, since the number of students who enroll in an online course is much larger than the number of students who enroll in a traditional course, the amount of required grading is considerably larger (Hew & Cheung, 2014). Faculty members are aware of these resource constraints, which is supported by the finding that most faculty members who develop online courses are already tenured (Kolowich, 2013). The more junior faculty members would rather concentrate their efforts on activities that would eventually benefit their careers. Results also indicate that most faculty members see working on MOOCs as a distraction (Kolowich, 2013). An even more critical view from faculty members' perspective is that online education would lead to the proliferation of lectures from "star" lecturers. Eventually, these lectures would replace the lectures of other faculty members (Rhoads et al., 2015). This would eventually result in most faculty members' jobs transforming from that of an educator to that of a teaching assistant (Rhoads et al., 2015). Faculty members who view their experience with MOOCs as being positive report the reason as being that work on MOOCs helps them develop their more traditional courses (Hew & Cheung, 2014), or to promote their research area in an entertaining way (Freitas & Paredes, 2018).

Most research in the field has focused on this topic from the perspective of educational institutions. This is reflected in the fact that most research has focused on students who enroll in these courses, in the design of these courses (Fadol, Aldamen, & Saadullah, 2018), and on the educational impact of these courses (Zhu et al., 2018). A minority of these studies concentrated on the instructor. This is reflected in the fact that a recent literature review of 60 articles in online business education included only a single article about faculty perceptions (Kumar et al., 2019). This is strange given the fact that the instructors are among the most important stakeholder groups

since MOOCs are designed and taught by faculty members. While research has concentrated on universities using MOOCs to expand their reach, relatively little has been said about faculty members using these courses as service providers themselves.

2.2. The platform economy

Originally, MOOCs were free and open to any student who wished to enroll in the class. However, with time, more and more providers of such courses have started to adopt different business models. For example, some providers allowed students to audit a class for free, but they had to pay in order to get a certificate. In some cases, students who enrolled for free were not allowed access to the entire course contents. With time, even the option to audit the class for free was dropped by many providers (Shi, Li, Haller, & Campbell, 2018). Therefore, what exists now is a marketplace that connects MOOC producers, which are usually universities, with the consumers, who are the students (Jia, Song, Bai, & Xu, 2017). Yet, these marketplaces offer an opportunity for instructors to be the service providers themselves. In other words, these marketplaces are part of what is referred to as the sharing economy.

Despite the ever-growing interest in the sharing economy (Cheng, 2016), no agreement exists as to what it exactly is (Herbert & Collin-Lachaud, 2016). Muñoz and Cohen (2017, p. 21) define the sharing economy as "a socio-economic system enabling an intermediated set of exchanges of goods and services between individuals and organizations which aim to increase efficiency and optimization of sub-utilized resources in society." Acquier, Daudigeos, and Pinkse (2017) present a useful classification of the term, where they identify three cores upon which it rests: access economy, platform economy, and community-based economy. The access economy consists of a set of initiatives that are used in order to share underutilized assets in order to optimize their use. The platform economy consists of initiatives that intermediate exchanges among peers through the use of digital platforms. The community-based economy consists of a set of initiatives that coordinate non-monetized forms of interaction. Online marketplaces that offer MOOCs fall under the category of the platform economy.

A review of the literature on the platform economy reveals that the majority of the studies have concentrated on the access economy (Bardhi & Eckhardt, 2012; Barnes & Mattsson, 2017; Jang, Farajallah, & So, 2020; Lamberton & Rose, 2012; Möhlmann, 2015) and the community economy (Benkler, 2016; Bradley & Pargman, 2017; Cohen & Kietzmann, 2014; Juric, Lindenmeier, & Arnold, 2020; Kostakis, Niaros, & Giotitsas, 2014). In addition, most of these studies have focused on the consumer (Ballús-Armet, Shaheen, ; Böcker & Meelen, 2017; Godelnik, 2017; Hazée, Van Vaerenbergh, Delcourt, & Warlop, 2019; Lee Zach, Chan Tommy, Balaji, & Chong Alain, 2018; Tussyadiah, 2016), while less attention has been paid to the service providers. As revealed by a recent review of the literature on the sharing economy, the dominant sectors in the literature are transportation and accommodation (Hossain, 2020). As the size and popularity of sharing economy firms continue to increase, these firms are facing more challenges from regulators. Studies have also found that while social motivations, such as sustainability, are a common motivation for many of these firms, many of these firms pursue profit aggressively by relying on lower prices and on the low quality of many traditional services (Hossain, 2020). The review has also found that males are the main consumers of services provided by sharing economy firms.

3. Purpose of the study

The literature review reveals that despite the growing interest in MOOCs and the sharing economy, two specific and related gaps are identified. First, research about MOOCs has been concentrating on MOOCs as a new tool for universities. Instructors are part of the equation only in so far as they are responsible for designing and using the tools on behalf of the universities. This has resulted in researchers studying MOOCs from an educational perspective. A review of the literature reveals a considerable amount of research about MOOCs delivered by educational institutes, with no research investigating this phenomenon as an opportunity for instructors to engage in the platform economy. Second, research about the sharing economy has concentrated on specific industries such as transportation (Anderson, 2014; Cramer & Krueger, 2016) and accommodation (Dolnicar, 2019; Ert, Fleischer, & Magen, 2016), with a particular focus on the consumers of the service, with little being said about service providers. As a result of these two gaps (MOOC research focusing on educational institutes and sharing economy research focusing on the transportation and accommodation industries), our knowledge about the educational marketplace, specifically from the perspectives of the service providers, i.e., the instructors, is very limited. This is reflected in the paucity of published data about both students and instructors in MOOCs.

Tackling the topic of the online marketplace for education from the perspective of the sharing economy in general and the platform economy specifically raises several important questions that as of now remain unanswered given the above-mentioned gap in the research. One important question is the size of the demand for these educational services. This question is crucial for the platform economy, where the value of the platform is proportional to the number of individuals connected to it (Hildebrand, 2012). Therefore, this study seeks to investigate the size of the demand for business MOOCs in the online marketplace and whether the demand varies by specialty.

In addition to understanding the size and nature of the demand, this study seeks to investigate whether symmetries exist in terms of gains for the service providers themselves. Online platforms offer opportunities to service providers through a promise of a decentralized marketplace (Sundararajan, 2016). It has, however, been observed that power asymmetries arise as the number of individuals using the platform increases (Richardson, 2015). These asymmetries not only apply to the relationship between the platform and the providers but can also arise between the providers themselves (Poutanen & Kovalainen, 2017). For example, research has found that "occupational sorting" existed in the platform economy (Hall & Krueger, 2017), which results in only a small proportion of providers gaining from the platform economy (Hoang, Blank, & Quan-Haase, 2020). As noted in the literature review, this would result in the emergence of "star" lecturers with certain characteristics.

The study also seeks to present demographic information about service providers, i.e., instructors on Udemy. While there is a

constricting paucity of data on both students and instructors in MOOCs delivered via the digital marketplace, recent data released by the digital marketplaces edX and Coursera reveal that the majority of students are male (Ho et al., 2014). No such information exists about the instructors. Therefore, this study seeks to shed light on the question, "who delivers courses using online marketplaces?"

