An Investigation into Participant Engagement in Massive Open Online Courses

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Declaration

I confirm that this research contribution is based on my own work, and that all externally sourced material has been properly and fully acknowledged.

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Usman Nazir

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Abstract

Massive Open Online Courses (MOOCs) carry considerable potential to educate those who cannot afford formal education, however low retention rates still haunt MOOC providers – with only five percent of users completing existing courses (Jordan, 2014). Since MOOCs are open to all, MOOC participants have varying intentions; including users who join to complete the course and those who do not. Therefore, it is important to learn how to facilitate a willing learner to continue and complete the course. Hence, engaging strategies must be implemented for a willing learner to meet the learning objectives on MOOC. Accordingly, this study investigates the retention element of MOOC, to understand the reasons for low completion, and proposes strategies of how students can be encouraged to engage and/or continue using the MOOC to completion.

This research is organised in a series of chapters to provide a comprehensive understanding of student behaviour. chapter 1 and chapter 2 focus on understanding and defining the issue through reviewing existing literature. Chapter 3 explains the methodology used to address the problem. Chapter 4 explores when the users are most likely to leave the course and reasons for it. The findings reveal that the highest number of people leave on the very first day of a course. The main reasons identified highlight gaps in literature linked to i) a lack of response on the MOOC forums, and ii) a change in user intention to continue or leave a MOOC. Subsequently, Chapter 5 delves deeper into exploring these reasons in the form of studying behavioural patterns of users on forums who complete or not complete the course, and Chapter 6 investigates the reasons for change in user intention to continue with the course.

The findings of the study on forum activity (chapter 5) confirms that not all finishers leave comments on the forum, however most of the comments on the forums are from course graduates. Accordingly, forum activity on MOOCs shows that the completers post the most responses on the forum, and answer rather than initiate queries. Hence, strategies that encourage greater individual participation in the forums would support user engagement and continuance. The qualitative study on the reasons for change in continuance intention of users (chapter 6) identified several key factors, which were then compared with the existing literature to ascertain contribution to the list of factors of course continuance intentions of the users - taking breaks in between the course and ease of leaving the course were discovered as two such factors. Chapter 7 then conducts a validation study to ascertain the significance of these two factors. It is found that taking breaks in between the course is not significantly related to leaving

the course earlier than intended, whereas ease of leaving the course is significantly related to making the willing participant to leave the course earlier than intended. Based on these findings, the study proposes corresponding strategies to improve user engagement such that a willing user continues using MOOC.

Finally, Chapter 8 provides a concise research summary, addresses limitations and discusses future research possibilities. It also highlights the theoretical and practical contributions made by the study. The theoretical contributions of this study include uncovering and validating an extensive list of reasons on why a MOOC participant leaves earlier or stays longer than intended. It also adds to the knowledge bank in the field by utilising the ECM model and highlighting the importance of ease of leaving a MOOC as an important factor that can impact participant intention to continue with the course. The practical contributions of this study offer valuable insights and actionable strategies to MOOC providers in order to get a willing learner to engage and continue using the course, which can translate into better reputation and financial returns. Some of the strategies are: providing timely feedback, a well-designed intro of the course, encouraging and providing opportunities for participants to interactions on MOOC, using a reward system such as certificates and badges to keep the participant engaged and motivated to continue using the course.

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Chapter 1

Overview

1.1. Introduction

MOOCs (Massive Open Online Courses) are offered by some of the world's most prestigious educational institutions (Weinhardt et al., 2019).

MOOCs have grown in popularity since its inception in 2008, when an online course on connectivism by Siemens and Downes was made available to anyone who wished to attend for free. The course had 25 students enrolled before it became free. After the course was made available to anyone, it attracted an additional 2,300 participants (Cormier et al., 2010). In another instance, Stanford's Artificial Intelligence course drew 160,000 students (Rodriguez, 2012), however, this figure does not apply to all MOOCs. According to a 2013 research conducted by The Chronicle of Higher Education, the average student enrolments for a MOOC is approximately 33,000 (Kolowich, 2013).

MOOCs' openness fuels the large number of people who enrol in such courses. The courses are free to anyone in the world who wants to take them. In the field of education, openness is not a new phenomenon. For more than 50 years, open universities around the world have successfully run non-web-based distance education programmes (Daniel, 2013). However, online MOOCs not only allow anyone to join the course, but they also allow anyone to join the course at any moment during its duration. Because there are no tightly imposed prerequisites, participants are free to join and quit the course at any time. MOOCs have grown in popularity because, unlike traditional classroom lectures, students can enrol in any course they want and work at their own pace. Furthermore, the system has been shortened, allowing students to join in any course without having to meet requirements. This, in turn, smoothens the procedure and allows a wider range of students to enrol in the course. The course material is open and available to anybody with internet access. However, it should be noted that certain MOOC providers have recently begun charging for materials in order to improve financial returns (Yuan et al., 2013).

The online nature of MOOCs gives learners with 24/7 accessibility. Anyone with internet connection, regardless of location, can participate in these courses at their own speed and in their own time (Chen et al., 2013). The online format of the course also allows for interaction with a broad and diverse body of students, which would not be viable in a classroom situation.

Course offerings are given through a platform that collaborates with several universities, the majority of which are prestigious. Universities such as MIT, Harvard, and Stanford are examples of this. As previously stated, other MOOC platforms such as Udacity, Coursera, and edX were established following Stanford's AI course success (see Appendix 10 for further information on commercial MOOC providers). Because of the growing popularity of MOOCs, The New York Times declared 2012 the Year of the MOOC (Pappano, 2012). The open access, i.e., no restrictions on joining courses offered by reputable universities, draws a large number of people to attend them.

The flexibility provided by MOOCs can also be seen in the course design and material delivered. Exams are part of the traditional learning system, and students must take class notes to retain the information. MOOCs, on the other hand, give learners with the convenience of brief interactive quizzes that provide students with connections to related video lectures and, if a concept need revision, other online resources. Because MOOCs are based on recorded lectures, students can watch them whenever and, as many times, as they like. The MOOC technique is especially popular since it allows learners to connect with a big group of people (Zhu et al., 2019). Because of its openness, it may bring together a diverse group of pupils from various social and cultural backgrounds. It allows groups separated by distance to collaborate and encourages both collaboration and independence. MOOC participants, on the other hand, face issues with isolation and disconnection comparable to those identified in online learning settings (Mazzolini et al., 2017). Furthermore, it is argued that students fail to self-organise because they lack the drive and confidence required to manage their own education (Gutl et al., 2014).

Even though MOOCs are popular, flexible, and widely used, recent research has revealed that completion rates are low - with some as low as 5% (Jordan, 2014; Reilly et al., 2020). For educators and institutions, the poor completion and retention rates are a serious cause of concern considering the substantial investment and resources allocated to offering a MOOC. The challenge lies in keeping participants' voluntary participation and engagement in the course to ensure they derive maximum benefit and stay with the course as the high attrition rate can impact the providers' reputation and financial returns (Liyanagunawardena et al., 2013).

Low engagement and satisfaction levels among participants can result in poor reviews and feedback, which can further damage the provider's reputation and reduce the likelihood of learners recommending the course to others (Grajek, 2016). Whereas, high engagement and satisfaction levels among participants can result in positive reviews and recommendations, leading to increased enrolments and repeat customers (Kizilcec et al., 2017). Furthermore, learners who complete MOOCs

are more likely to pay for additional courses or credentials from the same provider (Zheng et al., 2015). In a study of MOOCs conducted in Pennsylvania University, it was discovered that the revenue generated by courses with high completion rates was more than ten times greater than that generated by courses with low completion rates (Kizilcec et al., 2017). Similarly, a report (by the consulting firm Eduventures) found that MOOC providers with high completion rates tend to have higher revenues (Grajek, 2016).

The voluntary approach to participation may cause students to become disengaged and even drop the course upon loss of interest (North et al., 2014). It is not surprising that studies consistently show low MOOC completion rates (Jordan, 2014), i.e., when compared to in-person classes. Online university courses also have greater attrition rates for participants (Carr, 2000). When MOOC completion rates are compared to those of traditional online and in-person courses, it is clear that MOOCs have lower completion rates due to the lack of major fees and simplicity of registration. When people join up for a MOOC, they may or may not intend to complete the entire course (Deborah, 2015). The following section covers a brief history of MOOCs as well as current trends.

1.2. History and Trends of MOOCs

To better understand the MOOC phenomenon this section provides background on how MOOCs were developed, information on the most prominent providers of MOOCs and discusses the current and future trends of MOOCs.

1.2.1. History of MOOCs

Online open learning content has developed significantly since the beginning of the twenty-first century. The Massachusetts Institute of Technology (MIT) launched OpenCourseWare in 2002, whilst the Open University launched OpenLearn in 2006. The advent of MOOC is rooted in the ideals of open education, which states that education should be freely available to anyone who wants to learn, regardless of the difference in the sociocultural, economic, demographic and geographical constraints. The development of the Stanford MOOC in 2011 helped popularised the idea of massive open online courses (Rodriguez, 2012). The instructors involved in the Stanford MOOC went onto establish popular open learning platforms namely Coursera and Udacity. MIT in collaboration with other universities also opened a commercial platform namely edX, and Open University opened an open learning platform called FutureLearn. In addition, there are numerous entrepreneurial ventures, which have developed new service models and platforms to support trainings and competency based

education, and universities increasingly use MOOCs to support the flipped classroom model (Wang et al., 2016). The major historical events impacting MOOC acceptance are presented in Figure 1.1.

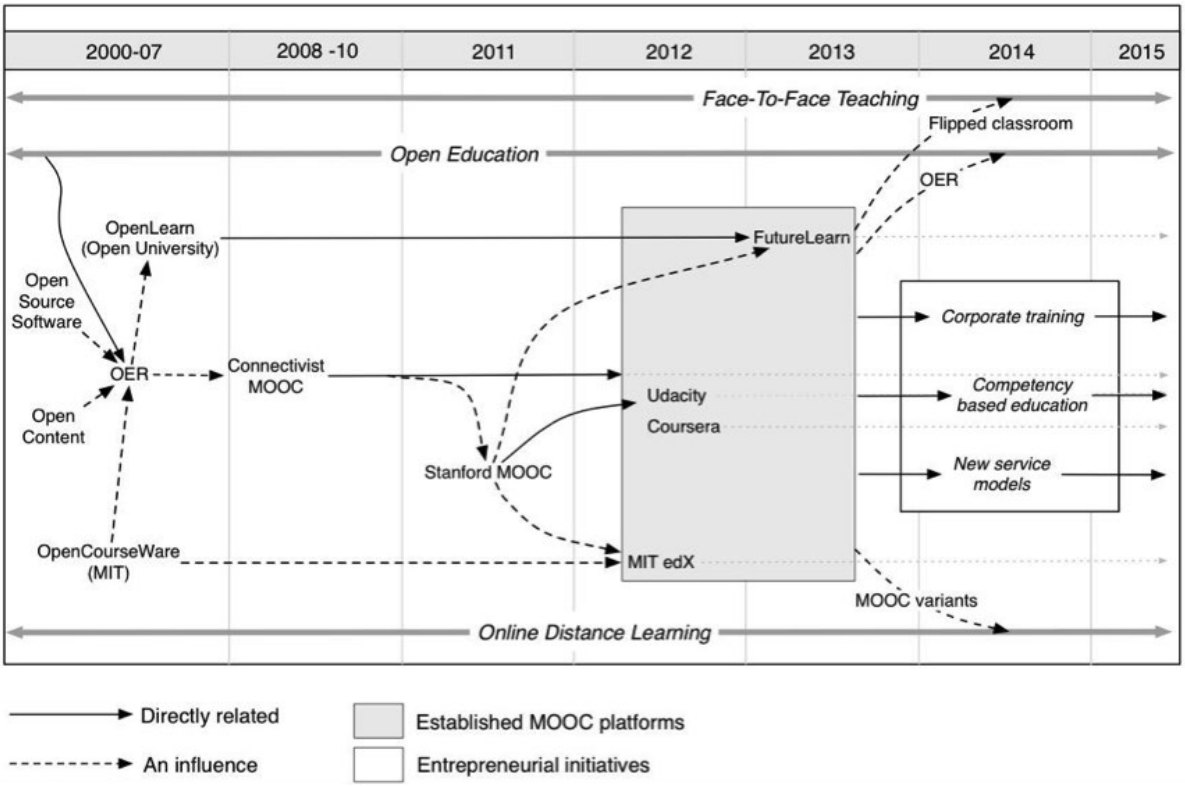

Figure 1.1. MOOCs and Open Education Timeline (Yuan 2015)

MOOCs continue to evolve and are being used as different variants in open education, examples of these would be SOOCs, i.e., Small Open Online Courses and SPOCs, i.e., Small Private Online Courses that target a niche audience for their learning needs (Sutchenkov, 2020). As technology develops the researcher expects increasing use of MOOCs around the world as they foster the ideals of open learning.

1.2.2. Trends in MOOCs

Nearly ten years ago about 300 thousand students were taking the Stanford courses. In 2021 there were now 220 million learners registered on MOOC platforms (Dhawal, 2021). In total there are 19,400 courses being offered by over 950 universities. About 70 MOOC based degrees existed, and 1670 micro-credentials were available on MOOC platforms (Dhawal, 2021). In 2021 alone MOOC providers launched over 3100 new MOOC courses, which were linked to over 500 micro-credentials. Moreover, 40 million learners signed up for a MOOC for the first time, showing that the prospect of MOOCs continues to expand and garner support from an increasing number of educational institutes

around the world. See appendix 10 for an introduction to the notable commercial MOOC providers mentioned in this thesis.

Institutes are not only offering courses on MOOCs they are also increasingly recognising the value of MOOC course outcomes but allocating credential offerings – often as part of full degrees and certificates. This recognition by top universities around the world is increasingly making MOOCs a credible and verifiable source to attain certifiable qualifications. Therefore, MOOCs not only provide willing learners with the opportunity to learn almost anything, they offer the potential to equip people with valuable qualifications to develop the distance learners' portfolios; for example, looking for jobs and establishing credibility for businesses.

Table 1.1. MOOC Provider Offerings and Users in 2021 (Dhawal, 2021)

Provider	Learners	Courses	Micro-credentials	Degrees
Coursera	97 million	6000	910	34
edX	42 million	3550	480	13
FutureLearn	17 million	1400	180	22
Swayam	22 million	1465	0	0

Table 1.1 presents the number of courses, degrees, micro-credentials and learners supported on the top MOOC providers (Dhawal, 2021), and highlights that Coursera, at least in 2021, was the market leader in this domain. It is important to note, however, that all these platforms have many regional and global institutional partners that support and provide courses on these platforms, which form the basis of its resilience and wide acceptance amongst learners. Figure 1.2 shows the recent growth of MOOCs in respect to the number of courses available.

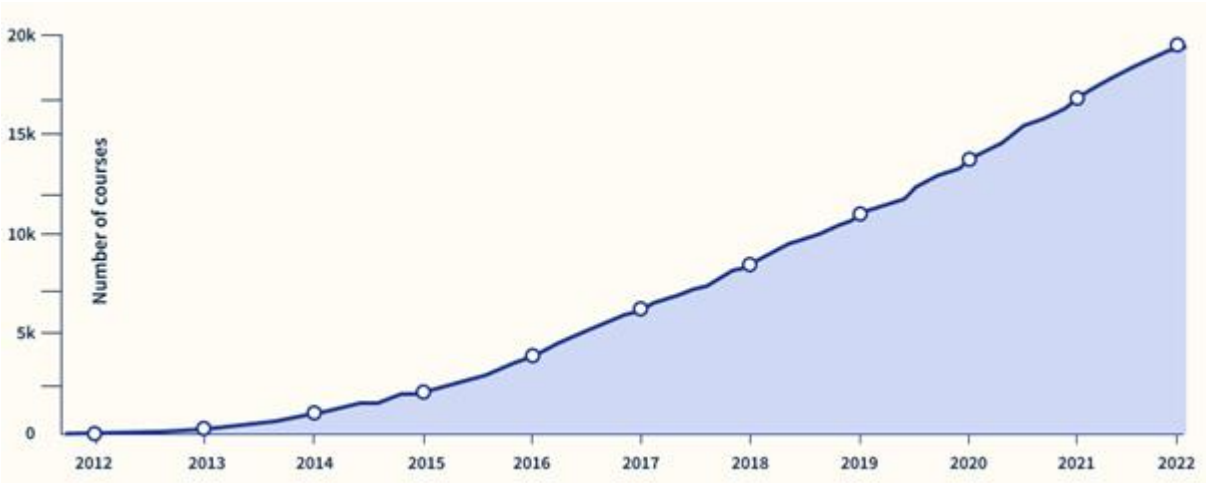

Figure 1.2. Growth of MOOCs (Dhawal, 2021)

Figure 1.2 exhibits a sharp rising trend in the number of courses offered from 2012 to 2022. About 19500 MOOCs, from 950 universities from around the world, were announced in 2021. This trend show how serious effort has been invested by higher educational institutions in supporting MOOCs. Also, it shows a wide and growing array of courses available to learners on MOOC platforms. For example, Table 1.2 presents the number of degrees offered by edX, Coursera, and FutureLearn in the past five years.

Table 1.2. Number of Degrees (Dhawal, 2021)

Provider	2017	2018	2019	2020	2021
edX	1	9	10	13	13
Coursera	4	11	16	25	34
FutureLearn	4	18	23	28	22

Degrees offer necessary credentials to the participants which can be leveraged to gain employment or other relevant goals. Offering degrees adds another layer of motivation for a learner to stick around, i.e., to complete the course and get a required degree. For the institutions, it means more participants who pay for the courses. It also adds to the geographic and ethnic diversity of the alumni boy. Therefore, the general trend in the rise of degrees offered is not surprising. However, the stagnant number of edX and the drop in the number of degrees may have something to do with the pandemic in 2020. It is likely that the lockdowns in 2020 around the globe got more and more learners to join MOOCs due to the limitation in attending the courses in-person, hence, many people opted for online means of attaining their learning goals. However, when the lockdowns got lifted in 2021 some degrees being offered in UK could be transferred back to their regular offline mode of content delivery. About twenty thousand courses are offered, yet not all courses are tied to degrees, which means that smaller modules or topic focused learning is on the rise. Table 1.3 shows the overall trend in terms of the number of learners in millions, universities offering courses on these platforms, and the number of courses available.

Table 1.3. Trend in Learners, Universities and Courses on MOOC platforms (Dhawal, 2021)

	2015	2016	2017	2018	2019	2020	2021
Learners (millions)	35	58	81	101	120	180	220
Universities	500	700	800	900	900	950	950
Courses	4200	6850	9400	11400	13500	16300	19400

The number of learners interested in MOOCS increases year on year; suggesting that MOOCs are desirable to new learners. The number of universities providing MOOCs, however, has seemingly stagnated in recent years. MOOC courses traditionally have provided education to a large numbers

of learners for free, with HEI receiving income from the few that wish to validate the qualification certificate. Accordingly, the viability of MOOCs depends on i) large cohort numbers and/or ii) an adequate percentage of students completing the course and demanding validation. Stagnation in the number of MOOC providers suggests that many HEIs (High Educational Institutions) shy away from MOOCs, since value creation is hugely dependent on student engagement. To maximise the number of students completing MOOCs, and therefore achieve financial viability. HEIs hoping to provide MOOCs need to understand student engagement. What do students expect from MOOCs? Why is there such a high drop-out on MOOCs? What strategically can be done to increase student continuance intention, in order to maximise the financial return.

1.3. Need for Investigating Participant Continuance Behaviour

Some might dismiss the non-completion and attribute it to the fundamental characteristics of MOOCs. However, this approach runs the danger of students losing interest in the subject matter too rapidly to gain anything from it. Therefore, to ensure that students get the most out of the course information, engaging learning strategies that motivate the willing learner to participate in the course must be implemented.

This presents us with an interesting problem of how to engage users and get them to continue using the course, so they get to achieve the maximum intended benefit from enrolling on the course. Hence, the aim of this study is to gain insight into the continuance behaviour of MOOC participants. To achieve this a mixed methods study is planned, supported by literature review, to determine when in the life of a MOOC are the participants most likely to dropout and their reasons for doing so? The main reasons obtained from this study, in line with the gaps highlighted in the literature, will then be used to investigate student MOOC continuance behaviour in further detail. The findings of this study shall contribute to the dialogue in the existing literature by addressing some of the gaps in MOOC continuance behaviour. It will also inform the practitioners, particularly the MOOC providers, on issues that need to be addressed and suggest possible strategies for MOOC student continuance engagement.

1.4. Aims and Objectives

The primary aim of this research is to investigate the continuance behaviour of MOOC participants, with a specific emphasis on examining the reasons for withdrawal or disengagement from the course, as well as the level of involvement and participation in the course. Hence, the initial idea was to understand when and why MOOC participants discontinue using MOOC and how do they differ from

participants who continue. After conducting extensive literature review and gap analysis (chapters 1, 2 and 3) supported by exploratory research findings (chapters 4, 5 and 6), the following research questions are finalised:

1. What day, during the life of a course, has the most dropouts, and what are the reasons for dropout?
2. How do MOOC students who participate in forums compare, in terms of completion rates, to those who do not?
3. Why would someone change initial intention to continue or not continue with the course?

The research intends to achieve the following objectives in order to meet the aim of this study and answer the questions derived above:

- Investigate which day the participants are most likely to drop out of the course. (chapter 4)
- Conduct interviews to understand reasons for dropping out on the specific day. (chapter 4)
- Compare the behaviour and completion rates of MOOC users who participate on forums with those who do not. (chapter 5)
- Identify the reasons why participants may change their initial intentions to continue or not continue with the course. (chapter 6)
- Check for contribution of reasons identified with exiting literature. (chapter 6)
- Empirically validate the reasons that adds to knowledge bank of the field. (chapter 7)
- Provide significance of research findings and areas of further research. (chapter 8)

1.5. Organisation of Report

This report is organised into a series of eight chapters. Chapters 1, 2, and 3 cover the Literature Review and Synthesis, Methodology, and Data Collection and Analysis, respectively. In Chapter 2, the Literature Review and Synthesis section explores the latest research on MOOC continuance engagement, addressing relevant issues and identifying research gaps. Chapter 3, the Methodology section, discusses the appropriate research approach, strategies, methods, and tools to be employed in order to address the research questions.

Chapters 4, 5, 6 and 7 delve into specific aspects of MOOC engagement. Chapter 4 focuses on factors leading to early course dropout, revealing that a significant number of MOOC participants tend to disengage on the first day, primarily due to communication issues and mismatched expectations. Chapter 5 examines the differences in forum activity between non-completers and completers of MOOCs, particularly emphasising the communication aspect. Furthermore, Chapter 6 explores the

factors that influence a user's intention to continue with the course, exploring gaps and highlighting two factors for further research: taking breaks and the ease of leaving the course. Chapter 7 presents a validation study aimed at assessing the significance these two factors.

Finally, Chapter 8 serves as the conclusion section, providing a summary of the study's findings. The references section follows, providing references in APA style. Lastly, the appendices section includes important detailed information that helps in getting better understanding of this research.

Chapter 2

Literature Review

2.1. Introduction

This chapter examines the literature on MOOCs continuance engagement in an effort to highlight the key aspects and gaps in field. The chapter starts by discussing technology in education, distance education, and online learning in the higher education field. Appreciation of these domains allows the researcher to undertake a discussion concerning MOOCs, which allows the researcher to focus on the research on MOOC continuance engagement. Within this, we will consider, in turn, classification of participant engagement, pedagogy/course design, dropout rates, motivation, characteristics and communication. Towards the end of the chapter the problem statements, aims and objectives steer the direction of this research.

2.2. Distance Education and Technology in Higher Education

This section explores the dynamic relationship between technology and distance learning in higher education. Starting with its historical foundations to the modern digital landscape giving prominence to MOOCs, we examine how technology has revolutionised distance education.

2.2.1. Distance Education

Distance education, also called distance learning, is a way of providing education to students who are not present in the educational premises (Kaplan et al., 2016). Distance education can be traced back to the seventeenth century, when correspondence courses were employed to teach students via mail (Tait, 2003). The University of London was one of the earliest universities to offer distant education, beginning in 1858 (Rothblatt et al., 1988). The establishment in 1969 of the Open University further strengthened and encouraged distance education proposition (Nasseh, 2013). With obvious benefits such as flexibility and accessibility to students, distance education comes with its own challenges such as feeling of isolation of learners, the need for participants to have self-discipline and motivation, difficulty in providing timely feedback and poorly designed programs that are not conducive to distance education mode of learning (Sazmandasfaranjan et al., 2013). The adoption of digital technologies, supported by internet access, has been a great enabler of distance education that has helped tackle these challenges and facilitated the use of educational technologies to facilitate learning.

2.2.2. Use of Technology in Education

Educational technology, in general, refers to the use of computers, software, and hardware to deliver education by implementing educational theories and practices (Mastellos et al., 2018). Theoretical foundations of educational technology come from a variety of disciplines including psychology, education, communication, computer science and artificial intelligence (Aithal et al., 2019). A range of technological tools are used in educational settings, including learning management systems, multimedia resources, and digital assessment tools (Bates, 2015). Distance education has been transformed by the use of digital technology and the internet, enabling a variety of dynamic and engaging learning experiences such as online debates, virtual classrooms, and collaborative projects. The future of educational technology is shaped by emerging trends, such as personalised learning, artificial intelligence, and immersive technologies (Garrison et al., 2013). In the wake of the COVID-19 pandemic, educational technology has gained renewed attention as schools and universities had to adopt distance learning mode (Hodges et al., 2020). Overall, educational technology provides a promising avenue for improving learning and performance, but achieving its successful implementation requires careful consideration of its benefits and challenges (Gamage et al., 2018).

Technology use in education removes many of the barriers that limit the traditional educational experience; such as high cost, time synchronisation, space and resource limitations, content consistency, limited interactivity in larger cohorts, limited consideration of learning preferences, life-long learning, etc. One of the main factors impacting open access to education is the significant cost (Bartley et al., 2004). Although online education programmes can be costly to set up, lower ongoing operational cost, due to lack of reduced space and resource requirements (e.g., infrastructure, full-time teachers, and physical spaces), and ability to scale-up cohort sizes, means that the cost per head can be reduced significantly. The removal of accommodation and travel costs for students, also makes technology-based solutions increasingly desirable to low-income students (Freund et al., 2002). Many students, due to their work or home responsibilities, are unable to undertake full time learning. Moreover, although part-time learning can be achieved in some traditional learning models, the virtual nature of online learning facilitates a level of accessibility and flexibility – in both learning space, time, and physical location, which was unobtainable with traditional models (Bjork et al., 2008; Koller et al., 2008). Online content can ensure a consistent quality to all (Cantoni et al., 2004), and this can be monitored and checked in advance of release by pedagogical designers. Content can, even for large size cohorts, be designed to either i) present content that is consistent for all, which is hard to obtain across multiple classes and for large cohort size, or ii) personalised to support defined

variations in learning styles (Banciu et al., 2012). Content can integrate discussion boards, interaction group session, tests and quizzes, which can be hard to initiate in large classes. Also courses can be designed to support virtual teaming and networking (Kim et al., 2005). Reusing content reduces staff teaching time, allowing staff to focus more time on providing interaction and feedback to students, which, especially when compared to traditional large cohort in-person sessions (Kim et al., 2005), can result in a more intimate relationship developing between staff and students.

In conclusion, use of technology in education can potentially provide a higher level off access, a reduced level of cost for both the educational provider and student, and increased flexibility in learning and dissemination of information. Hence, it comes as no surprise that many higher education institutions (HEIs) have attempted to adopt a more technology based education model.

2.2.3. Online learning in Higher Education Institutions (HEIs)

Online learning emerged in the mid-1990s owing to the widespread use of the Internet (Kentnor, 2015). Online learning in HEIs includes, in our definition, courses that are fully virtual and involve the use of online learning pedagogies to deliver education. Students access course materials, and participate in virtual classes, via the internet. Content and interaction is commonly administered using a learning management system (Lin et al, 2019). Learning management system platforms provide access to diverse student populations, allowing for interaction with learners, from range of different geographical locations, and a variety of perspectives on content of the course (Banciu et al., 2012). The learning systems can be run in both asynchronous and synchronous modes (Hrastinski, 2008; Giesbers et al., 2014). Asynchronous learning environments refers to online spaces where the students do not need to be online at the same time, thus allowing them to work on digital content at their own pace (Hrastinski, 2008). Interactive asynchronous learning feature allows learners to participate in learning at any time and from any location, which enhances the appeal of online learning. Synchronous learning environments, unlike asynchronous ones, are live (in terms of time), and learners utilise digital platforms simultaneously, providing a sense of immediate support and conversation (Giesbers et al., 2014). Within a synchronous learning environment, learners might feel the pressure to keep the conversation going, which could lead to a focus on response quantity rather than response quality (Goksu et al., 2021). Nonetheless, real-time responses can provide clarity, correct any misconceptions, and facilitate deeper engagement with the course material (Hrastinski et al., 2010). This research studies Massive Open Online Courses (MOOCs) which are platforms designed to provide online courses that has both asynchronous and synchronous elements to educate the masses (Kaplan, 2017). The section that follows explores MOOCs in more detail.

2.3. Massive Open Online Courses (MOOCs)

Massive Open Online Courses (MOOCs) are online course that offer open access to course material and unlimited participation via the internet (Weinhardt et al., 2019). MOOCs are a fairly recent development in online learning realm that has gained acceptance in higher education institutions. MOOCs typically feature various resources and learning materials, including recorded readings, lectures, cases, problem sets, as well as interactive components such as discussion forums and social media platforms. These interactive components are designed to facilitate collaboration between teachers, learners, and administrative assistants, and often provide timely feedback on assignments and quizzes. Since their introduction in 2008, MOOCs have been widely researched in the area of distance education (Liyanagunawardena et al., 2013).

MOOCs are generally divided into two distinct types: xMOOCs and cMOOCs. xMOOCs, or extended MOOCs, extend the traditional form of education by utilising technology and typically offer recorded lectures, reference material and self-test problems, with limited interaction between students. cMOOCs, or connectivist MOOcs, emphasize collaborative learning and knowledge building with material that is evolving to support future learning (Siemens, 2012; Prpic et al., 2015).

Figure 1.1 presents an overview of the significant milestones in the development of the phenomenon of MOOCs as a credible learning resource. Some of the prominent milestones included are the advent of Open Education Resources (OER) provided by MIT and the use of Open Learn platform for online learning content by Open University UK in early 2000s. The advent of connectivist MOOC in 2008 that led to establishing major MOOC platforms such as edX, FutureLearn and Coursera among others (Yuan, 2015). Appendix 10 provides more details on these and other popular MOOC platforms.

MOOCs continue to grow and are reported to have about 220 million registered learners on MOOCs in 2021, excluding China. There are about 950 universities offering over 19400 courses, 70 degrees, and 1670 micro-credentials (Dhawal, 2021). Figure 1.2 in the introduction section provides a pictorial chart on the growth in the number of courses for MOOCs.

The emergence of Massive Open Online Courses (MOOCs) presents a unique opportunity for research in various domains. One particularly important area of investigation revolves around the challenge of sustaining participants' engagement throughout the course. MOOCs' open accessibility allows individuals to join and leave at their own discretion when they lose interest (Haumin et al., 2019; North et al., 2014). Consequently, it is not uncommon for MOOC institutions to report low completion rates (Reich, 2019). While this phenomenon can be partly attributed to the inherent nature

of MOOCs, dismissing it as such would be unjust to the willing learner. To maximise the benefits derived from MOOCs, it is imperative to implement effective strategies that actively encourage learners to remain engaged and willingly participate in the course.

A comprehensive systematic review study on research trends in MOOCs was carried out by Zhu et al. (2019), which concluded that learner continuance, engagement and retention are among the main areas where the research is headed in this field. Hence, highlighting the importance that the research community places in investigating the area of student continuance engagement. The literature on the topic predominantly lies in the area of classification of participant engagement, pedagogy/course design, dropout rates, motivation, characteristics and communication. The following sections in this chapter delves deeper in the literature concerning the classification of MOOCs, which is followed by a discussion concerning pedagogy / course design and dropout rates. Finally, the student motivation, characteristics, and communication are discussed in order to clarify the problem scope considered in this thesis.

2.3.1. Classification of MOOC Participants

Considerable research has been done to understand, and classify, different types of MOOC students. These classification studies are important as they demonstrate how learners interact with the course, and consequently provide both researcher and educational providers, with a deeper understanding of student engagement behaviour.

Classification of MOOC students allows the reader to understand how researchers have categorised the behaviour exhibited by MOOC participants. The common classifications presented in literature on MOOC participants are presented in Table 2.1.

Table 2.1. Classifications of MOOC Participants

Study Reference	Classifications
Kizilcec et al. (2013)	➢ Completing – these are learners who have completed majority of the assessments given in the course. ➢ Auditing – these are learners who did assessments infrequently and watched majority of the videos. ➢ Disengaging – these are learners who did assessments at the beginning of the course but then showed as significant decrease in engagement levels. ➢ Sampling – these are learners who watched video lectures for only one assessment period.

Table 2.1. Continued

Study Reference	Classifications
Ferguson et al. (2015)	➢ Completers – learners who have completed majority of the assessments offered in the course. ➢ Strong starters – learners who complete most of the assessments at the beginning of the course but the engagement pattern drops as they progress during the course. ➢ Returners – learners who disengage from the course but return and complete the required assessments. ➢ Mid-way dropouts – learners who continue completing the requirements of the course but drop out in the middle. ➢ Nearly there – learners who complete most of the requirements of the course but not enough to qualify as a completer. ➢ Samplers – learners who watched video lectures for only one assessment period.
Milligan et al. (2013)	➢ Active participants – actively engaged with other learners, were thought to be ideal as they would add value in discussions and assignments of the course. ➢ Lurkers – actively followed the course but did not engage with other learners, were found to know what they were doing, that is, they had clear goals. ➢ Passive participants – classified as dissatisfied lurkers were frustrated and confused and did not seem to know what they were doing.
Ramesh (2013)	➢ Active engagement – those who show explicit signs of engagement, such as, take part in discussion, view lectures, submit quizzes and assignments. ➢ Passive engagement – those who show implicit signs of engagement and do not make an active effort to participate. ➢ Disengaged – learners who show signs of getting disengaged from the course.
Hill P. (2013)	➢ No-shows – people who register but never show up again. These form the largest category of students registering for the course. ➢ Observers – people who do not take assessment tasks but do login at times and read content and watch videos ➢ Drop-ins – these participants do not complete the entire course but do take part in some activities. Many of these learners have specific objectives they wish to achieve from the course, for example – obtaining specific content from the course. ➢ Passive – students who see the course as content and do not actively take part in the course ➢ Active – people who participate in all the activities, discussion forums and assignments.
Coffrin et al. (2014)	➢ Auditors – learners who watched videos but did not do any assessments. ➢ Active – learners who completed their assessments. ➢ Qualified – students who met the two assessment qualification criteria and watched at least one video.

Table 2.1. Continued

Study Reference	Classifications
Anderson et al. (2014)	➢ Viewers – these learners primarily watch lectures and hand in few assignments if at all. ➢ Solvers – primarily hand in assignments to get grades, yet watch only a few videos if any. ➢ All-rounders – these leaners balance the watching of lectures and handing of assignments. ➢ Collectors – these learners downloaded the lecture videos and did a few assignments. ➢ Bystanders – these learners register for the course but their total activity is very low.
Gillani et al. (2014)	➢ Committed crowd engagers – this is a groups of learners that tended to engage with others on the forum. ➢ Discussion initiators – these learners initiated the most number of threads ➢ Strategists – these are learners that connected with others but in a calculated fashion. They had argumentative posts and mostly posted when there was a learning element involved. ➢ Individualists – these learners posted less and when they did it was mostly an argumentative post.
Coleman et al. (2015)	➢ Shopping category of users remained nearly unchanged throughout the course. ➢ Disengaging and completing user distributions spread out as the course progressed. ➢ Completing user category engaged with the course material as soon as it was released. ➢ Disengaging category of users showed a significant lag.

These classification studies are important as they help show how the learners interact with MOOCs. These studies give a better understanding of common learner engagement behaviour. The classifications of MOOC participants discussed in the studies are varied, and each study offers unique categories based on their research findings. Among the categories that appear in multiple studies are completers, auditors, active participants, and lurkers. The natural direction of future research from these studies is to do cross-sectional analysis of each sub-group in gaining better understanding of how learners can get most out of the courses (Khalil et al., 2014). Our study will take the opportunity to learn behavioural pattern of completers in order to devise facilitating strategies for willing learners. It will also look deeper at the sub-group of users who could not continue with the course. Studying the completion aspect of MOOCs directly addresses the topic of this research, i.e., MOOC continuance engagement, and helps us better understand the challenges faced by MOOC users and providers, hence, it can inform MOOC providers to improve design and policy (Liyanagunawardena et al., 2014). Higher completion rates can also raise a MOOC platform's reputation and inform policy

(Jordan, 2014). The better completion rates also mean more requirement for paid certificates, which is the main source of MOOC revenue (Yuan et al., 2013), that means higher profits for MOOC providers. Therefore, it is in direct interest of the providers and participants of MOOC to be better informed about how a participant can stay as long as possible with the course and complete it.

2.3.2. Pedagogy and Course Design

This section delves into how the pedagogical elements such as quality of instruction, assessment methods, and instructional design principles impact learner engagement and continuance. By investigating these aspects, we gain insights into how MOOCs can be tailored for better learning experiences. A prominent research conducted by Margaryan et al. (2014) investigated the quality dimension of MOOCs by applying the First Principles of Instructions (i.e., Problem Centred, Activation, Demonstration, Application, Integration) – see Merill (2012). The study analysed seventy-six randomly selected MOOCs in order to determine the instructional quality of MOOCs. The use of the first principles of instruction approach allows a maximum scoring of 72, however none of the courses scored more than 28 points; for example, xMOOCs courses reported between 3-25 points and cMOOCs courses reported between 0-28 points. The findings of Margaryan et al. (2014) imply that the MOOCs quality is lacking in specific areas. This finding was concurred by Miller et al. (2015), who considered the differences between standard learning quality and the MOOC learning quality. Miller created as a 3-week workshop for instructors in higher education who had never before taught on online courses. Results showed that MOOCs are lacking two key elements, i.e., i) teacher-student interaction, and ii) the creation of online learning communities. Accordingly, research shows that teaching in a MOOC does not offer the same social presence for the instructor or the same kind of learning community for the students as is now available in traditional classroom education. Furthermore, MOOCs do not provide the same learner support services as traditional classroom courses.