This study explores the point of intersection between MOOCs and the sharing economy by exploring business education in the digital marketplace Udemy. Udemy was founded in 2010 and currently has 35 million students, 57,000 instructors as part of its platform (Udemy, 2020). Compared to MOOCs offered by other digital marketplaces, such as Coursera and edX, Udemy MOOCs are short, with an average of 6–8 h for each (Choy & Tay, 2016). According to a white paper co-authored by Udemy, the top 10 instructors using the platform have earned sales of up to US$ 17 million, with the average annual earning per instructor being US$ 7000 (Choy & Tay, 2016). This study aims to provide an exploratory analysis of the Udemy marketplace by analyzing the types of courses that are provided and comparing different groups of course creators.

4. Methodology

Data was collected from the Udemy website by using a web scraper tool called ParseHub (https://www.parsehub.com/). While a free version of the tool is available, it is only useful for gathering small amounts of data. A paid subscription to one of the premium services is needed when large amounts of data are to be collected. ParseHub provides the user with a user interface as opposed to having the user write code. This makes the process of creating the scraper easier. Courses on Udemy are classified into 13 categories, each containing further subcategories. One of the 13 categories is business. Within this category, there are 15 subcategories, which are listed in Table 1. Udemy allows users to search through the subcategories separately or to search through all courses in the Business category at once. When accessing the list of all courses in the Business category, Udemy allows users to sort the list by popularity, where 16 courses are displayed on each page with a total of 625 pages. The web scraper was programmed to go through these pages and download information relating to each course. The information collected for each course is displayed in Table 2. As can be seen from the table, some of the information pertains specifically to the course, with other parts pertaining to the course creator.

The total number of courses that were scrapped by the algorithm is 9064 courses. The courses were scrapped in the order in which they appeared in the research results. Since the results were ordered according to popularity, this allowed for the recording of the rank of each course, where the first course in the list was ranked as number one, the second course ranked as number two, and so on. This means that the most popular courses had the lowest ranks. The ranks were then reverse coded so that the most popular courses had the highest orders. Hence, instead of having an order of one, the first course in the list had an order of 9,064, the second course an order of 9,063, and so on. The last course had an order of one.

Using the information collected about the course creator, it was possible to generate two new variables that were specific to the course creator. The first variable records whether the course's primary creator was male, female, or a group of individuals. Some courses were created by an individual. In such cases, it was possible to identify whether the creator was a male or female using the name and the image on the biographical page of the creator. However, in other cases, the course creator was a group of individuals, usually using an organizational name, such as "365 Careers" or "Skill Boosters."

One final variable was created in order to identify whether the creator of the course was an academic. A small piece of code was written in order to search for the words "Ph.D.," "Lecturer," "Professor," "Academic" in the author bio.

5. Results

5.1. Course analysis

Table 3 shows summary statistics for the course-level variables. The average rating of the courses is 4.05 out of five, indicating that, on average, the courses are well-received. Interestingly, although Udemy allows for the creation of free courses, none of the 9064

Table 1
Business subcategories.

Subcategories in Business
Entrepreneurship
Communications
Management
Sales
Business Strategy
Operations
Project Management
Business Law
Business Analytics & Intelligence
Human Resources
Industry
E-commerce
Media
Real Estate
Other Business

Table 2
Data scrapped for each course.

Variables	Description
Course title	The name of the course.
Course URL	The website of the course.
Course rating	Udemy uses a five-star rating system where each course is rated from zero to five stars.
Course price	All prices were in U.S. dollars. It is important to note that Udemy allows for the creation of free courses.
Length of course	The length of the recorded lectures in hours.
Number of lectures	The number of lectures.
Course level	Courses are divided into four levels: beginner, intermediate, advanced, and all levels.
Number of students enrolled in course	The number of students enrolled in the course.
Number of student reviews	The number of reviews left by students (not all students review a course).
Subcategory of the course	The subcategory to which this course belongs (see Table 1).
Name of course creator (primary creator only)	The name of the course creator. Some courses have more than one creator. In such cases, only information pertaining to the primary creator was downloaded. The primary creator was determined to be the first listed creator.
Description of course creator	Each course creator on Udemy provides a one-line description of him or herself.
URL of course creator bio page	Each course creator has a page that includes the names of the creator, a one-line description of his or her background, a short biographical paragraph, and an image.
Overall rating of the primary course creator	The overall rating of the course creator across all of his or her courses.
Total number of students enrolled in all the courses of the primary course creator	The total number of students enrolled in all the courses offered by the primary creator.
Number of courses created by the course creator	The total number of courses on Udemy that were created by the primary course creator.

courses analyzed in this study were offered for free when downloading the data. The lowest-priced course was offered for 11.99, and the highest-priced course was offered for 199.99, with the average being 63.23.

In terms of length, the average number of hours was 3.11, with a standard deviation of 4.57. This indicates that the vast majority of the courses were short courses as opposed to being semester-long courses. However, the longest course contained 136.5 h of content. The average number of lectures is 33.18. Since the average number of hours for the entire course is 3.11, this means that the average length of a single lecture is 3.11/33.18 = 0.094 h or 5.64 min. This indicates that courses tended to be broken up into very short lectures instead of traditional hour-long lectures.

The average number of students enrolled in a course is 3168.97. However, the distribution is heavily skewed since the median is considerably smaller than the average (almost one-fifth of the average) and the standard deviation is almost three times larger than the average. This indicates that most courses have a small number of enrolled students (half of the courses have less than 625 students) and a smaller number of courses with very large numbers of students.

Finally, while the average number of students enrolled in a course is 3168.98, the average number of reviews was 275.45, meaning that only a minority of students take the time to review a course. Once again, we see that this variable's distribution is heavily skewed to the right, given that the median is around one-tenth of the average and the standard deviation is very large.

Fig. 1 displays the number of courses within each subcategory and across all levels. The figure shows that the subcategory with the largest courses is entrepreneurship (with a total of 1671 courses), and the subcategory with the smallest number of courses is Home Business (only one course). The subcategories that are most commonly offered, in addition to entrepreneurship, are management, communications, e-commerce, and business analytics & intelligence, while the subcategories that are least commonly offered, in addition to home business, are business law, industry, and media.

Fig. 1 also clearly shows that within all subcategories, most of the courses (58.93%) target all levels of students, i.e., they assume no prior knowledge of the subject matter and then move on to more advanced topics. Only 1.15% of courses target expert students, 11.16% target intermediate students, and 28.76% target beginners. These numbers indicate that the business courses offered on Udemy are mainly aimed at students with no background in the subject matter.

Fig. 2 displays the distribution of student enrollments within each subcategory. The x-axis has been transformed using a log base ten transformation in order to scale the axis and produce a more readable graph. Looking at the figure, we can see that the subcategory with the largest number of enrolled students is entrepreneurship, while the subcategory with the smallest number of enrolled students is business law. Note that no plot is produced for the subcategory home business because the dataset contained only one course under this subcategory. In general, the figure shows that the subcategories with the largest number of students in each course are business analytics & intelligence, entrepreneurship, e-commerce, and communications. While a large number of students are enrolled in courses under the subcategory management, the distribution seems to have two modes, indicating that some courses have a low number of enrollment and other courses have a high number of enrollment. On the other hand, the subcategories with the smallest number of students in each course are human resources, industry, media, and business law.

The above analysis pertains to the number of courses within each subcategory and to the number of students enrolled in these courses. As already mentioned, the ordering of the courses was captured since the courses were listed using the "most popular" filter. This ordering was reverse coded so that the more popular courses had a larger order. The courses were then divided into deciles where the bottom 10% of courses were in the first decile, and the top 10% of courses were in the tenth decile. Given that there were varying numbers of courses within each subcategory, it is expected that courses from the subcategory with the highest frequency count would outnumber courses from other subcategories in the top-ranked course. Therefore, instead of analyzing the number of courses within each decile, an analysis of the percentage of courses from each subcategory was carried out. Fig. 3 provides a visual representation of

Table 3
Descriptive statistics for course-level variables.

Variable	Median	Mean	Standard deviation	Minimum	Maximum
Course rating	4.2	4.05	0.81	0	5
Price	49.99	63.23	37.86	11.99	199.99
Hours	2	3.11	4.57	0.2	136.5
Lectures	22	33.18	42.44	1	646
Number of students	625.5	3168.98	10,259.04	0	379,854
Number of reviews	24	275.45	1786.88	0	82,438

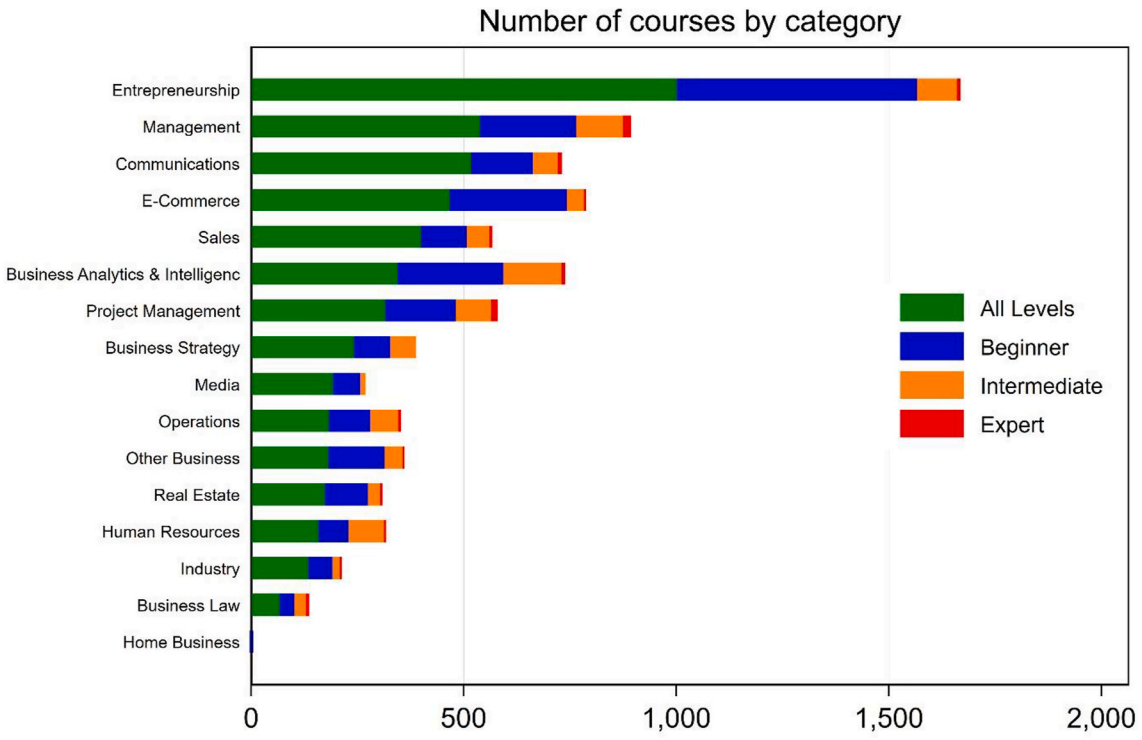

Fig. 1. Frequency of courses in each subcategory and across all levels.

this analysis.[1] The y-axis in the figure is the percent of courses in each subcategory, and the x-axis represents the ten deciles. Therefore, the figure shows the percent of courses of each subcategory in each decile.

Looking at the subcategory Business Analytics & Intelligence, it can be seen that courses that fall into this subcategory tend to be placed in the higher deciles, i.e., they are ranked closer to the top of the list than the bottom of the list, which is sorted in terms of popularity. Almost 20% (19.62) of the courses that fall within this subcategory were ranked in the top decile, whereas only 5% were ranked in the bottom decile. Other subcategories that are more represented in the higher deciles are communications, e-commerce, and operations. Looking at the subcategory entrepreneurship, it can be seen that there is minimal variation among the first nine deciles, with a small dip in the tenth decile. This means that despite the fact that this subcategory has the highest number of courses (Fig. 1), the courses, in general, are not more likely than the courses of other subcategories to appear near the top of the list. The same can be said about the subcategory business strategy and real estate. In the case of the subcategory sales, it can be seen that the courses tend to be clustered near the lower end of the spectrum, thereby indicating that these courses are not high in popularity in comparison to courses from other subcategories.

Fig. 4 shows the percentages for each subcategory in the top decile (most popular) and the bottom decile (least popular). The figure shows that the subcategory business analytics & intelligence has the highest percentage of courses in the top decile and the second-lowest percentage of courses in the bottom decile. The subcategory entrepreneurship had the second-lowest percentage of courses in the top courses and the fourth-highest percentage in the bottom decile.

[1] Note that the figure displays all subcategories except for the subcategory Home Business. There is only a single course in this subcategory which means that the 100% of the courses fall within the same decile. The subcategory was removed from the figure so as not to distort the y-axis scale by expanding it all the way to the number 100 which would make observing the variations of the remaining subcategories difficult.

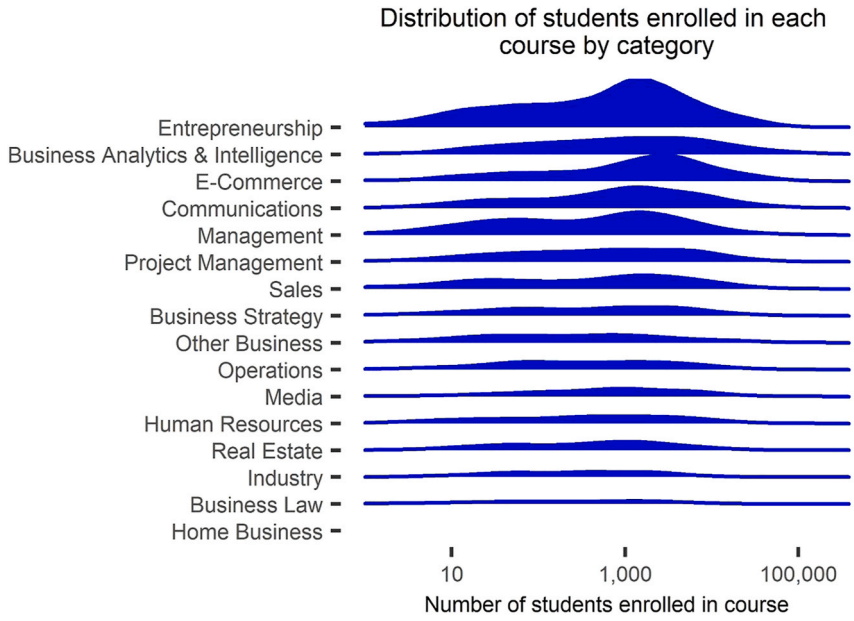

Fig. 2. Distribution of course enrollment numbers in each subcategory.