It would be erroneous, however, to claim that all MOOCs are inherently poor quality. Miller et al. (2015) also gathered responses from 115 undergraduate students from a public institution in the Midwest of the United States to understand how they rank MOOCs in terms of its quality. Each participant used rubrics for User Interface Design and Universal Instructional Design to evaluate three MOOCs at random, all of which were built on the Coursera platform. A Likert scale available online was used as the grading rubric. The results obtained were then analysed using Qualtrics software. Students had a generally favourable assessment of the MOOC course design; concluded due to the mean score being above 4 (on a 1 to 5 rubrics), thus indicating that students developed a positive

impression of the MOOCs. Miller et al. did recommend, however, that the application of relevant instructional design principles be further investigated.

Alario et al. (2014) offers some suggestions on improving the quality of MOOCs by recording their experiences in developing a MOOC on Miriadax. The suggestions included: defining integrative assessment structure, creating attractive videos, having a dedicated course manager who can support and coordinate with all stakeholders and offering accreditations. Ahn et al. (2013) described how learning tasks can facilitate engagement. For example, learners can earn badges by completing different learning tasks, such as peer feedback/reviews. The more badges a student has, the more credible he/she is in terms of how much you have learnt/participated in the course. This type of activity based reward promotes and enhances learners' reputation and influence within the cohort. Moreover, Cobos et al. (2016) found that more participants were willing to view shorter videos. This finding, supported by other MOOC providers (Guo et al., 2014), recommended the creation and use of shorter videos (5-10 minutes); since student attention span decreases after 5-10 minutes (especially true of videos that require high concentration). Using shorter videos not only facilitates more granular and easily digestible expression of content, it also provides flexibility and control to the user with respect to choice of videos or content to watch. Such findings directly inform the design and influences the pedagogical elements of the course; allowing MOOC content development from the user perspective and hence facilitating a more satisfactory user experience.

With the financial viability of the MOOCs dependent upon encouraging students to purchase a certificate at MOOC completion, ensuring the credibility of MOOC assessment is a significant challenge. Literature agrees that online courses and assessments possess an inherent risk of 'cheating'. Instead of following the traditional classroom approach to testing, however, other measures must be deployed to counter the effects of cheating in order to ensure a credible assessment of students. Accordingly, approaches of conducting effective and efficient MOOC assessments has attracted considerable attention. Meyer et al.'s (2013) considered how cheating can be reduced in online courses/MOOCs by tackling the weakness of the traditional classroom assessment methods (i.e., same paper for all, same difficulty level for all student types, etc.). Meyer et al. introduced IRT (Item Response Theory) as a measure to reduce cheating for credible assessment on MOOCs. IRT gives a weight to the question items being tested, and correlates it to the total score of the test, however takes into account the difficulty level of questions when presented to various types of students. Chen et al. (2013) discusses the use of test centres where students could take the assessment in a controlled environment. Also, the use of software and machine learning to detect plagiarism. Providing relevant and timely feedback is another challenge. Carr (2012) discusses how machine learning could be used

to track the activity of learners on the platform. Constant learning, aggregation, and analysis of data, would allow customised and personalised (automated) feedback to be provided to students. The field of online assessment is far from perfect at present, and much work is needed to prevent cheating and plagiarism in assessments. Common online techniques, i.e., to ensure assessment quality and credibility, include open book exams, flash quizzes, shared assignments and proctoring.

Previous studies have indicated that a significant number of MOOC students exploit their anonymity to gain points without putting in any effort (Alexandron et al., 2017; Northcutt et al., 2016; Ruiperez-Valiente et al, 2016), for example, through creating multiple fake user accounts to get answers of questions on assessments. Such acts undermine the importance of constructive feedback in the learning process. However, restricting feedback and access in order to prevent cheating hinders the openness of MOOCs. In an effort to strike a balance between learner-centred pedagogy, incentive design, and assessment reliability, Alexandron et al. (2020) conducted a study to explore a MOOC assessment method used by MITx Biology. This assessment approach aimed to prevent cheating and was evaluated based on two aspects of learner behaviour: the incidence of cheating and the extent of engagement in formative course activities. The researchers analysed relevant metrics from course run both before and after the implementation of the new assessment model to examine its impact on learner actions. To evaluate cheating, an anomaly detection technique employing person-fit statistics was employed, which detected abnormal learner behaviour. The paper makes a dual contribution: firstly, it presents MOOC designers with an analytically validated assessment paradigm that reduces cheating in formative assessments while maintaining learner engagement; secondly, it introduces a learning analytics technique that simulates the effects of such an intervention.

In a series of studies, Ferguson et al. (2015a, 2015b) explores engagement patterns connected to pedagogy and course duration using cluster analysis of MOOCs on FutureLearn platform. Such studies are important as they investigate the influence of pedagogical elements in shaping learners experience, which subsequently affects their retention rate. In the investigation students were awarded different points for different activities; for e.g., 1 for viewing the content, 2 for posting a comment. The sum of these scores provided an overview of the students' overall activity. K-means clustering was then applied to divide the students into smaller clusters. The process was replicated 100 times for the optimal solution. Seven clusters were then determined and studied. The study concludes that there is an obvious difference in the way students approach a three-week MOOC vs. the way they approach the first three weeks of an eight-week MOOC. These MOOCs' engagement patterns are correlated with pedagogy and course length, according to a cluster analysis of the data. Hence,

pedagogy and course length should be designed in accordance with the target audience in mind for the course.

Xing et al. (2019) also use clustering techniques to comprehensively analyse the fundamental components of MOOCs, and measure their impact on student performance. The researchers applied a two-stage K-means clustering method to assess over 200 MOOCs, which collectively attracted approximately 300,000 students. Through this analysis, they identified three distinct clusters representing various characteristics and attributes found within the MOOCs. Cluster 1 had the highest number of assignments, peer reviews and submission types. This reflected that cluster 1 had varied ways for students to learn and get feedback. Cluster 2 had the highest value of number of days and discussion forums, hence, this cluster of courses emphasised on collaboration, discussion, and networking. Cluster 3 had the highest value in the number of quizzes but scored low in almost all other features. The results show that Cluster 1 had the highest average student grade, while Cluster 2 had the lowest average student grade. Cluster one had the highest dropout rate, while Cluster three had the lowest. While the absolute differences between these values are small, the practical impact could be enormous given the size of MOOC enrolment. This kind of study proves to be useful in understanding participant behaviour in relation to the design features of the MOOC. The clusters that form can each be deployed with different strategies to improve their retention rates, grades and engagement patterns.

Schmeiden et al. (2019) used an iterative strategy to create an online course from scratch about research design. The research team categorised the input using three measuring tools; i) skill confidence rating, ii) course evaluation survey, and iii) qualitative interviews. This procedure yielded fifty-seven iteration tasks, which were included in the MOOC's public version. In the public MOOC, about three thousand learners actively participated out of a total of over five thousand participants. The MOOC was rated as satisfactory by about eighty-five percent of survey participants. Overall, the iterative approach to MOOC design was successful and beneficial. The protoMOOC's feedback resulted in sixty modifications. The protoMOOC was initially tested in a smaller group to identify possible errors, and then made accessible to a vast, international audience. Results indicate that learners are generally satisfied with the iterated MOOC. Such an approach no doubt is useful but can be time and resource consuming. Prototyping would need to involve the team to change structural elements of the course in a recurring fashion, hence, utilising resource and time. However, prototyping means that the final solution is more likely to have a better chance of meeting the expectations of the audience.

Another research, conducted by Rayyan et al. (2016), delves into the development of a Massive Open Online Course (MOOC) based on online preparatory resources for an introductory physics class at MIT. The study outlines three successive iterations of this MOOC, highlighting the unique approach of the teaching staff engaging with small groups of students who collaboratively tackle problem-solving activities, employing an expert problem-solving pedagogy. A text, short checkpoint tasks, and homework are included in the MOOC. They demonstrated how different components of course design influence student behaviour: substantial relationships between difficulty and time to solution, but modest correlations with percent accurate, when homework sets were organised by increasing (instructor-estimated) difficulty were discovered. Higher retention was achieved after changes to the second presentation of the course. Targeting physics teachers, and publishing materials far ahead of time, were among the changes made. Certificates gained in relation to individuals who put forth a significant effort on the second assignment are defined by the researchers as retention. Retention was measured in this method and ranged from forty to seventy percent, with the course oriented towards teachers having the highest retention rate. It was demonstrated that using item response theory (IRT) to solve common homework tasks, researchers discovered that MOOC participants were much more capable than students in a Massachusetts Institute of Technology course, and that this advantage remained throughout the MOOC. IRT is a common tool used for development, evaluation and administration of standardised measurements. It is known to reduce measurement error, improving accuracy and producing comprehensive analysis. This also ensures the students get credible and timely feedback on their work. Such findings only strengthen the importance of pedagogical elements in the course. MOOCs should be carefully designed with an audience-centric approach.

In conclusion, the research in the area of pedagogy and course design mainly revolves around instruction design, assessments, platform design elements, behavioural clustering, communication and feedback. However, there is still much work to be done in this areas to better serve varying needs of diverse student body if MOOCs are to meet their potential of reaching to the far corners of the world to offer free quality education to all who wish to attain it. Gaps can be observed in looking at the pedagogical elements as a whole in how they help to achieve the course objectives. Future research should also involve stakeholder perspective and resultant outcomes on the effect of following pedagogical technique.

2.3.3. Characteristics and Behaviour

This section discusses prominent literature on characteristics and behaviour of MOOC participants. The common characteristics of MOOC participants relate to the demographical elements, learning

style, level of knowledge/skill and socio-economic status, among others. Understanding the characteristics and behaviour of participant groups on the platform can help us understand how to design and deploy tools to serve the needs and preferences of the participants for better engagement.

Wintrup et al. (2014) studied learner engagement in MOOCs using the UK Engagement Survey on MOOCs. The findings show that the MOOC participants are mostly adult learners, two-third being over 46 years of age. They are educated, majority have university degree or above. When compared to disabled students in higher education, MOOCs reported a higher percentage of people who reported themselves with some form of disability. Majority of the participants are from working class with education and IT as the most popular industry groups. The results also showed higher scores for higher order, reflective and integrative learning. Only a minority engaged in collaborative learning. This means that MOOCs are successful agents of delivering challenging material to stretch critical thinking thus enabling personal development and change. However, the results of collaboration and interaction was low and warrants further investigation for their purpose and effectiveness. It must be said the results are UK specific and derived from the study of just two MOOCs. Nonetheless, it uncovers important findings in understanding MOOC participants and how they engage with the course.

Schulze (2014) explores the relationship between self-directed learning readiness and MOOC completion rates. She uses Adult Learning Theory which draws from self-directed learning and andragogy. She highlights that adult learners have different needs from others and are better at self-directed learning. Adult learners show reluctance when it comes to engaging in lengthy lectures, quizzes, and assignments typically observed in classrooms catering to children. Consequently, they often disengage from formal educational settings that treat them as if they were children, as highlighted by Knowles (1980). Schulze (2014) further identifies a significant statistical correlation between self-directed learning and the completion rates of MOOCs. This implies that individuals who possess stronger self-directed learning abilities tend to complete a higher proportion of the examined MOOC. Given that adults excel in self-directed learning and possess distinct learning requirements, it is crucial to design MOOCs that accommodate these specific needs and align with the characteristics of adult learners. For instance, drawing lessons from Wintrup et al.'s (2014) study explained above, there should be more independence and flexibility in choice of work, more venues and opportunities to participate in discussions, creative ways of assessing the varied approaches to adults learning, etc.

A research by Hansen et al. (2015) of Harvard University studies the socioeconomic status (SES) of learners enrolled in on HarvardX. They use the limited demographic information available on MOOC and use third-party data from Esri and American Community Survey to further understand demographic profile of MOOC students to identify a relationship between SES and MOOC enrolment. The data used contained group level and zip code level information. This data is used to compare parental education and neighbourhood income levels of MOOC participants. They discover that overall MOOC learners on HarvardX tend to lie in more affluent levels and that higher parental education level is also associated with a higher likelihood of MOOC enrolment. The generalisations the paper makes about US as a country where every neighbourhood is code-able can be considered plausible, i.e., those with higher education and in upper strata of SES classes are more likely to join the courses on MOOCs. However, when Hansen et al. (2015) suggest to extend the approach/technique to other countries, one must be very careful because other countries may not be so easily denominated into classes/earnings. Moreover, the findings are not startling as they support existing research. Wintrup et al. (2014) also found that more educated people are enrolling into MOOCs on FutureLearn, which seems counter intuitive. This all leads to the understanding that MOOCs have not penetrated into the low SES levels where the open and free nature is likely to make the bigger impact. If this is the desired result MOOC providers are trying to achieve they are probably doing a good job. However, if they truly want to reach the masses who cannot afford higher education, as is the perceived promise, then they need to better understand and enhance their product offerings so to appeal to the masses.

Li et al. (2019) conducted a study examining seventeen MOOCs offered by Duke University on Coursera. At the onset of each course, surveys were distributed to all participants, specifically targeting courses taught by one or two instructors. The aim of the study was to investigate the interconnections between learners' demographics, self-regulated learning methods, and their perceptions of learning and satisfaction within the MOOC environment, employing a simultaneous SEM model (Li, 2019). Some findings of this study were consistent with prior research, supporting the notion that female students tend to utilise more self-regulated learning strategies (Pajares, 2002). It also revealed that prior experience with course topics predicted the use of goal-setting strategies, aligning with the research conducted by Wang et al. (2013) which observed an increased employment of self-regulated learning strategies among learners with more online course experience. However, in contrast to earlier studies, participants with higher degrees exhibited a reduced inclination towards goal-setting and environment-structuring methods. This finding diverges from the results obtained by Kizilcec et al. (2017), who reported higher self-regulated learning skills among Ph.D. holders in

MOOCs compared to non-Ph.D. participants. It is important to note that Li et al.'s (2019) study used a larger data set providing a more comprehensive perspective.

In conclusion, studying characteristics and behaviour is a popular research area in MOOC research. The literature shows great emphasis towards classification of MOOC users based on their demographical elements such as age, gender, education level, SES class, etc. The studies also touch upon cultural elements and preferences of learners based on their unique requirements. Such studies are useful as they help understand the MOOC user, hence, the learnings obtained can be used to develop MOOCs accordingly and facilitate learning. Although this area has garnered much attention, there is still much room for research within this domain. Lack of Longitudinal studies and deep studying each classification of users are obvious gaps in this area. Further research needs to be done on why different sub-groups identified act the way they do. As such, our study will explore how and why completers and non-completers behave differently. In the process it will try to understand behavioural characteristics of different sub-groups.

2.3.4. Dropout Rates

Plethora of the literature on MOOCs has been driven by the phenomenon of high dropout rates. On average about 5% of the participants complete a MOOC (Jordan, 2014; Eynon et al, 2016). The research in this area has nonetheless contributed a great deal in understanding participant behaviour and devising engaging MOOC retention strategies.

The dominant approach of research in this topic is to try to find the distinct reasons for dropout through various quantitative and qualitative research methods. Khalil et al. (2014) utilised the completion rate data from 42 MOOCs offered by popular platforms, which included Coursera, edX, Udacity, and Moodle. He finds lack of time, feeling of isolation, low of learners' motivation, hidden costs (such as books authored by instructor), low required skill level for the course, poor knowledge of the topic as the main causes of why participants dropout of the course. Strategies suggested by Khalil et al. (2014) are: flexible timetables, formal recognition of achievements, enhancing student-student or student-instructor interaction, trained teaching assistants and peer based assessments. Adamopoulous (2013) uses the grounded theory method to investigate the high dropout rate phenomenon. The findings of the study reveal that professor(s) or instructors are the most significant element in online course retention and have the greatest beneficial impact on a student's likelihood of passing a course. Furthermore, retention is impacted by whether a certificate is given following successful course completion. Also, a student's likelihood of passing a course increase with how good a university is regarded (i.e., higher ranking).

To further discussion on distinct reasons for dropout, Nawrot et al. (2014) conducted a survey to investigate the primary causes of dropout. Participants were provided with a predefined list of twelve reasons tailored to the MOOC context, along with the opportunity to provide additional explanations for their decision to withdraw. The study revealed that poor time management emerged as the primary cause of high MOOC withdrawal rates. Other factors, such as lack of time, isolation, insufficient background knowledge and skills, varying learner motivation and approach, hidden costs, and course design, were also identified as influential in participants' decisions to withdraw that are common reasons found in other studies (Belanger, 2013; Yuan, 2013; Bruff, 2013; Aldowah, 2019). Moreover, research has indicated that several key variables (including academic skills and talents, prior experience, course design, feedback, social presence, and social support) directly influence student dropout in MOOCs. On the other hand, elements such as interaction, course difficulty and length, dedication, motivation, and family/work conditions play a supporting role in voluntary disengagement with the course (Aldowah, 2019).

Although, finding out the reasons of dropouts do indirectly inform you on how to stop making the same mistakes and prevent high dropout in the next run of the MOOCs. The next realm of research in the area of dropout rates is researchers trying to explore and come up with predictive measures to prevent users dropping out of MOOCs. In a study, Kizilcec et al (2014) from Stanford University created a predictor tool that identifies if the student is going to dropout or not. Criteria for drop out is defined as: if a student doesn't attend for one month or doesn't watch 50% of videos. They claim that they can red flag a student before he is dropped out about 40 to 50% of the time while they are still active. The criteria they use is subjective and may vary from one MOOC to another but nonetheless it is a step in the right direction. It'd be great to see a study whereby an individual person's interests are tapped into and flagged when s/he is at a risk of dropout.

Another plausible way to understand and predict the dropout behaviour is by understanding clusters or groups formed that shared similar behavioural patterns. Feng et al. (2019) studied two datasets from a MOOC platform. The first dataset included thirty-nine instructor-paced courses, while the second included about seven hundred instructor-paced courses and about five hundred self-paced courses. Clustering analysis was performed on the dataset to better understand the users' learning behaviour, which divided the users into five clusters using the k-means algorithm. Clusters two and five both had low dropout rates, with cluster five being hard workers and cluster two being active forum participants. Cluster four members frequently reset their answers, indicating that they had difficulty understanding concepts. The patterns identified in the cluster activity were used to brainstorm solutions for predicting when and whether a user will drop out of a course. The result of

this study has developed a predictive model to determine the likelihood of whether a student is likely to dropout or not. If it is found that the student is likely to drop out he/she is given an intervention message encouraging him to continue. The messages are divided into three categories: i) certificate driven, ii) certificate driven with video, and iii) effort driven. For certificate driven a message a message is sent that tells them how likely it is for them to receive the certificate and the necessary steps they should take. For certificate driven in video a message is sent to them when they are watching video. The messaging uses the same strategy, i.e., the message encourages them to continue working to receive the certificate. For effort driven messages, participants are sent messages on how much they have accomplished and how much effort they have put in. At the same time encouraging them to continue on. It was discovered the certificate and effort driven messages produced positive results to reduce the dropout rate. Whereas, the certificate with video messages proved helpful in encouraging participants to watch videos. This is another successful study that works on predicting dropout of participants. It uses the classification of different types of courses and similar actions produced by friends on the course. Although, this is a conclusive study and with useful findings, it is limited, i.e., there can be many other factors that need to be explored e.g. the influence of different reward systems and engagement strategies of MOOC to minimise dropouts.

To better understand the dropout behavioural pattern of participants Clow (2013) introduces the metaphor of a "funnel of participation" (see Figure 2.1) to help better understand the high dropout rate phenomenon in MOOCs.

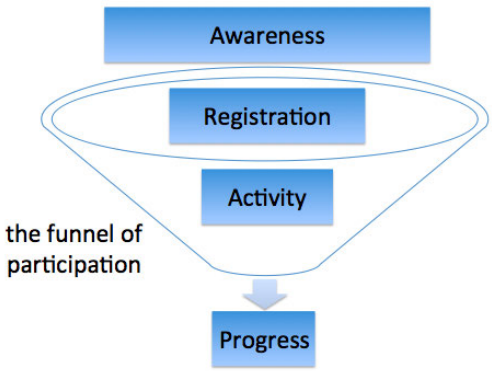

Figure 2.1. Funnel of Participation (Clow, 2013)

The "marketing funnel" commonly taught in marketing courses serves as the model for the participation funnel. The first stage of the participation funnel in a MOOC is awareness where prospective students must be aware that the MOOC is available before activity is possible. The next step is registration, which will only be desired and successfully completed by a small percentage of

people who are informed. A portion of individuals who registered will then participate in an activity, and some of them will make progress in their learning that is significant. At each stage, the drop-off is significant. The funnel's two key characteristics are sharp drop-offs between levels and substantially unequal participation levels. Analysis of the three communities (iSpot, Cloudworks, and openED) finds other examples of the funnel's steep drop-off and highly unequally distributed activity patterns in relation to formal schooling. The participation funnel shows that high drop-offs and extremely unequal participation patterns are a specific challenge for MOOCs and other analogous open online environments. Kloft (2014) also explores the when students drop out of the course by observing that with the passage of time, the number of active users of MOOCs rapidly declined. In addition, they found out that the likelihood of dropping out is particularly significant during the first two weeks. Analysing deeper into this insight, they studied the student dropout rate during the earlier weeks of MOOCs. It was found that the first week of enrolment recorded the highest number of dropouts. The trend continued in the second week, although at a comparatively lower rate than the first week. In order to further understand when students dropout from a course, it is important to find out the most probable day for their lost interest. Earlier research has indicated the first two weeks, more evidently the first week, as the one accounting for the highest attrition rate. However, finding out the exact day of their leaving, and why students decided to leave, can help us devise strategies to retain them. Also, delving deeper and examining precisely when students stop paying attention in class is an important aspect to further research in this area. The results obtained will assist in identifying any recurring behavioural patterns and addressing them.

Although, much research has been conducted exploring why and how people drop out of a course, an important aspect that needs more consideration is - what is the phenomenon of dropout in MOOCs. For instance, dropping out of MOOC may not mean leaving the course because a user does not like it. To understand the dropout phenomenon, Liyanagunawardena et al. (2014) conduced a qualitative study that uses an ethnographic approach to investigate MOOC participants' perspectives on dropout, completion, and success. Semi-structured interviews were used to collect data from six participants. At the time of interview, the six participants had registered for twenty-seven MOOCs and taken twenty-one of them. Each face-to-face interview of about thirty minutes was audio recorded with permission and later transcribed in full. The interview transcription was emailed to the participant in cases where clarification was required. The research population consists of MOOC participants who have registered for and/or participated in one or more MOOCs. All of the participants had different definitions of the word dropout, but when pressed further, their answers seemed to align to some extent. Some participants even considered the personal aspect, i.e., the fact that some people drop out

of MOOCs after they have achieved their goals, which the general definition of dropout does not cover. Participants stated that such people should not be labelled as dropouts. This small study suggests that dropouts should be examined from a different angle, taking into account participant situational factors such as when they enrolled in the course and their intentions for the course. Hadi et al. (2016) presented a novel methodology to assess learner achievement in MOOCs, considering both overall completion rates and the micro-learning experiences within the courses. This new model introduced two key metrics in addition to the conventional measure of overall MOOC completion. The first metric in the proposed model is the percentage of units completed relative to the total number of units available for learners. Within each MOOC, there were six units, and to determine the maximum number of units that could be completed by learners, the number of enrolled and active learners was multiplied by six. The model suggests that instead of solely focusing on overall completion rates, MOOCs should prioritise the measurement of meaningful learning, as proposed by Bali et al. (2014). Katy et al. (2014) also acknowledge the importance of exploring completion defined as a percentage of active learners in courses and suggest further investigation in this area. The proposed model presents a more comprehensive set of metrics for evaluating the success of MOOCs, as it considers not only overall completion rates but also the meaningful micro-learning experiences that occur within the MOOC environment (Hadi et al., 2016).

In conclusion, dropout rate is a popular topic among MOOC researchers. The very nature of the MOOCs allows students to drop out of a course at will. As such the dropout rates are very high and the literature reviewed in this area generally tries to unearth various causes of dropout and propose solutions to tackle them. Researchers try to understand the concept and behavioural patterns of dropout. Predictors are also developed that signal when a user is likely to dropout such that timely interventions can be planned and deployed. To further research in this area there is a need to study dropout rates from different aspects and angles. This could be in the form of studying dropout behaviour of different categories and sub-classifications as is the recent trend explained above. This research investigates the change in intention for a participant to continue with the course. This means studying the MOOC users from the perspective of change in intentions, hence, understanding why users change intentions to continue using the MOOC.

2.3.5. Motivation

As the preceding sections have indicated, motivation plays an important role in the engagement and continuance of learners in Massive Open Online Courses (MOOCs). However, understanding the intricacies of why individuals enrol in and participate in MOOCs can provide valuable insights into

their ongoing commitment and decision to continue or discontinue a MOOC. In this section, we delve deeper into the diverse motivations that drive individuals to join MOOCs.

Motivation is defined as "the reason why someone does something or behaves in a particular way" in Oxford dictionary. However, does having a credible reason to take up a MOOC relevant to improve retention of learners? This question is considered by Xiong et al. (2015) research who uses structural equation modelling to model data from a Penn State University MOOC to investigate the links between student motivation, engagement, and retention. Motivation can be investigated in three ways: intrinsically, extrinsically, and socially. The following hypotheses are being tested: (a) student motivation predicts course engagement; and (b) student engagement predicts course retention. Xiong et al. (2015) used data from an 8-week Coursera course called Introduction to Art: Concepts and Techniques at Pennsylvania State University. Upon completion of the MOOC, a total of approximately 37 students had initially registered for the course. After excluding individuals who did not complete the pre-course survey and those who did not engage in any course activities beyond registering, a sample of around 17,000 participants was retained for analysis. The motivation of these participants, which could be influenced by intrinsic, extrinsic, or social factors, was assessed using a pre-course survey questionnaire featuring items rated on a five-point Likert scale. It is important to note that intrinsic motivation, extrinsic motivation, and social motivation are latent variables, meaning they are not directly observed but can be measured using observed indicators (MacCallum et al., 2000). Multiple indicators were utilised to measure these variables, while retention and intrinsic motivation were measured using a single indicator. The results of the structural equation modelling (SEM) analysis revealed that motivation strongly predicts student engagement in the course. Moreover, engagement was found to be a robust predictor of retention. Based on these findings, monitoring individual students' online activities could potentially enhance course retention, while focusing on improving student motivation may also contribute to increased retention rates. Hence, motivation can be a great tool of enhancing engagement in the course. Understanding motivational needs of the participant sub-groups can help device strategies that can facilitate participants to achieve their learning goals. Much of research in the area of motivation is centred around the reasons for taking up MOOC. However, it is important to explore participants' reasons for taking up a MOOC.

White et al. (2014) try to uncover motivation of MOOC producers and participants. A qualitative approach was used to analyse published content in determining whether higher education institutes should foster MOOCs or not. To understand participants' motivation, an online survey was used to gather their response and quantitative techniques were used to analyse the data. The research discovers the following motivations for producers to make MOOCs: strategic growth, marketing,

strategic collaboration with universities, organic evolution, response to learners needs, data for research analytics and educational enhancement. For the participants the motivational elements identified are: free availability, flexible timetables, opportunity to learn with the top universities, professional development and life-long learning. The top three scores were obtained by the attributes that MOOCs are free to take, the topic interests the participants and the opportunity to refresh knowledge. It is interesting to note the most popular reasons are all intrinsic in nature and are defined by the free will and internal derive of the participants. Accordingly, it is important to appeal to intrinsic motivations of the participants for better engagement in MOOCs. Semenova (2020) investigated the impact of internal motivational elements impacting completion of a MOOC while accounting for participant characteristics and the degree of interaction with the course materials. The research resource combines participant tracking data from nine MOOCs with participant survey data. The study sample is made up of students from nine Coursera MOOCs. All registered participants were asked to complete an online survey before the MOOCs began. Only students who participated in the survey are part of the research sample. About ten thousand participants from nine MOOCs in the subject of economics make up the final sample. Three common ways were used to measure how involved students are in MOOCs: via watching video lectures, completing activities, and participating in forums. This study utilised the MOOC completion and participating in forums as indicators of high motivation. The completion indicator is used because it has been shown to be the best predictor of task completion (De Barba et al., 2016). Furthermore, research has shown a correlation between participation in the MOOC forum and passing the course (Ferguson et al., 2015; Barak et al., 2016). The motivation scale was developed to assess motivation in MOOCs using the concept of a typology of motivation. For each motive type established in the self-determination theory (Vallerand, 2000), a set of sentences conveying a specific motivation for enrolling in the course was generated. When learners' characteristics (gender, age, level of education, subject knowledge, prior experience with online learning), level of engagement with the course materials (passing the first week's tests, participating in the forum), and motivation are taken into account, the results of logistic regression show a significant relationship between motivation and finishing a MOOC. Therefore, motivation is closely tied to participants' earning a certificate and learners' level of participation in the course as also supported by Barak et al. (2016), Yang, (2014) and Xiong et al. (2015). This also indicates that students are taking MOOCs with objectives other than earning a degree in mind. Hence, the likelihood that a MOOC will be completed is greatly increased by intrinsic motivation.

Motivation to join a MOOC can be as simple as a friend's recommendation. Bayeck (2016) conducted a study on students assigned to work in groups within a massive open online course. The research

gathered data on students' demographics, motivations for enrolling, and found that women outnumbered men in MOOCs with group work, and the primary motivation for enrolment was through friend recommendations. The study used a pre-course survey of MOOC students from Pennsylvania State University on the Coursera platform. Participants rated the importance of statements related to personal interest, skill acquisition for job prospects, and connecting with other students. The findings indicated that women were more likely to participate in MOOCs with group work, and friends played a significant role in motivating students to enrol. These results align partially with earlier research that emphasised the desire for learning new concepts, exploring areas of interest, and skill development as motivations for enrolling in MOOCs (Chang et al., 2015). However, Bayeck (2016) highlighted greater significance of making friends in motivating students to join a MOOC, compared to credit collection and program-related factors observed in previous studies (Zhong et al., 2016; Stokes et al., 2015; Radford et al., 2015).

In conclusion, a thorough examination of the literature indicates that disengagement and high dropout rates in MOOCs can be attributed to various factors. These include differing levels of learner motivation (Yuan et al., 2013), participants' inadequate knowledge and skills to effectively engage with the course material, and a sense of isolation among some learners who must take initiative and develop independent learning habits (Belanger et al., 2013). Furthermore, the presence of hidden costs, such as the requirement to purchase textbooks and additional learning materials, can act as deterrents to engagement (Nawrot et al., 2014). To address these challenges and promote greater engagement while reducing dropout rates, several recommendations have emerged from the literature. These include providing formal recognition, such as certificates, to motivate students towards completion of the course (Belanger et al., 2013). Additionally, offering flexible timetables that accommodate learners' schedules can enhance participation (Khalil et al., 2014). Furthermore, fostering a sense of community and encouraging social interactions among learners can have a positive impact on engagement and course completion (Young, 2013; Saadatmand et al., 2014). In response to these recommendations, many MOOC providers (such as Coursera) have implemented measures to address these issues. For example, Coursera now offers certificates at a cost for learners who successfully complete the course, ensuring accessibility to course materials without barriers, while providing an optional certification for those who require it (Young, 2013; Saadatmand et al., 2014). By incorporating these strategies and initiatives, MOOC providers aim to enhance learner engagement, reduce dropout rates, and facilitate a more fulfilling learning experience for participants.

As discussed, motivation of joining and using a MOOC have generally been discussed by a large number of researchers. However, further studying each reason for joining in greater depth will unearth

clues for improving retention and the overall MOOC experience. For instance, it would be interesting to understand why a student drops out of a course even though their initial motivation was to learn and complete the course. This study tackles such a change in intention to continue using a MOOC or drop out from it.

2.3.6. Communication

Encouraging effective communication within MOOCs is vital in getting participants to interact with each other. This not only helps them learn from each other but helps them build networks which are useful in enhancing participants engagement and continuance behaviour (Gillani et al., 2014).

MOOC participants, as discussed in earlier sections often have diverse backgrounds and motivations, rely on various communication channels. A large number of participants communicate and learn on MOOC forums (Ntourmas et al., 2019). Participants do not only use MOOC forums they are now utilising other social media platforms and blogs to learn and communicate about courses offered on MOOC platforms (Sui et al., 2010). Gillani et al (2014) conducted a study that attempts to identify the demographics, communication pattern and performance outcomes of students who participate in forums. They used pre and post-course surveys together with learners' activity in the course and forum. They found that most forum participants were young adults from the western world. It was also discovered that participants assembled and dispersed in crowds and not communities. Also, generally, participants who participated on forums are higher performers than those who do not. When learners want to explore a topic they discuss with their peers and instructors to further understand it. Therefore, understanding forum participation and how leaners communicate with each other can help improve learner's experience on the course and help improve dwindling retention rates.

Wong et al. (2015) focused on users who actively engaged in discussions within MOOC discussion forums. The research aimed to answer two key questions: 1) Do active users have a greater influence on forum conversations compared to typical users? 2) Overall, do active users contribute positively to the MOOC forum? To assess the impact of different types of forum users, to answer question one, three measures were employed: 1) the number of times a user viewed or read a thread, 2) the total number of replies or posts in the thread, and 3) the duration of the thread, which indicates the length of discussions. The number of thread views reflects the popularity of a discussion topic among students, whilst the number of replies indicates user participation. The duration of a thread can indicate the significance and engagement of the topic. To address the second research question, the study analysed votes received by posts and comments in the forum. Users had the option to rate posts positively or negatively. Higher positive votes indicated useful and valuable content, while more

negative votes suggested irrelevant or inappropriate contributions. The study examined both positive and negative votes to assess the impact of active users on course discussions. The findings of the analysis revealed that users who consistently participated in forum discussions held statistically higher influence, and their contributions had a positive impact on discussions. Therefore, understanding participants and their communication patterns is crucial to understand engagement.

Huang et al. (2014) examined data from 44 Coursera MOOCs, focusing on the forum activity of users and focused on the participants who contribute the most to the forum, dubbed "superposters." The study investigates who these superposters are and examines their engagement patterns across the MOOC platform, with a specific focus on the question: to what degree is superposting a beneficial phenomenon for the forum? While superposters definitely contribute significantly to the forum in terms of quantity, how do their contributions fare in terms of quality, and how does this prolific posting behaviour effect the contributions of the vast majority of students in the class? It is discovered that superposters exhibit the same behaviours across the majority of MOOCs they participate in. On Coursera, superposters enrol in more courses and receive higher grades than the average forum participant. Students who thrive in one course perform significantly better in another. They are more likely to be outliers in succeeding courses. In terms of utility, our analysis shows that, while superposters' responses are not the fastest or most voted, they are faster and receive more votes than the average forum user's posts. Finally, it is discovered that increased superposter activity does not overpower the silent majority, but rather has a positive and significant correlation with increased forum activity and health.

Gillani et al. (2014) used Bayesian Non-negative Matrix Factorisation (BNMF) to extract communities of learners. The model learns and groups students based on their posts on the forum. They extracted four and five different communities from case sub-form (a place for students to discuss, share and practice their tools/concepts learnt) and Final Project sub-form (a place for students to discuss their final project) respectively. The groupings obtained helped understand the behaviour of participants on the forum. It was also observed that people belonging to the same region tended to communicate in a similar fashion. In another study, Colas et al., (2016) studied the effect of using other language facilitation in conjunction with using English language for facilitation. Seven teams of facilitators were studied who worked on the Hands-On ICT MOOC, each serving a distinct linguistic community. Promoting active involvement and peer mentoring was facilitators' core responsibility. A number of indicators of intention to learn were discovered by comparing language groups; some of these predictors were already visible in the first few days of the MOOC. The comparison also revealed four important factors: group size, language of involvement, facilitation,

and an already-existing sense of community influences active participation of the users. The results show that multi-lingual facilitation promotes active participation of users. This may be because participants are more comfortable articulating and seeking help in their own language, which could be other than English. These studies show that personalising interaction among MOOC users holds key to active engagement of participants.

Wen et al. (2014) aimed to extract collective sentiment from forum posts within a Massive Open Online Course (MOOC). Their objective was to track students' evolving attitudes toward the course and its major components, such as lectures and peer-assessment. The researchers examined the impact of sentiment on attrition over time at the user level and investigated the relationship between student opinions and dropout rates using collective sentiment analysis at the course level. To facilitate instructors in obtaining students' opinions on different course tool designs, the study identified the most associated positive and negative sentiment words related to specific course tool keywords. Survival analysis was employed to assess how the expression and exposure to sentiments by members within a given week predicted their continued participation in forum discussions, thereby exploring the influence of sentiment at the user level. The study discovered a relationship between the sentiment ratio, as measured by daily forum posts, and the daily dropout rate of students. This finding suggests a connection between the expressed sentiment within forum discussions and the number of students who discontinue their participation in the course on a daily basis.

Du et al. (2022) conducted a study to examine the impact of instructor participation in online discussion forums on student engagement in MOOCs. The analysis utilised data from a Chinese MOOC platform, which included approximately 17,000 classes from around 4.5 thousand Chinese MOOCs. The dataset consisted of 16 million student posts and replies, 200 thousand instructor posts, and 2 million instructor replies. Overall, student participation in online discussion boards was found to be low, with an average of only 3 minutes of activity per week. Instructor participation primarily involved responding to student posts, accounting for about ninety percent of all instructor activities. On average, instructors posted one message per week and replied to nine messages. The study employed class-level fixed-effects regression analysis to test hypotheses. The findings indicated that instructors were more inclined to participate by replying to posts rather than initiating new discussions. However, when it came to increasing student participation, instructor posting was found to be more effective than instructor replying, and this advantage became more pronounced as class size increased. The positive effect of instructor response was negatively influenced by class size, while instructor posting remained unaffected. These findings suggest the importance of having a well-planned participation strategy for instructors to effectively engage in MOOC discussion forums.

In conclusion, research reviewed in the area of MOOC communication generally supports positive evaluative outcomes of MOOC participation. Studies in this area try to understand different venues and platforms of participation, type of user participations, community and group development, content analysis, sentiment analysis, the effect of instructor and administration involvement, etc. A significant gap in this area, which this research will explore, is studying how the forum activity of different category of participants, specifically completers, is different from others.

2.4. Discussion

The literature examined in this chapter primarily focuses on different aspects related to participant continuance behaviour in the area of participant engagement, pedagogy/course design, dropout rates, motivation, characteristics, and communication in MOOCs. Despite the existing research, there are still significant gaps in the literature that provide opportunities for further investigation.

Studies like Clow (2013) and Kloft (2014) in the literature try to tackle the behavioural patterns on when the participants are likely to drop out with respect to the time spent on the course and have highlighted early dropout patterns as a common phenomenon. However, there remains an opportunity to conduct cross-sectional analyses during the entire course duration. Specifically, we aim to investigate which specific day during the life of the course experiences the highest number of dropouts and, more importantly, why students tend to disengage at that particular juncture.

The communication aspect of MOOCs holds great opportunities for research. As explained in the literature review section the communication area in MOOCs research carries opportunity to do research on different categories of users and their interactions amongst each other and the environment. As such, this research takes the opportunity to investigate the responses between the categories of completers and non-completers.