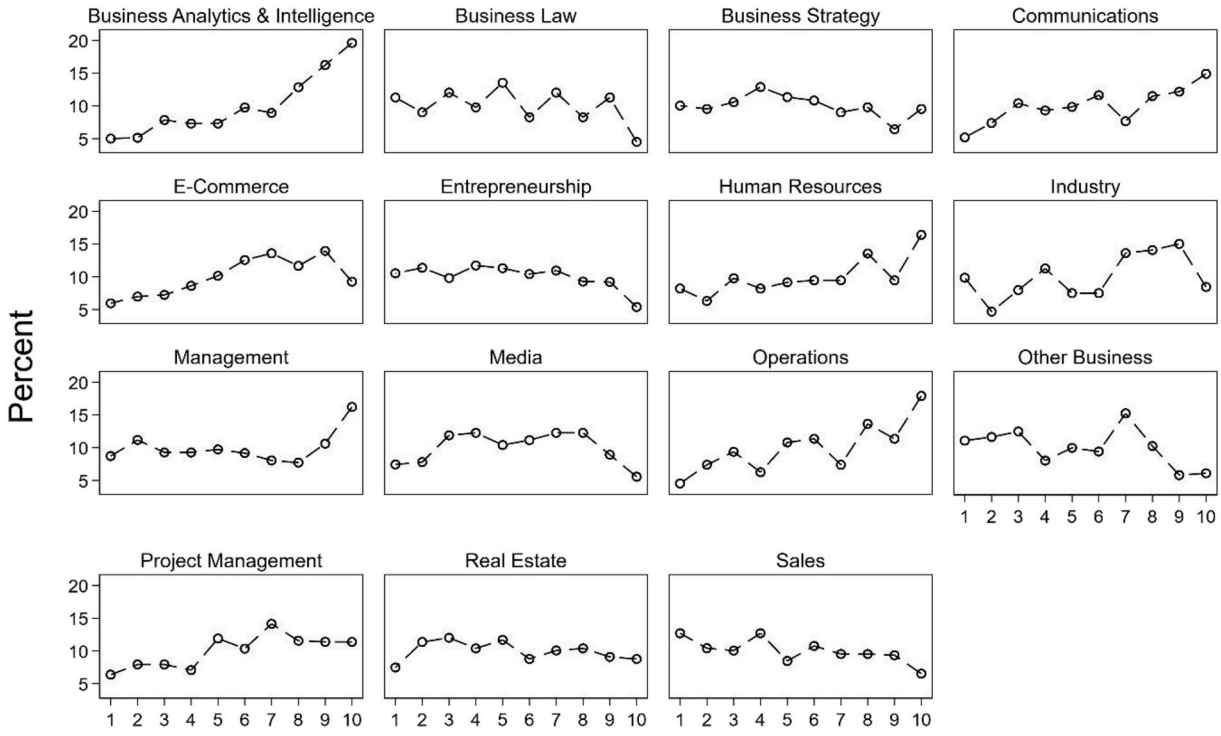

Fig. 3. The distribution of courses within each subcategory among the ten deciles of the reverse coded order.

5.2. *Instructor analysis*

The 9064 courses analyzed in this study were created by a total of 4433 creators. Table 4 displays descriptive statistics for several creator-level variables. Similar to what was observed in the course-level variables, the number of students enrolled in all the creators' courses and the number of course reviews are highly skewed, and the total number of courses offered by the creator with the mean being much larger than the median, and a very large standard deviation when compared to the mean. For example, while 50% of

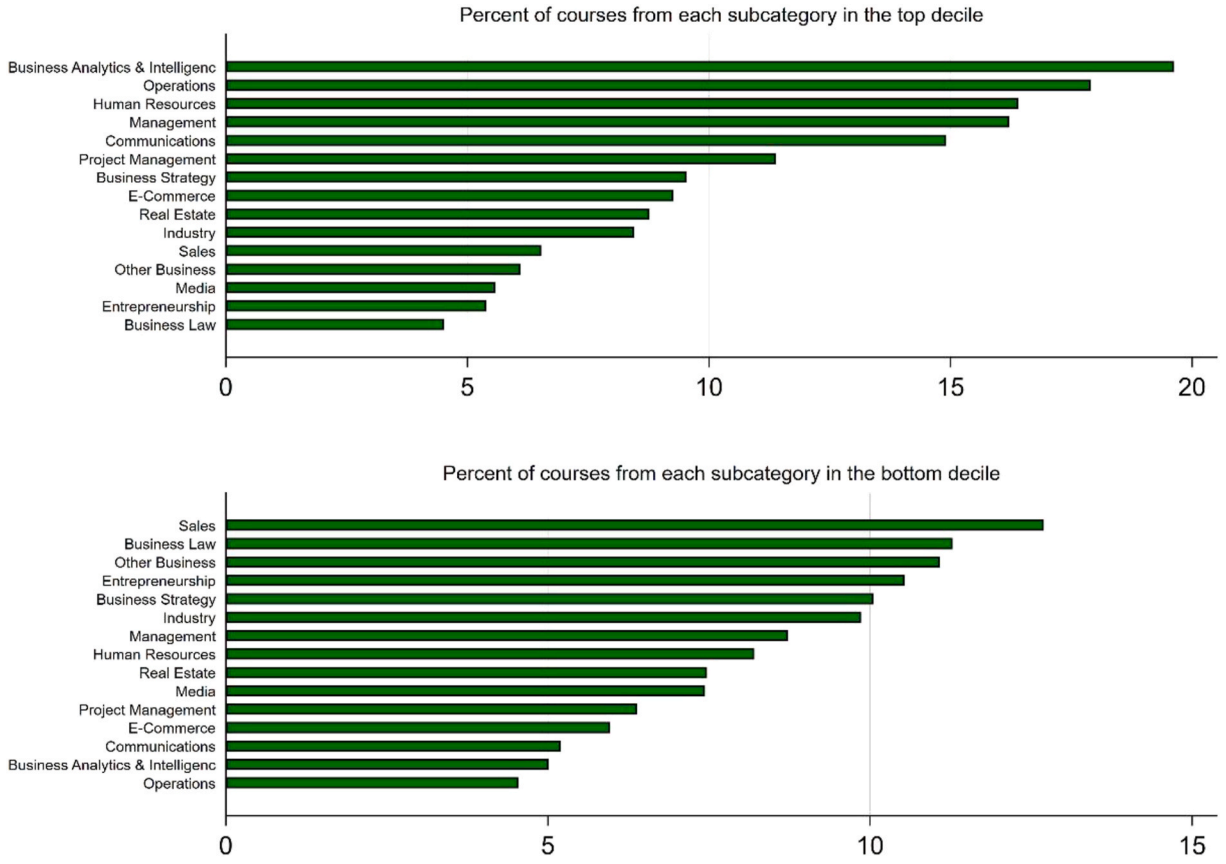

Fig. 4. The percent of courses from each subcategory that were listed in the top decile (top) and bottom decile (bottom).

creators have a total of fewer than 625 students, the maximum value is above 2 million students. Therefore, the information presented in Table 4 indicates that a small number of creators are dominating the market.

With regards to gender, 897 of the primary creators were female (20.26%), 3072 were male (69.38%), and 459 were groups (10.37%). Therefore, the vast majority of creators are male, and only around one-fifth are female. Only 177 of the creators identified themselves as academics (3.99%). The percent of academics among both genders was almost the same (4.46% for females and 4.39% for males).

Fig. 5 shows the distribution of courses with each subcategory by gender. The bars are ordered in ascending order of female representation. As previously mentioned, there was a single course in the home business subcategory. The course creator is a male, which is why 100% of courses in this subcategory are created by males. Looking at the other subcategories, it can be noted that the gender gap is smallest (but still sizeable) in the subcategories other, media, communications, and human resources, while it is largest in the subcategories industry, operations, business analytics & intelligence.

Table 5 displays the average course price, length, and rating by gender. Female creators priced their courses at a lower price when compared to males. A *t*-test reveals that the difference is statistically significant. On the other hand, males created courses that were generally longer than courses created by females (the difference is significant). However, the average course ratings are almost identical (the difference is not significant). Overall, these numbers indicate that there were no gender differences in terms of the quality of the courses (measured by course rating), but that gender differences existed in terms of the material, with males creating longer courses with a higher price than those created by females.

Fig. 6 shows the density plot of student enrollment in the courses divided by gender. The x-axis is transformed using a log base ten

Table 4
Descriptive statistics for creator-level variables.

Variable	Median	Mean	Standard deviation	Minimum	Maximum
Creator rating	4.3	4.19	0.46	0.5	5
Number of students	1375	19,174.13	86,256.46	0	2,048,799
Number of reviews	64	2215.36	17,288.07	0	658,659
Number of courses	2	6.30	26.91	1	1411

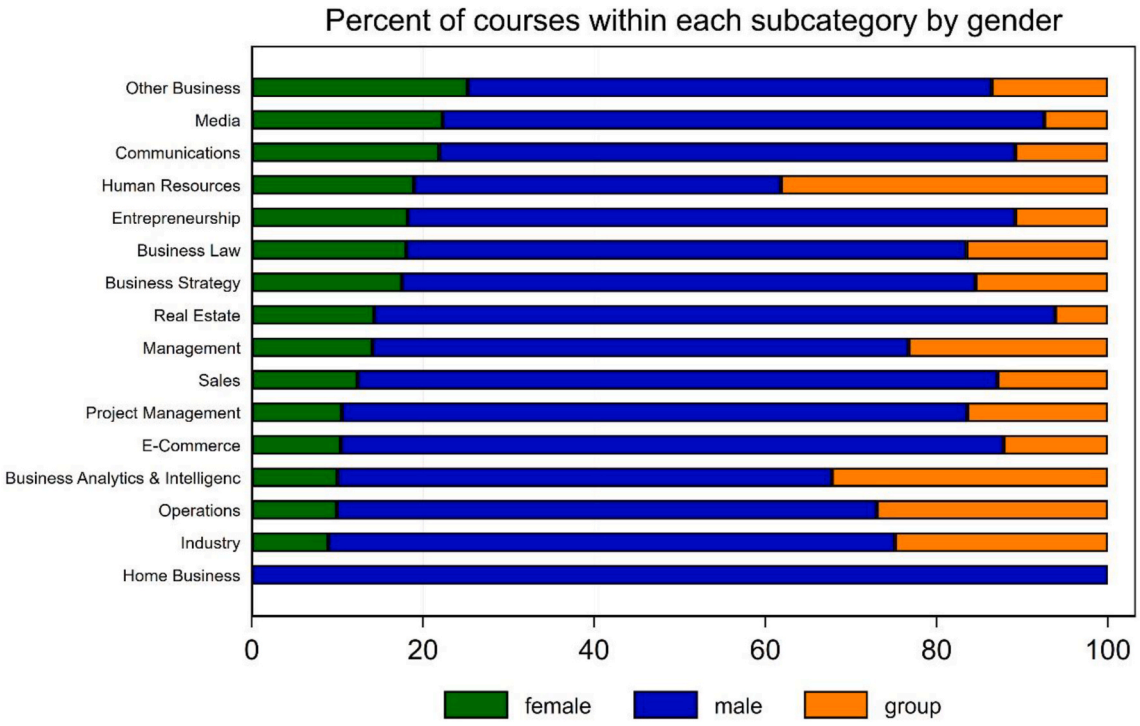

Fig. 5. Distribution of courses in each subcategory by gender.

Table 5
Averages of course variables by gender of course creator.

	Females	Males	Group
Price	57.07	63.43	68.58
Hours	2.08	3.28	3.40
Course rating	4.04	4.07	4.01

transformation in order to scale the plots and make the distributions more visible. The density plots have different areas reflecting the varying number of courses created by each gender group. The figure shows the shape of the density plot for all three groups is very similar. However, the plot for females is shifted more to the left in comparison with the other two plots, indicating that student enrollment in courses created by females is less than enrollment in courses created either by males or by groups of creators. This is also supported by the fact that the density plot for females is relatively thicker near the lower end than the plot for males which has a larger and longer right tail. Therefore, while the enrollment pattern in the three groups is similar, the enrollment numbers in courses created by females are less than those for males and groups. This finding is important, especially when coupled with the finding that no differences were found in course ratings. The figure also shows that overall, courses created by males have the most enrollment rates, which is reflected by the area under the curve.

6. Discussion and conclusion

Over the past few years, researchers have been paying an increasing level of attention to the topics of MOOCs and the sharing economy. However, the research has been developing along two different strands. This study sought to unify these strands by providing a descriptive analysis of the digital marketplace for MOOCs. By doing so, this study has shed light on several previously unanswered questions.

First, previous studies have helped us develop a better understanding of the sharing economy in the transportation and accommodation industries. Studies in these industries have provided us with detailed knowledge about pricing mechanisms (Gibbs, Guttentag, Gretzel, Yao, & Morton, 2018), social impact (Jeon, Lee, & Jeong, 2020), and the motivations of the consumers of these services (Guttentag, Smith, Potwarka, & Havitz, 2018). On the other hand, very little data exists on the sharing economy in the education industry. The small amount of data that is available tells us more about the consumers than the marketplace itself (Choy & Tay, 2016; Ho et al., 2014). This study provides an analysis of one of the first data sets that contain information about the education marketplace in the platform economy, specifically business education. The analysis of the data reveals that the demand for MOOCs in business is

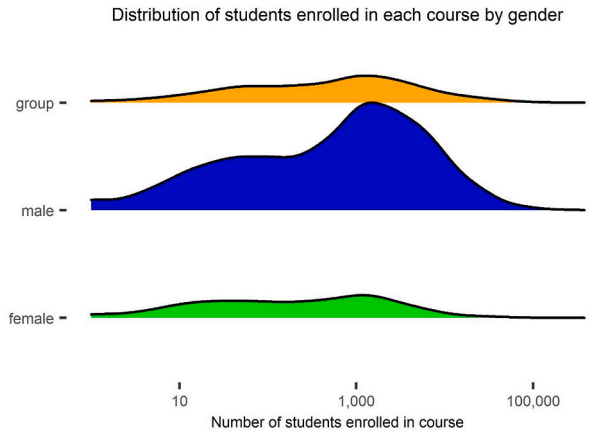

Fig. 6. Distribution of course enrollment numbers for each gender group.