Another area literature review suggests hold great opportunity for research is investigating dropout rates. Researchers continue to try to understand and influence the phenomenon of high dropout rates. Gaps exist in literature to study dropout rates in light of various different categories of users and behaviours. This research takes an opportunity to explores the aspect of changing intention during the course.

Presented below are the aims and objectives of this research that utilise the gaps derived from literature review and synthesize problem statements to be answered in this research.

2.4.1 Aims and Objectives

The primary aim of this study is to investigate the continuance behaviour of MOOC participants, with a specific emphasis on examining the degree of involvement and active participation, as well as the reasons for withdrawal or disengagement from the course. As discussed in the literature review, there are numerous gaps that provide opportunity for research in this area. In line with the gaps identified, following are the objectives and questions that this study strives to address:

1. To identify patterns of dropout in MOOCs by analysing when do the most number of students dropout and to investigate the reasons behind it. Consequently, the questions are: i) what day during the life of a course shows the most number of dropouts? And more importantly ii) why do students dropout at this point?
2. To compare the forum activity between the categories of completers and non-completers. The question to answer is: How do MOOC students who participate in forums compare, in terms of completion rates, to those who do not?
3. To explore and understand the aspect of changing participant intention during the course. The question formulated for this investigation is: Why would a student change initial intention to continue or not continue with the course?

2.4.2 Conclusion

In conclusion, the literature review has provided valuable insights into the dynamics of MOOC learners' continuance engagement and retention. It is evident that existing literature has made significant contribution in the areas of MOOC learners' classification, motivations, pedagogical elements, characteristics and behaviour, communication, dropout rates and motivation.

However, several critical research gaps persist, offering opportunities for further investigation. This study aims to address three specific gaps in the literature, which include identifying the specific day during the course when the most dropouts occur, investigating the differences in completion rates between MOOC students who participate in forums and those who do not, and exploring the phenomenon of changing intention during the course and its effects on dropout rates. The outcomes of this research will provide the MOOC providers valuable insights to reduce dropout rates, enhance student engagement and retention, and improve the overall quality of online education resulting in improved learning experience and outcome for the participants. Consequently, improved revenues and reputation for the providers.

Chapter 3

Research Questions & Methodology

This research studies participant behaviour in how they engage with MOOCs. In doing so it will help MOOC stakeholders in identifying and deploying improved strategies for better engagement. By addressing the identified gaps in the literature (Section 2.8) and delving deeper into research findings the study makes a valuable contribution to the field of MOOC research. Following research questions have been addressed in this study:

- Research Question 1: What day during the life of a course shows the most number of dropouts and the reasons for it?

  The first research question seeks to determine the day during the life of a course that shows the highest number of dropouts and the reasons behind this trend. By understanding the pattern of dropouts, the research aims to develop ways to enable and encourage willing participants to remain engaged with the course for a longer period, maximising the benefits they derive from it. The research methodology includes a pragmatic and deductive approach with data analysis using mixed-methods, which is explained in detail in section 3.1. The data for this question is sourced from FutureLearn.

- Research Question 2: How do MOOC students who participate in forums compare, in terms of completion rates, to those who do not?

  The second research question aims to compare MOOC students who actively participate in forums with those who do not, specifically in terms of completion rates. Understanding the relationship between active forum participation and course completion rates will inform strategies to encourage engagement in MOOC forums, potentially leading to improved overall completion rates. The research approach for this question is pragmatic and deductive, using data analysis with a mono-method approach, which is explained in detail in section 3.1. Data for this question is collected from FutureLearn.

- Research Question 3: Why would someone change initial intention to continue or not continue with the course?

  The third research question seeks to investigate why someone would change their initial intention to continue or not continue with the MOOC. Understanding the reasons behind these changes in intention will provide insights into the strengths and drawbacks of the MOOC. By identifying

engaging aspects of the course that led participants to modify their decision, the research aims to encourage increased participant engagement in MOOCs. The research methodology for this question is pragmatic, deductive, and employs a survey approach with mixed-methods, which is explained in detail in section 3.1. Data is collected directly from the MOOC participants.

3.1. Critical Evaluation of Research Strategies

Some researchers believe that concerns of paradigm are more important to your research than questions of which methodologies to use (Guba et al., 1994). It may not be totally accurate because questions about the procedures to use are equally, if not more, important, as the appropriate methods and their correct application will help you reveal truth efficiently and reliably. However, it must be stated that paradigm questions cannot be overlooked. They undoubtedly contribute to a better understanding of the research topic and approach. Research Onion, Figure 3.1, by Saunder et al. (2012) is utilised to further illustrate the research methodologies used in this study.

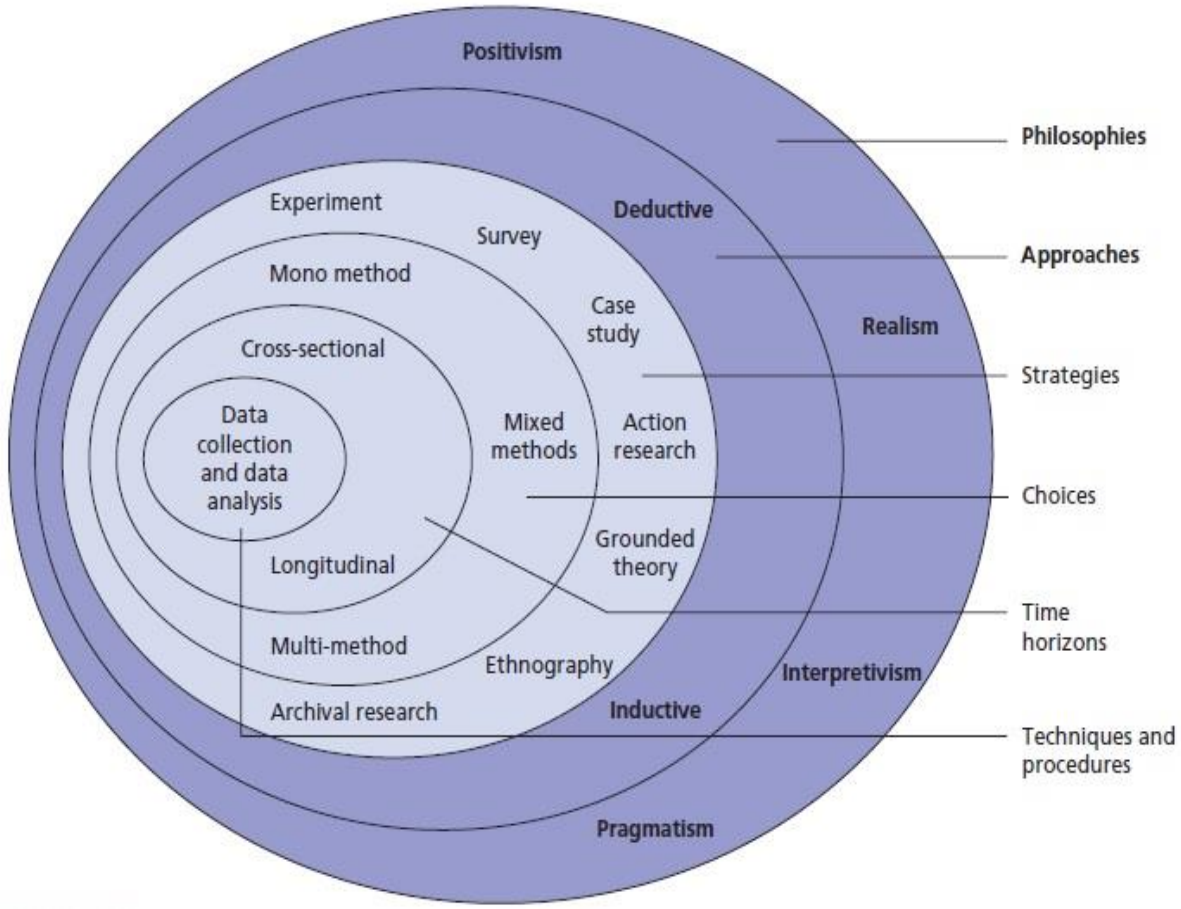

Figure 3.1. The Research Onion (Saunders, 2012)

3.1.1. Philosophies

The first layer of the research onion contains the following philosophies (Saunders, 2012; Grace, 2010; Legg et al., 2008; Dudovskiy, 2011):

- Pragmatism – Pragmatism emerged in the United States around 1870 and is increasingly recognised as a global alternative to both analytical and "Continental" traditions. The classical pragmatists, Charles Sanders Peirce (1839–1914) and William James (1842–1910), laid the foundation for this philosophical school. Pragmatism views the understanding of the world as inseparable from our actions within it. It has been interpreted in diverse ways, including the notions that philosophical concepts should be tested through scientific experimentation, that truth is determined by usefulness, that experience involves interacting with nature rather than representing it, and that language relies on implicit shared human practices. Pragmatism rejects the idea that thought's purpose is to describe, represent, or mirror reality.

  To analyse this research from a pragmatist way of thinking, from ontological perspective (concerned with the nature of reality), the researcher is focused on addressing the core questions. The analysis, findings, and methodologies were all shaped based on the researcher's perception of what was necessary to address the issues effectively. Epistemologically (concerned with what constitutes acceptable knowledge), the researcher diligently prepared to collect data and gain a comprehensive understanding of the situation. There is a strong inclination towards analysing scientific facts and providing contextualisation for the analysis throughout the investigation. Additionally, qualitative data from interviews with social actors is integrated into the framework when seeking to interview MOOC participants. Axiologically (concerned with the role of values in research), a pragmatic research method was employed, combining both quantitative and qualitative measurements to answer questions. The advantage of this approach lies in its ability to maintain focus on answering the essential questions, leading to more convincing findings. However, a drawback is the risk of overlooking valuable insights from external factors or contextual nuances, potentially dismissing what might be considered unimportant. As a pragmatist, the researcher is careful to formulate precise questions and acknowledges the significance of considering externalities whenever feasible and relevant to the problem at hand. Balancing thoroughness with practicality is a key aspect of this approach, aiming to provide plausible answers to the research problem.

- Interpretivism – This philosophy incorporates the perspectives of individuals into research by focusing on the interpretation of study components. Influenced by the philosophical ideas of Max

Weber (1947), Immanuel Kant (1964) and Edmund Husserl (1960), interpretivism emphasises subjectivity and assumes that social constructs such as language, consciousness, shared meanings, and tools provide access to reality, whether it is given or socially constructed. Interpretive researchers challenge positivism in the social sciences, favouring qualitative analysis over quantitative methods. They believe that research conducted by humans on humans cannot produce objective findings because researchers' values and beliefs inevitably influence their investigations. Instead, interpretivists seek to understand the subjective experiences of social interaction and develop hypotheses by immersing themselves in the social context. It emphasises the understanding of human differences as social actors.

To analyse this research from a pragmatist way of thinking, from an ontological perspective, the focus on understanding the reasons for drop out and changing intentions in first and third questions, respectively, actively embrace and seek to understand the interpretivism aspect. From epistemological perspective, the research specifically aims to delve into qualitative data. This will involve gathering feedback from MOOC participants and forums. Axiologically, the researcher opting out of participating in this research would be extremely challenging, if not impossible. It's important to acknowledge that biases are inherent in this method. Nevertheless, these biases can be mitigated by supporting proposed solutions with well-established facts. This research makes a concerted effort to extract meaningful insights from the social construct presented by MOOCs. However, it is crucial to recognise that both the researcher's personal experiences and the experiences of the participants in the MOOCs being studied can introduce bias, potentially limiting the generalisability of the findings. Therefore, great care will be taken when developing measures to minimise the likelihood of bias. Overall, the research recognises and addresses the complexities of its approach, striving to ensure a rigorous and objective analysis of the data gathered.

- Realism – It is a philosophical perspective that posits the existence or nature of things independent of subjective thoughts or perceptions (Grace, 2010). It encompasses various domains, such as ethics, aesthetics, causation, modality, science, mathematics, semantics, and the everyday world of macroscopic objects and their attributes (Legg et al., 2008). While philosophers may choose to embrace or reject realism entirely, it is more common for them to adopt a selective realist or non-realist stance depending on the specific topic under consideration. For instance, one could maintain a realist position concerning the common world of macroscopic objects and their properties while adopting a non-realist perspective regarding aesthetic and moral values. Realists

generally argue that our present understanding of reality is an approximate representation, and both its accuracy and comprehensiveness can be enhanced.

To analyse this research from a pragmatist way of thinking, from an ontological perspective, while the research questions have a positivist tilt, the study acknowledges the significance of context and the influence of social actors in the analysis and solutions. Epistemologically, the research not only relies on scientific evidence but also considers the broader setting of the scenario. Axiologically, contextual information is essential for interpreting the research findings, although it may not always be explicitly provided. To mitigate potential biases, drawing conclusions by considering previous research is crucial, as emphasised in the document related to the first question. The complexity of the problem at hand is simplified to facilitate measurement, but this approach also introduces a novel perspective on how social actors impact the outcomes. However, it may fall short in capturing the atmosphere or social construct of the scenario. Enhancing the research's efficacy can be achieved by relating scientific findings to the influence of social variables, allowing for more comprehensive and practical solutions. By grounding solutions in the real world, the research can be better understood and implemented. Careful consideration and thoughtful methods are necessary to ensure the relevance and applicability of the proposed solutions.

- Positivism – It is an empiricist philosophical philosophy that asserts that true knowledge is derived either from definitions or from sensory experiences through reason and logic. It upholds the belief that only factual knowledge acquired through observations, including measurements, can be considered reliable (Comte, 1830). Consequently, positivist research findings typically prioritise observability and measurability. While the positivist approach has been influential throughout the history of Western thought, it was Auguste Comte who first articulated modern positivism in the early 19th century (Comte, 1830). Following his work, positivist schools emerged across various disciplines, including logic, psychology, economics, historiography, and others, aiming to apply scientific methods to the subjects they studied. Please note that the above interpretation has been paraphrased to avoid plagiarism, but the ideas and concepts remain the same.

  To analyse this research from a positivist way of thinking, from an ontological perspective, this research relies on objectivity and the analysis of data through scientific methods. Epistemologically, the analysis involves gathering information such as user activity logs, enrolments, and dropouts. These aspects are rooted in the scientific approach and are subject to

measurement. Axiologically, every question posed in this research requires objective data collection, emphasising that the data should be allowed to speak for itself. This approach minimises the impact of the researcher's personal experiences and biases, enabling a more comprehensive and impartial evaluation of the issue, thereby facilitating the exploration of potential solutions. However, it must be acknowledged that not everything can be measured with absolute precision. For instance, the emotions experienced by participants in MOOCs and their online interactions might be challenging to quantify accurately. Therefore, when formulating questions for this study, special care is taken to include only observable characteristics that are relevant to the phenomenon being investigated.

In conclusion, this researcher follows pragmatist way of thinking. It strives to address core questions whilst considering context, subjective experiences, and objective data per the requirements of the question. Balancing practicality with thoroughness, the study aims to provide plausible and well-supported solutions to the research problem, acknowledging the complexities and potential biases inherent in the research process.

3.1.2. Approach

Peeling down to the second layer of the research onion (Saunders, 2012), this section delves into the deductive and inductive research approaches. The deductive approach, commonly associated with scientific inquiry, involves analysing existing theories pertaining to the phenomenon under investigation, examining previous research, and subsequently testing hypotheses derived from those theories. The deductive approach relies on drawing conclusions from premises or propositions, focusing on deriving logical inferences. However, it is important to acknowledge that this approach may be overly rigid, potentially limiting alternative explanations. Nevertheless, it proves highly advantageous when dealing with scientific data and addressing straightforward hypotheses with limited possibilities. The deductive technique offers several benefits, including the ability to explain causal relationships between concepts and variables, quantitatively assess concepts, and partially generalise research findings (Heit, 2010).

On the other hand, the inductive approach, also referred to as inductive reasoning, commences with observations, and theories emerge as a result of these observations during the course of the research process. Inductive research seeks patterns within observations and utilises a series of hypotheses to construct theories surrounding these patterns (Goddard, 2004). Unlike the deductive approach, inductive investigations do not begin with pre-existing theories or hypotheses, allowing the researcher the flexibility to modify the direction of the study as necessary. Inductive reasoning progresses from

specific facts to broader generalisations, moving in the opposite direction of deductive reasoning (Bernard, 2017).

This research follows both deductive and inductive approaches. All three questions require a significant component of deductive reasoning, however, question number three takes inductive reasoning into account before applying deductive approach on the findings to generalise results.

3.1.3. Research Strategy

As a pragmatist the researcher works with the strategy that is deemed best to answer the research questions. From the discussion above it is clear that this research requires the researcher to work with both deductive and inductive approaches.

Grounded Theory is an inductive research methodology that primarily involves qualitative data but can also incorporate quantitative data. It focuses on identifying patterns across multiple data sets and deriving conclusions from the study as a whole, without trying to fit the results into pre-existing theories or frameworks. The central principle of Grounded Theory is to allow the facts and data to speak for themselves, guiding the development of a new theory, model, or framework based on the data itself. This approach is particularly valuable for studying topics that are understudied or entirely novel (Charmaz, 2006; Glaser et al., 1967). Grounded Theory concepts are employed to tackle the question of why users change intention to continue with the MOOC. Exploring such reasons without a preconceived theory shall be useful in gathering varied factors that cause users to change their intention to continue studying a MOOC.

Case study research, on the other hand, is typically qualitative in nature and leans towards inductive reasoning. It is often guided by an interpretivist philosophy, considering the researcher's assumptions and interpretations as relevant (Yin, 2018). It takes into consideration the social context and culture surrounding the subject under investigation. The aim of case study research is to gain a thorough understanding within the context of the study, analysing and comprehending issues in a practical situation. Case studies involve a comprehensive and in-depth examination of a single subject, such as an individual, a group, an organisation, or a specific event, phenomenon, or problem. Hence, it will not be suitable for the questions that are tackled in this study.

Action research is conducted in real-world settings, such as schools, hospitals, or workplaces, rather than controlled environments like laboratories. It helps educators and practitioners address issues or deficiencies in real-world situations. Action research places significant emphasis on the participants involved in the problem being examined, and it is commonly used in social sciences and professions

where individuals strive for personal and professional improvement. Qualitative methods are frequently employed in action research, making it well-suited for studying and understanding individuals and their actions (Reason et al., 2008). Action research will not be suitable in this research as the action of the researcher in the MOOC environment are not required to be studied to answer the research questions.

Ethnography involves observing people in their natural settings and inferring meaning from their cultural relationships. The primary goal of ethnography is to capture the subjective perceptions of participants and understand the world from their perspective. Ethnography is particularly suitable for studying and immersing oneself in the social aspects being investigated (Denzin et al., 2018). Ethnography will not be suitable for this research as it mostly requires opinions rather than observations of the subjects in their natural settings.

Archival research relies on pre-existing data sources, and meaning is derived through the analysis of these data. This approach can utilise resources such as manuscripts and documents and is particularly well-suited for historical research. In the current study, archival research is utilised by examining user logs maintained by FutureLearn to address the first and second research questions (Scott, 1990). This research does make use of data logs maintained by FutureLearn. The first and second questions do require the information stored in user logs to get to the answer.

Surveys are particularly well-suited for a deductive approach, as they allow for the collection of scientific data in a relatively cost-effective manner and can generate a large amount of data. However, surveys may require careful data analysis and can be less comprehensive in terms of exploring complex topics or probing deeply into individuals' experiences and perceptions. (Dillman et al., 2014). To overcome the such limitations researchers often combine surveys with other qualitative methods such as focus groups or interview, as is done in our research.

Experimental research, in contrast, is deductive in nature, aiming to test established theories rather than develop new ones. It aligns with the positivist research philosophy, based on the belief that knowledge can be objectively explored and separated from external influences like environment or culture. Experimental research involves manipulating the independent variable and observing how it affects the dependent variable, aiming to confirm, refute, or validate a study's theory. This approach is characterised by a scientific approach and is typically conducted in a controlled setting (Campbell et al., 1963). Experimental research will not be suitable for any of the questions of this research as they are best answered by exploring and validating data. They do not require test cases or establishing controls to meet the objectives.

In conclusion, surveys, interviews, and analysis of archived data are the main strategies employed in this study. Archived data is primarily used in questions one and two where user activity logs of MOOCs from FutureLearn are analysed in order to make deductions about the behaviour of MOOC participants. Questions one and three both employ interviews to conduct exploratory research where inductive approach is used to draw meaning from the data gathered. Question three utilises survey questionnaire to gather primary data from a large number of participants in order to strengthen and validate research findings.

3.1.4. Method

The first and third research questions necessitate a diverse range of responses. As a result, besides collecting discrete responses through surveys and analysing archived data, the research approach also requires the inclusion of open-ended questions and interviews to capture the nuanced perspectives of the respondents. This invokes the need for a mixed-method approach, combining both quantitative and qualitative elements. On the other hand, the second research question specifically focuses on data that is discrete in nature, hence adopting a mono-method approach that primarily utilises quantitative analysis. By utilising a mixed-method approach for the first and third questions and a quantitative approach for the second question, the research can address the different requirements of each inquiry while ensuring comprehensive data collection and analysis.

3.1.5. Time Horizons

For this research, a cross-sectional study design is employed. The nature of the questions necessitates examining a specific phenomenon at a specific point in time, making a cross-sectional analysis the most suitable approach.

3.2. Approach, Data Collection and Analysis of Research Questions

Approach on data collection and analysis to tackle each question of this study is presented below:

1. What day during the life of a course shows the most number of dropouts and the reasons for it?
   This research primarily takes an explanatory approach, focusing on analysing the enrolment data of three MOOCs offered on FutureLearn during the 2013/14 period. The dataset obtained includes unique participant IDs, as well as their timestamps for enrolment and un-enrolment. The objective is to identify any discernible patterns regarding when participants are more likely to discontinue their involvement in the course. To achieve this, an analysis of the enrolment and un-enrolment data needs to be conducted in order to detect any distinct patterns that may exist. Assuming the

hypothesis is true, interviews are planned to be conducted with MOOC dropouts to explore the underlying reasons of why participants are likely to drop out on a particular day.

2. How do MOOC students who participate in forums compare, in terms of completion rates, to those who do not?

   The necessary data is acquired from FutureLearn on the MOOCs given by FutureLearn. User activity logs, completion rates, and forum feedback are to be used to determine a causal relationship between the variables. As all of the relevant data for the courses can be gathered, sampling is not required, and the data can be utilised to draw the necessary statistical inferences.

3. Why would someone change initial intention to continue or not continue with the course? This is an interesting and complex 'why' question to answer. Simply because there can be so many different variations to the answer. A mixed-methods strategy is utilised to address the variations and validation aspect.

Firstly, interviews of participants who have taken a MOOC are to be conducted. Then, thematic analysis shall be applied on the transcribed interviews data to explore ideas of why would a participant change his / her intention to continue or not continue the course. The resultant findings are to be used to design a survey questionnaire to generalise the findings obtained.

3.3. Ethical Issues

Ethical considerations hold significant importance as primary data is gathered for this study. Firstly, great care is taken in designing the questionnaire to ensure that it does not contain any offensive or inappropriate language. Attention is given to crafting clear and respectful questions that promote a positive and inclusive response from the participants. Moreover, it is ensured that the respondents are well-informed about the purpose of the survey and the anticipated outcomes. Transparency is maintained by providing them with comprehensive information regarding how their responses will be used and the potential impact of their participation. In essence, the aforementioned steps are taken to uphold ethical standards and safeguard the well-being and rights of the participants. These measures help foster an environment of trust, respect, and voluntary participation throughout the data collection process.

The required Ethical approval from University of Reading is obtained to conduct the study. The details of the ethics documents and approval are presented in Appendix 1.

3.4. Conclusion

This chapter has provided a comprehensive overview of the methodology adopted for the research study. It discusses the philosophical stance and approach used in this research, highlighting the epistemological and ontological perspectives adopted for each research question exploring MOOC continuance behaviour of participants. It also outlines the hypotheses that were formulated to guide the study.

In addition, the methods used for data collection and analysis were presented, including the data collection tools, and procedures for data analysis. The chapter also touched on the potential ethical considerations associated with the chosen methods.

Overall, this methodology chapter serves as a roadmap for the entire research study, laying the foundation for the data collection and analysis phases. The approach and methods outlined here will enable the research team to address the research questions and hypotheses in a robust and rigorous manner.

Chapter 4

Investigating MOOC Leaving Patterns

4.1. Introduction

Retaining learners and ensuring course completion remain significant challenges for MOOCs (Henderikx et al., 2017). This chapter strives to address the gap in literature, discussed in section 2.4, and identify patterns of dropout in MOOCs by analysing when do the most number of students dropout, and to investigate the reasons behind it. Studying temporal data on MOOCs can give insight into the underlying causes of when and why the participants are likely to dropout, which can help develop intervention strategies to engage the willing learner to continue using the course. Clow's (2013) 'funnel of participation', explained in the literature review section, draws attention to different stages when the participants are likely to drop out. This research further develops the idea to understand the temporal pattern in a MOOC to identify what day are the participants most likely to drop out? and what could be the main reasons for it?

4.2. MOOCs to be studied on FutureLearn

User enrolment data for the following MOOCs was obtained from FutureLearn platform.

- Exploring Our Oceans: (2 courses)

  Recognise the background of ocean exploration and begin to consider possibilities beyond the surface and coasts. This course reveals the true nature of our planet and discusses how scientists are still learning about this largely unexplored body (ExploreOceans, 2015). The participant investigates a recently mapped area of the ocean floor and learns about the origins of oceanography as a science. The learners will consider ocean currents, sea temperatures, and the tremendous amount of salt in the ocean as they move on to the makeup of the ocean. It runs for six weeks for three hours per week. The course examines the scope and diversity of marine life. The student will find out how life adapts to many habitats, from the coast to arctic conditions and the strange realm of the ocean's depths. Explore seagrasses and coral reefs while getting a glimpse of the variety of life that exists in the oceans. The course also introduces students to species that lurk in the deepest seas as well as how whales can serve as markers of ocean health. To comprehend the effects of human behaviour on the ocean, such as the use of single-use plastics

and microbeads, the future of the ocean is also examined. The participant also thinks about current ocean-related laws and learns about the resources that are accessible on the ocean floor. Data for two courses is obtained where the course activity started in January and June, 2014 and there were 8724 and 9345 students enrolled in the two courses, respectively.

- Digital Marketing: (1 course)

  The participant in this course studies data analytics, privacy, and new trends in digital culture and online consumer behaviour (DigiMarketing, 2015). Participants explore and learn the effects of these advancements on both marketers and consumers throughout the course. They examine how internet behaviour is changing and what implications are for businesses. The relationship between marketing online and offline as well as technological advancements are covered in the course. The participant will learn about the opportunities and difficulties associated with extracting value from data at a time when there is a great deal of ambiguity over personal privacy and control over internet assets. Through interactive exercises and games, the participant will also produce and distribute digital assets, and at the conclusion of the course, they will post a brief video summarising what they have learned. Choosing a marketing strategy that works for your company might be challenging with so many options available. You may learn more about each marketing tactic in depth in this course, including display advertising, pay per click advertising, search engine optimisation, and email marketing. There is no prerequisite for this course; it is designed for those with an interest in learning about digital marketing. Data was obtained for one course where the course started in August, 2014 and had 14511 total student enrolments.

4.3. Methodology

Research design to employs a mixed methods approach, combining both quantitative and qualitative methods to gain a comprehensive understanding of participant dropout patterns in MOOCs. Initially, the study focuses on analysing enrolment data from three MOOCs offered on the FutureLearn platform. The dataset consists of unique participant IDs along with their 'enrolled' and 'unenrolled' timestamps. The objective is to identify any discernible patterns regarding the specific day or time when participants are more likely to discontinue their engagement with the course. Through thorough analysis of the 'enrolled' and 'unenrolled' data, distinctive patterns are sought after. Furthermore, the research extends to qualitative inquiry by conducting interviews with participants who have dropped out of MOOCs. This qualitative phase aims to explore and understand the underlying reasons and motivations behind their decision to withdraw from the course. By engaging in in-depth interviews,

valuable insights into the participants' experiences and perspectives can be gained. By employing this mixed methods approach, the research endeavours to provide a comprehensive understanding of participant dropout dynamics in MOOCs, combining quantitative analysis of enrolment data with qualitative exploration of individual experiences and motivations for discontinuation.

4.4. Analysing Data for Highest Dropout Day

The goal of this part of the study was to find any pattern of when participants are most likely to drop out of the MOOC. To achieve this, data was analysed from both ‘enrolled’ and ‘unenrolled’ groups. The difference between the 'enrolled' and 'unenrolled' timestamps was then calculated to estimate how long individuals remained enrolled in the course. The results obtained are then analysed to check the pattern for the possibility of a common day with the highest number of dropouts. Figures 4.1 to 4.3 show the data of each MOOC plotted in a graphical format.

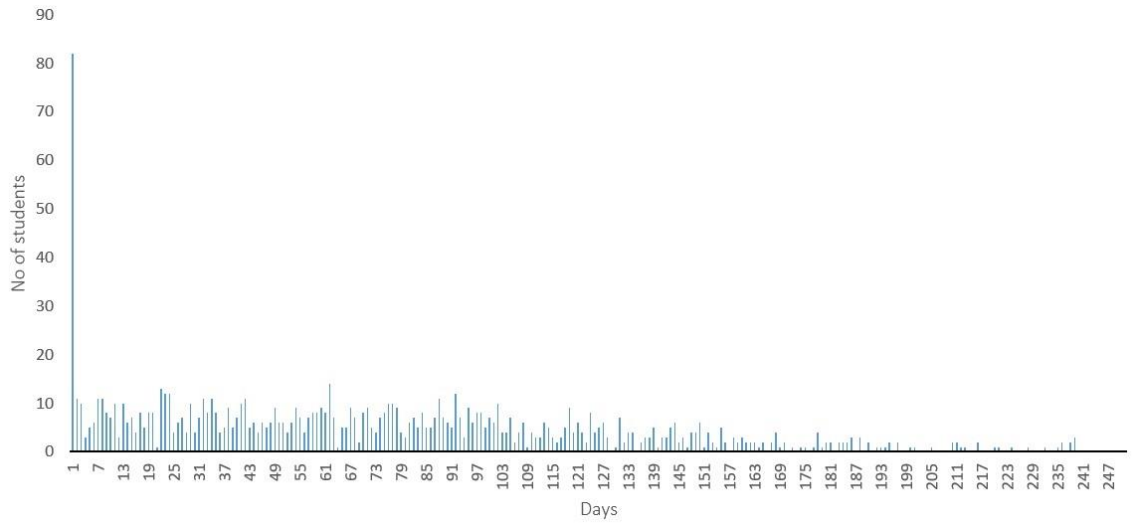

Figure 4.1 Length of Stay of Unenrolled Students (MOOC 1: Exploring Our Oceans)

Figure 4.1 shows that 82 students dropped out on the first day of the course. The second highest score for any other day is 14, which is about five times lower than the score for the first day. It demonstrates conclusively that the highest number of students drop out on the first day of the course.

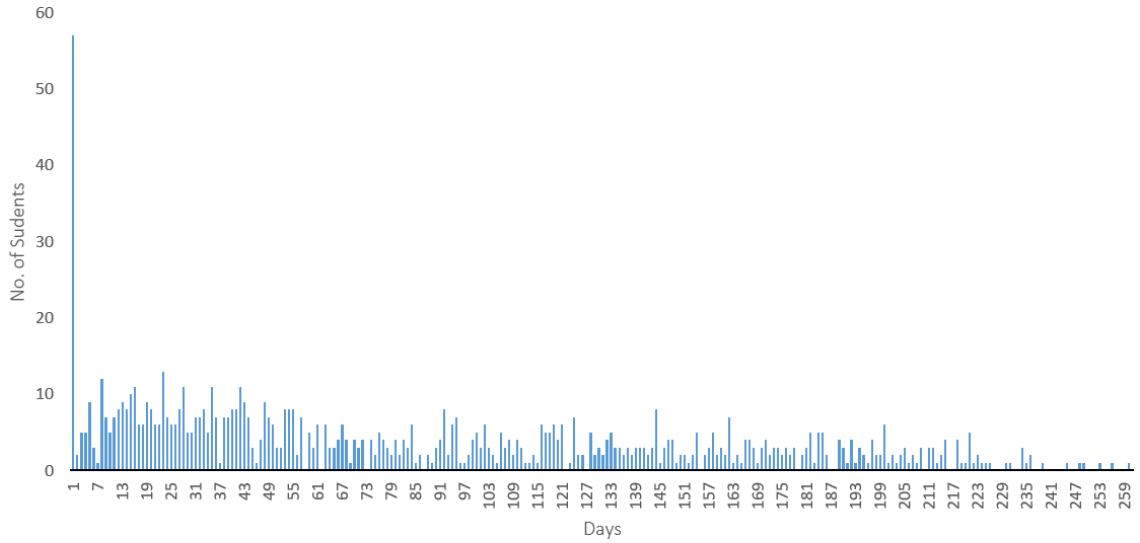

Figure 4.2. Length of Stay of Unenrolled Students (MOOC 2: Exploring Our Oceans)

Figure 4.2 reveals that 57 students dropped out on the first day of the course. The second highest score for any other day is 13, which is about four times than the score for the first day. Again, it is convincing to state that the highest number of students drop out of the course on the first day.

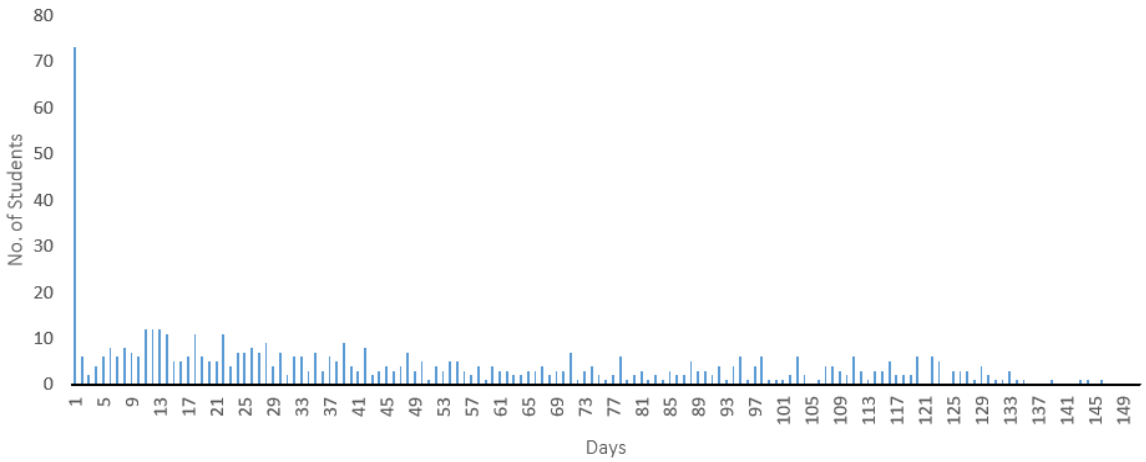

Figure 4.3 Length of Stay of Unenrolled Students (MOOC 3: Digital Marketing)

Figure 4.3 shows that 73 students dropped out on the first day of the course. The second highest score on any other day is 12, which is about six folds less than the first day. Yet again, it gives conclusive results that most number of students drop out on the very first day they join the course.

The data clearly indicates that the highest number of students who leave MOOCs do so on the very first day of joining the course. While the percentage of dropouts on the first day may appear relatively small when considering the total number of enrolments, its impact appears significant on the students who continue with the course. These students show a tendency to drop out, especially during the initial half of the course, and needs to be studied further. This particular finding underscores the

crucial importance of offering engaging and relevant course content and establishing effective support systems right from the outset of the course. Hence, it becomes critical to thoroughly comprehend the factors contributing to student dropouts on the first day of joining the course. In the following section, a qualitative study is presented, which was conducted to comprehensively explore the reasons behind such early dropouts.

4.5. Exploring the Reasons for First Day Dropout

As a continuation to the research on the first day dropout phenomenon an exploratory study was carried out to understand the main reasons why participants' dropout on the very first day of joining the MOOC.

Question: Why do participants' dropout on the first day of joining a MOOC.

To answer this questions qualitative approach was used where twenty-two interviews were conducted through convenience sampling to unearth the main reasons of why participants dropout on the very first day of taking the course. The research participant were mainly university students who dropped out on the very first day of joining the MOOC. These participants were basically asked one open ended question, i.e., 'Why did you leave on the very first day of the course?' The participants understood the question fairly well and were able to precisely point out the reasons for dropout. The responses were recorded in person or through the phone per the availability and preference of the participants. All the ethics requirements were strictly adhered to and participants' consent was obtained to conduct and record the interviews. Table 4.1 shows the profile of the participants who took part in the study. Also, to maintain anonymity, index in Table 4.1 is used to refer to participants of this study.

Table 4.1. Participant Profile

	Age	Education Level	Field of Study	Gender	Use of Technology Level
1	22	Undergraduate	Non-Technology Related	Male	Medium
2	22	Undergraduate	Non-Technology Related	Female	Medium
3	21	Undergraduate	Non-Technology Related	Male	Medium
4	20	Undergraduate	Non-Technology Related	Male	Medium
5	20	Undergraduate	Non-Technology Related	Male	Medium
6	22	Undergraduate	Non-Technology Related	Male	Medium
7	20	Undergraduate	Non-Technology Related	Female	Medium
8	20	Undergraduate	Non-Technology Related	Female	Medium
9	22	Undergraduate	Non-Technology Related	Male	Medium
10	23	Undergraduate	Technology Related	Female	Advanced
11	21	Undergraduate	Non-Technology Related	Male	Medium

Table 4.1. Continued

	Age	Education Level	Field of Study	Gender	Use of Technology Level
12	20	Undergraduate	Non-Technology Related	Female	Medium
13	21	Undergraduate	Non-Technology Related	Male	Medium
14	21	Undergraduate	Non-Technology Related	Male	Medium
15	22	Undergraduate	Technology Related	Male	Advanced
16	20	Undergraduate	Non-Technology Related	Female	Medium
17	21	Undergraduate	Technology Related	Male	Advanced
18	21	Undergraduate	Non-Technology Related	Female	Medium
19	21	Undergraduate	Non-Technology Related	Male	Medium
20	20	Undergraduate	Non-Technology Related	Male	Advanced
21	21	Undergraduate	Non-Technology Related	Female	Medium
22	22	Undergraduate	Technology Related	Male	Advanced

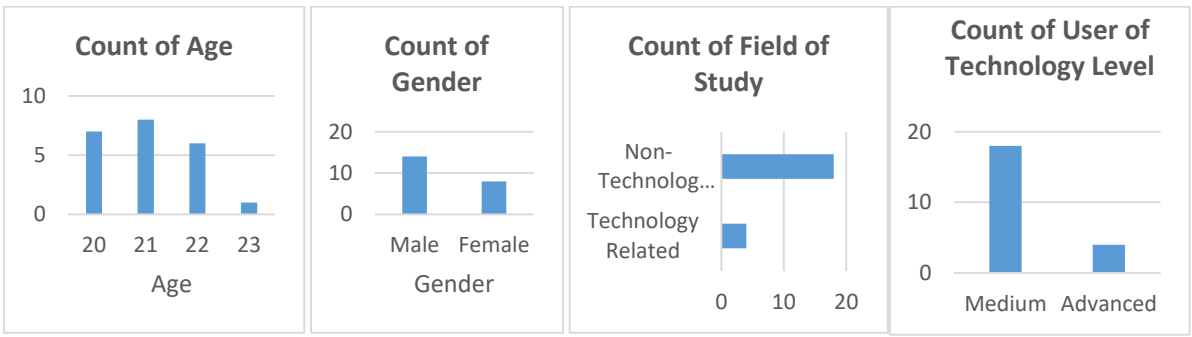

Figure 4.4. Participant Profile Charts

Figure 4.4 shows the graphical representation of the participant profiles. As shown, all participants were undergraduate students in the age bracket of 21 to 25. Eight female and fourteen male participants were interviewed. Majority of the participants were from non-technology related disciplines and were rated as medium level for the use of technology. Such female to male ratio is a typical statistic in Pakistani universities (HEC, 2020). A hierarchy chart presented in Figure 4.5, below, can be used to gain deeper insight into the participant profiles.