great, with an average of 3169 students enrolled in each course, with some courses surpassing 100,000 students. The demand is particularly high for entrepreneurship courses, followed by management and then e-commerce. While the total number of students enrolled in the subcategory business analytics & intelligence is the fourth largest among all subcategories, the density plot reveals the existence of a single mode, unlike for most other distributions where two modes exist, one at the lower end and one at the higher end. This indicates that the majority of courses in the business analytics & intelligence category are able to attract a large number of students, whereas in other categories, many courses fail to attract students. This is clearly visible for the subcategory entrepreneurship, for example. Therefore, it seems that the marketplace for entrepreneurship courses is saturated, while the marketplace for business analytics & intelligence is still developing with a large demand compared to the current supply. The data analysis has also revealed that currently, the course with the highest enrollment rate out of all courses falls within the entrepreneurship subcategory. Therefore, online entrepreneurship courses, just like entrepreneurship education in general (Katz, 2003), are high in demand. On the other hand, while the demand for business analytics & intelligence is high, the supply of such courses has yet to catch up with this demand.

In terms of popularity, the results displayed in Fig. 3, which displays the percent of courses in each subcategory within each decile of rank, clearly show that business analytics & intelligence courses are more popular than other courses. Entrepreneurship, business strategy, real estate, and sales courses are more or less equally distributed among the deciles of the ranking. Courses in communications, e-commerce, human resources, management, and operations are more represented in higher deciles of the ranking. In general, the subcategories that ranked highest in popularity are business analytics & intelligence, operations, and communications.

Second, the results uncovered that the distribution of the course enrollments in individual courses is highly skewed, with 50% of the courses having less than 625 students and 5% of the courses having more than 13,234 students. This finding is important because it reveals that while the playing field for service providers in the education marketplace is level at the start, eventually, a small number of players dominate the marketplace. The same picture emerges when looking at the numbers for each course creator, with the distribution being very skewed. This finding is consistent with previous discussions about power asymmetries that seem to arise in such decentralized markets (Acquier et al., 2017; Rosenblat & Stark, 2016). It is also consistent with the prediction that online education would lead to the creation of "star" lecturers (Rhoads et al., 2015).

Third, this study also sheds light on another understudied topic, and that is student course evaluations in MOOCs. Currently, the literature includes studies comparing student course evaluations using pen and paper and using online surveys. Most of these studies perform this comparison for traditional face-to-face courses only. These studies have found that for face-to-face courses, student responses drop significantly when they are asked to rate the course using an online tool (Gerbase, Germond, Cerutti, Vu, &). This problem is believed to be magnified when the course itself is delivered online (Berk, 2012). The results obtained in this study provide support for this belief based on the finding that while the average student enrollment in a course is 3,169, the average number of reviews is only around 276. There are several reasons for the drop, and it is not possible to identify these reasons in this study. With only around 8.71% of students rating the courses, making sense of the results becomes highly questionable (Gerbase et al., 2015). However, given that this is the only data available to date, the study does not reveal that, at least in the opinion of students who have left a rating, these courses on Udemy have a generally high rating, with 50% of the courses having a rating of at least 4.2 out of five stars. This is consistent with previous studies that have found that online learning is viewed favorably by students (Kumar et al., 2019), but the validity of this claim cannot be ascertained at the moment with the given data.

Fourth, the small number of studies that exist about the characteristics of participants in the digital marketplace for education are concerned with demographic information about the consumers (Choy & Tay, 2016). This study helps us understand "who participates as a service provider in the platform economy?" The data pertaining to the course creators reveal that the majority of course creators, or service providers, are males, followed by groups of people, with females constituting the smallest group. The results also show that these gender differences vary by course subcategory, where it was observed that the subcategories with the lowest female service providers are e-commerce, business analytics & intelligence, operations, and industry. Interestingly, as previously noted, these subcategories also happen to be the most popular. This finding is also interesting because these subcategories are more technical in nature

than other subcategories. Therefore, the finding that females service providers are less active in these subcategories is aligned with other studies that have found that females are underrepresented in technical fields (Sáinz & Eccles, 2012). The data analysis also revealed that there were gender differences in course price and length, with female course creators setting lower prices for their courses than male course creators and male course creators creating longer courses than female course creators.

These gender differences, particularly in student enrollment, are important because they reveal that not everyone benefits the same from the platform economy (Hoang et al., 2020). The results obtained in this study support the previously reported finding that individuals belonging to certain groups are disadvantaged even in the online economy (Ayres, Banaji, & Jolls, 2015) and that traditional gender gaps in occupational choices are also reflected in this new economy (Poutanen & Kovalainen, 2017).

Finally, the analysis showed that despite increasing academic interest in online education (Allen & Seaman, 2010; Kumar et al., 2019), academics have been slow to enter the digital marketplace as service providers, with only 3.99% of creators identifying themselves as academics or holders of doctorate degrees.

Funding details

No funding was received for this research.

Declaration of competing interest

The author declares that he has no conflict of interest.

References

Acquier, A., Daudigeos, T., & Pinkse, J. (2017). Promises and paradoxes of the sharing economy: An organizing framework. *Technological Forecasting and Social Change, 125*, 1–10. https://doi.org/10.1016/j.techfore.2017.07.006

Admiraal, W., Huisman, B., & van de Ven, M. (2014). Self- and peer assessment in massive open online courses. *International Journal of Higher Education, 3*(3), 119–128.

Al-Atabi, M., & DeBoer, J. (2014). Teaching entrepreneurship using massive open online course (MOOC). *Technovation, 34*(4), 261–264. https://doi.org/10.1016/j.technovation.2014.01.006

Allen, I. E., & Seaman, J. (2010). *Class differences: Online education in the United States, 2010*. Retrieved from https://files.eric.ed.gov/fulltext/ED529952.pdf.

Anderson, D. N. (2014). Not just a taxi"? For-profit ridesharing, driver strategies, and VMT. *Transportation, 41*(5), 1099–1117. https://doi.org/10.1007/s11116-014-9531-8

Ayres, I., Banaji, M., & Jolls, C. (2015). Race effects on eBay. *The RAND Journal of Economics, 46*(4), 891–917.

Ballús-Armet, I., Shaheen, S. A., Clonts, K., & Weinzimmer, D. (2014). Peer-to-Peer carsharing: Exploring public perception and market characteristics in the san Francisco Bay area, California. *Transportation Research Record, 2416*(1), 27–36. https://doi.org/10.3141/2416-04

Bardhi, F., & Eckhardt, G. M. (2012). Access-based consumption: The case of car sharing. *Journal of Consumer Research, 39*(4), 881–898. https://doi.org/10.1086/666376

Barnes, S. J., & Mattsson, J. (2017). Understanding collaborative consumption: Test of a theoretical model. *Technological Forecasting and Social Change, 118*, 281–292. https://doi.org/10.1016/j.techfore.2017.02.029

Benkler, Y. (2016). Peer production, the commons, and the future of the firm. *Strategic Organization, 15*(2), 264–274. https://doi.org/10.1177/1476127016652606

Benoit, S., Baker, T. L., Bolton, R. N., Gruber, T., & Kandampully, J. (2017). A triadic framework for collaborative consumption (CC): Motives, activities and resources & capabilities of actors. *Journal of Business Research, 79*, 219–227. https://doi.org/10.1016/j.jbusres.2017.05.004

Berk, R. A. (2012). Top 20 strategies to increase the online response rates of student rating scales. *International Journal of Technology in Teaching & Learning, 8*(2), 98–107.