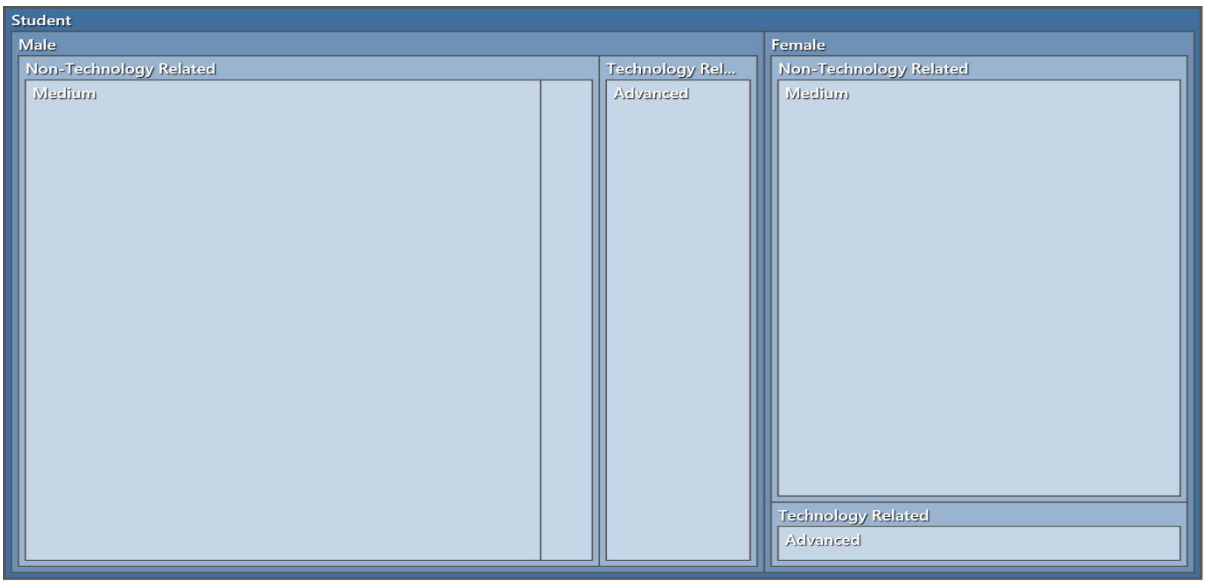

Figure 4.5. Hierarchy Chart of Participant Profile

The boxes in the hierarchy chart directly represent the number of participants within each respective category. The hierarchy is arranged as Profession->Gender->Field of Study->Use of Technology Level. Age is not included in the hierarchy as all the participants represented one age bracket, i.e., 21-25. It can be observed the hierarchy chart that participants who are advanced users of technology are from technology related backgrounds. It can also be noted that relatively more male members are technology related disciplines and advanced users of technology.

4.5.1. Qualitative Analysis

At the beginning of the interview the participants were shared an information sheet explaining objective of the study and the rights of the interviewee. The information sheet can be found in Appendix 9. At the start of the interview each participant was asked to show an understanding to the information presented on the information sheet and state their consent to giving the interview. The interviews were asked to state their name, age, gender and profession. The only question asked from the participants was 'Why did you drop out on the very first day of taking the course?'. The interviews were recorded in an audio format. The interviews were than transcribed and uploaded on Nvivo.

Thematic analysis was used to analyse the data collected to identify the reasons for participants leaving a MOOC on the first day. This method, as proposed by Braun et al. (2006) and Clarke et al. (2013), involves the explicit analysis of interview data to formulate themes and concepts.

Thematic analysis, proposed by Braun et al (2006) and Clarke et al. (2013), was followed for the analysis, i.e., where the interview data was explicitly analysed to formulate themes and concepts. Additionally, Nvivo software was utilised to aid in organising and analysing the data. In the first stage

of thematic analysis a layer of nodes was created by coding data on Nvivo. In the second stage of thematic analysis the nodes were analysed and grouped in terms of common patterns and similarities to form themes. In the third stage of thematic analysis all the themes and nodes were analysed to form high level themes that could help understand the concepts to meet the research objectives. The collection of data through interview and analysis was an iterative process, which was repeated until no new information was obtained from last five interviews, hence, saturation was achieved. Table 4.2 shows the final result of thematic analysis.

Table 4.2. Thematic Analysis: Reasons for First Day Dropout

Name	Files	References
>Poor Teaching Style	**1**	**1**
.Instructor Speaking Fast	1	1
>No Response on Forum	**4**	**4**
>Mismatched Expectation	**18**	**23**
.Poorly Designed Content	1	1
+Unclear Course Details	1	1
.Long Course	3	3
+Lengthy Videos	1	1
.Impractical Course	3	4
+Not Useful for Career	2	2
+Not Practical	2	2
.Easy Course	5	5
+Very Basic	1	1
+No Learning	1	1
+Already Knew Material	3	3
.Difficult Course	6	6
+Not For Beginners	1	1
+Difficult To Understand	3	3
+Ambiguous Course Structure	1	1
>Difficulty in using system	**1**	**1**
.Technical Issues	1	1

Note:
- (>) parent node, (.) child node, (+) sub-node
- (Name) Node name, (File) #of interviewees, (Reference) #of occurrences

4.5.2. Explanation of Themes

The results in Table 4.2 show poor teaching style, difficulty in using system, no response on forum and mismatched expectations as the high level themes. The results of thematic analysis clearly show that the main reasons for dropping out on first day are mismatched expectations and poor communication on forums which are studied further in Chapter 5 and Chapter 6. The nodes of

teaching style and difficulty in using the system only had one reference each and hence are not explored further.

Mismatched expectation is shown to be the most common reason why participants drop out on the very first day. A few responses obtained for this node are:

"the animations used in videos were abrupt and videos were very lengthy. I found it difficult to stay persistent to take these classes, so I de enrolled." (Participant 12, Female, 20)

"I dropped out because the course was not focused on the practical aspects rather it was most theory based, that I felt would not be helping me in my career. So, I de enrolled as it was not in my favour." (Participant 11, Male, 21)

"I dropped because the course content was not aligned to my expectations. It was more focused on lab testing then on sceptical auditing techniques." (Participant 12, Female, 20)

This means that participants were expecting something different to the experience they obtained when using the MOOC, hence, they changed their mind and dropped out from the course due to various reasons such as they found the course too difficult, too easy, too long, impractical or poorly designed. Hence, an in-depth analysis of the idea of changing intentions to continue or not continue with the course can be extended further not just with the first day of the course but anytime during the life of the course. Chapter 6 explores this idea in more detail.

Having no response on the forum is the second most frequently cited node. Few responses on this node include:

"I was literally confused like how to go about it. Therefore, I placed my queries and concerns in the chat box so they can respond as they claim to respond within few hours but no one really responded me and helped me so that I can continue with the course. Therefore, I had to discontinue with the course on the very first day." (Participant 5, Male, 20)

"I dropped the data science course on the first day on Coursera because I did not get any response from anyone on my question on the forum. I guess I felt a little alone or left out, so I just left the course." (Participant 21, Female, 21)

This means a participant tried to engage with the course participants or administration. However, due to no response the participant does not continue with the course. This aspect falls under the communication realm. Hence, it stresses the importance of communication on MOOC. Other parent nodes include poor teaching style and difficulty in using system only have one reference and are not discussed further.

4.6. Conclusion

In this study, we examined the dropout patterns of three MOOCs and investigated the reasons why participants tend to drop out on the very first day. Our analysis of archived log data revealed that the first day of the course is the most common day for dropouts. To gain a deeper understanding of this phenomenon, we conducted qualitative research by interviewing participants who dropped out on the first day. The findings from thematic analysis revealed two key factors contributing to early dropout: poor communication and mismatched expectations for MOOC participants. Based on these findings and early dropout pattern observed in initial half of the course, two areas for further research are suggested. First, investigating the differences in forum communication between MOOC completers and non-completers can provide insights into the impact of effective communication on completion rates, this study is presented in Chapter 5. Second, studying the reasons behind changes in participants' intentions to continue with the MOOC can help identify factors influencing participants' continuance engagement with the course, this research is presented in Chapter 6 and Chapter 7.

Chapter 5

Forum Activity of Completers and Non-Completers

5.1. Introduction

This chapter builds on our previous findings that poor communication on forums is a common reason for early dropout, section 4.6, which is also highlighted in literature as an important are to research, section 2.4. MOOC forums continue to be an effective tool to encourage learners to interact with each other, which result in more knowledge sharing, community building and, consequently, sense of belonging (Ntourmas et al., 2019; Gillani et al., 2014). When learners want to explore a topic they discuss with their peers and instructors to further understand it. Therefore, understanding forum participation and how leaners communicate with each other can help improve learner's experience on the course and help improve dwindling retention rates (Gillani et al., 2014).

Students can create a virtual community that they can turn to for assistance by participating in online student forums and other online interactions with other students (Ebner, 2014). Learning is stimulated through participants' interaction with one another, specifically through the discussion of ideas and the practise of skills (Frankola, 2001). It has been demonstrated that participating in online collaborative learning interactions can improve academic discourse, encourage higher level cognition of concepts, and ultimately lead to improvements in overall learning outcomes (De Smet et al., 2008; Ke et al., 2009; Schellens et al., 2006). A recent study on 'superposters,' or forum participants who make the highest volume of contributions, suggests that being a superposter is an innate trait that is individual specific. Additionally, it causes an increase in activity from other students, as well as an improvement in the quality of their contributions (Huang et al., 2014). It would be interesting to learn how participants in MOOCs who have finished the course (also known as "completers") contribute to the activity in the forums associated with MOOCs.

Literature review, section 2.4., highlights the opportunity to do research on different categories of users and their interactions amongst each other and the environment. As such, this research takes the opportunity to investigate the responses between the categories of completers and non-completers. It explores the forum activity of four Massive Open Online Courses (MOOCs) hosted on FutureLearn. The goal of the study is to determine whether or not there is a correlation between completing a MOOC and active participation in its associated forums. Specifically, it looks for behavioural patterns

and investigates How do MOOC students who participate in forums compare, in terms of completion rates, to those who do not?

Hypotheses:

- MOOC completers put up most number of comments.
- MOOC Completers initiate most number of comments.

The findings of this study are likely to assist providers of MOOCs in developing more effective strategies to increase the number of participants who successfully complete MOOCs.

5.2. MOOCs to be studied on FutureLearn

In addition to the MOOCs described in section 4.2, user activity log data for the following MOOC FutureLearn platform was also incorporated in this study.

- Understanding Language: Learning and Teaching: (1 course)

  What exactly is language? How can we learn a new language? Is learning another language easy or difficult? What is the most efficient method for teaching foreign languages? This free online course provides answers to these questions. It is the product of a partnership between the University of Southampton and the British Council to create a combined online MA in English Language Teaching. The course takes four weeks to complete. It will introduce you to some of the most modern theories in language teaching and learning research and practise. This course looks into second language acquisition and what it means to learn a language, examines language classrooms and how instruction affects our language learning, investigates the use of technology in instruction and considers its benefits and drawbacks for language learning, investigates the case of English, the most widely taught and learned language in the world, and asks how it came to hold this position, and provides you with the most recent information on the use of technology. Graduate students interested in language advancement and language instruction should take this course. It will give you a taste of postgraduate study in teaching English as a second language. It runs for four weeks for three hours per week. We obtained data for one course where the course activity started in October, 2014 and there were a total of 58787 students enrolled in the course.

5.3. Data and Methodology

The data consisted of participant enrolment timestamps, task/step activity performed, and details on the forum comments. Data on user enrolled and/or unenrolled in the system was used to comprehend

participant patterns of engagement and disengagement with the course. The step activity data provided the information on how each participant interacted with the steps / tasks. As a result, it could be calculated that how many steps a participant visited and/or completed. This helped determine how many students dropped out or completed the course. The timestamps for the participant's input were provided by the details on comments. Actual comments as well as the parent comments that started comment chains were extracted as well. This data was used to figure out how each student interacted with the forum.

The cleaned, organised, and structured data was analysed using pivot tables in Excel. Using enrolment ids as the primary key, the pivot tables were then used to draw correlations between data sheets. When a participant has completed more than half of the course's activity steps, FutureLearn considers him or her to be a completer. The goal of the effort was to identify and document how participants interact with the forum. To that end, data on the number of comments initiated and responded to by course participants was extracted.

5.4. Data Analysis and Findings

Figure 5.1 shows the percentage of participants who completed the course. It is clear that the vast majority of students do not complete the courses. The findings are consistent with previous research on MOOCs (Jordan, 2014). It's also interesting to see how completion rates differ between two runs of the Exploring Our Oceans course. A comparative study of how successive runs of the course differ from one another could be an interesting topic for future research.

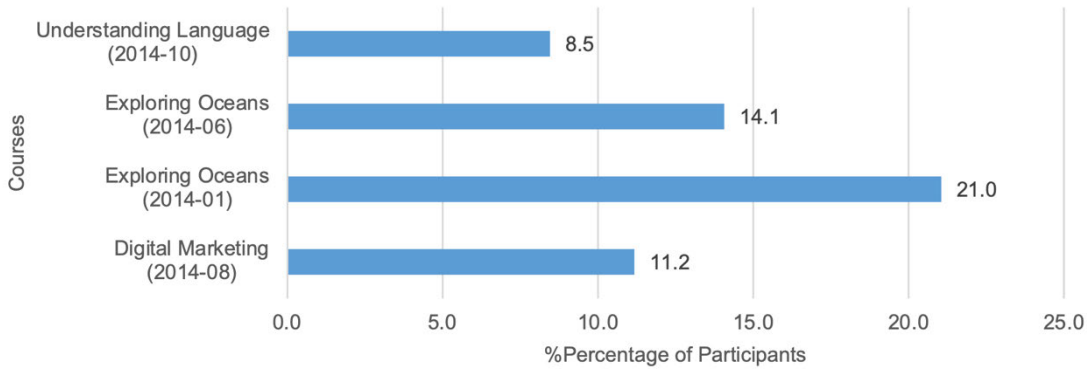

Figure 5.1. % of Participants Who Completed Course

Figure 5.2 depicts the percentage of participants who commented on each course's forums. The findings also support previous research (Mackness, 2010) that only a small percentage of people actually participate in forums.

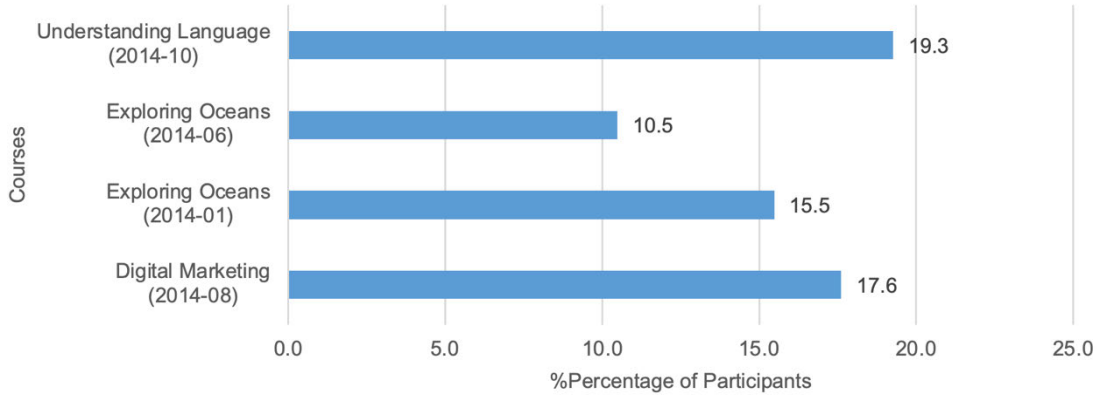

Figure 5.2. % of Participants Commented

It is clear from Figure 5.3 that the majority of the comments posted by all participants are from participants who completed the course. Completers, auditors (who do tasks infrequently), and lurkers (who stay but do not contribute to the online group) (Kizilcec et al., 2013; Nonnecke et al., 2003) all stick with the course for a long time, but the vast majority never post a single comment on the forum. As a result, it is clear that, of all the participant types in a MOOC, completers contribute the most to the forums.

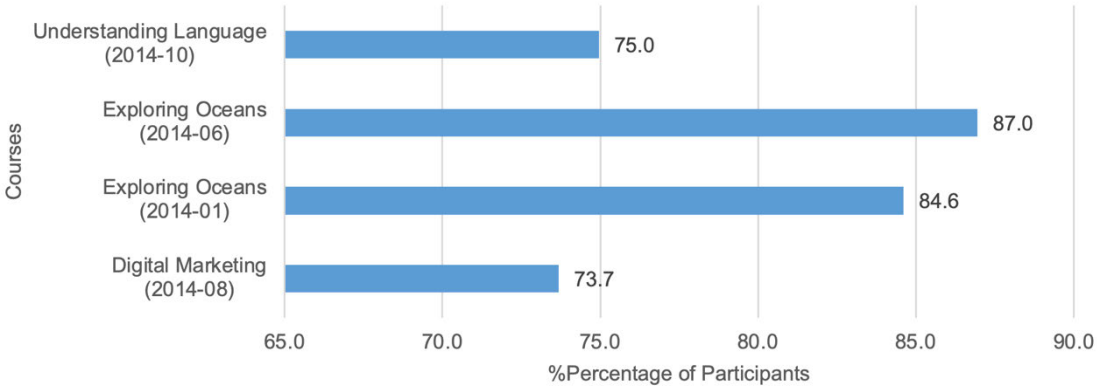

Figure 5.3. % of Comments by Participants Who Completed Course

Figure 5.4. depicts the average number of comments posted by participants and non-participants. It is clear that completers make far more comments than non-completers. As a result, it is safe to conclude that completers are more active and engaged on forums than non-completers.

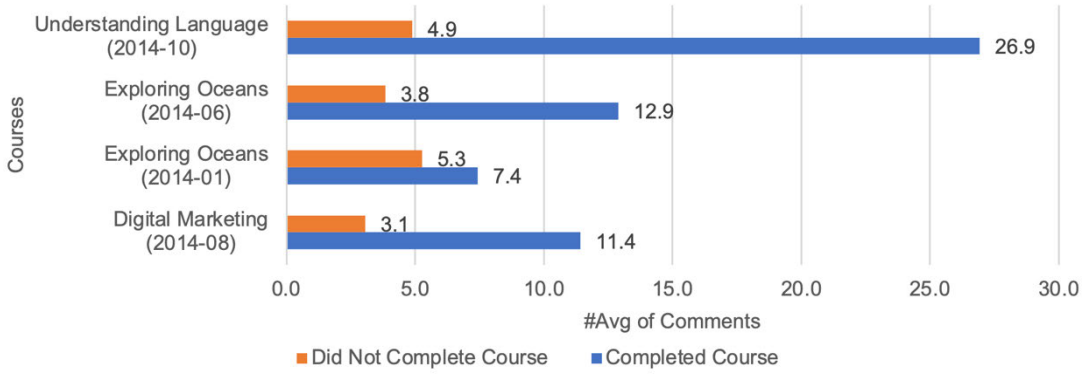

Figure 5.4. Average Number of Comments

To further segment and comprehend the preceding findings, Figure 5.5 depicts the percentage of participants who completed the course and initiated a forum comment. In two out of four courses, less than half of the comments are initiated by the course completers. In other words, majority of comments initiated / started in MOOCs are not from participants who completed the courses. This means that initiating comments is not an inherent trait of the MOOC completers, and that other factors such as pedagogical differences in courses and type of activities, among others, have a strong influence on how the participants initiate comments on the forum. Further research is recommended in the area of studying different aspects of a course to determine what prompts the initiation of most number of comments on the forums.

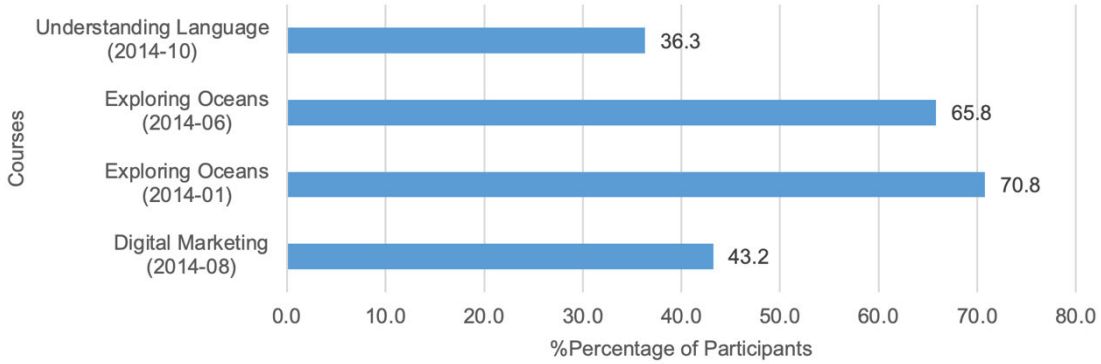

Figure 5.5. % of Participants Who Completed Course & Initiated Comment

We've already established that the majority of comments posted on the forums are by completers, and that they don't necessarily initiate the majority of the comments. This leads us to investigate the forum responses to the already initiated comment thread. Figure 5.6 shows that completers outnumber those who respond to comments.

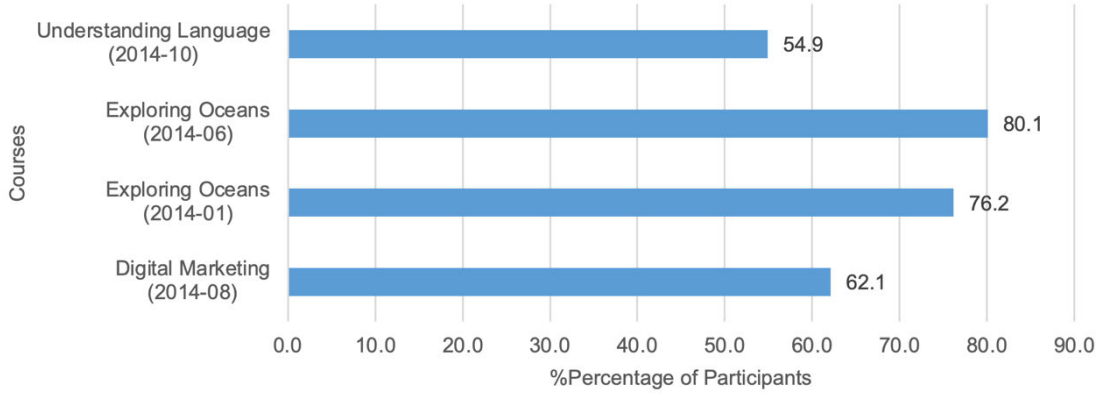

Figure 5.6. % of Participants Who Completed & Replied to Comment

This means that most number of responses to the already initiated discussion threads are provided by participants who complete the course.

5.5. Discussion

Thousands of people enrol in a single MOOC. Only a few people finish the course, and even fewer post on the forums. According to the findings above, completers leave far more comments than non-completers. Although it cannot be proven that completers initiate the majority of the comments, it is clear that the vast majority of responses are provided by completers.

It is surprising to learn that such a small group of participants, completers, are the primary contributors to forum activity. It is true that not all finishers leave comments on the forums. However, it is clear that the majority of the comments on the forums are from course graduates. Knowing this, we can confidently predict which participants will complete the course. Not only that, but we can devise strategies to encourage potential non-completers to stay engaged with the course for a longer period of time, possibly until completion.

Engaging strategies that encourage greater individual participation in the forums can be devised. Some strategies that may be useful include: Early response - According to research, people who receive a response to their comments quickly are more likely to post again (Burke et al., 2010). This is an effective method of involving participants in the community. This is especially helpful for first-time posters. The priority and visibility of first-time posters on forums could be increased for a response and, as a result, increased engagement. Sharing Network Activities - It has been discovered that people are more likely to participate in online discussion when someone they know, a friend, has posted something (Burke et al., 2010; Joyce, 2009). We can use a participant's activity logs to show him/her relevant prompts on a user with whom he/she has previously interacted. The 'follow me' link

is another strategy used by large social networking sites under this category. The link could be used to notify a participant whenever the person they choose to follow posts a comment on the forum. Moreover, when participants are shown similarity and uniqueness results, they are more likely to respond (Ludford et al., 2004). Course activities and questions can be designed to generate reports and prompts based on the similarities and differences in a participant's presence on the course. This results in a more personalised approach to interacting with students, which promotes participation.

5.6. Conclusion

In conclusion, the study's analysis of MOOC forum activity revealed an intriguing pattern: completers of the course were found to be the primary contributors to responses on forums, while non-completers participated significantly less. This finding suggests that forum engagement can serve as a potential indicator for course completion. By implementing strategies that encourage active participation and timely responses, such as prioritising first-time posters and leveraging social networks, MOOC platforms can foster a sense of community and enhance the likelihood of course completion. Further research in comparing different iterations of courses, analysing participation drivers, assessing comment quality, and developing predictors for course completion holds promise for improving MOOC experiences. These findings contribute to a better understanding of online learning dynamics and provide valuable insights for optimising future MOOC offerings.

Chapter 6

Factors Impacting Changes in MOOC Behavioural Intention

6.1. Introduction

Literature review, section 2.4, points out the area of change in intention as an important area to do further research on in this field. Also, in Chapter 4 of our research, an important contributor to participant attrition was identified: the presence of mismatched expectations, leading to a change in participants' intention to continue using MOOCs. The extent to which users' expectations of MOOCs are met or exceeded can greatly influence their intention to persist with the course. Meeting or exceeding these expectations tends to lead to a positive user experience and an increased likelihood of continued participation. Conversely, if expectations are not met, users may become disappointed and may lose intention to continue (Schneider et al., 2019; Meng et al., 2020; Li et al., 2018).

MOOCs are gaining popularity as a useful platform for online learning. These courses provide learners with flexibility to learn at their own pace, from any location with internet access (Li et al., 2018). However, many learners drop out before completing the course (Meng et al., 2020). As identified in the literature review section and informed by the results of the qualitative study in Chapter 4, Educators and course designers should understand the factors that influence learners' decision to continue or discontinue using MOOCs (Schneider et al., 2019). Understanding the changes in these intentions and the underlying factors can help enhance learners' experiences and outcomes. This essay will discuss the importance of understanding the change in intention of participants to continue or discontinue using MOOCs, factors that influence these changes, and how educators can address these changes to improve learners' experiences and outcomes. Hence, this research aims to answer the following question:

Why would someone change initial intention to continue or not continue with the course?

The following two hypotheses need to be tested:

- MOOC participants that left the course earlier than intended did so because they lost interest in the course.

- MOOC participants who stayed on the course longer than intended did so because they became interested in the course.

This is an interesting and complicated ‘why’ question as there can be so many variations to its answer. To tackle the variations and validation aspects a mixed-methods approach is used. Firstly, a qualitative study is conducted to understand the reasons that influence the participants to change the initial intention to continue or not continue with the course. Then, a comparative analysis is done by comparing the results of a systematic literature review study with the factors obtained from the qualitative study to determine the novel factors that are uncovered by findings from qualitative study. Two factors, ease of leaving the course and taking breaks in between the course are finalised as gaps. Then, a quantitative study is done to determine validate and generalise the findings. Presented below are the details of the studies done.

6.2. Qualitative Study

As explained earlier, mixed-methods approach is used for this research, i.e., both qualitative and quantitative. In the first qualitative stage convenient sampling is used to gather data. Through snow-ball technique a number of participants are identified and interviewed to collect their changing intentions when taking MOOCs.

6.2.1. Participants and Procedure for Interviews

A general framework for the interview questions, presented in Appendix 6, was prepared to guide the interview and facilitate the discussion. The questionnaire used open ended questions, which were used to prompt the user to share his / her own experiences. Probing questions were also used to understand the meaning and root causes of the answers. This semi-structured approach allowed for flexibility and allowed the interviewer to explore specific topics in more detail based on the participants' responses. The elements present in the interview pertained to participant’s intention, quality aspect, system performance, social influence and satisfaction aspects. The main objective of the questions was to understand what causes the person to complete or not complete a course where the initial intention was to do otherwise. Careful framing of the questions, feedback from other researchers, and consciously practicing effective listening skills helped avoid the participant bias and researcher bias. The interviews were conducted and recorded in person or through phone where the participant could not come to a face to face meeting. All the ethics requirements were strictly adhered to and participants’ consent was obtained to conduct and record the interviews. Total 18 interviews

were conducted. Presented in Table 6.1 below are the profile information collected from each of the participants.

Table 6.1. Participant Profile

	Age	Education Level	Field of Study	Gender	Use of Technology Level
1	21-25 years	Undergraduate	Non-Technology Related	Female	Medium
2	21-25 years	Undergraduate	Technology Related	Female	Advanced
3	21-25 years	Undergraduate	Non-Technology Related	Female	Medium
4	21-25 years	Undergraduate	Non-Technology Related	Female	Medium
5	21-25 years	Undergraduate	Non-Technology Related	Male	Medium
6	15-20 years	Undergraduate	Technology Related	Male	Advanced
7	15-20 years	Undergraduate	Technology Related	Male	Advanced
8	21-25 years	Undergraduate	Technology Related	Male	Advanced
9	15-20 years	Undergraduate	Non-Technology Related	Female	Medium
10	15-20 years	Undergraduate	Non-Technology Related	Female	Medium
11	21-25 years	Undergraduate	Technology Related	Male	Advanced
12	15-20 years	Undergraduate	Technology Related	Male	Advanced
13	21-25 years	Undergraduate	Technology Related	Male	Advanced
14	21-25 years	Undergraduate	Non-Technology Related	Male	Advanced
15	15-20 years	Undergraduate	Non-Technology Related	Female	Medium
16	15-20 years	Undergraduate	Non-Technology Related	Male	Medium
17	21-25 years	Undergraduate	Non-Technology Related	Male	Medium
18	15-20 years	Undergraduate	Non-Technology Related	Male	Medium

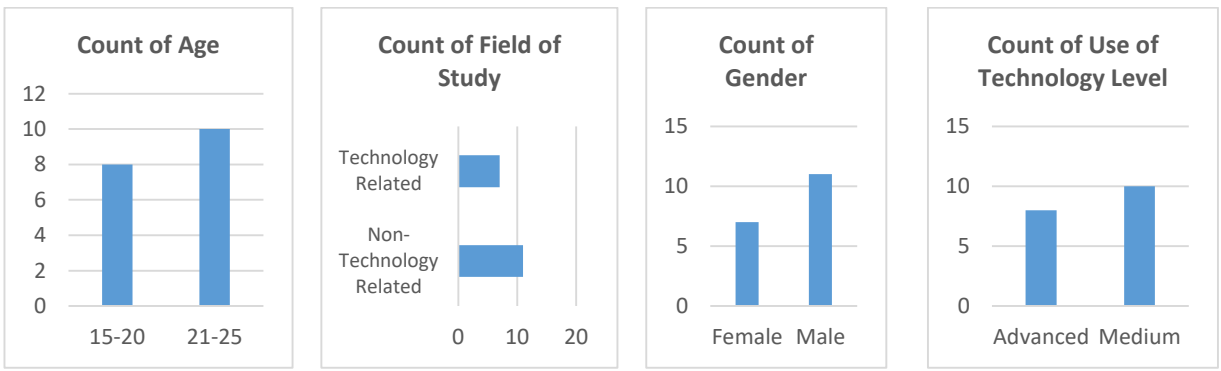

Figure 6.1. Participant Profile Charts

Figure 6.1 is a graphical representation of data in Table 6.1. As can be noted participants of the study ranged from 15 to 25 years of age. All participants were undergraduates. 11 participants were from non-technology related fields, 7 from technology related fields. 11 males and 7 females participated in the study. Per the report of Higher Education Commission of Pakistan such spread of data is typical of undergraduate level students in Pakistani universities (HEC, 2020). In terms of use of technology,

10 participants were of medium level and 8 were of advance level. A hierarchy chart can be used to better visualise the profile data of the participants collected.

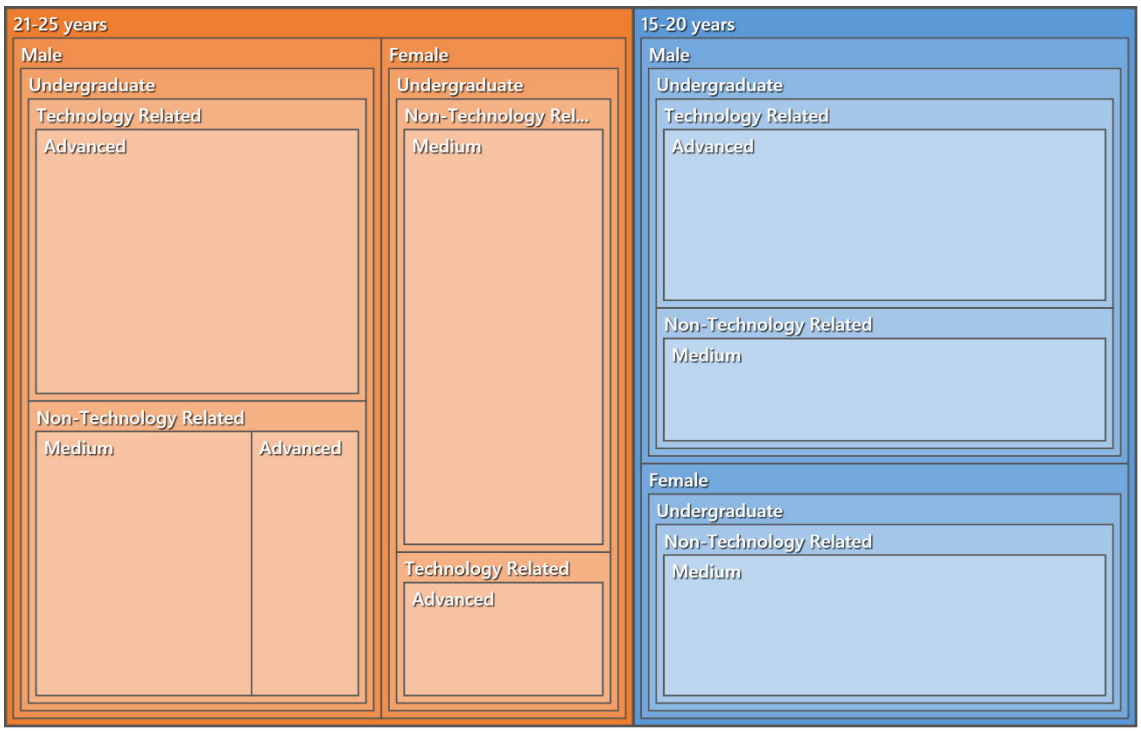

Figure 6.2. Hierarchy Chart of Participant Profile

The hierarchy chart in Figure 6.2 displays the data in Table 6.1. in a hierarchical format. Following hierarchy is used to organise the hierarchy chart: Age->Education Level->Field of Study->Gender->Use of Technology Level. The area represented by the boxes in the hierarchy chart direct pertains to the number of participants that lie in that category. It can be seen that of all but one of the users who were classified under 'Advance' use of technology level all had technology related degrees. It can also be observed that most of the female participants were not in technology related field of study and were not classified as advanced use of technology level.

6.2.2. Qualitative Analysis

The data collected was analysed, using thematic analysis, and the causes of changing intentions were obtained. Thematic analysis approach by Braun et al (2006) and Clarke et al. (2013) was followed for the analysis, i.e., where the interview data was explicitly analysed to formulate themes and concepts. Nvivo software was also used to aid in the organisation and analysis of the data.

In the first stage of thematic analysis a layer of nodes was created by coding data on Nvivo. Aspects about the initial intention and aspects that caused the user to leave early or stay longer with MOOC

were highlighted and recorded. The nodes included in the first layer were simply the plain text codes highlighted in the interviews. Some examples of the highlighted text are: "The fact that you have courses from MIT and Stanford", "I am always looking to learn different language", and "basically in that semester I had philosophy course, so I thought I'll be able to understand it in a more elaborative way, which would be helpful for me." In the second stage of thematic analysis the nodes were analysed and grouped in terms of common patterns and similarities to form themes. For example, comments like "Because I had to give IELTS, so it was my necessity" and "I prepared for my SAT" were grouped together to form a node for Test Preparation. In the third stage of thematic analysis all the themes and nodes were analysed to form high level themes that could help understand the concepts to meet the research objectives. When an interview was conducted, it was transcribed and used for analysis. The collection of interviews was an iterative process where interviews were conducted till saturation in data collected was achieved. After 13 interviews it was observed that no new node was formed, i.e., no new information was obtained from the interviews and the concepts were simply repeating. After that five more interviews were conducted and analysed that showed no new concept was obtained, when no new information was unearthed, it was concluded that saturation has been achieved. Table 6.2 shows the final result of thematic analysis.

Table 6.2. Thematic Analysis: Changing Intentions to Stay Longer or Lesser

Nodes
Name
1) Initial Intentions
2) Stayed Lesser Reasons
3) Stayed Longer Reasons

1) Initial Intentions		
Name	Files	Ref
To Sample The Course	4	5
To Prepare for Task	2	2
To Improve Job Prospects	2	3
To Get Certificate	1	1
To fulfil Course Requirement	8	18
To Explore for Personal Interest	11	22
To Experience Repute	3	4

Table 6.2. Continued

2) Stayed Longer Reasons		
Name	Files	Ref
Non-Course Related Reasons	6	13
No other course options	1	1
Important for career	5	8
Add-on to the course	3	4
Course Related Reasons	14	82
Teaching Related	8	16
Right level of course	1	2
Practical	1	2
Learning&Knowledge	12	33
Interactive	7	14
Good System Quality	7	9
Good Service Quality	2	2
Flexible	2	2
Clear Expectations	2	2

3) Stayed Lesser Reasons		
Name	Files	Ref
Non-Course Related Reasons	12	44
Due to Personal Mood or Feeling	1	1
Due to Other Tasks	11	27
Due to Other Better Options to the Course	1	1
Due to Lack Or Loss Of Interest	6	10
Due to End of Agreement	1	1
Due to Breaks In Between Course	2	4
Course Related Reasons	13	68
Due to Poor Feedback	1	1
Due to Poor Course Design	9	20
Due to Poor Course Delivery	3	9
Due to Poor Course Content	6	8
Due to Mismatch Expectations	9	23
Due to Lack of Observation	1	1
Due to Lack of Incentive	2	2
Due to Ease of Leave	2	2
Due to Difficulty in Using System	2	2

6.2.3. Explanation of Themes

This section expands and justifies the themes derived from the thematic analysis (see Table 6.2).

1) Initial Intentions

<u>To Sample The Course</u>

To sample the course means to explore the course just to understand what is the course about. Four different interviewees said that they joined the course to sample it. One participant said:

"I did one, it was on finance. Actually, I was confused I had to decide which course which, like, major Should I pursue in university? Where should I go for like, normal business management? Or should I take my economics and master Accounting and Finance? So, I just did a course on finance." (Participant 3, Female, 21-25 years)

This goes on to show some people don't know enough about the courses and they are just auditing it to test whether the subject suits them or not, or whether they might like to learn more about this domain.

Along the same lines, another participant responded:

"if you're like exploring it, you will join the course. But then you come to realisation, okay, this course just looked well on the surface" (Participant 7, Male, 15-20 years)

This goes on to show that joining and exploring the course to get a better idea of what the course is a common reason.

To Prepare for Task

To prepare for task means that people join MOOCs to prepare for an upcoming project, course or exams. An interviewee noted:

"database is a very important course for CS students. In the modern world all the devices and all the big companies, are using database. This is important because all the courses that we have in the 7th and the 8th semester, database is its pre-req. I want to use this course effectively so that I will not have any trouble later on in the coming courses." (Participant 8, Male, 21-25 years)

Another respondent said:

"Because I had to give IELTS, so it was my necessity. I thought I'll take an online free course so that I can learn easily without paying any fee. I opted for IELTS and started doing it" (Participant 5, Male, 21-25 years)

This goes on to show that people use MOOCs to get help in preparing for an upcoming task.

To Improve Job Prospects

To improve job prospects means that the participants of the course join it for advancing their career. This node has two sub nodes, i.e., Add to CV and Add to Skill.

An interviewee said:

"I think, to add up to skills. It was a different course; it was a programming course. And since I'm a finance major, so I thought it would add up in my CV and would show really nicely, so I googled a few things. And there were some courses from edX and Coursera." (Participant 11, Male, 21-25 years)

Another interviewee responded:

"I got this course from udemy, it was about amazon advertising. So, my initial intention was that once I purchase the course I will get to learn new things and by the end of the course I will be in a position where I could sell that to the rest." (Participant 14, Male, 21-25 years)

This shows people look for MOOC courses to learn new skills and knowledge so they could use it for better job / career prospects.

To Get Certificate

There is only one node coded for this. For this the interview respondent pointed out:

"For the content I would take it again. And if I don't get a certificate in the end for completing my course, so I would not opt for it for sure. If I can"t get the recognition that I have completed the course, then there's no point in doing it." (Participant 13, Male, 21-25 years)

This shows that the desire to get recognition for taking the course in the form of a certificate is a credible source of motivation to join a course.

To fulfill Course Requirement

To fulfil course requirement means that the participants were assigned or asked to do the course on MOOC by their teacher or the institution they attend in order to meet the requirements of the course, teacher or the degree. It may also simply be an add on to the course already taking place. This is the second most referenced node and hence holds particular significance in reasons for using MOOCs. Responses under this node include:

"basically in that semester I had philosophy course, so I thought I'll be able to understand it in more elaborative way and it would be helpful for me." (Participant 1, Female, 21-25 years)

"we don't have much information available here in university, so I came across this really good course on Coursera so I decided to take it." (Participant 3, Female, 21-25 years)

"you get the material and information from good university teachers like Stanford university so getting information from them, getting to know about the topic from their perspective is a big opportunity. So I took this opportunity to get to know my course more." (Participant 3, Female, 21-25 years)

"I came to know about moocs through my instructor. He asked me to do any tech course through Coursera." (Participant 5, Male, 21-25 years)

This means that many participants on MOOCs are there to further understand their course/topic that they are already doing at their institute. They may be asked by an instructor to do so or they may be doing it own their own.

To Explore for Personal Interest

This node is the most referenced node under the initial intentions folder. It says that users join MOOC to explore their personal interests, for example to gain more knowledge or learn something new. Some responses under this node include:

"most of them were like, programming related or stuff that I was interested in. I was interested in cryptography at one point, and then game development at one point. So basically, I was exploring things that I might be interested in. So I started joining these courses." (Participant 7, Male, 15-20 years)

"I remember I was doing my summer vacations and I was always looking to learn different language because at that time, I think I was really passionate about learning something, Italian or something. And I also discovered edX at the time. So they had these new courses and it's fun, very easy to find materials." (Participant 10, Female, 15-20 years)

"Because It was after my second year, and I was very much into physics. Oh, and also Einstein. I like Einstein a lot. So, I wanted to learn about relativity a lot. So, when I joined that, for the first two weeks, I kind of enjoyed it." (Participant 12, Male, 15-20 years)

This goes on to show that personal interest weighs heavily on users' decision to join a MOOC. Hence, increase the number of participants varied courses in realm of interest of the target audience should be offered. For example, to attract university students, courses that such an age group is interested in should be designed and offered on MOOCs.

To Experience Repute

To experience repute means that students join the course to experience course being delivered from some of the best institutes and instructors in the world. Responses to this node include:

"although they are not giving the certificate, but you get the information, you get the material and information from good university teachers like Stanford university so getting information from them, getting to know about the topic from their perspective is a big opportunity. So I took this opportunity to get to know my course more." (Participant 3, Female, 21-25 years)

"The fact that you have courses from MIT and Stanford, yeah, that's very interesting." (Participant 10, Female, 15-20 years)

This means that people can join MOOCs simply because they are offered by well reputed universities around the world. They may not have the chance to go to such universities in person, however, this provides them a good opportunity to learn from their content and professors.

2) Stayed Longer Reasons

Stayed longer reasons are divided into two sections: non-course related and course related. Non-course related reasons highlight the reasons other than the course that made the user stay on the course longer than originally intended, whereas, course related reasons are related to the elements of the course itself. Presented first are the non-course related reasons:

No other course options

This node means that users stayed on the course because there no other better alternative available or they could not find one. The interviewee response for this node is:

"in data science, I had my interest and in Pakistani universities, they are not advanced academically in data science, so you have to do it on your own. That's why a lot of people prefer specialisation in this course on Coursera and it also has a lot of worth in Pakistan." (Participant 6, Male, 15-20 years)

This means that it's not the quality of the course elements themselves that made the user stay on the course but simply because the users cannot find any other alternative for it whether they like it or not.

Important for career

This node explains that users may stay on the course longer because doing the course can help their career. Responses recorded in support of this node include:

"So, I really want to complete it and get the certification because nowadays, companies that hire employees, they really want them to be skilled in programming along with their major disciplines. So, like, it's really going to add up in my CV and I can officially, like officially coated in my CV and on my LinkedIn profile as well." (Participant 11, Male, 21-25 years)

"when I did that, I wanted to learn something out of it. Throughout the course, my intention was the same but towards the end, the course becomes a burden on you. then, only the certificate motivates you to complete the course." (Participant 4, Female, 21-25 years)

It shows that people may stay on the course because they feel it's important for their career to learn more from it or complete it to get the certificate.

Add-on to the course

Add-on to the course means that the course offered on the MOOC platform is an additional venue of learning in conjunction with the course offered at the institution. A response for this includes:

"we have a course going on in our university, which is an auditing course. And now the good thing is that sir, our teacher has told us that we would have to do a course online on Coursera. And we are going to learn more from that. And he's going to mark us on that we would have to post our results. Like there are videos, and then there's a short quiz following the videos. So, we will have to attend that quiz and the results, we have to post on LMS. And we're going to get marked on that." (Participant 11, Male, 21-25 years)

This shows that the teachers can ask students to take up the course on a MOOC. Whether the student likes the course or not, the student will have to attend the MOOC to fulfil teacher or course requirements. Also, it can be noted that MOOCs can work in congruence with the course offered at the learning institute and the instructors/teachers can utilise the freely available quality content.

Presented below are the course related reasons for the users to stay longer than intended with the course:

Teaching Related

Teaching related means aspects related to teaching of the course. It is the second most referenced node after Learning and Knowledge. The nodes coded under Teaching Related are include 'catchy teaching methods', 'different from usual teaching style' and 'teacher developed interest'. Some of the response for this node include:

"Well, obviously, you stay because of a good teacher, right. If the teacher is like teaching the way that you want them to teach, you will obviously stay if the teacher is bad, then you will be like, okay, I cannot stay" (Participant 7, Male, 15-20 years)

"it was a long course but I was determined to complete it. and by the time I was doing it, the course got more interesting, and the teacher who was teaching the course, he had like the information that we never learnt here. So it got more interesting, I decided to complete it" (Participant 3, Female, 21-25 years)

"The main thing that develops your interest is the instructor. The way he explains things. Like when I was doing positive psychology, he explained everything very well. My interest got developed well. He gave his personal examples of his life and those were very applicable and it helped me a lot" (Participant 4, Female, 21-25 years)

"It depends more on the person rather than the course. If I don't like the instructor, I would leave the course but if I like the instructor, I go through it. Because I'm a visual thinker. Some teachers teach keeping the visual aspects in the mind, so I learn much more easily. It's a personal preference." (Participant 2, Female, 21-25 years)

This shows that the teacher and teaching style are an important part of why a user would voluntarily decide to continue using the course.

Right level of course

The right level of the course means that choosing the right level of the course helped the user engage with and continue using the course. Response from a participant for this node include:

"I think, what I do is, I always apply for a high-level course, because there are levels, so you can go for a beginner level course where they will literally spoon feed you all the information. And there are advance level courses, I always apply for advance level courses because they don't spoon feed you everything that is why I prefer it." (Participant 2, Female, 21-25 years)

"you have to gauge into the level of the knowledge that you want before you decide to go on with the course" (Participant 2, Female, 21-25 years)

This shows that helping the users choose the right level of course for themselves should help them continue using the course.

Practical

Practical means the learnings from the course can be applied. A response from the interviewee about what made him stay longer explains this further:

"there's this other course I did. It was called introduction to TensorFlow. That's a programming tool. So what that course was that, it had like, it was on Coursera, but it was linked to a Python notebook. So whatever that guy was doing, you could test it out in the browsers with sila. So like, then in there, right then in there, you could test it out, you could play around with it, you can like change it. And so like that was quite interactive, I guess, from like a programming perspective. And very practical." (Participant 7, Male, 15-20 years)

This shows that practicality of the course does add to engagement with the course and, hence, continued usage.

Learning and Knowledge

Learning and Knowledge means the participant of the course stayed longer with the course due to the learning and knowledge element of it. This is the most referenced node for reasons to stay longer with the course. Some sub-nodes included under this node are: 'More knowledge', 'Learning element' and 'interesting content'. A complete list of sub-nodes can be obtained from Appendix 7. Some of the interviewee responses for Learning and Knowledge' include:

"I came to know about moocs through my instructor. He asked me to do any tech course through Coursera. I opted for Data Science. I started learning Data Science through Coursera. I completed my course in 4 weeks. It was very useful and informative. I came to know about new things." (Participant 5, Male, 21-25 years)

"It depends on the course that you're doing, actually, some courses might be really good, and some courses might be just okay. But things that are available on moocs generally are amazing. I'm like, very, very happy with that. Because there is actually a lot of good things that you could learn and Like apply as well. Like, if you're smart enough. I think you can, like get into the practical world faster if you just start using MOOCs at a very young age. And you know, like, learn a skill through it." (Participant 7, Male, 15-20 years)

"I was expecting it to be a normal course but there was a lot of information and detail to it that I didn't even know existed." (Participant 2, Female, 21-25 years)

This shows that as long as the participants are learning and gaining knowledge they stay interested and continue using the course. Hence, learning element and user interest must be focused on when the courses are designed.

Interactive

Interactive means that the participants of the course interact, share and collaborate with each other and other aspects of the course. This is the third most referenced node in course related reasons to continue using the course. The sub-nodes coded include: 'Human Connection', 'Interactive Course', 'Like the Community' and 'Practice Right Away'

"On the answer, this course in which I was enrolled in it had a chat panel as well. So, some, some of the students enrolled were chatting along with watching videos. That was a good, that was a good option, I guess. Because it's a programming courses, of course, like you can even share your assignments and tasks and collaborate with each other. I really like that." (Participant 11, Male, 21-25 years)

"I think it would be like the course is interactive, or the material they are providing us it's not like the bookish material, like they're just giving the bookish statements which we have to learn." (Participant 3, Female, 21-25 years)

"Usually with the video lectures, and like, even in the quizzes, they would give very descriptive feedback on your honour assessment. So, it was easy to point out my mistakes. And what things I have learnt" (Participant 15, Female, 15-20 years)

This shows that communication among the participants and interaction with the course elements, such as getting feedback from quizzes, are important to keep participants engaged and get them to continue using the course.

Good System Quality

Good system quality translates into generally how the users perceive the quality of the system to be. It translates into the ease of use, the organisation of the portal, aesthetics, etc. Some of the responses from the interviewees for this part are:

"the quality of the system was very good. There were subtitles for the students who couldn't understand the video, there were Spanish subtitles as well for those who wanted it in Spanish. So, the quality of the system was very good." (Participant 3, Female, 21-25 years)

"I think the interface was user friendly, nothing too complicated, so easy to use. And then they provided instructions as well. So the first time you login, they explain everything to you how the interface works."

"The system quality was perfect for navigation, like the videos have subtitles as well. So, it's very good. If you don't want to listen to the videos and want to skip right to the notes, you can. You can read the subtitles and make your own notes too just beside the reading material as well. And it's all perfectly ticketed. So, like you don't miss out on anything. You can continue right, where you left from. And it's very easy. Like for someone for a newbie, it's very easy to follow." (Participant 11, Male, 21-25 years)

This shows that perception of the quality of the system to be good can add value in user experience and, hence, can get him to continue using the system.

Good Service Quality

Good service quality means the support and service provided by the MOOC providers to the participants of the course. A response from the interviewee is as such:

"I don't participate that much because it takes time. But Coursera's forums are very good like if you have any questions, they reply you efficiently because their courses are also paid, their professors are very active." (Participant 6, Male, 15-20 years)

It shows that participants do appreciate if the service providers are directly involved and engaged with the participants.

Flexible

Flexibility means the course offers flexibility to the users in terms of schedule and ability to start in between the course. Some of the comments from the interviewees for this part are:

"I have taken courses like a month long and finished them in two days, because I was feeling like that. Yeah, there's an event that I did it all night, for like two days, and it's over. That's nice." (Participant 7, Male, 15-20 years)

"You can start from wherever you want there is no restriction." (Participant 13, Male, 21-25 years)

This shows that participants to the course value flexibility which provides them freedom to manage their own course and time.

Clear Expectations

Clear expectations mean the user clearly understands the expectations from the course. Some of the comments for this node are:

"There is this time layout which they give, and I really like, they told us the estimated time that we have to give to the course. It was like if you give 20 mins per day which is 140 mins per week, then you can end this course in one month. I really liked that provided us with the estimated time that we have to put in." (Participant 5, Male, 21-25 years)

"It individually gives all the description of the course and from where we want to start" (Participant 13, Male, 21-25 years)

This shows that when the user understands the offerings of the course he / she is better able to manage it and, therefore, continue using it.

3) Stayed Lesser Reasons

Stayed longer reasons are divided into two sections: non-course related and course related. Non-course related reasons highlight the reasons other than the course that made the user stay on the course lesser than originally intended, whereas, course related reasons are related to the elements of the course that made the user stay on the course lesser than originally intended. Presented first are the non-course related reasons:

Due to Personal Mood or Feeling

Personal mood or feeling is the MOOC user's mood and feeling in relation to the course they are attending. An interviewee provided the following comments for this:

"Another thing that could be a reason to drop, is that if you start a course depend on your mood and you don't have a need for that course, then you end up quitting the course because you don't have a need to complete the course. It solely depended on your mood." (Participant 5, Male, 21-25 years)

This means that at the time of joining the course the participant may be in a different state of mind or feeling than when he left it. Since participants to the course join and leave anytime, they want, their moods and feelings can weigh in on when they decide to leave, i.e., they could decide to leave the course earlier when they are in a bad mood.

Due to Other Tasks

Other tasks mean tasks other than the activities of the course itself. This is the most referenced node. Some of the sub-nodes included under this node are: 'Differing schedule', 'other high priority task' and 'workload elsewhere'. More details on the sub-nodes can be obtained from Appendix 7. Responses on this node included:

"The course was on coursera. I joined the course during the end of my summer break but then my semester started and I left the course in between." (Participant 17, Male, 21-25 years)

"reasons could be that you started course, but you will get caught so busy with university stuff and everything that you didn't get the time to do it. Because obviously, since it's self-paced, no one's like pushing your or no ones like telling you that you have to do it in this time. And it's obviously free. So you wouldn't, like prioritise over the thing that you're paying for in the university" (Participant 7, Male, 15-20 years)

"I learned a lot of things. I attended a few sessions and watched some videos and learned a lot of stuff. But then I dropped out, because that motivation was not there for me, I guess. And I also had an internship going on, so it was very difficult for me to manage." (Participant 11, Male, 21-25 years)

"yes, but I didn't get time. The Data Sciences courses were related to my studies and I had to take out time for them because I had to do them. But this course psychology one, it was a nice course, but it didn't matter that I do it now or later." (Participant 6, Male, 15-20 years)

This shows that participants may leave the course other than the reasons that pertain to the elements of the course itself.

Due to Other Better Options to the Course

Other better options to the course means that there could be other courses that may seem more interesting than the one enrolled in. Presented below is a comment on interviewee on this:

"So you take multiple courses. And you will be like, I want to try this. You're like, okay, but maybe that other course that I enrolled in, maybe that might be better. You know, like, how you're watching a YouTube video, and you're getting suggestions like, Okay, if the song you are listening to is nice, but one of the other suggest song might be better. We have to try it out. So yeah, that happens." (Participant 7, Male, 15-20 years)

This shows that as soon as user finds something more interesting and engaging they can leave the course.

Due to Lack Or Loss Of Interest

Lack or loss of interest means that the users do not carry interest in course or lose interest in between the course. This is the second most referenced node in the non-course related reasons. Some of the comments from the interviewee include:

"For example, if I'm trying the new course, like if I am trying to do a management course and it doesn't interest me, like the course is boring. So I will be like it's kind of a waste of time. It's not something of my interest to continue." (Participant 3, Female, 21-25 years)

"my intention was to major in psychology, but my interest is now diverting so I started that course, but I don't think I will complete it now and it is a bit lengthy too." (Participant 4, Female, 21-25 years)

"It was due to my personal interest because I didn't want to go for database, so I didn't have any incentive to complete that course." (Participant 6, Male, 15-20 years)

This shows that when the participants of the course are not interested in the course or when they lose interest in the course they don't complete it.

Due to End of Agreement

End of agreement means the user may not be able to use the course should the agreement with the institutions and MOOC end. A comment from an interviewee says:

"although I took these courses out of my sheer interest but then I couldn't cope up with them. One thing that the contract between the government and other international universities got ended and so many of my friends and I lost the track so eventually, we had to back off." (Participant 1, Female, 21-25 years)

This shows that there be government or institutional level agreements with MOOC providers. When these agreements end the users may stop using the courses and drop out.

Due to Breaks In Between Course

Breaks in between course means the users stop using the course for some time, i.e., they take a break from the course. Some responses to this node are:

"So even though the course is interesting, you fall behind and the deadlines you can't meet and questions you can follow, fall behind. And also if you aren't keeping up in every week, you really forget the previous stuff. And when you come back again, you don't know what's happening." (Participant 12, Male, 15-20 years)

"Sometimes when you're stuck at one place, you will be like a little discouraged to move further. And you say I cannot do this, and would say that I will come back to it another time. So, basically, if you the break for any reasons at all, it's going to hinder your progress right then and there. Because the moment you're like, Okay, I'm going to take a break, then you're like, Okay, I don't need to go back to it immediately. I will go back to it when I feel like it. So stop right there." (Participant 7, Male, 15-20 years)

"I kind of forgot to go ever go back to it. I was like, Okay, I'll do it later. I tried delaying it, but then eventually forgot, basically." (Participant 7, Male, 15-20 years)

This shows when participants take break their rhythm/progress of working on the course gets affected, as a result when they come back to join the course they find it difficult to continue and drop out.

Due to Poor Feedback

Poor feedback means inadequate feedback provided to learners to meet their learning goals. Presented below is an interviewee response:

"They should have been detail explanation of why certain options were wrong, and why certain options were right they get confusing. Sometimes, you don't figure it out completely from a video." (Participant 10, Female, 15-20 years)

This shows that feedback is important for learners to understand and learn from their mistakes, as such it can be an effective source of motivation to continue learning using the course.

Due to Poor Course Design

Poor course design pertains to the poorly devised pedagogical elements of the course. This is the second most referenced node in course related reasons to stay lesser. Some responses on this node are presented below:

"Course is too long, it has about 200 to 300 topics or videos." (Participant 3, Female, 21-25 years)

"I couldn't, because the lectures were very lengthy though they were very much helpful, but I couldn't cope up with that" (Participant 1, Female, 21-25 years)

"I had to drop them off because I couldn't cope with all the quizzes and the video lectures. The initial lectures were just very basic outlines and basic terminologies. And after that, there was advanced level, so I had to drop them off." (Participant 7, Male, 15-20 years)

"At first I was very interested in joining and completing the course. However, as I continued I lost interest. I already knew majority of the things they were teaching." (Participant 18, Male, 15-20 years)

"I did Psychology but videos were very lengthy so there was no motivation to complete it." (Participant 4, Female, 21-25 years)

"terminologies used in the courses and the some of the technologies and some of the way of teaching. I didn't like the course that much." (Participant 16, Male, 15-20 years)

"I don't know how to explain, but usually they sort of start very good. But then they really come down to a same level, I mean, stagnant point where they would just move on and the same level doesn't get any more interesting." (Participant 12, Male, 15-20 years)

This shows that course design in an extremely important element in the success of a MOOC. Courses on MOOCs should be carefully designed to keep a willing learners engaged in achieving their learning goals.

Due to Poor Course Delivery

Course delivery means how the content of the course are delivered to meet the course objectives. Presented below are some responses for this node:

"But after I purchased it I got sort of zoned out, it was monotonous, it was not very engaging" (Participant 14, Male, 21-25 years)

"I expected it to be more thorough and practical, there were lack of examples and this sort of caused a sense of disengagement between a consumer and the content creator. I think this was the core reason why I did not complete the course." (Participant 14, Male, 21-25 years)

"he used to talk a lot and didn't ever take a break in the middle so it was getting very difficult to follow him" (Participant 4, Female, 21-25 years)

"the guy that was teaching that course was like sometimes he used to become a teacher in some videos, and in other videos, he used to become a student. His voice was also very disturbing so I couldn't do it." (Participant 4, Female, 21-25 years)

The responses show that delivery of the content is an important element in how student responds to the course. It is vital that the delivery be considerate and engaging to meet the needs of a willing learner.

Due to Poor Course Content

Poor course content means the content of the course was not thought out well or not put together well. Presented below are some of responses for this node:

"Because firstly, I did one my first course, actually, on Coursera. So, when I started, I founded the course it was most stuffy and secondly, it was some sort of messy." (Participant 16, Male, 15-20 years)

"So, when you join the MOOC, you look for the content. If you don't find the content interesting, you leave" (Participant 12, Male, 15-20 years)

"so, it was extremely slow-paced and boring, and it was a beginners-level course. It bored me so I left." (Participant 2, Female, 21-25 years)

This shows that getting the content thought out well is an important aspect. The content must be aligned with objectives of the goal and organised well for the ease of understanding.

Due to Mismatch Expectations

This means that the participant expectations from the course and the course requirements/expectations from the participant do not match. This is the most referenced node under 'Course Related Reasons' for staying lesser with the course. Presented below are some responses from the interviewees:

"your courses don't meet your expectations over there. And you're like, Okay, I should probably, like, take a better course. Which is like more suited to my current knowledge or level. Yeah. So you do that" (Participant 7, Male, 15-20 years)

"So, my initial intention was that once I purchase the course I will get to learn new things and by the end of the course I will be in a position where I could sell that to the rest. That was my initial intention and expectation to the course. But after I purchased it I got sort of zoned out, it was monotonous, it was not very engaging, it just failed to meet my expectations." (Participant 14, Male, 21-25 years)

"yes. It was very basic. So, that's why I ended up quitting it. it had useful tips, but it was so basic that I was getting bored to continue it." (Participant 5, Male, 21-25 years)

"Okay. So basically, the level was if I understand correctly, the level was a bit higher than you are used to." (Participant 13, Male, 21-25 years)

"so, it was extremely slow-paced and boring, and it was a beginners-level course. It bored me so I left." (Participant 2, Female, 21-25 years)

At the start of a course participants have some expectations or idea of the course. However, when a participant joins and the course does live up to or meet their expectations they leave the course. To tackle this thorough understanding of the what to expect from the course should be provided. This may be done through introductory videos or orientation sessions.

Due to Lack of Observation

Lack of observation means the absence of an observer, such as a teacher or administrator, who is checking whether the participants is doing their work or not.

"Yeah, it's basically it's self-paced. So you're like, I will do it when I feel like it. It's not like someone's forcing me to go into class, right? It's not like someone's like marking my attendance or something." (Participant 7, Male, 15-20 years)

This shows that have an observer who can keep a check, encourage or guide the participants to do their work can be a source of motivation to continue working on the course activities.

Due to Lack of Incentive

Lack of incentive means participants not looking forward to achieving an outcome or reward. Presented below are responses collected for this node:

"it's not like I'm getting an incentive to complete it earlier, right?" (Participant 7, Male, 15-20 years)

"As I said before, there might be a decreased amount of motivation as you progress. Since because it's a free course, you are not getting a certificate for it unless you pay for it." (Participant 11, Male, 21-25 years)

This means that some participants do not find a motive to continue using the system. MOOC providers should use several rewards, other than achieving a certificate, which could speak to a wider array of participants and their reasons for taking the course, for example, offering scholarships, chance to visit universities, etc.

Due to Ease of Leave

Ease of leaving means that participants find it easy to leave the course. Following comments were coded for this node:

"since it's self-paced, no one's like pushing your or no ones like telling you that you have to do it in this time. And it's obviously free. So you wouldn't, like prioritise over the thing that you're paying for in the university. Right?" (Participant 7, Male, 15-20 years)

"another reason is that it's a free course, like, it's a free course so you can leave anytime" (Participant 11, Male, 21-25 years)

This means that participants leave the course because they find it very easy to leave. It may because there is no sacrifice attached to it in terms of money, time, friendships etc. So participants do not stand to lose much.

Due to Difficulty in Using System

Difficulty in using the system means the participants did not find the system user friendly for themselves. Presented below is a comment from respondent for this node:

"I remember doing a course from edX, it was called CS50. It's like a basic intro to programming by Harvard University, right. So I enrolled myself into it on edX, but I didn't really like edX interface at that time. I knew I can get all of those videos also on YouTube, as well. It's more comfortable with YouTube. I have watched the same videos on YouTube" (Participant 7, Male, 15-20 years)

This shows that participants will not stay the course if they find it difficult to use or if there is an alternative that is easier to use to meet their learning goals. Hence, the system should be built that

participants find it easy to use. Some suggestions include catchy interface, adequate system speed and well organised for easy navigation.

Tables 6.3a, 6.3b and 6.3c present further analysis and discussion of the top three reasons for each category / node. Table 6.3a presents analysis of top three results from thematic analysis for 'Initial Intentions' node.

Table 6.3a. Analysis of Top Results for Initial Intentions

Initial Intentions
1. To full fill course requirements (8,18) 2. To explore for personal interest (11,22) 3. To sample the course (4,5) (x,y): x represents the number of interviewees recorded, y is the number of references for the node
Analysis: - Since all the participants were university students it is acceptable to note that the top intention to join a MOOC is to full fill course requirements, which is likely assigned by the university course instructors. - This also means that targeting universities and other educational institutes is an effective way to increase the use of MOOCs. - The 2nd and 3rd reasons are basically derived out of personal interest. Most of the things under 'Personal Interest' are directed towards course content that interests the individual. Therefore, to get people to use MOOCs interesting content, topics and titles must be used.

Table 6.3b presents analysis of top three results from thematic analysis for 'Stayed Lesser Reasons' node.

Table 6.3b. Analysis of Top Results for Stayed Lesser Reasons

Stayed Lesser Reasons
Course related reasons (13, 68) 1. Due to mismatch of course and personal expectations (9,23) 2. Due to poor course design (9,20) 3. Due to poor Course Content (6,8) Non-Course related reasons (12,44) 1. Due to other tasks (11,27) 2. Due to lack / loss of interest (6,10) 3. Due to breaks in between course (2,4) (x,y): x represents the number of interviewees recorded, y is the number of references for the node
Analysis: - Other tasks is the most popular reason for leaving the course. This means that while doing the course another non-course related higher priority tasks comes in-between that causes the individual to leave. - The 3rd item under non-course related reasons can also mean 'other tasks' as it is usually the other tasks that cause the individual to take breaks and have differing schedules. - Other Tasks and Loss of interest (non-course related reasons) are likely to be prompted by course related reasons. - Mismatch of course and personal expectations is the top reason for leaving the course. This means when students join it they may find the course too difficult or easy. Or, some students say they leave because as the course progresses the difficulty level rises and they cannot cope up with the cours2e so they leave.

Table 6.3b. Continued

- Participants leave because they find that the course takes too long. Some say it is the length of videos, tasks or the whole course itself. These are reasons for poor course design. - Poor course content is also a popular reason participants leave the course It can be deduced that the poor design of the course and bad content causes participants to leave the course.

Table 6.3c presents analysis of top three results from thematic analysis for 'Stayed Longer Reasons' node.

Table 6.3c. Analysis of Top Results for Stayed Longer Reasons

Stayed Longer Reasons
Course related reasons (14,81) 1. Learning and knowledge (12,33) 2. Teaching related (8,16) 3. Interactive (7,14) 4. Good System Quality (7,9) Non-Course related reasons (6,13) 1. Important for Career (5,8) 2. Add-on to the course (3,4) 3. No other course options (1,1) (x,y): x represents the number of interviewees recorded, y is the number of references for the node
Analysis: - Most people stay longer with MOOC mainly due to the course related reasons. - Most people stay with the course because they wish to learn and gain knowledge. - Most popular non-course related reason to stay longer with the course is career related - Interest in the content for learning that is delivered by a good teacher makes students stay with the course. - It can be deduced that the quality of content for learning, its delivery by a good teacher and interactivity for continuous engagement are the most important aspects for a participant to stay with the course. - Lastly, it is important to ensure that the user feels that the system is ease of use.

After the completion of thematic analysis an extensive phase of systematic literature review was done to explore, compare and understand the findings made by other researchers in the field, i.e., in order to garner support on the credibility of the findings and discover gaps that could help from further research in the area.

6.3. Validation of the model through Systematic Literature Review

In order to understand how the findings of the qualitative study, section 6.2, contribute to the knowledge in the field, a systematic review of the existing literature is carried out that validates the findings of the qualitative analysis from section 6.2.2, and identifies potential areas for further investigation, ensuring robust theoretical and practical contributions as research outcomes.

A thorough and unbiased literature review typically serves as an essential step in research. The purpose of a systematic review is to synthesise and evaluate existing research in a fair and unbiased manner. By employing a systematic approach, relevant studies pertaining to a specific phenomenon, topic, or research question are located, assessed, and interpreted (Kitchenham et al., 2009). Systematic reviews serve various purposes, including identifying research gaps for further investigation, summarising available evidence on treatments or technologies, evaluating empirical support for theoretical hypotheses or generating new hypotheses, and providing a contextual framework for future research endeavours.

An approach, suggested by Kitchenham (2009), for systematic literature review was followed and implemented for this study. The approach consists of five activities which are: (1) Define research question, (2) Define search keywords, (3) Select electronic resources, (4) Search process, (5) Match inclusion and exclusion criteria.

1. Define research question

The strategy requires firstly to define the research question. It is important to define the question with care and precision to ensure the objective of the study is met in the answer to the question. Following question is used for the purpose - Why would someone change initial intention to continue or not continue with the course?

2. Define search keywords

The second step is to define the keywords that will be used to search the required databases, search engines, indexes, etc. Different keywords are to be defined to ensure most to all the relevant literature pertaining to the research question can be gathered. A common technique is to fragment the research question into individual concepts to create the keywords or 'search terms' (Kumar et al., 2020). It is also useful to work the synonyms of the keywords to tackle the issue of use of language (Kumar et al., 2019). The search keywords finalised and used for this research are: "MOOC Retention", "MOOC Continuance", "MOOC Dropout" and "MOOC Engagement".

3. Select electronic resources

The third step involved identifying the electronic resources/databases to search from. These resources were identified by searching for top journals in educational technology in google scholar list of top journals. Top five journals from social sciences and engineering and computer science categories

were selected. Other prominent journals through peer referrals and search indexes were also included in the list presented below.

- British Journal of Educational Technology (BJET)
- Computer and Education (CE)
- The International Review of Research in Open and Distributed Learning (IRRODL)
- The Internet and Higher Education (IHE)
- Journal of Educational Technology and Society (JETS)
- Distance Education (DE)
- Open Learning: The Journal of Open Distance and eLearning (JODE)
- European Journal of Open Distance and E-Learning (EJODE)
- Journal of Computer Assisted Learning (JCAL)
- Google Scholar (GS)
- IEEE Xplore (IEEEX)
- Elsevier's ScienceDirect (ESD)
- Taylor and Francis Online (TF)
- Wiley Online Library (Wiley)
- SpringerLink (SL)

4. Search process

For the fourth step, the search process is to be carried out. In order to do this the keywords identified in step 2, above, were used to extract articles from the databases and search indexes identified in step 3. As such, following keywords are used to search the databases: "MOOC Retention", "MOOC Continuance", "MOOC Dropout" and "MOOC Engagement". A multi-stage search strategy was used to find relevant documents. In the beginning, selection criteria were loosely construed, and full copies of papers found using electronic and manual searchers are acquired unless they can be clearly dismissed based on titles and abstracts. The articles are then carefully compared to the inclusion/exclusion criteria before decisions are made at the end.

5. Match inclusion and exclusion criteria

The fifth and final step required inclusion/exclusion criteria to be defined and implemented. The inclusion / exclusion criteria are a form of a sieve with which irrelevant research is filtered out and relevant papers are gathered for analysis. For this systematic review:

- 2011 to 2020 studies were included - the year 2011 was chosen because this is when MOOCs first started being used widely for online learning (Sunar et al., 2016).
- Both qualitative and quantitative studies were included - this gives a wider range of relevant papers to choose from.
- Only studies that determine the participants' reasons for staying or leaving were included - this targeted the required results that directly correlated with this study.
- Only papers written in English Language were included.
- All other studies were excluded.

Table 6.4 presents the overall search results for each of the keywords from each of the databases and search indexes considered in step 3.

Table 6.4. Keyword Search Results

SearchResults	MOOC Retention	MOOC Continuance	MOOC Engagement	MOOC Dropout
BJET	20	254	86	20
Wiley	477	877	914	123
AJDE	14	22	28	5
DE	34	53	75	27
TF	508	1068	1224	155
CE	45	11	109	38
ESD	305	33	659	128
IRRODL	62	4	119	48
IHE	11	1	23	9
JETS	2	2	2	2
SL	8	3	18	2
JODE	32	52	67	12
EJODE	28	28	28	28
GS	9920	928	17400	6810
IEEEX	19	2	85	72

For each database all the results obtained were checked for inclusion/exclusion criteria. However, for search indexes such as Taylor and Francis Online (TF), Wiley Online Library (Wiley) and Google Scholar (GS) where the results were in thousands their pages were searched up until the relevant papers were not found. This is because these search results were sorted by relevance and as the numbers went up fewer and fewer relevant studies were identified. Out of the 7881 journal searched based on their abstracts and findings for reasons of staying or leaving, only 60 met the inclusion criteria that directly related to the study. Out of 60 studies 46 of them used quantitative approach, 10

used qualitative approach and 4 used mixed methods approach to determine the reasons for leaving or staying with the course. Therefore, qualitative and mixed methods approach studies could be considered to further explore this topic from different angles. The current study uses mixed methods approach and, therefore, adds to theoretical contribution of this field.

6.4. Comparative Analysis

From the papers selected, the reasons for participants to leave or stay with a MOOC were listed against the findings from the qualitative research of this study and a comparative analysis (see Appendix 5) was done to find out any gaps and factors that may need further study. The comparative analysis involved comparing each factor identified from the qualitative study of this research with the ones identified by the systematic literature review. An example of comparative analysis from Appendix 5 is presented in Table 6.5, which shows that all the factors, with their corresponding study references, are organised in tabular format to facilitate comparison. The matching factors identified from qualitative research in this study and from systematic literature review are coded with the same colour and corresponding index number to demonstrate a match. The factors identified in this study that did not match the factors from the literature are highlighted in green in Table 6.5 (i.e. '(9) Breaks in between courses' and '(10) Ease of leaving'). For an extensive list of factors and more details on comparative analysis please see Appendix 5.