Böcker, L., & Meelen, T. (2017). Sharing for people, planet or profit? Analysing motivations for intended sharing economy participation. *Sustainability Perspectives on the Sharing Economy, 23*, 28–39. https://doi.org/10.1016/j.eist.2016.09.004

Bradley, K., & Pargman, D. (2017). The sharing economy as the commons of the 21st century. *Cambridge Journal of Regions, Economy and Society, 10*(2), 231–247. https://doi.org/10.1093/cjres/rsx001

Breslow, L., Pritchard, D. E., DeBoer, J., Stump, G. S., Ho, A. D., & Seaton, D. T. (2013). Studying learning in the worldwide classroom research into edX's first MOOC. *Research and Practice in Assessment, 8*, 13–25.

Bulfin, S., Pangrazio, L., & Selwyn, N. (2014). Making 'MOOCs': The construction of a new digital higher education within news media discourse. *International Review of Research in Open and Distance Learning, 15*(5). https://doi.org/10.19173/irrodl.v15i5.1856

Cheng, M. (2016). Sharing economy: A review and agenda for future research. *International Journal of Hospitality Management, 57*, 60–70. https://doi.org/10.1016/j.ijhm.2016.06.003

Choy, M., & Tay, B. (2016). Meeting the upskilling demands of the Singapore workforce through MOOCs: A white paper by udemy and dioworks learning. *Dioworks learning*.

Cohen, B., & Kietzmann, J. (2014). Ride on! Mobility business models for the sharing economy. *Organization & Environment, 27*(3), 279–296. https://doi.org/10.1177/1086026614546199

Cramer, J., & Krueger, A. B. (2016). Disruptive change in the taxi business: The case of Uber. *The American Economic Review, 106*(5), 177–182. https://doi.org/10.1257/aer.p20161002

Deng, R., Benckendorff, P., & Gannaway, D. (2019). Progress and new directions for teaching and learning in MOOCs. *Computers & Education, 129*, 48–60. https://doi.org/10.1016/j.compedu.2018.10.019

Dolnicar, S. (2019). A review of research into paid online peer-to-peer accommodation: Launching the Annals of Tourism Research Curated Collection on peer-to-peer accommodation. *Annals of Tourism Research, 75*, 248–264. https://doi.org/10.1016/j.annals.2019.02.003

Ert, E., Fleischer, A., & Magen, N. (2016). Trust and reputation in the sharing economy: The role of personal photos in Airbnb. *Tourism Management, 55*, 62–73. https://doi.org/10.1016/j.tourman.2016.01.013

Evans, S., & Myrick, J. G. (2015). How MOOC instructors view the pedagogy and purposes of massive open online courses. *Distance Education, 36*(3), 295–311. https://doi.org/10.1080/01587919.2015.1081736

Fadol, Y., Aldamen, H., & Saadullah, S. (2018). A comparative analysis of flipped, online and traditional teaching: A case of female middle Eastern management students. *International Journal of Management in Education, 16*(2), 266–280. https://doi.org/10.1016/j.ijme.2018.04.003

de Freitas, S. I., Morgan, J., & Gibson, D. (2015). Will MOOCs transform learning and teaching in higher education? Engagement and course retention in online learning provision. *British Journal of Educational Technology, 46*(3), 455–471. https://doi.org/10.1111/bjet.12268

Freitas, A., & Paredes, J. (2018). Understanding the faculty perspectives influencing their innovative practices in MOOCs/SPOCs: A case study. *International Journal of Educational Technology in Higher Education, 15*(1), 5. https://doi.org/10.1186/s41239-017-0086-6