Table 6.5. Comparative Analysis Example

Factors from this study		Factors from Systematic Literature Review				
		Exploring the Factors Affecting MOOC Retention: A Survey Study	Examining the Relations among Student Motivation, Engagement, and Retention in a MOOC: A Structural Equation Modeling Approach	Sentiment Analysis in MOOC Discussion Forums: What does it tell us?	Factors Influencing Learning and Factors Influencing Persistence: A Mixed-method Study of MOOC Learners' Motivation	Engagement and retention in VET MOOCs and online courses: A systematic review of literature from 2013 to 2017
(1)	Learning and Knowledge	Kate S. Hone, Ghada R.	Yao Xiaong	Rose	Biyun Huang	Paton
(2)	Good System Quality	2016	2016	2014	2017	2018
(3)	Interactive	Quantitative	Mixed Methods	Quantitative	Quantitative	Quantitative
(4)	Teaching related	Course content (11)	Curiosity	Early Forum participation (3)	Personal interest (8)	Good quality instructional course design (12)
(5)	Important for Career	Perceived effectiveness	Enjoyment	Prolonged peer discussions (3)	Professional development (5)	Well-developed assessment tasks aligned with course objectives
(6)	Compliments a course	Interaction with the instructor (3)	Job related development (5)		Self improvement (1)	Opportunities for learners to collaborate (3)
(7)	Priority of Other tasks		Future economic benefit		Credentials	Instructor commitment to timely contextualised communication (4)
(8)	Interest Level					Certification for course achievement
(9)	**Breaks in between courses**					Pathways to further study
(10)	**Ease of leaving**					
(11)	Course content					
(12)	Course design					
(13)	Course Delivery					
(14)	Expectations Matching					
(15)	Being observed/feedback					

The results of the analysis revealed that the effect of taking breaks in between courses and ease of leaving the course for reasons of leaving earlier than originally intended are the two factors that could be researched further and contribute to the knowledge bank in the field. Therefore, this study plans to conduct a quantitative study to test the impact of these two factors on participants' continuance intention. The hypotheses for the study are:

Hypothesis 1 (H1): Participants' ease of leaving the course is positively associated with them leaving the course earlier than originally intended.

Hypothesis 2 (H2): Participants' taking a break in the course is positively associated with them leaving the course earlier than originally intended.

6.5. Conclusion

In conclusion, this chapter explored the phenomenon of change in user continuance intention on MOOCs, focusing on identifying the factors that lead to such changes. The research utilised a mixed-methods approach, combining a qualitative study and a systematic literature review.

The qualitative study involved interviewing MOOC participants who had experienced a change in their intention to continue the course. Thematic analysis was conducted on the interview data, revealing the main factors that influenced users' continuance intentions. Simultaneously, the systematic literature review examined previous research to understand the factors already discovered by other scholars in the field.

By comparing the findings from the qualitative study with those from the literature review, this research identified two factors that contributed to the existing body of knowledge. These factors, namely taking breaks in between the course and the ease of leaving the course, presented gaps in the literature. These findings highlight the significance of these factors in influencing users' continuance intentions and emphasise the need for further investigation

To validate and expand upon the identified factors, a quantitative research phase will be conducted. This next phase will involve a larger sample of MOOC participants, who will be asked to complete a survey. The results of this quantitative research will provide a broader understanding of the impact of the identified factors on user continuance intentions, thereby strengthening the validity and generalisability of the findings.

Chapter 7

Validating the Impact of Taking Breaks and Ease of Leaving

7.1. Introduction

To strengthen the validity and generalisability of our findings, this chapter presents a validation study that aims to further investigate and confirm the impact of the two factors identified in Chapter 6 for user continuance intention on MOOCs, i.e., i) ease of leaving the course and ii) taking breaks in between the course. The validation study will utilise a quantitative research approach, employing a survey to collect data from MOOC participants.

The primary objective of this validation study is to establish a robust empirical foundation for the identified factors, reinforcing their importance and providing insights into their influence on user continuance intention. By conducting a survey, we can gather a substantial amount of data that will allow us to statistically analyse the relationships between the identified factors and continuance intention of the user, and subsequently validate their significance in the MOOC context.

7.2. Quantitative Study

This study will use the two factors obtained from the comparative analysis of the qualitative study performed in chapter 6. The two factors identified are: i) ease of Leaving the course and ii) taking breaks in between the course. These two factors are both obtained from the thematic analysis performed in chapter 6, and are both linked to a participant leaving the course earlier than originally intended. As presented above, the hypotheses drawn on these findings are:

Hypothesis 1 (H1): Participants' ease of leaving the course is positively associated with them leaving the course earlier than originally intended.

Hypothesis 2 (H2): Participants' taking a break in the course is positively associated with them leaving the course earlier than originally intended.

Ease of Leaving the course translates into how easy a participant finds it to leave the course in between. The ease factor could stem from anything of value to a participant that may be missing, not

encouraged or enforced in the system. Examples of this could include no obligation to use the system, no monetary sacrifice made to stay on the system, lack of learning, etc.

Taking breaks in between the course is simply whether a student took a break in between the course or not. This may be due to various reasons, for example, conflicting priorities that come in the way when a participant takes the break, or it could be due to difficulty in catching up with the course when a participant stay away from the course for some time, or a general change in motivation to continue with the course, etc.

This part of the study will use the two variables identified to establish their impact on continuance intention of the MOOC, thereby, validating and generalising qualitative study's findings that ease of leaving the course and taking breaks in between the course has a significant impact on the change in intention to continue using MOOC.

7.3. Understanding Relevant Theoretical Models

7.3.1. Introduction

The basic approach used for the study is to explore and finalise a well-established theoretical model of continuance intention that can be extended with the two variables identified. The existing framework of the established model can be used to build upon and develop a survey instrument to gather data. The results of the survey can then be analysed to determine whether the two variables have any impact on continuance intention of using a MOOC or not.

In order to establish a solid theoretical foundation for this study, several models were investigated and examined. The subsequent sections present concise explanations of the prominent theories frequently employed in research concerning the intention to continue using information technology (Nabavi et al., 2016). These models include the IS Success Model, the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Expectation Confirmation Model (ECM).

7.3.2. IS Success Model

DeLone and McLean's Information System (IS) Success model incorporates multiple dimensions of information system quality, including Information Quality, System Quality, and Service Quality. These quality dimensions directly influence user satisfaction and the intention to utilise the system.

Furthermore, the intention to use the system subsequently impacts the actual usage of the system. The extent of system usage contributes to user satisfaction and the overall net benefits obtained from the system. Additionally, user satisfaction and net benefits mutually influence each other, forming a reciprocal relationship. Consequently, both user satisfaction and net benefits have an impact on the intention to use the system. The interconnections between these variables are visually represented in Figure 7.1 of DeLone and McLean's work (DeLone et al., 2003).

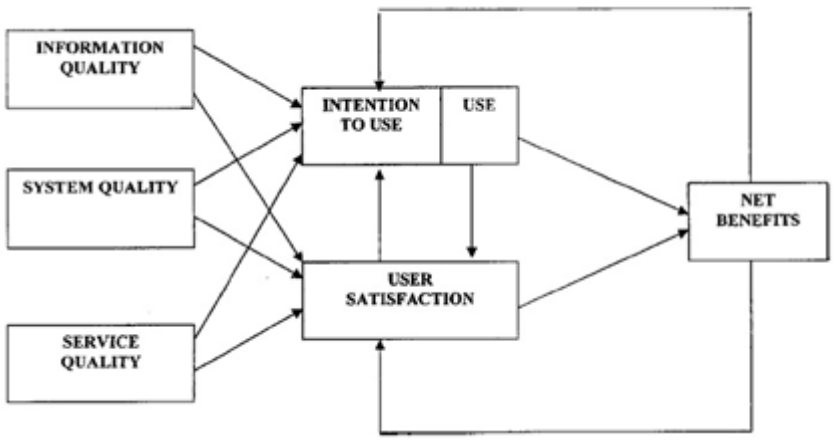

Figure 7.1. IS Success Model (Delone and Mclean, 2003)

DeLone and McLean introduced the IS success model first in 1992, the original model consisted of dimensions such as information quality, system quality, utilisation, user satisfaction, individual impact, and organisational effect. In 2003, an updated version was presented, incorporating system quality, information quality, service quality, intention to use / use, user satisfaction, and net benefits. This comprehensive model provides a framework for evaluating the success of information systems (DeLone et al., 2008; Nabavi et al., 2016).

Each component of the IS Success Model can be explained as follows, based on the work of Delone et al. (2008) and Nabavi et al. (2016):

- System Quality: This dimension focuses on the desired technical characteristics of the system, including the technology used and its ease of use. It encompasses aspects such as system navigation and speed. For example, in the context of MOOCs, it could refer to the quality of platforms like Coursera, edX, or FutureLearn.
- Information Quality: This dimension relates to the content provided by the system. It includes the quality of the information delivered and the way it is presented. In the case of a MOOC, it could refer to the course content, instructor notes, and other related materials.

- Service Quality: This pertains to the quality of service-related activities offered by service providers. It can encompass administrative support, trainer feedback, technical assistance, call centres, forums, and other similar services.
- Intention to Use / Use: The model treats intention to use and actual use as separate constructs. Intention to use is a cognitive construct that reflects the user's attitude toward utilising the system, while use is a behavioural construct that represents the actual utilisation of the system. In the context of MOOCs, intention to use could refer to the intent to continue or discontinue using the system, while use would denote the active participation in courses.
- User Satisfaction: This dimension represents the users' opinion of the system and their overall transaction experience. It is influenced by the quality features and net benefits derived from the system. For example, a user may be satisfied with a system of substandard quality if they are experiencing positive net benefits. In the context of MOOCs, user satisfaction would indicate how satisfied a participant is with the course they have taken.
- Net Benefits: Net benefits encompass the overall positive outcomes and contributions of the information system to individuals, groups, organisations, industries, and even nations. It includes the extent to which the system contributes to success, effectiveness, and overall well-being. Net benefits can be both positive and negative, with positive net benefits leading to increased user satisfaction and intention to use the system. In the case of MOOCs, net benefits would refer to the overall value gained by participants, such as knowledge, skills, or social connections.

It is important to note that while the IS Success Model focuses primarily on IS dimensions, it provides only a partial view of the entire system. Additional metrics may be necessary in dynamic contexts such as the cloud, and alternative measures might be required for hedonic IS situations like gaming or social networking. Furthermore, different levels of management may require distinct indicators to predict system success (Green et al., 2014).

This model was initially picked for the purpose of this study because of its robustness and popularity. A draft of the questionnaire was also designed for the purpose. However, through many reviews of the questionnaire and discussions on its appropriateness, it was decided to look for other models that may be better fit in specifically addressing continuance intentions of participants. DeLone and Mclean IS Success Model is essentially a quality centric model that measures the success of the information system in terms of its quality features that provide net benefits and result in satisfaction and vice versa. However, our quest is to analyse the continuance aspects more from the cognitive and behavioural aspect of the use of the system. Therefore, other models presented below were considered that may be better fit for our purpose.

7.3.3. Technology Acceptance Model (TAM)

Within the realm of information systems, Davis et al. (1986) adapted the Theory of Reasoned Action (TRA) and introduced the Technology Acceptance Model (TAM). Figure 7.2 illustrates TAM, where perceived usefulness and perceived ease of use play a role in shaping attitude, which subsequently affects behavioural intention. TAM primarily aims to predict the initial adoption of information systems (Liao et al., 2009) and serves the purpose of identifying potential design shortcomings prior to users engaging with new systems (Morris et al., 1997).

Davis et al. (1989) modified the original TAM by removing the attitude since it did not adequately mediate the influence of perceived usefulness on intention (Figure 7.3).

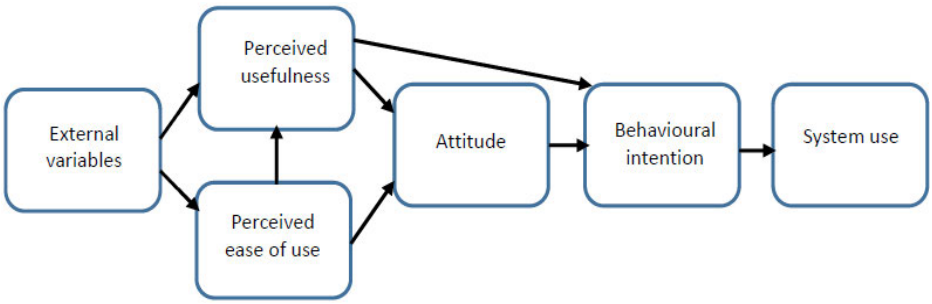

Figure 7.2. Technology Acceptance Model (Davis et al., 1986)

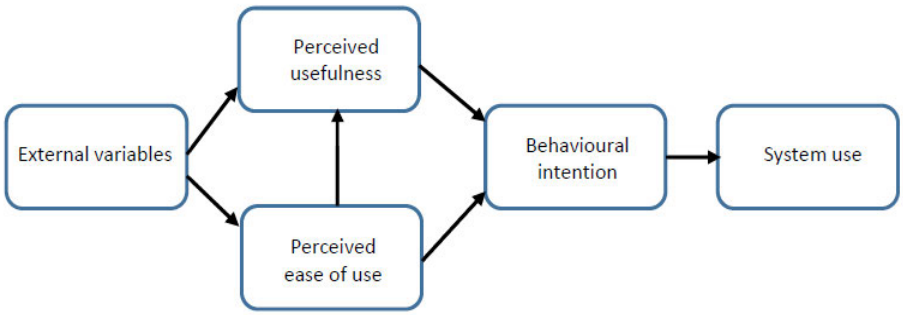

Figure 7.3. Revised Technology Acceptance Model (Davis et al., 1989)

Explanation of each of the components of Technology Acceptance Model (TAM) in Figure 7.3 is presented below (Davis et al., 1989):

- Perceived usefulness is the extent to which a person believes that using a given system will improve his abilities or performance. It is important to note that it is perception of usefulness and not the resultant or actual usefulness. For example, in case of a MOOC, this could mean the belief that taking course on MOOC platform will enhance the participant's skills and consequently performance.

- Perceived ease of use is the extent to which a person believes that utilising a specific system will be effortless. It is important to note that this is an element of perception and not the actual use of the system. This would mean that participant thinks that it would be easy to use the system. In case of MOOCs perception of the elements like technology proficiency requirements and level of difficulty of a course could formulate the perception a course is easy or difficult to use.
- External Variables are any external element that could affect the perception of the usefulness or ease of use of the system. For example, technical trainings, educational level, etc.
- Behavioural Intention is cognitive in nature and pertains to the attitude or inclination to perform a particular behaviour. For example, this could mean an intent to continue using a system or drop out of it.
- System Use is the actual use of the system. This is performed when a user actually uses the system.

TAM has become one of the most frequently employed theory in previous studies investigating the intention to continue using information technology (Nabavi et al., 2016). However, like any theoretical model, TAM has its own limitations. Firstly, the generalisability of conclusions may be restricted since Davis et al. (1989) verified TAM using a sample of university students (Legris et al., 2003; Lee et al., 2003). Secondly, the model's explanatory power is relatively low, accounting for only about forty percent of the variance in behavioural intention (Venkatesh et al., 2000; Davis et al., 1989), which is considered modest (Al-Aulamie, 2013; Sun et al., 2006). Augmenting the TAM with additional external variables may enhance its explanatory capabilities. Thirdly, the relationships between TAM variables exhibit inconsistencies across different situations and settings (King et al., 2006; Al-Aulamie, 2013). For instance, the effect of perceived ease of use on behavioural intention is found to vary significantly among studies (Al-Aulamie, 2013).

7.3.4. Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) developed an influential and comprehensive theory that aimed to give a unified understanding of technology acceptance and utilisation. Their work involved a comparative analysis of eight existing models: Social Cognitive Theory (SCT), Motivational Model (MM), Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), an integrated TAM-TPB model, Innovation Diffusion Theory (IDT) and the Model of PC Use. By examining and synthesising these models, the researchers sought to establish a coherent framework for comprehending consumers' adoption of technology. The resulting theory proposed by Venkatesh et al. identified key factors that influence behavioural intention and use behaviour. Specifically, the theory emphasised three independent variables: effort expectancy, performance

expectancy and social influence, which collectively shape individuals' behavioural intention. Additionally, the model highlighted the role of facilitating conditions in influencing actual usage behaviour. By considering these elements, the theory offered a holistic perspective on the adoption and utilisation of technology by consumers.

Gender, experience, age, and willingness to use have all been included as moderators in the model. The UTAUT model is presented in Figure 7.4.

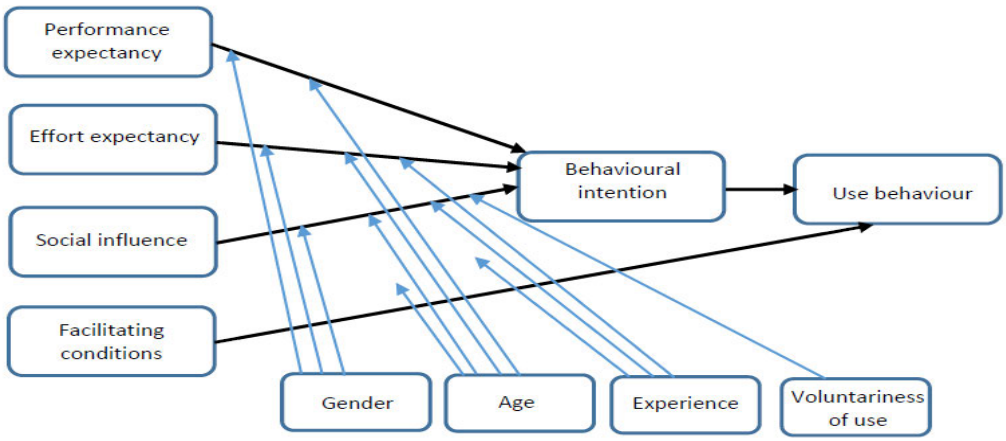

Figure 7.4. UTAUT (Venkatesh et al., 2003)

The Unified Theory of Acceptance and Use of Technology (UTAUT) consists of several key components that contribute to individuals' acceptance and utilisation of a new system. Venkatesh et al. (2003) explain each of these components as follows:

- Performance Expectancy: This refers to an individual's belief in the system's ability to enhance their performance. For instance, if a user believes that utilising the system will lead to performance gains, they are more likely to use it regularly.
- Effort Expectancy: This component relates to the perceived ease of using the system. When users find the system easy to use, they are more inclined to adopt it. Conversely, if the system requires significant effort or is difficult to navigate, users may be less likely to embrace it.
- Social Influence: Social influence encompasses the impact of important individuals in one's life, such as friends, family, and colleagues, on their adoption decision. The perception of others' beliefs and expectations regarding system adoption can strongly influence an individual's motivation to use the system and seek acceptance from their social circle.
- Facilitating Conditions: This component refers to an individual's perception of the support and resources available to facilitate system usage. It includes factors like organisational support, financial resources, and necessary infrastructure. When individuals perceive a supportive

environment that enables effective system utilisation, they are more likely to engage with the system.

- Behavioural Intention: Behavioural intention is the cognitive inclination or intent to use the system. A positive orientation towards using the system indicates an individual's intention to adopt and utilise it.
- Use Behaviour: Use behaviour represents the actual engagement and actions taken by individuals to utilise the system. It reflects the extent to which users actively interact with and make use of the system's features and functions.
- Moderating Variables: Moderating variables, such as gender, age, experience, and voluntariness of use, interact with the components of the UTAUT model. They influence the strength or impact of these components on behavioural intention and use behaviour. In other words, these variables introduce additional complexity by shaping the relationship between the UTAUT elements and the desired outcomes, depending on individuals' specific characteristics.

Research by Waehama et al. (2014) has shown that UTAUT is a valid and stable model in various study scenarios. Additionally, the model accounts for a substantial amount of variance in behavioural intention (approximately seventy percent) compared to other models that typically explain only forty percent of the variance (Waehama et al., 2014).

UTAUT was created primarily to investigate employee perceptions of technology adoption. As a result, it is unclear how this theory may be applied in other circumstances, such as the consumer context (Venkatesh et al., 2012). Notably, there have been inconsistencies observed in the relationships proposed by UTAUT (Thomas et al., 2013). Some studies have confirmed the positive effects of performance expectancy and social influence on behavioural intention, while others have yielded different results (Thomas et al., 2013). Furthermore, Van et al. (2008) have raised concerns about the model's lack of simplicity and identified the incorporation of multiple unrelated variables to define a single psychometric construct as problematic. These considerations highlight the need for further examination and refinement when using the UTAUT model in different settings and contexts.

7.3.5. Theory of Reasoned Action (TRA)

Fishbein and Ajzen (1975) introduced the Theory of Reasoned Action (TRA) as a framework rooted in social psychology. The main premise of TRA is that an individual's intention to engage in a specific behaviour serves as a direct influence on their actual behaviour. This theory has been extensively employed in the field of information systems (IS) to forecast individuals' behavioural intention

concerning the adoption of particular technologies. TRA comprises three fundamental constructs, namely behavioural intention, attitude, and subjective norm, as depicted in Figure 7.5.

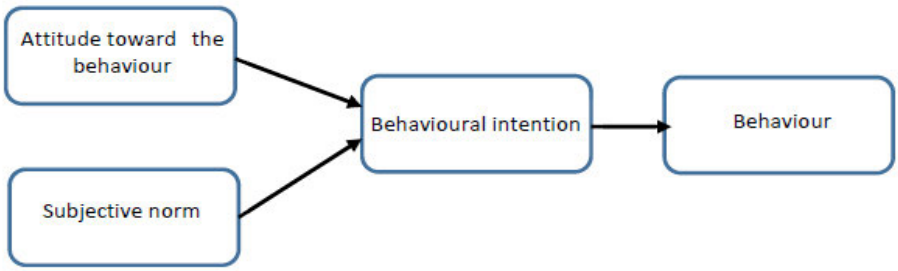

Figure 7.5. Theory of Reasoned Action (Ajzen, 1991)

TRA has found wide acceptance and utilisation within the IS domain. Its application allows for the prediction of individuals' behavioural intention, which is crucial for understanding their inclination to adopt specific technologies. By adopting TRA, researchers and practitioners in the IS field can gain valuable insights into the factors influencing individuals' decisions and behaviours related to technology adoption, thereby facilitating the development of effective strategies and interventions.

Despite the widespread use of the Theory of Reasoned Action (TRA), it has not been without its share of criticism from researchers. One notable drawback, referred to as "correspondence," is that TRA's ability to accurately predict behaviour relies on the alignment of attitudes and intentions with the specific context, target, and time (Ajzen, 1985; Sheppard et al., 1988; Wright, 1998). This limitation suggests that TRA may not be equally effective in all situations. Another limitation of TRA is its applicability primarily to behaviours that are under voluntary control, as it fails to consider constraints such as time, financial resources, and other factors that may hinder individuals from acting as intended (Yousafzai et al., 2010). Consequently, TRA does not fully account for habitual behaviours, irrational decision-making processes, or behaviours influenced by unconscious factors (Samaradiwakara et al., 2014). This limitation restricts the generalisability of TRA to behaviours that are driven by conscious intention and within individuals' control. Furthermore, TRA is criticised for its broad nature, as it does not specify the particular beliefs that are predictive of a specific behaviour (Davis et al., 1989). This lack of specificity may limit the precision and accuracy of predictions made using TRA. Hence, TRA alone will not be suitable for this study.

7.3.6. Theory of Planned Behaviour (TPB)

Building upon the Theory of Reasoned Action (TRA), Ajzen (1991) expanded the theoretical framework and introduced the Theory of Planned Behaviour (TPB) shown in Figure 7.6. TPB posits

that an individual's intention to engage in a specific behaviour is influenced by three distinct predictors: attitudes, subjective norms, and perceived behavioural control (PBC) (Ajzen, 1991). Perceived behavioural control refers to an individual's perception of the ease or difficulty associated with performing the behaviour (Ajzen, 1991). This addition of perceived behavioural control in TPB addresses a limitation of TRA, which assumed volitional control over behaviour. By incorporating perceived behavioural control, TPB acknowledges that factors beyond voluntary control can influence behavioural intentions (Ajzen, 1991).

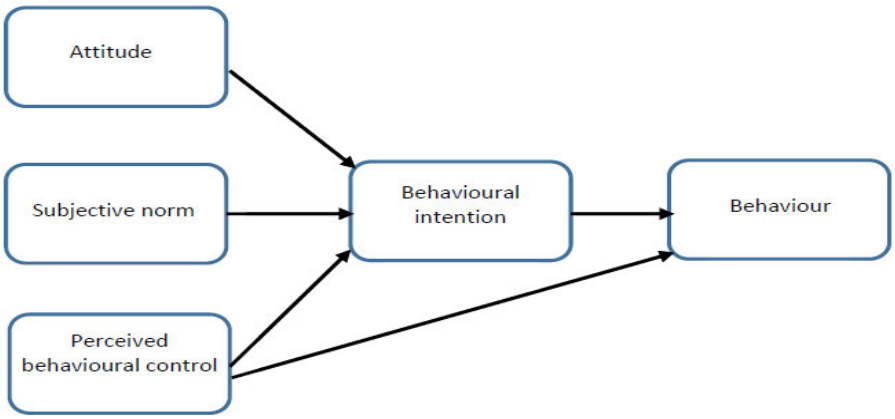

Figure 7.6. Theory of Planned Behaviour (Ajzen, 1991).

According to Ajzen (1991), this theory is open to other determinants that can explain for variation in intention or behaviour. Previous empirical research found that TPB explained only around 40% of the diversity in people's behaviour, according to Al-Aulamie (2013). Taylor et al. (1995) have critiqued the practise of grouping all non-controllable variables that influence people's behaviour into a single variable, i.e., perceived behavioural control (PBC).

TPB, however, has also been subject to discussion and analysis in previous years. According to Ajzen (1991), the theory remains open to the inclusion of other determinants that can account for variations in intention or behaviour. Empirical research conducted by Al-Aulamie (2013) found that TPB explained only approximately 40% of the variability in people's actual behaviour. This suggests that there are additional factors beyond the scope of TPB that contribute to the complexities of human behaviour. Criticism of TPB has also been raised by Taylor et al. (1995) regarding the practice of amalgamating all non-controllable variables that influence behaviour into a single variable, namely perceived behavioural control (PBC). This critique implies that the consolidation of uncontrollable factors may oversimplify the understanding of how these variables individually impact behaviour. Considering these discussions, researchers and practitioners should be aware of the limitations and potential shortcomings of TPB. It is essential to recognise that while TPB provides valuable insights

into behavioural intentions, it may not fully capture the entire spectrum of factors that influence human behaviour.

7.3.7. Expectation Confirmation Model (ECM)

The expectation-confirmation model (ECM) shown in Figure 7.7 is also known as Information System Continuance Model (ISCM). Oliver conceived it (1980). Bhattacherjee (2001) expanded the ECM by incorporating the TAM's perceived utility part in the context of post-adoption information systems (IS). In this hypothesis, users' happiness, confirmation of expectations, and perceived utility are the three key factors of IS continuation intention (see Figure 7.7). In previous studies on the intention to continue using information technology, the ISCM model was the most commonly used model (Nabavi et al., 2016).

Figure 7.7. Expectation Confirmation Model (Bhattacherjee et al., 2001)

In Figure 7.7, IS continuation intention refers to a user's intention to continue utilising a technology. Satisfaction refers to people' feelings regarding previous technology use. Perceived Usefulness refers to consumers' perceptions of the expected benefits of technology use. Confirmation is the view of users of the congruence between their expectations of technology use and its actual performance. Theoretically, ECM is an ideal model for IT continuity studies. However, in order to strengthen the robustness and predictive capacity of ISCM when examining continuation intention in new technological contexts, new variables for distinctive properties of the new technology should be added (Bhattacherjee et al., 2008; Lin et al., 2017).

7.3.8. Conclusion

ECM is one of the most widely used model in research for predicting and explaining continuance behaviour in information systems. It is certainly right fit for the purpose of this study. Like Theory of reasoned action and Theory of Planned Behaviour, this is not a generic one size fits all approach to working with online learning. It is specifically designed and has been widely used in the

Information System (IS) realm. This model goes beyond the element of acceptance of technology and focuses on the continued use of the system which is in line with the requirements of this study. Therefore, we will be using ECM to understand the impact of the two factors, ease of leaving and taking breaks in between course, on the change in user intention to continue the use of MOOC.

7.4. Methodology

In order to test the hypothesis derived from the qualitative part of this research, this study employs quantitative methods. This section explains the research design, sampling technique, data collection and data analysis.

7.4.1. Research Design

Research methodology can be categorised into three main type of methods: qualitative, quantitative and mixed methods. Qualitative research methods are a part of inductive, subjective, naturalistic and interpretive approach, which is used to explore a complex phenomenon and draw meaning out of the findings.

The advantages of qualitative approach include the scope to address and understand complex phenomenon from participants own point of view. Interviews can be conducted with a relatively few number of participants. It is ideal for exploring ideas, developing theories and formulating hypotheses. It can be used to understand the cause and effect of a particular phenomenon. However, the disadvantages of qualitative methods are that it may not be used to generalise findings in other contexts from which the data was collected. It is not used to test predictions or hypotheses. The data collection and analysis are relatively more time consuming.

Whereas, the quantitative research methods are frequently used to test ideas, predictions and hypotheses. The advantages of quantitative methods are that the data collection and analysis are relatively less time consuming. Quantitative research can be generalised given adequate sample size, using a random sample. The data collection in this research can be vast and many. Also, it is objective and relatively independent of the researcher. The disadvantages of quantitative methods are that it works with pre-determined categories and theories thus it is relatively less flexible in terms of explaining or developing an idea. This method shares a risk of confirmation bias – focusing to testing theories rather than constructing the ideas into workable understanding.

The third type of method is generally termed as mixed methods (Johnson et al., 2007). As the term implies, mixed methods is when both qualitative and quantitative methods are deployed with a

research study. The advantages of mixed methods are that it can potentially give more validity to research by combining both qualitative and quantitative data. The qualitative data collection and analysis of the study can be used to develop instruments and hypothesis for the quantitative part of the study, which the approach used by this study. Post obtaining the quantitative study results the qualitative study can be used to explore, understand and explain the results better. Mixed methods allows the researcher to answer different research questions in a single study. Also, the quantitative and qualitative study are often used to complement each other to obtain better analysis and inferences. The disadvantage of mixed methods research is that it can be relatively difficult to manage. Also, it can be quite time-consuming and more expensive.

This part of the study strives to test hypotheses and validate findings made by the qualitative research performed earlier. To test the hypotheses data would need to be collected from large number of respondents in order to determine whether the hypotheses are supported or rejected for this study. Since, a large amount of objective data needs to be collected the qualitative or mixed methods approach will not be appropriate as nature of the data required is not rich, subjective or complex. Therefore, quantitative research methods are the most appropriate to test the hypotheses. The hypotheses for this study are:

Hypothesis 1 (H1): Participants' ease of leaving the course is positively associated with them leaving the course earlier than originally intended.

Hypothesis 2 (H2): Participants' taking a break in the course is positively associated with them leaving the course earlier than originally intended.

Hypothesis 3 (H3): Participants' extent of confirmation is positively associated with their satisfaction with the course.

Hypothesis 4 (H4): Participants' extent of confirmation is positively associated with their perceived usefulness of the course.

Hypothesis 5 (H5): Participants' satisfaction level is positively associated with them leaving the course earlier than originally intended.

Hypothesis 6 (H6): Participants' perceived usefulness of the course is positively associated with them leaving the course earlier than originally intended.

Hypothesis 7 (H7): Participants' perceived usefulness of the course is positively associated with their satisfaction with the course.

Figure 7.8 shows the proposed model with associated hypotheses in a graphical format.

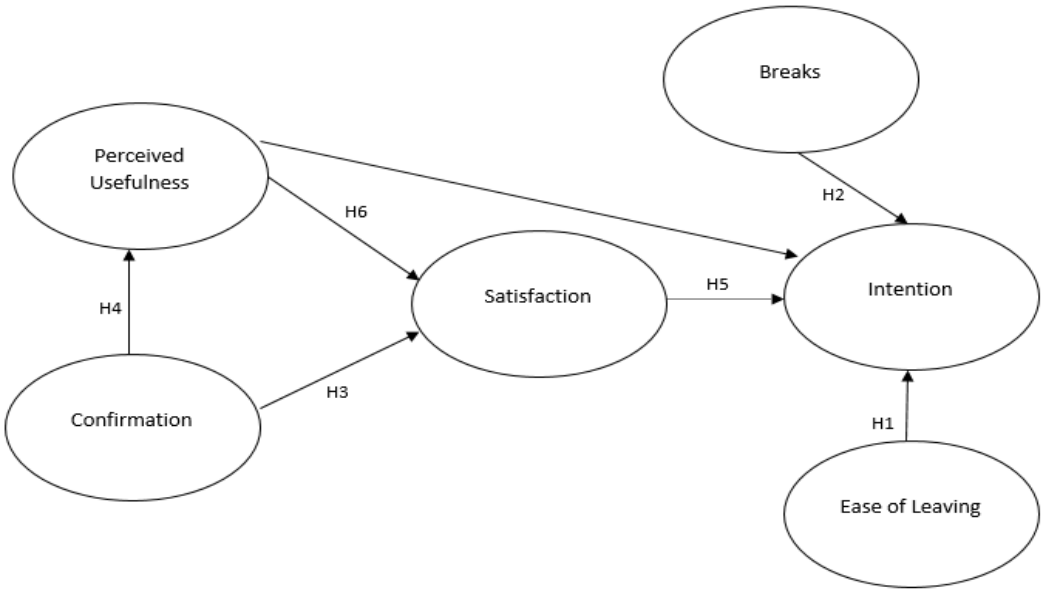

Figure 7.8. Extended ECM Model

7.4.2. Participants and Procedures

This study aims to validate the findings of the qualitative part of this research by assessing the significance of the impact of the two variables, i.e., taking breaks in between the course and ease of leaving the course, on participants who leave the course earlier than originally intended. MOOC users in Pakistan who attended a course and changed their initial intention to continue using the course were required to fill out the questionnaire. The survey link was shared with university students on their whatsapp groups and was posted on MOOC social media pages in Pakistan. The students taking the survey were also asked to forward the link to other people who may have attended a course on MOOC platforms. To facilitate the decision of potential participants to fill out the survey it was informed that the survey involves multiple choice questions and should take only about seven minutes of their time. At the beginning of the survey each participant was provided with the information sheet and asked to give their consent to use data they provide for research purpose. The information sheet was designed per the requirements from the University of Reading and provided information on the purpose of the study, the researchers and institutions involved, the data required from the participants and details on its safe keeping, the right to withdraw at any time, the possible risks involved and the confidentiality and anonymity aspects (Ong et al., 2021). At the end of the survey completion note with appreciation on the time taken to fill out the survey was presented to the participant.

7.4.3. Instrument development

The instrument developed for data collection must be able to collect the required information to achieve research objective. As such, the instrument designed must be clear, at an appropriate level and easy to understand (Kazi et al, 2012). Hence, when designing the instrument utmost care was taken to ensure that the questionnaire gathers the required information to answer the research question. In order to achieve this following steps were taken; the objective of the questionnaire was clearly stated and understood, research on previously published and validated questionnaire that could be used with the study (Kazi et al, 2012), verifying the instrument created through review and feedback from experts. Also, using three or more questions to represent a construct stands a better chance that a representative data for can be captured (Gerbing et al, 1985). Therefore, for the ease of leaving construct, where self-made questions were to be used, six questions were used to represent the construct that ensured improved chances of capturing representative data for the construct. For breaks in between the course, initially, there were several questions developed, however, through expert discussion it was decided that a binary question would be sufficient to capture whether student took during the course or not. All the other questions were borrowed from the ECM model (Bhattacherjee, 2001).

The instrument developed has three main sections. The information sheet and consent form, as explained above, was placed as the first section in the questionnaire. If a participant did not agree to provide his consent to continue with the questionnaire, all the steps were skipped and the survey ended. However, if the participant agreed to provide the consent the survey took him to the second section. The second section collected profile details from the participants. The information required included, Country of origin, Gender, Age, Education Level and Occupation. All these questions were provided in multiple choice or list box format. After the profile section the survey took the participant to the third section. The third section included the questions on ECM model and the two variables to be tested.

Section three was developed using an existing scale of Expectation Confirmation Model (ECM) designed published by Anol Bhattacherjee in MIS Quarterly (Bhattacherjee, 2001) and extending the questions on the two variables to be tested. Firstly, the section asks about the MOOC platform used and the course taken to set the context with which the participant will be answering the questions. The questions that followed were directly taken from the ECM model. As stated earlier, the ECM model has four elements: Expectation Confirmation, Perceived Usefulness, Satisfaction and Continuance intention (see Figure 7.7). Questions are designed for each of these elements.

Firstly, three questions on course continuance intention are asked. The first question asks the participant to rate "I intended to continue using the course rather than discontinue its use." This means whether the initial intention was to leave the course in between or continue using the course. High agreement score for this statement reflects that the initial intention was to stay longer with the course that later changed, which means later the participant changed his intention and dropped out of the course. The second statement asked the participant to rate "My intentions were to continue using the course than use any alternative means." Alternative means could be leaving the MOOC and switching to social media, personal tutors, etc. This option is meant to ask about learner's intention to continue using the course for learning than to stray off and find a different source for the purpose. A high score on this question would mean that the learner intended to continue using the MOOC for learning than drop out and find other channels. The third questions asked the participant to rate "If I could, I would have liked to discontinue my use of the course." This is a negatively worded statement. The statement means that the initial intention was to stay lesser that later changed. This statement also acts as a check whether the participant filled out the questionnaire correctly or not as the score to this statement are likely going to be to the other extreme in comparison to the first statement for continuance intention.

Secondly, the next four questions of the survey ask about the satisfaction level of the participant at the point when the initial intention was changed. The first statement in this part asks the participant to rate "I felt satisfied with the overall experience of the course use." This statement reflects how satisfied the user felt when the initial intention was changed. A high score rating for this statement would mean that the participant was satisfied with the course. The second statement to rate is "I felt pleased with the overall experience of the course use." A high score on this statement would reflect that the participant liked the course and hence satisfied with it. The next statement says "I felt frustrated with the overall experience of the course use." This is a negatively worded statement. A high score on this statement would mean the participant is not satisfied with the overall usage of the course. The next statement says "I felt terrible with the overall experience of the course use." This again is a negatively worded statement where a high score would mean the participant is not satisfied with the course. The negatively worded statements act as a checkpoint on whether the participant filled the questionnaire with care or not.

Thirdly, five questions are asked on the perceived usefulness of the course. This part asks about how useful the participant perceived the course to be when he changed the initial intention. The first statement in this section asks to rate "Using the course improved me.", "Using the course benefited me." and "Using the course enhanced my skills." A high score on these statements would mean that

the participant perceived that the course benefited or improved him. This would mean that the participant perceived the course to be useful. The next statement asks to rate "Overall, the course was useful." This is a direct question asking whether the participant found the course useful or not for any possible reason. A high score on this statement would mean that the participant perceived the course to be useful. The next statement is "I did not find the course useful." This is a negatively worded statement that acts as a good checkpoint to ensure the participant answered this section of the survey correctly. A high score on this statement would indicate that the participant did not find the course to be useful.

Fourthly, four questions on expectation confirmation were asked. The first statement in this part asks the participant to rate "My experience with using the course was better than what I expected." This directly asks the participant to rate whether expectation from the course were confirmed or not. The next statement to rate is "The service level provided by the course admins was better than what I expected." A high score on this statement reflects that the participant found the service level better than expected, which means that his expectation from the course were met. The next statement asks the participant to rate "Overall, most of my expectations from using the course were confirmed." A high score on this statement would mean that the sum of all things experienced results in participant expectation from the course as confirmed. The last statement to be rated in this section is "My expectations from using the course were NOT confirmed." This is a negatively worded statement where a high score would reflect that the participant expectations from the course are not confirmed. This also acts as a good checkpoint for the section to ensure reliability of the responses.

Finally, questions for the variables to be tested with ECM are added. It must be noted that all the ECM based questions explained above are directly borrowed from the well-tested and tried ECM scale developed by Bhatarjee (2001). The questions that follow ask about the two variables that are extended with the ECM model. The first variable is taking breaks in between the course and the next is ease of leaving the course. Taking breaks in between the course means whether the participant took a break in between the course with the intention to return back to the course. Ease of leaving the course means how ease it was for the participant to leave the course. Since all the questions for ECM were borrowed from a well published and cited study (Bhattacherjee, 2001), the questions for these two extended variables were to be designed to ensure that the true essence of the construct is captured. For a construct it is known that at least two indicators per variable must be present for confirmatory factor analysis. However, only two indicators for the construct may not capture the breadth of the information required to represent that construct, hence, it is recommended that three to five indicators are used to ascertain a plausible analysis (Kline, 2011). For this study, we devised six indicators for

the constructs. For breaks in between variable it was observed after the pilot test that directly asking whether the participant took a break in between the course or not was sufficient to capture the essence of the variable, i.e., the objective of the study to understand whether taking the breaks in between the course was met just by simply asking if the student took a break in between the course or not. For ease of leaving the course six indicators or statements were prepared for the participants to rate. The first statement asked the participant to rate, "It was easy to leave the course anytime in between." This directly asks the participant to indicate whether the participant found it easy or difficult to leave the course in between. A straight forward statement like this would get the participant to answer the question directly with whatever reason he may have to determine whether it was easy to leave the course or not. For example, among other reasons, it may be easy to leave the course because participant did not think he was losing anything of value, tangible or intangible. It may be easy to leave the course due to no obligations from anyone, i.e., no friendships were affected (whether online or offline), and no learning was left unattained or lost, no pressure from anyone to continue with the course, and no monetary or non-monetary sacrifice was made. The second statement asked the participant to rate, "I was not answerable to anyone for leaving the course." By becoming answerable makes the participant attend the course, which means the participant would have to continue using the course and report back on the progress even when he himself would not like to continue with the course. This makes difficult for him to leave the course at his own free will without any repercussions. The third statement asked the participant to rate, "I would lose (or lost) nothing if I left the course in between." This causes the participant to reflect upon any value that he would lose if he were to drop out of the course. The loss could be in terms of money, knowledge, etc. If the participant were to lose something it would make it difficult for him to leave the course. The fourth statement asked the participant to rate, "I would gain nothing for staying on the course." By staying on the course the participant does feel like he is gaining anything of value, which would make it easier for him to leave the course. The fifth statement asked the participant to rate, "No one relevant was (or would have been) affected if I left the course in between." This pertains to the significant others (e.g., friends, teachers, peers, parents, relatives, etc.) who may influence the participant to continue on with the course. If no one relevant was affected, it would make it easier for the participant to leave the course. The sixth statement asked the participant to rate, "It was (or would have been) difficult to leave the course in between." This is a negatively worded statement it verifies the initial claim of the participant on whether it was easy or difficult to leave the course in between. It also serves as a checkpoint that is used to verify whether the participant has properly filled out the form or not.

Granularity of the answer choices add to the continuity of the data, thus it defines the scope of results obtained and, consequently, influences analysis and outcomes (Rhemtulla et al., 2012). Questionnaire with low granularity has the advantage that it is quicker to answer since there are very few options. The disadvantages of low granularity questions are that the scale exhibits more bias and the respondents can become frustrated if their desired response is not presented among the choices (Pierce, 2011). Whereas, the questionnaire with high granularity has the advantage that it is more likely to have exhaustive, inclusive and mutually exclusive options for responses. A high granular questionnaire can have more precise data, higher reliability, higher validity, increased score variance, opportunities for a more in depth statistical analysis and fewer uncertain responses (Pearse, 2011). The disadvantages of a high granular questionnaire are that it can get more difficult to differentiate categories when choosing a response, respondents may become impatient or frustrated with so many choices, the highly granular categories may become trivial and it may get prone to distortion effects of cognitive reference points. In line with both pros and cons of granularity of the questionnaire five or seven point Likert-scale are recommended to be used especially with the new items as they can give credible coefficients of reliability. As suggested, five point Likert scale is used in the survey for this study as its granularity is deemed appropriate enough to capture the desired response. Also because five point Likert-scale is used in the established ECM model study and it is only appropriate to use this scale when extending the model.

The constructs and the latent variables can be modelled as formative or reflective depending on the research purpose and how the instrument is to be operationalised (Albers, 2010). The most obvious difference is in the relationship between the construct and its indicators. In a reflective construct, the construct exists first, and the evidence of its existence is manifested in the indicators. In terms of variance, the variance of the construct "happens" first, then the variance becomes visible through the indicators. Anything else that also causes variance of the indicators is called "error", and each indicator has some. In a formative construct, it is somewhat the opposite, and the error depends on the type of formative construct. In a causal formative construct, the variance in the indicators exists first, and that variance manifests itself in the variance of the construct. Anything else that causes variance of the construct is again, error, and is "attached" to the construct, not the indicators (MacKenzie, 2011). This study extends the already well established Expectancy Confirmation Model (ECM), which uses reflective construct for formulate the model, which means the variation of the construct is directly reflected in its indicators. In line with the ECM the two variables under investigation, i.e., ease of leaving the course and taking breaks in between, are extended with ECM

using reflective constructs. The next section discusses how the questionnaire was developed and operationalised to collect the required data to test the extended model.

7.4.4. Operationalising Questionnaire

Several options were considered when deciding what platform to use to create the questionnaire. Among them were Google Forms, SurveyMonkey and SmartSurvey. Google Form was finalised because it is relatively easy to use and understand. The potential respondents use Google products all the time and are likely to be familiar with Google Form applications due to its multi-purpose features. Google Form is easily accessible by the potential participants to the survey and provides for sufficient flexibility to create questionnaire as required. Another important feature is that Google Forms is free to use by anyone, whereas other tools offer limited services for free usage.

When the questionnaire was created it was tested in the preview environment of Google Forms. There were several runs of the survey in the preview section where the survey was tweaked to make it more user friendly. One of the things that was enhanced at this stage was adding sections to each part of the survey, i.e., Information and Consent Sheet, Profile questions (country, age, gender, education level and occupation) and questions on ECM model and the extended two variables. The survey also doubled checked for typos and errors. When the questionnaire was finalised a shareable link from Google Forms was obtained that could be sent to the potential participants to collect their response.

At this stage expert opinion was sought from the PhD supervisor and a few professors who are well established researchers. These experts have likely developed and reviewed many such instruments. Their feedback could certainly help improve the questionnaire. One of the important feedback incorporated from the experts was to have five or more questions for ease of leaving construct to support correction in case cross-loading or poor loading occurred. This feedback was incorporated in the questionnaire and there were six questions made for the ease of leaving construct. Next, the Google Forms shareable link was sent to some university students who were asked to fill it out and pass on the link to other relevant people. The university students shared the link with their friends and placed them on whatsapp groups.

7.4.5. Pilot Study

A pilot study is essentially a small study conducted as a prelude to a larger study (Polit et al, 2003). The methods and procedures used in a pilot study are practically similar to the ones deployed for the larger study. The purpose of the pilot study is to test if the larger study can be carried out successfully,

if yes, then how to proceed with it (Connelly, 2008). There are numerous advantages of a pilot study, these include: checking the feasibility of the full study, collecting preliminary data, testing sampling strategies and developing and testing procedures and protocols for the larger study (Becker, 2008). The results of the pilot study inform the deployment of the larger full study (Van et al., 2001). Results obtained from the pilot study are analysed to check if the researchers can continue to do more of the same to complete the study. The feedback obtained from the pilot study can also be used to correct the instruments and tools used for the final study (Jairath, et al., 2000).

The methodology used for the pilot study is the same as the one planned and presented above for the larger study. The pilot study follows positivist approach. It is a cross-sectional study that collects data using a survey and deduces findings based on the results obtained from the survey. It uses snowball convenience sampling technique whereby some university students are asked to fill out the survey and asked to forward the survey to other people in their contacts who have previously taken a MOOC.

The instrument developed for the pilot study extends the ECM Model. It borrows questions from ECM Model for the constructs of Continuance intention, Satisfaction, Perceived usefulness and Expectancy Confirmation. All these questions are explained in the instrument development section above. The two variables extended are taking breaks in between the course and ease of leaving the course. Six questions were developed for each of the variables to be extended. This is in line with the recommendation of creating more than three variables for each construct (Gerbing et al, 1985).

For taking breaks in between the course following questions were developed:

- The effect of taking breaks in-between course made it more likely to leave the course.
  - This statement directly gives the impact of taking breaks on the likelihood of leaving the course.
- The effect of taking breaks in-between course got me disengaged from the course.
  - When participant gets disengaged from the course it becomes more likely that he will leave the course.
- The effect of taking breaks in-between course helped in continuation of the course.
  - This is a statement that says that taking breaks in between the course has a positive effect in continuation of the course. In essence, it is opposite of the first statement. This acts as a good checkpoint in too that reflects that the participant has carefully filled out the questionnaire.
- The effect of taking breaks in-between course made it easy for me to leave the course.
  - This statement is in line with the first statement. It directly says that taking breaks in between the course made it easy for the participant to leave the course.
- The effect of taking breaks in-between course caused my satisfaction with the course to decline.

  - This is a cause and effect statement. It says that as a result of taking breaks in between my satisfaction level decline. With decreased satisfaction if makes it more likely that the participant will drop out of the course.
- The effect of taking breaks in-between course reduced the usefulness of the course.
  - The reduced usefulness of the course would make it more likely that the person would leave the course.

For ease of leaving construct following questions were created:

- Ease of Leaving the course makes people not complete the course.
  - This is a statement that directly implicates that ease of leaving the course would make people leave the course.
- Ease of Leaving the course means I do not lose much when I drop the course.
  - This statement implies that participant do not lose much, e.g. money, time, effort, etc., when the participant drops out of the course. This means ease of leaving the course makes it easier for people to drop out of the course.
- Ease of Leaving the course was not a factor in my decision to leave the course.
  - This is a reverse logic statement. It is opposite to the first statement and acts as a good checkpoint to determine whether the participant has filled this part of the questionnaire appropriately.
- Ease of Leaving the course reduces the importance of the course.
  - This statement tackles the usefulness of the course. A high score for this statement would mean ease of leaving the reduces the importance of the course as such it makes it more likely that he leaves the course.
- Ease of Leaving the course helped me achieve what I expected from the course.
  - This statement tackles the expectancy confirmation. It means that ease of leaving the course makes it easy to meet what is expected from the course.
- Ease of Leaving the course improved my satisfaction with the course.
  - This statement tackles the satisfaction aspect of the ECM model. This means ease of leaving the course directly affects the satisfaction level of the course.

Google Forms was used to develop the instrument. Information sheet and Consent sheet was placed before the questionnaire. When the instrument was finalised, as explained above, a sharable link to the survey was sent to some of the university students and they were asked to forward it to other people who have experience taking a MOOC before.

After getting about a hundred responses factor analysis with principal component analysis to check the data loadings. Factor analysis consists of a number of statistical techniques commonly used in social sciences research that aim to simplify complex set of data (Kline, 2014). There are a number of methods used to extract factors from the data. Among others, these methods include Principle Component Analysis (PCA), Image factoring, Common Factor and Maximum likelihood method. Principal Component Analysis (PCA) is a data extraction method that is used in exploratory data analysis and is commonly used as a dimension reduction technique. PCA can be thought of working with data in such a way that maximises the variance of the projected data (Abdi et al, 2010). Maximum likelihood method works with the data as such that it increases the likelihood that the parameters values obtained are as per the process described by the model under consideration. In the common factoring method, the common variance of all the factors is extracted and is put into factors. In Image factoring method, rather than using function of hypothetical factors, the common part of the variables, called partial image, is defined by the linear regression on the rest of the variables. This means it does not include the unique variance of all the variables. For the purpose of this study PCA is used as the factoring method because, firstly, it is the most common used factoring method for such a study and hence is well practiced in the context. Secondly, it is used to do dimension reduction such that it makes it easier to work with data, makes it more representative and can be used to analyse trends, clusters and outliers. The factor loadings to be checked are the correlation coefficient of the factor and variable. As a common practice 0.5 or above loading represents that the factor extracts majority of the variance from that factor. Another important element to consider in checking factor loading is the Eigenvalues, which is also known as characteristic roots. Eigenvalue basically shows the variance showed by that particular factor out of the total variance. According to Kaiser Criterion Eigenvalue is a good benchmark to determinant to ascertain a factor. As is the common practice and in line with recommendation Eigenvalue of one is used for this research. This means if Eigenvalue is of a dimension is greater than one it should be considered a factor, whereas, if Eigenvalue is less than one it should not be considered a factor. When analysing the output of correlation rotation method makes it easier to make sense of the data. As a common practice Varimax rotation method is used to rotate the data along with Kaiser normalisation for this research (Rummel, 1988). Also, in line with the model the criterion was set to pick six factors and for the ease of reading results only 0.5 or above values were filtered out to be shown. When the data was loaded and analysis run on SPSS, it was discovered that the questions were not loading as expected. The situation was explained to supervisor and other researchers and it was decided that more data should be gathered to draw conclusive results. A drive to gather more data was conducted and 178 responses were gathered to check the loadings again. The results of the loadings are presented in Table 7.1.

Table 7.1. Loading Results

Rotated Component Matrix						
	Component					
	1	2	3	4	5	6
Q1_Intention	.715					
Q2_intention	.728					
Q3_intention	.668					
Q1_Satisfaction	.849					
Q2_Satisfaction	.881					
Q3_Satisfaction	.658					
Q4_Satisfaction	.760					
Q1_PerceivedUsefulness	.889					
Q2_PerceivedUsefulness	.904					
Q3_PerceivedUsefulness	.889					
Q4_PerceivedUsefulness	.893					
Q5_PerceivedUsefulness	.798					
Q1_Confirmation	.773					
Q2_Confirmation	.812					
Q3_Confirmation	.828					
Q4_Confirmation	.693					
Q1_BreaksInBetween		.773				
Q2_BreaksInBetween		.847				
Q3_BreakInBetween		.643				
Q4_BreaksInBetween		.821				
Q5_BreaksInBetween		.738				
Q6_BreaksInBetween		.745				
Q1_EaseOfLeaving				.736		
Q2_EaseOfLeaving					.734	
Q3_EaseOfLeaving						.706
Q4_EaseOfLeaving				.867		
Q5_EaseOfLeaving			.799			
Q6_EaseOfLeaving			.835			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.[a]						

Table 7.1 shows less than ideal results. It shows that the factors are not loaded appropriately. Continuance Intention, Satisfaction, Perceived Usefulness and Expectation Confirmation all are loaded under one dimension. Break in between come are loaded as the second factor and ease of leaving is spread across all the other factors. This means that the questions for each component of the

model are not identified separately. In light of the situation, it was decided to go back to the drawing board and discuss how best to develop the instrument to capture the desired results.

It was realised that when developing the instrument, a key step was missed, i.e., feedback from expert researchers on the instrument. Expert researcher or panel review is an important step in instrument development. Among other things, it is commonly south to seek advice on the appropriateness of the instrument, comprehension issues, potential data collection or analysis traps, reduction or expansion of the questionnaire in accordance with the theory or model, re-phrasing words or sentences to make them more appropriate for the purpose (Rubio et al., 2003). A panel of four expert researchers, including the supervisor, were selected to review the survey instrument. The survey link was sent to them on WhatsApp and telephone called followed requesting them to provide overall feedback on the instrument in line with the extended ECM model to be tested. After a week the reviewers were called again to collect their feedback.

The feedback obtained had both good and improvement points together with recommendations on analysis. The good points included the fact that a well-established framework of questions was borrowed from a well-accepted and credible study. They look and feel of the survey was appropriate, the time it takes to fill the survey (3 to 5 minutes) was appropriate and there were no language errors in the questions made.

Among the improvement points were that the questionnaires for the two extended variables, taking breaks in between the course and ease of leaving the course, did not fit well with the constructs. The organisation of the questionnaires should be improved with more explanation of each element of the survey where necessary. It was suggested that the instrument was not developed properly and should be created again. One of the key issues with the instrument was that the questions made for the two variables to be extended, i.e., taking breaks in between the course and ease of leaving the course, did not represent the construct. Instead, they were created to explain the relationship of the variables with the model. Therefore, it was decided that the instrument questions are to be created again. It was also recommended that for taking breaks in between a direct and binary-response question should be used as it is best answered by simply asking whether the participant took a break in between the course or not. For ease of leaving construct it was recommended to create about six questions again that would be more representative of the construct. Also, it was suggested SEM be used for the analysis. The updated and final questionnaire incorporated all the feedback obtained from the experts. All the experts gave positive feedback and a green signal for the updated instrument.

After revising the survey instrument the data collection started from again from scratch. In line with expert suggestion it was planned that over three hundred responses are to be gathered for plausible analysis.

SEM can be conducted using two different approaches: Partial Lease Square SEM (PLS-SEM) and Covariance Based-SEM (CB-SEM) (Hair et al., 2016). CB-SEM uses a theoretical covariance matrix, where explained variance is not the main focus, i.e., all the variance is not explained only the common variance is focused (Hair et al., 2011). PLS-SEM aims to maximise the explained variance of the latent constructs, as a result is commonly used in studies where prediction is the focus (Lowry et al., 2014). Table 7.2 shows comparison of the two approaches in relation to the requirements of the model.

Table 7.2. Comparison of PLS-SEM and CB-SEM (Lowry et al., 2014)

Requirement	**PLS-SEM**	**CB-SEM**
Non-normal distributions	Preferred	Not recommended, may yield unreliable outcomes
Non-homogeneity of variance	Preferred	Not recommended, may yield unreliable outcomes
Includes interaction effects	Preferred, designed for easy interaction	Difficult, especially with large models
Include Formative Factors	Easier	Difficult
Include multi-group moderators	Can be used, but challenging	Preferred
Testing alternative models	Can be used	Preferable, provides model fit statistics for comparison
Includes more than 40 to 50 variables	Preferable	Sometimes unreliable, convergence issues may arise
Small Sample size	Feasible (min 30 to 100)	Unreliable if it converges, often fails to converge
Prediction Effect	Preferred, emphasises prediction	Emphasises Parameter estimations
Approach used for all variance	Preferred, Variance-based approach	Covariance-based approach
Complexity of model	Preferred, Supports small to large complexity models	Suitable for small to medium complexity models

Analysis of the comparison table presented above support the expert researchers' recommendations that SmartPLS that works with PLS-SEM approach is the most appropriate for this research. Among other reasons the important points to note for this are:

1. The objective of this research is to extend an existing well-established model. This means there will be new latent variables tested that were not tested previously. Since, this is exploratory in nature PLS-SEM is recommended for this objective rather than CB-SEM that is used more for confirmatory research. (Hair et al., 2011).
2. The data obtained for this research is non-parametric in nature that is collected through convenience sampling techniques. This means that normal distribution of the sample may not be normally distributed and may not be homogenous. Therefore, PLS-SEM is the most appropriate approach for this research.
3. PLS-SEM can run with small sample size. This research is predicted to collected anywhere between 300 to 400 responses, which may not be sufficient for CB-SEM approach given the complexity of the model, therefore it would be most appropriate to use PLS-SEM for this research.
4. PLS-SEM can work with complex models with large number of variables and complex relationships among them. It is thought that this research does present moderate complexity as such PLS-SEM is preferred for this research.
5. The goal of this study is to predict the impact of the two variables, taking breaks in between the course and ease of leaving the course, on ECM components, i.e., Continuance Intention, Satisfaction, Expected Confirmation and perceived usefulness. Unlike CB-SEM, which is parameter oriented, PLS-SEM is the most appropriate for this research that is prediction oriented.

The initial analysis of the data collected using SmartPLS showed that the data loaded properly and could be further strengthened by continuing to collect more data. Therefore, it was decided to continue to collect data for final analysis. The result of factor loadings and further analysis is presented in Table 7.3 under the results section. The data collection section is explained in the next part of the report.

7.4.6. Summary

This section discussed the methodologies and approaches deployed to answer the research question with supporting reasoning. The section explains the research design, sampling techniques and approaches, data collection and data analysis aspects. The literature review analysis is used to identify possible and imminent gaps in research which are used to develop the research model and consequently its hypothesis. The next section explains the results and findings of research.

7.5. Results

This study utilised SmartPLS software for data analysis (Ringle et al., 2015) with a focus on prediction. Considering the research focus, PLS-SEM was deemed more appropriate for the analysis, as indicated by Hair et al. (2020), who emphasised the relevance of considering CCA as a technique when prediction is the primary objective. They further emphasised the importance of validating results in line with the prediction-oriented nature of PLS-SEM (Shmueli et al., 2016). To address this, recent scholarly discussions have proposed evaluation procedures tailored to the prediction-oriented nature of PLS-SEM (Shmueli et al., 2016).

Following the recommendations from PLS-SEM literature, a two-step approach was adopted for result analysis (Anderson et al., 1988; Henseler et al., 2009; Siyal et al., 2019; Wah et al., 2012). The first step involved examining the measurement model to assess inter-item reliability, convergent validity, and internal consistency reliability. In the second step, the structural model was examined (Figure 7.9) to test hypotheses and evaluate predictive capability (Henseler et al., 2009).

7.5.1. Measurement Model

To ensure the reliability of the measurement model, inter-item reliability was assessed by examining the factor loadings, adhering to the recommended threshold of 0.70 (Hair et al., 2016). Convergent validity was evaluated using the average variance extracted (AVE), with a threshold of 0.50 (Bagozzi et al., 1991; Chin, 1998; Fornell et al., 1981; Gefen et al., 2000). The internal consistency reliability was examined through composite reliability (CR) scores, which surpassed the threshold of 0.70 (Bagozzi et al., 1991; Chin, 1998; Fornell et al. 1981; Gefen et al., 2000; Hair et al., 2016). Detailed results of the measurement model can be found in Table 7.3.

To assess discriminant validity, the Heterotrait-Monotrait Ratio of Correlations (HTMT) method was employed (Henseler et al., 2015). The HTMT method was chosen due to recent criticism of the criterion proposed by Fornell and Larcker (1981). According to the suggested criteria, if the HTMT value exceeds 0.85 (Kline, 2005) or 0.90 (Malhotra et al., 2001), it indicates a potential issue with discriminant validity. Our findings, presented in Table 7.4, indicated that all HTMT values are below the recommended threshold of 0.85 (Kline, 2005).

Table 7.3. Measurement Model

Factor	Items	Loadings	AVE	CR	Alpha
Expectation	EC1	0.876	0.772	0.931	0.902
	EC2	0.844			
	EC3	0.901			
	EC4	0.893			
EaseOfLeaving	EL1	0.821	0.63	0.872	0.805
	EL2	0.853			
	EL3	0.751			
	EL4	0.747			
Intention	IN1	0.921	0.716	0.882	0.796
	IN2	0.733			
	IN3	0.873			
Usefulness	PU1	0.881	0.819	0.945	0.958
	PU2	0.911			
	PU3	0.908			
	PU4	0.925			
	PU5	0.9			
Satisfaction	ST1	0.914	0.815	0.924	0.946
	ST2	0.917			
	ST3	0.88			
	ST4	0.9			
Break	BR1	1	1	1	1

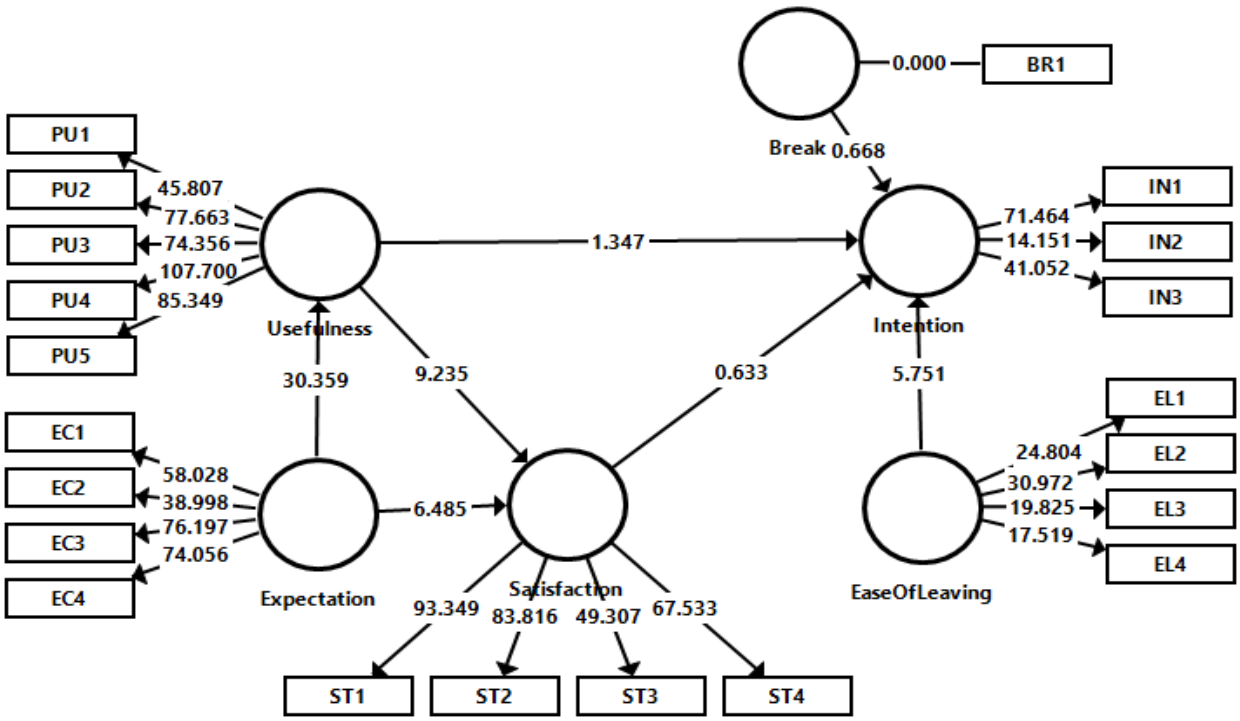

Figure 7.9. Structural Model

Table 7.4. Discriminant Validity - HTMT Ratio

	Break	EaseOfLeaving	Expectation	Intention	Satisfaction	Usefulness
Break						
EaseOfLeaving	0.199					
Expectation	0.232	0.061				
Intention	0.032	0.419	0.055			
Satisfaction	0.175	0.102	0.816	0.087		
Usefulness	0.188	0.086	0.832	0.111	0.838	

Note: HTMT = Heterotrait-Monotrait Ratio of correlations

7.5.2. Hypothesis Testing

In accordance with the recommendations found in the PLS-SEM literature, the next step involved hypothesis testing and the assessment of path coefficients' significance (Anderson et al., 1988; Henseler et al., 2009; Wah et al., 2012). To perform this analysis, we employed the bootstrapping procedure with 5000 subsamples (Hair et al., 2011) using the SmartPLS version 3.2.8 software (Ringle et al., 2015). The results of the hypothesis testing can be found in Table 7.5.

H1 is supported by the study ($\beta = 0.345$, $t = 5.656$, $p < 0.001$). This means that there is a positive relationship between ease of leaving the course and change in intention to leave the course early.

H2 is not supported by the study ($\beta = -0.036$, $t = 0.665$, $p = 0.253$). This shows that taking breaks in between the course is not significantly related to the change in intention of leaving the course.

H3 is supported by the study ($\beta = -0.357$, $t = 6.406$, $p < 0.001$). This means that participants whose expectation are confirmed express satisfaction for taking the course.

H4 is strongly supported by the study ($\beta = 0.771$, $t = 31.137$, $p < 0.001$). This shows that participants whose expectations are confirmed find the course to be useful.

H5 is not supported by the study ($\beta = -0.058$, $t = 0.632$, $p = 0.264$). This means that even change in intention to leave the course is not significantly related to how satisfied the participant is for taking that course.

H6 is not supported by the study ($\beta = 0.124$, $t = 1.369$, $p = 0.086$). This means that the perceived usefulness of the course is not significantly related to the change in intention to leave the course.

H7 is supported by the study ($\beta = 0.51$, $t = 9.236$, $p < 0.001$). It shows that participants who find the course useful are satisfied with it.

Table 7.5. Path Coefficients and Significances

Hypothesis	Relationships	Beta	SD	t Values	p Values	Cls		Decision
						5%	95%	
1	EaseOfLeaving -> Intention	0.345	0.061	5.656	0.000	0.249	0.451	Supported
2	Break -> Intention	-0.036	0.054	0.665	0.253	-0.126	0.05	Not Supported
3	Expectation -> Satisfaction	0.357	0.056	6.406	0.000	0.264	0.445	Supported
4	Expectation -> Usefulness	0.771	0.025	31.137	0.000	0.73	0.811	Supported
5	Satisfaction -> Intention	-0.058	0.092	0.632	0.264	-0.213	0.092	Not Supported
6	Usefulness -> Intention	0.124	0.09	1.369	0.086	-0.023	0.273	Not Supported
7	Usefulness -> Satisfaction	0.51	0.055	9.236	0.000	0.42	0.601	Supported

Figure 7.10 shows the model after testing the hypotheses in a graphical format

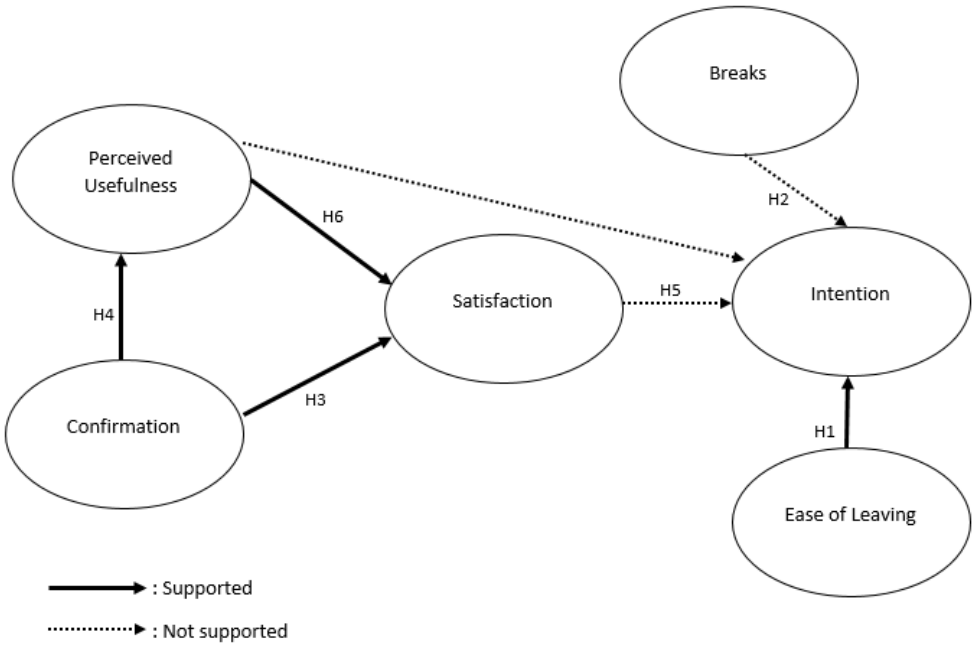

Figure 7.10. Model with hypotheses Tested

7.5.3. Explanatory power of the model

To evaluate the model's explanatory power, we assessed its coefficient of determination, commonly known as R^2. The R^2 values were computed using the PLS algorithm within the SmartPLS software. It is important to note that all the R^2 values obtained exceeded the recommended threshold of 0.10, as suggested by Falk and Miller (1992). The results, as shown in Table 7.6, indicate that the R^2 value for Intention was 0.124, Satisfaction had an R^2 of 0.668, and Usefulness displayed an R^2 value of 0.595.

Table 7.6. R^2 Assessment

Factor	R-Square
Intention	0.124
Satisfaction	0.668
Usefulness	0.595

7.5.4. Predictive power of the model

In line with recent recommendations by Shmueli et al. (2016, 2019), who introduced an evaluation procedure tailored for the prediction-oriented nature of PLS-SEM, we expanded our analysis to include a predictive relevance assessment using PLS-Predict (Shmueli et al., 2016, 2019). This procedure involved employing a 10-fold approach with PLS-Predict to generate case-level predictions at the item or construct level. The aim was to evaluate the predictive power of our model. To determine predictive relevance, Shmueli et al. (2019) suggested assessing the latent variable Q^2 first. A Q^2 value greater than 0 indicates good predictive relevance at the construct level. In our study, the Q^2 value for the latent variable Intention was 0.081, surpassing the threshold of 0, indicating favourable predictive relevance at the construct level. Subsequently, based on Table 7.7, all the item level Q^2 were greater than 0, and all the item level errors of the PLS model were lower than the LM model thus we can conclude that our model has a strong predictive power based on Shmueli et al. (2019). Therefore, based on the findings of our predictive relevance analysis, as per Shmueli et al. (2019), our model demonstrated strong predictive power, as evidenced by the greater Q^2 values at the construct level and the favourable item-level differences.

Table 7.7. PLS Predict

	PLS RMSE	LM RMSE	PLS-LM RMSE	Q^2 predict
IN2	1.147	1.157	-0.01	0.054
IN1	1.252	1.267	-0.015	0.076
IN3	1.194	1.213	-0.019	0.065

7.6. Discussion

The present study's framework used for quantitative analysis was obtained through the findings of the qualitative study done earlier. These findings have helped the present study to test the existing Expectancy Confirmation Model (ECM) along with the two variables, i.e., taking breaks in between the course and ease of leaving a course. The results of this analysis will validate and generalise the

significance of these two factors on the change in intention to continue using the course. It contributes to literature by concluding insignificant impact of taking breaks in between the course and a strong significant impact of ease of leaving the course on the change in intention to continue using MOOC. It contributes to practice by informing practitioners of the factors that may cause a participant of the course to change intention to continue using the course.

In hypothesis 1, we found a strong positive relationship between ease of leaving and change in intention to continue the course. This means that participants are likely to leave the course earlier than originally intended if they find it easy to leave. The factors of ease of leaving the course stem from lack of sacrifice, feeling no loss, no obligation, no loss friendships, lack of sense of community, no lack of learning, no obligation or pressure from anyone to continue with the course. Therefore, it would be conclusive to say that the MOOC providers should deploy strategies that would make it less easy for participants to leave the course in between. These could be in the form of deploying engagement strategies. Engagement strategies could include buddying, micro-quizzes, encouraging involvement on the forum, etc. (Bonafini et al., 2017; Kovacs, 2016; Nazir et al., 2015b). Strategies to engage student in learning activities through teacher and admin involvement may get the participant to have a sense of achievement, obligation and responsibility to continue using the course. Also, improving interactivity on the course among participants and MOOC providers will help in creating a sense of community and friendship that would result in better engagement and learning experience (Xiong et al., 2015).

In hypothesis 2, it is evident from the results that taking breaks in the course has no significant impact on the change in intention to continue using the course. This means that participants do not change intention to continue using the course as a result of taking a break. This is contrary to our initial belief where it was thought that taking breaks in between the course would make it difficult for participants of the course to continue with the course for the reasons such as difficulty in catching up with the course after taking a break, emergence of conflicting priorities during the break thereby making it difficult to continue with the course, etc. Therefore, it is a discovery and a conclusive finding that taking breaks in between the course do not significantly change intention to continue using the course. In fact, the flexibility to take a break may very well be a source of ease to self-pace and continue with the course. However, the number of breaks and the duration of breaks remain a research element to be explored in future studies.

In hypothesis 3, the results show that the expectation confirmation has significant relationship with satisfaction. This means that people who have their expectation confirmed for taking the course are

more likely to be satisfied with the course. Therefore, it is advised that MOOC providers set the expectations of the participants right. Some suggestions to perform this will include a short introductory video before the start of the course, brief on what to expect from the course and clearly stating the objectives and outcomes of the course (Bayeck et al., 2018; Bonafini et al., 2017).

In hypothesis 4, the model shows significant relationship between expectation confirmation and perceived usefulness, which means that participants whose expectations are confirmed for taking the course are likely to perceive the course as useful too. The resultant implication of these findings are that participants who join a course with certain expectations and/or objective in mind are likely to find the course useful if those expectations are met. Expectation Confirmation was also highlighted as an important variable to establish participant satisfaction with the course in hypothesis 3. This means that MOOC providers should put effort into learning about, and managing, participant expectations before they enrol in the course. Among other methods, as mentioned above, this could be achieved by introductory videos, providing briefs on the objectives and key takeaways of the course, tracking progress and providing roadmaps of learning as the participant goes through the course (Bayeck et al., 2018; Bonafini et al., 2017).

In hypothesis 5, the results show that there is no significant relationship between satisfaction and leaving the course earlier than initially intended. This shows that people who are satisfied with the course do not necessarily leave the course earlier than originally intended. This result is logical and is well support by other studies (Lu et al., 2019; Jo, 2018; Halawa et al., 2014; Khalil et al., 2014), as participant who are satisfied are more likely to continue using the course than change their continuance intention and leave the course.

In hypothesis 6, the analysis of the results show that the relationship between perceived usefulness and change in continuance intention to leave the course earlier than originally intended is not supported by the study. This is in line with expectations and is well supported by the outcome from other studies (Daneji et al., 2017; Joo et al., 2018; Wu et al., 2017; Kim et al., 2022) where it is evident that participant who find the course useful intend to continue using the course. This shows that participants who find the course useful are not likely to change their intention to continue using the course.

In hypothesis 7, the results prove a significant relationship between perceived usefulness and satisfaction. This means that the participants who find the course useful tend to show satisfaction towards the course. Therefore, MOOC providers must try to incorporate engaging and ease to understand learning strategies to make it easy for the learners to take useful takeaways for themselves.

One example of such strategy can be gamification where participants can learn from playing engaging and interesting games on the topic.

7.7. Conclusion

This chapter discusses why participants change their intention to continue or discontinue a MOOC course. The study employs a mixed methods approach, involving a qualitative study with thematic analysis and a systematic literature review. Results show that course-related and non-course related factors impact the decision to stay or leave. Taking breaks and ease of leaving were identified as important reasons for leaving earlier than intended. A subsequent quantitative study using the ECM model found that taking breaks in between courses do not but ease of leaving does significantly affect discontinuation. Hence, it is suggested that MOOC providers should employ engaging strategies that makes it less easy for users to leave the course, for example, offering career oriented certificates, performance badges as rewards and incentives to help other participants (Xiong et al., 2018).