Friedman, J. (2016). *Explore online education trends in 4 bar graphs*. U.S. News.
Gasevic, D., Kovanovic, V., Joksimovic, S., & Siemens, G. (2014). Where is research on massive open online courses headed? A data analysis of the MOOC research initiative. *International Review of Research in Open and Distance Learning, 15*(5). https://doi.org/10.19173/irrodl.v15i5.1954
Gerbase, M. W., Germond, M., Cerutti, B., Vu, N. V., & Baroffio, A. (2015). How many responses do we need? Using generalizability analysis to estimate minimum necessary response rates for online student evaluations. *Teaching and Learning in Medicine, 27*(4), 395–403. https://doi.org/10.1080/10401334.2015.1077126
Gibbs, C., Guttentag, D., Gretzel, U., Yao, L., & Morton, J. (2018). Use of dynamic pricing strategies by Airbnb hosts. *International Journal of Contemporary Hospitality Management, 30*(1), 2–20. https://doi.org/10.1108/IJCHM-09-2016-0540
Godelnik, R. (2017). Millennials and the sharing economy: Lessons from a 'buy nothing new, share everything month' project. *Environmental Innovation and Societal Transitions, 23*, 40–52. https://doi.org/10.1016/j.eist.2017.02.002
Guttentag, D., Smith, S., Potwarka, L., & Havitz, M. (2018). Why tourists choose Airbnb: A motivation-based segmentation study. *Journal of Travel Research, 57*(3), 342–359. https://doi.org/10.1177/0047287517696980
Hall, J. V., & Krueger, A. B. (2017). An analysis of the labor market for uber's driver-partners in the United States. *ILR Review, 71*(3), 705–732.
Hazée, S., Van Vaerenbergh, Y., Delcourt, C., & Warlop, L. (2019). Sharing goods? Yuck, No! An investigation of consumers' contamination concerns about access-based services. *Journal of Service Research, 22*(3), 256–271. https://doi.org/10.1177/1094670519838622
Head, K. (2013). *Massive open online adventure*. The Chronicle of Higher Education.
Herbert, M., & Collin-Lachaud, I. (2016). Collaborative practices and consumerist habitus: An analysis of the transformative mechanisms of collaborative consumption. *Recherche et Applications en Marketing, 32*(1), 40–60. https://doi.org/10.1177/2051570716678736
Hew, K. F. (2016). Promoting engagement in online courses: What strategies can we learn from three highly rated MOOCS. *British Journal of Educational Technology, 47*(2), 320–341. https://doi.org/10.1111/bjet.12235
Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. *Educational Research Review, 12*, 45–58. https://doi.org/10.1016/j.edurev.2014.05.001
Hildebrand, T. (2012). Estimating network effects in two-sided markets without data on prices and quantities. *Economics Letters, 117*(3), 585–588. https://doi.org/10.1016/j.econlet.2012.07.036
Hoang, L., Blank, G., & Quan-Haase, A. (2020). The winners and the losers of the platform economy: Who participates? *Information, Communication & Society, 23*(5), 681–700.
Holdaway, X., & Hawtin, N. (2013). *Major players in the MOOC universe*. The Chronicle of Higher Education.
Hone, K. S., & El Said, G. R. (2016). Exploring the factors affecting MOOC retention: A survey study. *Computers & Education, 98*, 157–168. https://doi.org/10.1016/j.compedu.2016.03.016
Ho, A. D., Reich, J., Nesterko, S., Seaton, D. T., Mullaney, T., Waldo, J., et al. (2014). *HarvardX and MITx: The first year of open online courses (HarvardX and MITx Working Paper No. 1)*. Retrieved from http://papers.ssrn.com/sol3/paper s.cfm?abstract_id=2381263.
Hossain, M. (2020). Sharing economy: A comprehensive literature review. *International Journal of Hospitality Management, 87*, 102470. https://doi.org/10.1016/j.ijhm.2020.102470
Israel, M. J. (2015). Effectiveness of integrating MOOCs in traditional classrooms for undergraduate students. *International Review of Research in Open and Distance Learning, 16*(5), 102–118. https://doi.org/10.19173/irrodl.v16i5.2222
Jang, S., Farajallah, M., & So, K. K. F. (2020). The effect of quality cues on travelers' demand for peer-to-peer ridesharing: A neglected area of the sharing economy. *Journal of Travel Research*. , Article 0047287519897998. https://doi.org/10.1177/0047287519897998
Jeon, M. M., Lee, S., & Jeong, M. (2020). Perceived corporate social responsibility and customers' behaviors in the ridesharing service industry. *International Journal of Hospitality Management, 84*, 102341. https://doi.org/10.1016/j.ijhm.2019.102341
Jia, Y., Song, Z., Bai, X., & Xu, W. (2017). *Towards economic models for MOOC pricing strategy design*. Cham.
Jung, Y., & Lee, J. (2018). Learning engagement and persistence in massive open online courses (MOOCS). *Computers & Education, 122*, 9–22. https://doi.org/10.1016/j.compedu.2018.02.013
Juric, J., Lindenmeier, J., & Arnold, C. (2020). Do emotional solidarity factors mediate the effect of personality traits on the inclination to use nonmonetary peer-to-peer accommodation networks? *Journal of Travel Research*. , Article 0047287519895127. https://doi.org/10.1177/0047287519895127
Katz, J. A. (2003). The chronology and intellectual trajectory of. *American entrepreneurship education, 18*(2), 283–300, 1876–1999.
Kolowich, S. (2013). *The professors behind the MOOC Hype*. The Chronicle of Higher Education.
Kostakis, V., Niaros, V., & Giotitsas, C. (2014). Production and governance in hackerspaces: A manifestation of commons-based peer production in the physical realm? *International Journal of Cultural Studies, 18*(5), 555–573. https://doi.org/10.1177/1367877913519310
Kumar, P., Kumar, A., Palvia, S., & Verma, S. (2019). Online business education research: Systematic analysis and a conceptual model. *International Journal of Management in Education, 17*(1), 26–35. https://doi.org/10.1016/j.ijme.2018.11.002
Lamberton, C. P., & Rose, R. L. (2012). When is ours better than mine? A framework for understanding and altering participation in commercial sharing systems. *Journal of Marketing, 76*(4), 109–125. https://doi.org/10.1509/jm.10.0368
Lee Zach, W. Y., Chan Tommy, K. H., Balaji, M. S., & Chong Alain, Y.-L. (2018). Why people participate in the sharing economy: An empirical investigation of Uber. *Internet Research, 28*(3), 829–850. https://doi.org/10.1108/IntR-01-2017-0037
Liyanagunawardena, T. R., Adams, A. A., & Williams, S. A. (2013). MOOCs: A systematic study of the published literature 2008-2012. *International Review of Research in Open and Distance Learning, 14*(3), 202–227. https://doi.org/10.19173/irrodl.v14i3.1455
Lucas, H. C. (2013). Can the current model of higher education survive MOOCs and online learning? *Educause Review, 48*(5), 54–56.
Mangan, K. (2013). *MOOCs could help 2-year colleges and their students, says Bill Gates*. The Chronicle of Higher Education.
Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). *Computers & Education, 80*, 77–83. https://doi.org/10.1016/j.compedu.2014.08.005
Möhlmann, M. (2015). Collaborative consumption: Determinants of satisfaction and the likelihood of using a sharing economy option again. *Journal of Consumer Behaviour, 14*(3), 193–207. https://doi.org/10.1002/cb.1512
Muñoz, P., & Cohen, B. (2017). Mapping out the sharing economy: A configurational approach to sharing business modeling. *Technological Forecasting and Social Change, 125*, 21–37. https://doi.org/10.1016/j.techfore.2017.03.035
Poutanen, S., & Kovalainen, A. (2017). *Gender and innovation in the new economy*. New York: Palgrave Macmillan US.
Rhoads, R. A., Camacho, M. S., Toven-Lindsey, B., & Lozano, J. B. (2015). The massive open online course movement, xMOOCs, and faculty labor. *The Review of Higher Education, 38*(3), 397–424. https://doi.org/10.1353/rhe.2015.0016
Richardson, L. (2015). Performing the sharing economy. *Geoforum, 67*, 121–129. https://doi.org/10.1016/j.geoforum.2015.11.004
Rodriguez, O. C. (2012). MOOCs and the AI-stanford like courses: Two successful and distinct course formats for massive open online courses. *European Journal of Open, Distance and E-Learning, 2012*(1), 1–13.
Rosenblat, A., & Stark, L. (2016). Algorithmic labor and information asymmetries: A case study of Uber's drivers. *International Journal of Communication, 10*, 3758–3784. https://doi.org/10.2139/ssrn.2686227, 19328036.
15-16 Oct. 2016 Rustam, D. D., & van der Weide, T. P. T. (2016). *The knowledge market online learning (K-MALL) architecture for higher education*. Paper presented at the 2016 International Conference on Advanced Computer Science and Information Systems (ICACSIS).
Sáinz, M., & Eccles, J. (2012). Self-concept of computer and math ability: Gender implications across time and within ICT studies. *Journal of Vocational Behavior, 80*(2), 486–499. https://doi.org/10.1016/j.jvb.2011.08.005
Sandeen, C. (2013). Assessment's place in the new MOOC world. *Research & practice in assessment, 8*, 5–12.
Shah, D. (2018). *By the numbers: MOOCS in 2017*.
Shi, Y., Li, X., Haller, A., & Campbell, J. (2018). *Knowledge pricing structures on MOOC platform – a use case analysis on edX*. Paper presented at the PACIS.
Sundararajan, A. (2016). *The sharing economy: The end of employment and the rise of crowd-based capitalism*. Cambridge: The MIT Press.

Tussyadiah, I. P. (2016). Factors of satisfaction and intention to use peer-to-peer accommodation. *International Journal of Hospitality Management, 55*, 70–80. https://doi.org/10.1016/j.ijhm.2016.03.005

Udemy. (2020). *About us*. Retrieved from https://about.udemy.com/.

Veletsianos, G., & Shepherdson, P. (2016). A systematic analysis and synthesis of the empirical MOOC literature published in 2013–2015. *International Review of Research in Open and Distance Learning, 17*(2), 198–221. https://doi.org/10.19173/irrodl.v17i2.2448

Zhu, M., Sari, A., & Lee, M. M. (2018). A systematic review of research methods and topics of the empirical MOOC literature (2014–2016). *The Internet and Higher Education, 37*, 31–39. https://doi.org/10.1016/j.iheduc.2018.01.002