Chapter 8

Conclusion

This chapter provides a concise overview of the research's goals and outcomes. It starts by discussing the key takeaways from each chapter of the thesis. Afterwards, the final conclusion of this research is explained followed by theoretical, methodological and practical contributions. Finally, limitations and potential for future research are given.

8.1. Research Summary

The research begins with the introduction section, Chapter 1, in which the concept of Massive Open Online Courses (MOOCs) is discussed together with its nature and defining characteristics. The discussion also emphasises on the scope of this study, which aims to research on continuance engagement and the retention issues in MOOCs. After this MOOCs' historical background is explained, which highlights the important milestones that have been achieved in this field. Additionally, the latest trends in MOOCs are also discussed, revealing a steady increase in their popularity and usage. The introduction section ends by emphasising the need to investigate participant continuance behaviour and explaining the organisation of this report.

In chapter 2, literature review largely concentrates on several key areas, including the classification of participant engagement, pedagogy and course design, dropout rates, motivation, characteristics, and communication. As such, this review of the literature aims to examine and synthesise the existing research within these specific domains. To summarise, classification studies play a significant role in understanding the engagement behaviour of learners in a course. By categorising users based on their behaviour or traits, these studies provide insights into how learners interact with the course material. One widely cited classification scheme, introduced by Kizilcec et al. (2013), distinguishes between course participants who complete the course, audit it, disengage from it, or sample it. To better understand how participants can benefit from the course, cross-sectional studies can be conducted to understand the workings of each group. One such study that his research conducts is understanding the behavioural patterns of course completers and non-completers on forums to devise strategies that can facilitate their learning experience. The MOOC continuance field related to pedagogy and course design research, primarily focuses on areas such as instruction design, assessments, platform design elements, behavioural clustering, communication, and feedback. The topic of dropout rates is a prevalent area of focus for MOOC researchers. MOOCs allow students to leave a course at any time,

leading to high dropout rates. The literature on this subject aims to identify various reasons behind dropout and suggest strategies to prevent it. Researchers strive to comprehend the underlying concepts and behavioural patterns that lead to dropout. Researchers have also developed predictors that can anticipate when a user may drop out, enabling timely interventions. To further enhance research in this field, it is necessary to investigate dropout rates from diverse perspectives and angles. As such, this research investigates the change in intention of participants to continue or not continue the MOOC. Analysis of literature on motivation in relation to MOOC continuance reveals that a large number of studies are directed towards finding the initial reasons or the driving force for participants to take up a MOOC, these reasons include external motivation such as getting a certificate (Belanger et al., 2013) or internal motivation such as need to gain knowledge or learn new concepts (Chang et al., 2015). Further studying each reason in depth would improve understanding the motivational factors. The existing research on communication in Massive Open Online Courses (MOOCs) suggests that participating in MOOCs has generally positive outcomes. Research in this tries to understand different channels and platforms used for communication, the types of user participation, the development of communities and groups, content and sentiment analysis, and the impact of instructor and administration involvement. However, one notable gap in this research is how the forum activity of MOOC sub-groups of participants differ from each other. The research questions formulated in accordance with the gaps identified in literature which are in line with the findings from research done to explore when the participants are most likely to dropout. These questions are highlighted again in the Methodology section.

Chapter 3 presents the methodology section. It explains the methodology adopted to address the research questions. The questions and how they are studied are summarised below:

- Question: what day during the life of a course shows the most number of dropouts and the reasons for it?

  The archived data of FutureLearn courses are used to quantitatively analyse what day are the participants most likely to dropout. Thereafter, a qualitative study that was conducted that used interviews to collect reasons of dropping out on the very first day. The main reasons identified in this study are mismatched expectations and no response on forum. These two aspects together with the gaps analysed in the literature review are used to devise the two studies explained next to further research on MOOC continuance behaviour of participants.

- Question: How do MOOC students who participate in forums compare, in terms of completion rates, to those who do not?

This quantitative study used activity log data of FutureLearn courses and analysed it using pivot tables to understand the behavioural patterns of completers and non-completers on the forum.

- Question: Why would someone change initial intention to continue or not continue with the course?

  This mixed methods study first used qualitative study to collect data through interviews on why would participants change intention to continue or discontinue a course. Then, a comparative study was done that compared the findings of the qualitative study with existing literature. The gaps identified from the qualitative study (i.e., ease of leaving the course and taking breaks in between the course as reasons for dropping out early) were then used to conduct a comprehensive quantitative study using surveys to collect data and validate the reasons of dropping out earlier than originally intended.

The rest of the methodology section critically evaluates the research strategies used. This included discussion on philosophies, approaches, strategies, choices, time horizons, techniques and procedures of data collection and analysis.

Chapter 4 presents the research to clarify the claim that the first day of a MOOC is when the participants are more likely to dropout, and to determine the reasons for it. This study was designed to use a mixed methods approach. The first method involved examining enrolment data from three MOOCs offered on FutureLearn to determine the day when most participants are likely to drop out. The data included unique participant IDs, as well as timestamps for when participants enrolled and unenrolled from the courses. The aim was to identify any distinct patterns that may indicate when participants are most likely to leave the course. The second method involved conducting qualitative research through participant interviews to gain a better understanding of the primary reasons why individuals drop out of MOOCs. The study findings suggest that the first day of a MOOC has a considerable impact on whether participants continue with the course or not, with those who are not interested dropping out on the initial day itself. The qualitative research conducted as part of the study revealed that the primary reasons for such dropouts were mismatched expectations and poor communication. In light of these results and gaps identified in the literature review, Chapter 5 of the report delves into the differences in behaviour between completers and non-completers on forums. Additionally, Chapter 6 explores the reasons for change in participant intention to continue or discontinue using the course and Chapter 7 conducts a quantitative study to further investigate and validate the reasons identified as gaps in the literature. Chapter 5 to Chapter 7 are explained in more detail next.

Chapter 5 presents a study on how MOOC students, who participate in forums, compare in terms of completion rates, to those who do not? It aimed to establish a connection between MOOC completion and active participation in its forums. The investigation focused on behavioural patterns, and compared completion rates between MOOC students who participated in forums and those who did not. Enrolment timestamps, task activity, and forum comments were analysed to identify engagement patterns. Step activity data allowed for the identification of course dropouts and completers. The analysis of comments helped to measure forum engagement. The results of this study show that MOOC completers put up most number of comments on a forum and place most number of responses on a discussion thread. The study suggests several strategies to increase individual participation in MOOC forums. This includes responding quickly to comments, increasing visibility of first-time posters, and sharing network activities. It also recommends showing participants information on similarity and dissimilarity to encourage responses. Personalised prompts based on course activities and questions can be used to create a more tailored approach to student interaction, which promotes participation.

Chapter 6 presents research on why someone would change initial intention to continue or not continue with the course? A qualitative study is conducted that uses interviews to collect data from MOOC participants and analyses it using thematic analysis technique to understand the reasons for participants to change their intentions to continue or not continue the course. These reasons are presented in Table 6.2. The reasons are generally divided into course related and non-course related reasons for participants who stayed longer or lesser than intended. Some reasons to stay longer than intended include: important for career, learning new things, decent teacher and interaction with other participants on the course. Some reasons for staying less time than expected include: mismatched expectations, poor course design, taking breaks in between the course and ease of leaving the course. After getting the reasons a systematic literature review was conducted to understand the reasons other researchers have found. Then comparative analysis is done between the reasons obtained from this study and reasons from literature. The result of analysis highlighted taking breaks in between and ease of leaving the course as two aspects from leaving the course earlier than intended reasons, which could be researched further and add to knowledge bank in the field.

Chapter 7 conducts a quantitative study to extend and test the two variables uncovered in Chapter 6 (i.e. taking breaks in between and ease of leaving the course) with the expectation-confirmation model (ECM), also known as Information System Continuance Model. An online questionnaire was developed to collect MOOC participant responses and SmartPLS was used to test the claims that ease of leaving the course and taking breaks in between the course leads to participant leaving the course

earlier than intended. The results of the study suggest that taking breaks in between the course did not significantly impact the likelihood of users leaving the course earlier than originally intended. However, the study did find a significant relationship between ease of leaving and discontinuing the course earlier than intended. These findings highlight the importance of designing online courses that make it less easy for users to leave the course without careful consideration.

8.2. Practical Contribution

This research makes several important practical contributions for the MOOC providers and designers:

- By knowing that the highest number of people leave on the very first day of joining MOOC than any other day, the MOOC providers can devise interventions to address the common concerns of the participants. The research provides buddying, briefing and feedback as effective engagement strategies that can be deployed
- The study finds that the major reasons for leaving MOOCs on the first day are mismatched expectations and lack of response to user queries. By knowing this the MOOC providers can devise strategies to better match participant expectations with the course offerings. The MOOC providers must also try to answer all user queries in a timely manner.
- The completers put most number of comment on MOOC forums. Also, completers are the ones who place the highest number of responses to the already initiated queries on the forum. This finding can be used by MOOC providers to predict completers, who they can use to assign roles and allocate responsibilities for better course management. For example, the potential completers can be incentivised to become buddies of new joiners.
- The discovery that ease of leaving has a highly significant impact on the change in intention to continue using MOOC and taking breaks in between the course is not a significant factor for a participant to change its intention to continue using the course has profound practical implications.
- The flexibility to take breaks anytime between the course does not get the students to leave the course earlier than originally intended means MOOC providers should keep providing the freedom to take a break any time in between the course.
- Ease of leaving the course carries a significant impact on the participants' intention to leave the course earlier than intended. MOOC providers should make it less easy for participants to leave the course. The longer a participant can stay with the course the more he can learn. This can be done by implementing external and internal motivational strategies for example offering certificates, merit badges, etc. For instance, MOOC providers give a certificate of completion with nominal fees at the end of the course. As such more participants completing the course can result

in more participants opting to get the certificate of completion and consequently more fees. The implementation of such strategies can also strengthen the business proposition of MOOCs.

8.3. Theoretical Contribution

There are several theoretical contributions provided by this research:

- The study contributes to the literature in the field by uncovering an extensive list of reasons, and validates it with a comprehensive systematic literature review, on why a participant leaves a MOOC early or stay longer than intended. Table 6.2 in Chapter 6 provides a detailed list of the reasons.
- The study adds to the knowledge bank in the field of MOOCs by extending ECM model and highlighting the importance of ease of leaving the course in between the course as an important factor that can impact participant intention to continue with the course. This knowledge can help inform the design of future studies (see chapter 7).

8.4. Limitation and Scope for Future Research

Even though a comprehensive study was carried out that makes valuable contributions to both theory and practice, like any research, it is not exempt from limitations. However, these limitations can serve as potential areas for future research, which are discussed in this section.

- The data for the study presented in Chapter 6, i.e., change in intention to continue or not continue a MOOC, was collected from university students in Karachi, Pakistan. To overcome this limitation, future studies should be conducted on a larger and more diverse sample of learners, from different geographic locations and cultural backgrounds. Generalising the results on other age groups, countries and cultures would require the expansion of the study at a global scale.
- Due to access and permission issues, the archived data used for studies in Chapter 4 (i.e., investigating MOOC leaving patterns), and chapter 5 (i.e., investigating the forum activity of completers and non-completers), are taken from the FutureLearn platform. These studies could be re-conducted on other MOOC platforms to test generalisability.
- The studies presented in this research are cross-sectional in nature. Although, cross sectional studies are useful as they provide a snapshot of learners' behaviour and attitudes at a specific point in time, but they do not provide information about how these factors may change over time. It is recommended that longitudinal studies also be done in the future to understand the

process of how the change in intention happens for the users and communication dynamics on the forum. Undertaking a longitudinal study can help provide evolution of user behaviours over time and, hence, can add to the knowledge bank in the areas of MOOC continuance behaviour and communication.

- Another shortcoming of this research is that it did not study the impact of control variables as moderator on the extended ECM model used in Chapter 6. It is recommended that the impact variables such as age, gender and educational level be studied as moderators, which may enhance the predictive power of the model.
- Some of the interviews conducted for this research was during covid-19 period when in-person access was restricted. Therefore, phone interviews were conducted. Although, the interviews were comprehensive in nature and did provide the required data, in-person interviews provide more information such as the sentiments, physical and emotional cues that could have been recorded (Johnson et al., 2021). Hence, for future research it is recommended that in-person interviews are conducted.

8.5. Concluding Comments

This research contributed in the field of user continuance behaviour in the context of MOOCs. It highlights various touch points and suggests interventions how to get the engagement from willing learner on the courses. It starts by exploring what day the participants are most likely to discontinue using the course. The main reasons discovered, which align with the gaps in the literature, are the lack of response on the forums and change in continuance intention of the participants on the very first day of the course. These reasons are further explored in subsequent studies and the findings reveal that MOOC completers are avid users of forums and rather than initiate most discussion threads, they put up most number of responses. Hence, such a factor can be used among the predictors to differentiate from a user who would continue using the system from someone who would not continue. Also, the research finds that ease of leaving is a relevant factor in participants who would leave early and taking breaks in between is not. Therefore, it is important to design online courses that make it less easy for users to leave the course without careful consideration through deploying external / internal motivational and engagement strategies. To the best of researcher's knowledge this is the only study that highlights these findings.

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Appendices

Appendix 1 – Ethics approval

The ethics approval documents below include the cover sheet, Section A and Section B of the required forms.

Cover Sheet

Project details

Name of researcher: Usman Nazir Student number: 27804811

Programme: PhD in Informatics and System Science

Email:

Title of proposed project: Causes of change in user intention to stay with or dropout of MOOC

Responsible persons

Details of academic supervisor (*when appointed*)

Name: Dr. Stephen Gulliver

Email: s.r.gulliver@henley.ac.uk

Nature of project

(Mark with an 'x' as appropriate)

Undergraduate	[ ]	Masters (not MBA)	[ ]
MBA	[ ]	MSc in BMR	[ ]
Doctoral	[x]	Other	[ ]

Date of Cover Sheet/Section A submission: 30/June/2020

Date of final submission (to be completed on completion of Pilot Study/thesis):

Section A: Research approval application

Section A must be completed in full and submitted prior to any data collection. If you have any questions regarding the form, please discuss them with your programme director or academic supervisor (if one has been appointed).

Approval must be obtained *before* the research project commences.

Summary of proposed project and research methods

The unique opportunity offered by MOOCs comes with its own challenges and gives way to many research areas. One of the research areas is how to retain voluntary engagement of participants. The openness offered by MOOCs means that participants can voluntarily join and leave the course at any time when they lose interest (North et al. 2014)[1]. Consequently, it is not surprising that studies continue to report low completion rates (Chen et al. 2019)[2]. This effect may be attributed to the inherent nature of MOOCs, however, chucking it away as just that would be doing injustice to the participants. Engaging strategies must be put in practice to encourage the willing learner to voluntarily participate in the course to gain most out of it.

I plan to further research in the area of managing participant engagement. My research will study the social and technological aspects to help understand participant behaviour in how they engage with MOOCs. In doing so it will help MOOC stakeholders in identifying and deploying improved strategies for better engagement. I plan to work on the research area through tackling the following questions:

Research Question 1: What day during the life of a course shows the most number of dropouts and the reasons for it?

Identify the day with the highest number of dropouts in the course and explore reasons behind this trend. It uses a mixed-methods approach for data analysis sourced from FutureLearn. It aims to encourage sustained participant engagement and maximize course benefits.

Research Question 2: How do MOOC students who participate in forums compare, in terms of completion rates, to those who do not?

[1]North, S. M., Richardson, R., & North, M. M. (2014). To Adapt MOOCs, or Not? That Is No Longer the Question. Universal Journal of Educational Research, 2(1), 69-72.
[2]Chen, J., Feng, J., Sun, X., Wu, N., Yang, Z., & Chen, S. (2019). MOOC dropout prediction using a hybrid algorithm based on decision tree and extreme learning machine. Mathematical Problems in Engineering.

This study aims to compare MOOC students who actively participate in forums with those who do not in terms of completion rates. Understanding this relationship will inform strategies to encourage forum engagement, potentially improving overall completion rates. It uses a mono-method deductive approach. Data for this question is collected from FutureLearn.

Research Question 3: Why would someone change initial intention to continue or not continue with the course?

This study seeks to investigate why someone would change their initial intention to continue or not continue with the MOOC. The findings will provide insights into the strengths and drawbacks of the MOOC that will help design better strategies to encourage increased participant engagement in MOOCs. It utilizes interviews and surveys in a mixed-methods approach where the data is directly solicited from MOOC participants who changed their initial intention to continue or discontinue MOOC.

1. Questions about proposed research (University ethics requirements)

Please reply to all of the following questions concerning your proposed research by marking with an 'x' as appropriate.

		Yes	No
1.1	Have the participants and subjects of the study been chosen because they are patients and/or clients of the National Health Service or Social Services in the UK, or equivalent health or social care systems in another country?		X
1.2.	Are the participants and subjects of the study unable to give free and informed consent because they are not over the age of 18, or as a consequence of their mental capacity? (For more details on how mental capacity might impair the ability to give free and informed consent, please consult the Mental Capacity Act 2005)		X
1.3	Are you asking questions that are likely to be considered inappropriate or to cause distress to any of the participants?		X
1.4	Are any of the subjects in a special relationship with the researcher that could affect their ability freely to give informed consent?		X
1.5	Is your project funded by a Research Council or other external source (excluding research conducted by postgraduate students)?		X

If you have answered Yes to any of these questions, your proposal will be reviewed in accordance with the requirements of the University Research Ethics Committee.

If you are unsure whether any of these conditions apply, please contact your programme director or academic supervisor (if one has been appointed) for further advice.

2. Questions about proposed research (administration of investigation process)

Please respond to all the following questions concerning your proposed research project by marking with an 'x' as appropriate.

		Yes	No
2.1	The research involves only archival research, access to company documents/records, access to publicly available data and/or questionnaires, surveys, focus groups or other interview techniques.	X	
2.2	The need to reimburse expenses or make other payments to any research participants has been reviewed.	X	
2.3	Participants will be/have been advised that they may withdraw at any stage if they so wish.	X	
2.4	Arrangements for ensuring personal privacy, commercial confidentiality and data protection during and after the project and for the disposal of material will be in line with University guidelines.	X	
2.5	Arrangements for providing subjects with research results if they wish to have them have been considered.	X	
2.6	Research instruments (questionnaires, interview guides, etc) will be reviewed against the policies and criteria noted in The University Research Ethics Committee Notes for Guidance.	X	
2.7	The arrangements for publishing the research results and, if confidentiality might be affected, for obtaining written consent of this have been reviewed.	X	
2.8	Information Sheets and consent forms will be prepared in line with University guidelines for distribution to participants, as appropriate. This contains details of the project, contact details for the principal researcher and advises subjects that their privacy will be protected and that their participation is voluntary and that they may withdraw at any time without reason.	X	
2.9	Completed consent forms, where required, will be retained and submitted with the final report on completion of the project for retention by Henley Business School.	X	

If you have answered No to any of these questions, contact your programme director or academic supervisor (if one has been appointed) for further advice.

3. Safeguarding personal safety and security of the researcher(s) and research participants

If the research is to be conducted outside of an office environment or normal place of work and/or outside normal working hours please note the details in the comments box below and state how the personal safety and security of the researcher(s) and research participants will be safeguarded.

Comments

[ ] I confirm that I have read and understood the ethics requirements of the University of Reading and will abide by these requirements in the course of my research.

Signed (student): Usman Nazir

Date: 30/June/2020

Print name: Usman Nazir Student number: 27804811

(**Note to Research Associate**: a signature is not required for Section A if submitting electronically via the RISISweb portal. In submitting via the RISISweb portal you are confirming that declarations regarding your proposed research are true and correct to the best of your knowledge, that you have read and understood the ethics requirements of the University of Reading and will abide by those requirements in the course of your of your research).

Section B Final submission form

When you are ready to submit your Pilot Study/thesis, please update the cover sheet and complete and sign Section B. The complete ethics form, including Section A, must then be sent to the MSc/DBA Office at Henley in hard copy when you submit the final version of your Pilot Study (via RISIS), and when you submit your thesis for examination. The report will not be marked until this form is received. (You may sign and scan the cover sheet and Section B and attach this in RISIS with your Pilot Study, and then send a hard copy by post, if you wish).

Mark with an 'x' as appropriate:

[ ] I confirm that any related documents (including, as appropriate, copies of any questionnaires, interview schedules etc, and/or a copy of the information sheet and completed consent forms from each participant) are attached and submitted with this report.

I confirm that the primary data:

[x] will be destroyed on confirmation of award

Or

[ ] is submitted with this report for secure storage (where this has been required by the University of Reading Ethics Committee) and that any other copies have been destroyed

[x] I confirm that the research has been conducted in accordance with the ethics requirements of the University of Reading.

Signed (student):

Date: 30/June/2022

Print name: Usman Nazir Student number: 27804811

Appendix 2 – Information Sheet

Changing Continuance Intention in MOOC

Information Sheet

Dear participant,
You are being asked to take part in a research study that aims to explore MOOC participants continuance intentions. This study is part of a research initiative by Usman Nazir. You will be expected to answer multiple choice questions about your experience and continuance intentions when taking MOOC. The research has received favourable review by the Institute of Business Administration (IBA).

Your participation
In this study, you will be asked to answer questions about your experience with taking a MOOC. Please follow the instructions carefully and answer the questions about how your continuance intentions changed when taking MOOC. Your participation should not take longer than 20 minutes.

Data Storage
All data is stored Google forms. Backup copies are made on a local hard drive and never shared with anyone outside the research team. Data is destroyed after five years as part of the International data protection act.

Right to withdraw
You can stop being a part of the research study at any time with no need for an explanation. You have the right to ask that any data you have supplied to that point be withdrawn or destroyed, you also have the right to omit or refuse to answer or respond to any question that is asked of you. You have the right to have your questions about the procedures answered, before, or after the experiment.

Risks
There are no foreseeable risks.

==Cost, reimbursement and compensation==
Your participation in this study is voluntary and no monetary compensation will be given for this study.

==Confidentiality/anonymity==
The data we collect does not contain any personal information and any records of this study (either hard copy or electronic) will be kept private. In any sort of report we make public we will not include any information that will make it possible to identify you. Research records will be accessed only by the researchers.

For further information

Contact: Usman Nazir / Dr. Stephen Gulliver

/ s.r.gulliver@henley.ac.uk

/ +44 (0) 118 378 4422

Appendix 3 – Consent Form

Consent Form

1. I have read the accompanying Information Sheet relating to the project.

2. I understand the purposes of the project and what will be required of me, and any questions I had have been answered to my satisfaction. I agree to the arrangements described in the Information Sheet in so far as they relate to my participation.

3. I understand that participation is entirely voluntary and that I have the right to withdraw from the project at any time, and that this will be without detriment.

4. I understand that the study has been reviewed by the School of Management Research Ethics Committee and has been given a favourable ethical opinion for conduct.

Appendix 4 – Survey Questionnaire

Changing Continuance Intention in MOOC - Information Sheet

Dear participant,
You are being asked to take part in a research study that aims to explore MOOC participants' continuance intentions. This study is part of a research initiative by Usman Nazir. You will be expected to answer multiple choice questions about your experience and continuance intentions when taking MOOC.

Your participation
In this study, you will be asked to answer questions about your experience with taking a MOOC. Please follow the instructions carefully and answer the questions about how your continuance intentions changed when taking MOOC. Your participation should not take longer than 20 minutes.

Data Storage
All data is stored Google forms. Backup copies are made on a local hard drive and never shared with anyone outside the research team. Data is destroyed after five years as part of the International data protection act.

Right to withdraw
You can stop being a part of the research study at any time with no need for an explanation. You have the right to ask that any data you have supplied to that point be withdrawn or destroyed, you also have the right to omit or refuse to answer or respond to any question that is asked of you. You have the right to have your questions about the procedures answered, before, or after the experiment.

Risks
There are no foreseeable risks.

==Cost, reimbursement and compensation==
Your participation in this study is voluntary and no monetary compensation will be given for this study.

==Confidentiality/anonymity==
The data we collect does not contain any personal information and any records of this study (either hard copy or electronic) will be kept private. In any sort of report we make public we will not include any information that will make it possible to identify you. Research records will be accessed only by the researchers.

Consent Form

1. I have read the accompanying Information Sheet relating to the project.
2. I understand the purposes of the project and what will be required of me, and any questions I had have been answered to my satisfaction. I agree to the arrangements described in the Information Sheet in so far as they relate to my participation.
3. I understand that participation is entirely voluntary and that I have the right to withdraw from the project at any time, and that this will be without detriment.
4. I understand that the study has been reviewed by the School of Management Research Ethics Committee and has been given a favourable ethical opinion for conduct.

Would you like to proceed with the survey? * ☐ Yes ☐ No

*:Answers required

Country: *	Pakistan					
Gender:*	☐ Male	☐ Female				
Age:*	☐ < 11 ☐ 11-15	☐ 16-20 ☐ 21-25	☐ 26-30 ☐ 31-35	☐ 36-40 ☐ 41-45	☐ 46-50 ☐ 51-55	☐ 56-60 ☐ >60
Occupation:*	Student (University Level)					

Select course option for the survey: *	☐ Course where I left earlier than originally intended	☐ Course where I stayed longer than originally intended

Choose the name of the platform where you took the course. *	☐Coursera ☐edX	☐Udacity ☐Khan Academy	☐iversity ☐Canvas

	☐Udemy ☐FutureLearn	☐XuetangX ☐iCourse	☐Others:_____

Select the academic discipline of the course. * (Please answer the questions that follow in context of the MOOC you choose.)	☐Business: accounting, economics, finance, management, marketing, etc ☐Humanities: art, history, languages, literature, music, philosophy, etc ☐Applied Sciences: computer science, engineering, medicine, etc ☐Natural Sciences: biology, chemistry, physics, geology, math, etc ☐Social Sciences: anthropology, education, law, psychology, sociology, etc ☐Others: _____

Questions on course continuance intention

The questions that follow ask about the INITIAL INTENTION that CHANGED to continue to use the course or not.

	Agree(1)←----→(5)Disagree				
I intended to continue using the course rather than discontinue its use. *	☐1	☐2	☐3	☐4	☐5
My intentions were to continue using the course than use any alternative means. *	☐1	☐2	☐3	☐4	☐5
If I could, I would have liked to discontinue my use of the course. *	☐1	☐2	☐3	☐4	☐5
	☐1	☐2	☐3	☐4	☐5

Questions on Satisfaction with the course

The questions that follow ask about how satisfied you felt with the course when you changed your initial intention.

	Agree(1)←----→(5)Disagree				
I felt satisfied with the overall experience of the course use. *	☐1	☐2	☐3	☐4	☐5
I felt pleased with the overall experience of the course use. *	☐1	☐2	☐3	☐4	☐5
I felt frustrated with the overall experience of the course use. *	☐1	☐2	☐3	☐4	☐5

I felt terrible with the overall experience of the course use. *	☐1	☐2	☐3	☐4	☐5
Questions on Perceived Usefulness Following questions ask you about how useful you perceived the course to be when you changed your initial intention.					
Using the course improved me. *	☐1	☐2	☐3	☐4	☐5
Using the course benefited me. *	☐1	☐2	☐3	☐4	☐5
Using the course enhanced my skills. *	☐1	☐2	☐3	☐4	☐5
Overall, the course was useful. *	☐1	☐2	☐3	☐4	☐5
I did not find the course useful. *	☐1	☐2	☐3	☐4	☐5
Questions on Expectation Confirmation Following questions ask about how your expectations were met with the course when you changed your initial intention.					
	Agree(1)←----→(5)Disagree				
My experience with using the course was better than what I expected. *	☐1	☐2	☐3	☐4	☐5
The service level provided by the course admins was better than what I expected. *	☐1	☐2	☐3	☐4	☐5
Overall, most of my expectations from using the course were confirmed. *	☐1	☐2	☐3	☐4	☐5
My expectations from using the course were NOT confirmed. *	☐1	☐2	☐3	☐4	☐5
Questions on the effect of taking breaks in between the course Following questions ask you about the effect of taking breaks in between the course for changing the initial intention. (i.e., break means leaving the regular routine of the course and coming back to it later)					
I took a break in between the course. (i.e., before changing initial intention)	☐Yes ☐No				

Questions on ease of leaving the course Following questions ask about the influence of ease of leaving the course on changing the initial intention (i.e., the ease of leaving the course affected or influenced your initial intention to stay longer or leave the course early)					
	Agree(1)←----→(5)Disagree				
It was easy to leave the course anytime in between. (i.e., there was no loss, obligation, friendship, learning, pressure, sacrifice, etc.) *	☐1	☐2	☐3	☐4	☐5
I was not answerable to anyone for leaving the course. (e.g. teachers, friends, course admin, classmates, etc.) *	☐1	☐2	☐3	☐4	☐5
I would lose (or lost) nothing if I left the course in between. (e.g. money, knowledge, etc) *	☐1	☐2	☐3	☐4	☐5
I would gain nothing for staying on the course. (e.g. new knowledge, reward, recognition, etc.) *	☐1	☐2	☐3	☐4	☐5
No one relevant was (or would have been) affected if I left the course in between. (e.g. friends, teachers, peers, parents, relatives, etc) *	☐1	☐2	☐3	☐4	☐5
It was (or would have been) difficult to leave the course in between. (e.g. because of investment, knowledge, friends, recognition, etc) *	☐1	☐2	☐3	☐4	☐5
Any Comments on the effect of taking breaks in between the course OR ease of leaving the course on the intention to stay lesser or longer with the course? (Optional)					

Presented below are the drop down lists for Country and Occupation on the questionnaire used:

- Country:

Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bhutan, Bolivia , Bosnia and Herzegovina, Botswana , Brazil, Brunei, Bulgaria , Burkina, Faso, Burundi Cabo Verde , Cambodia , Cameroon Canada , Central African Republic (CAR) Chad , Chile, China, Colombia, Comoros , Congo, Democratic Republic of the Congo, Republic of the Costa Rica, Cote d'Ivoire Croatia, Cuba, Cyprus, Czechia, Denmark, Djibouti, Dominica , Dominican Republic Ecuador , Egypt, El Salvador Equatorial Guinea, Eritrea, Estonia,Eswatini (formerly Swaziland) Ethiopia ,Fiji Finland France Gabon ,Gambia ,Georgia, Germany Ghana Greece Grenada Guatemala Guinea, Guinea-Bissau Guyana, Haiti, Honduras, Hungary, Iceland, India Indonesia Iran, Iraq Ireland Israel Italy Jamaica Japan Jordan ,Kazakhstan, Kenya, Kiribati, Kosovo Kuwait Kyrgyzstan Laos, Latvia Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg Madagascar Malawi Malaysia Maldives Mali ,Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia ,Nauru Nepal Netherlands ,New Zealand Nicaragua Niger ,Nigeria North Korea, North Macedonia ,Norway Oman Pakistan Palau Palestine Panama ,Papua New Guinea, Paraguay, Peru, Philippines, Poland Portuga Qatar Romania Russia Rwanda ,Saint Kitts and Nevis Saint Lucia ,Saint Vincent and the Grenadines Samoa ,San Marino ,Sao Tome and Principe Saudi Arabia ,Senegal, Serbia, Seychelles, Sierra Leone Singapore Slovakia Slovenia ,Solomon Islands Somalia ,South Africa ,South Korea, South Sudan, Spain, Sri Lanka, Sudan, Suriname, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Timor-Leste Togo,Tonga,Trinidad and Tobago Tunisia,Turkey

Turkmenistan Tuvalu Uganda Ukraine, United Arab Emirates (UAE) United Kingdom (UK),United States of America (USA) Uruguay, Uzbekistan, Vanuatu, Vatican City, (Holy See) Venezuela, Vietnam, Yemen, Zambia Zimbabwe, Other (Not in List)

- Occupation:

Student (University Level), Student (Other), Sales and Related Occupations, Community and Social Service Occupations, Protective Service Occupations, Architecture and Engineering Occupations, Computer and Mathematical Occupations, Arts, Design, Entertainment, Sports, and Media Occupations, Legal Occupations, Food Preparation and Serving Related Occupations, Production Occupations, Personal Care and Service Occupations, Office and Administrative Support Occupations, Healthcare Support Occupations, Business and Financial Operations Occupations, Building and Grounds Cleaning and Maintenance Occupations, Construction and Extraction Occupations, Installation, Maintenance, and Repair Occupations, Life, Physical, and Social Science Occupations, Transportation and Materials Moving Occupations, Other

Appendix 5 – Comparative Analysis

The tables below show the factors explored from systematic literature review for reasons to stay or leave a MOOC (see chapter 6). The tables contain the topic of the study, the primary author of the study, the year of publication, the approach, i.e., quantitative/qualitative and the factors researched for the purpose.

The first table below shows the results of qualitative analysis from the study presented in this report in chapter 6. The rest of the tables show the relevant factors researched from other studies that form a part of the systematic review. Each factor identified in our study is compared with the factors found through systematic literature review.

The two factors, highlighted in green, (9) and (10), are identified as gaps in literature that need to be studied further.

Comparative Analysis (see chapter 6) This table shows the factors identified from qualitative research in chapter 6 of this report	
2019	
Qualitative	
Reasons for Staying Longer =>	
(1)	Learning and Knowledge
(2)	Good System Quality
(3)	Interactive
(4)	Teaching related
(5)	Important for Career
(6)	Compliments a course
	Reasons for Leaving Early =>
(7)	Priority of Other tasks
(8)	Interest Level
(9)	**Breaks in between courses**
(10)	**Ease of leaving**
(11)	Course content
(12)	Course design
(13)	Course Delivery
(14)	Expectations Matching
(15)	Being observed/feedback

As discussed above, the tables presented below are show the factors identified from systematic literature review. Colour coding and number matching is done to demonstrate comparative analysis. The factors that match are coloured and numbered the same.

Exploring the Factors Affecting MOOC Retention: A Survey Study	Examining the Relations among Student Motivation, Engagement, and Retention in a MOOC: A Structural Equation Modeling Approach	Sentiment Analysis in MOOC Discussion Forums: What does it tell us?	Factors Influencing Learning and Factors Influencing Persistence: A Mixed-method Study of MOOC Learners' Motivation	Engagement and retention in VET MOOCs and online courses: A systematic review of literature from 2013 to 2017
Kate S. Hone, Ghada R.	Yao Xiaong	Rose	Biyun Huang	Paton
2016	2016	2014	2017	2018
Quantitative	Mixed Methods	Quantitative	Quantitative	Quantitative
Course content (11)	Curiosity	Early Forum participation (3)	Personal interest (8)	Good quality instructional course design (12)
Perceived effectiveness	Enjoyment	Prolonged peer discussions (3)	Professional development (5)	Well-developed assessment tasks aligned with course objectives
Interaction with the instructor (3)	Job related development (5)		Self improvement (1)	Opportunities for learners to collaborate (3)
	Future economic benefit		Credentials	Instructor commitment to timely contextualised communication (4)
				Certification for course achievement
				Pathways to further study

What makes a great mooc? an interdisciplinary analysis of student retention in online courses	Understanding Student Motivation, Behaviors, and Perceptions in MOOCs	Interactive networks and social knowledge construction behavioral patterns	Continuance intention to use MOOCs: Integrating the Technology Acceptance Model (TAM) and Task Technology Fit (TTF) model	Building Engagement for MOOC Students
Panagiotis	Zheng	Zhang	Wu & Chen	Nawrot
2013	2015	2017	2017	2014
Quantitative	Qualitative	Quantitative	Quantitaive	Quantitative
Instructor (4)	High Workload	Course Content (11)	Preceived ease of use	Bad Time Management
Course content (11)	Challenging Course Content (11)	Teacher's knowledge (4)	task technology fit (2)	
Discussion Forums (3)	Lack of Time	Interactivity (3)	reputation	
Certificate	Lack of Pressure (15)		social recognition	
Flexibile schedule	No Sense of Community or Awareness of Others (3)		social influence	
	Social Influence		preceived usefulness	
	Lengthy Course Start-Up		attitude	
	Learning on Demand (13)			

Explaining Chinese University Students' Continuance Learning Intention in the MOOC Setting: A Modified Expectation Confirmation Model	Exploring the Factor Associated with MOOC Engagement	Attrition and Retention Aspects in MOOC Environments	Grit in the path of e-Learning Success	Factors Influencing Learning and Factors Influencing Persistence: A Mixed-method Study of MOOC Learners' Motivatio
Dai	Petronzi	Erasmus	Aparicio	Huang
2019	2016	2016	2016	2017
Quantitative	Qualitative	Quantitative	Quantitative	Mixed
attitude towards the course (8)	academic involvement	Discussion Forums (3)	Grit	Instructional Design (12)
	peer colaboration (3)	automated grading/feedback	System Quality (2)	Personal Interest (8)
	Pedagogical design (12)		Service Quality	Credential
			Information Quality	
			use	
			satisfaction	

MOOC Retention Rate and Motivation	Understanding the quality factors that influence the continuance intention of students toward participation in MOOCs	Promoting engagement in online courses:What strategies can we learn from three highly rated MOOCS	Understanding students' engagement in MOOCs: An integration of self-determination theory and theory of relationship quality	Survey of learning experiences and influence of learning style preferences on user intentions regarding MOOCs
Henek	Yang	Hew	Sun	Chang
2017	2017	2014	2018	2015
Qualitative	Quantitative	Mixed	Quantitative	Quantitative
Lack of time	System Quality (2)	Instructor (4)	learner autonomoy	Varied Learning style
	Service Quality	Course Resources (11)	learner competence	
	Course Quality (11)	Pedagogical Practices (12)	learner relatedness	
	Perceived usefulness	active learning	relationship quality	
	Perceived ease of use	problem centric learning		

Designing Massive Open Online Courses to take account of participant motivations and expectations	Learner Satisfaction with Massive Open Online Courses	Learners' Perceptions and Experiences of Two Chemistry MOOCs: Implications for Teaching and Design	What Makes a Good MOOC: A Field Study of Factors Impacting Student Motivation to Lear	Examination of Relationships among Students' Self-determination, Technology Acceptance, Satisfaction, and Continuance Intention to Use K-MOOCs
Salmon	Gameel	Li	Deshpande	Joo
2016	2017	2019	2017	2018
Mixed	Quantitative	Qualitative	Quantitative	Quantitative
new knowledge (1)	content (11)	Lack of time	content (11)	Perceived ease of use
professional development (5)	flexibility	Other tasks (7)	accessibility	Perceived usefulness
specific expectations (14)		Boring (8)	interactivity (3)	
		too difficult		
		too many course requirements		

The influence of instructional design on learner control, sense of achievement, and perceived effectiveness in a supersize MOOC course	Technological environment, virtual experience, and MOOC continuance: A stimulus–organism–response perspective	Self-regulation of learning and MOOC retention	Understanding the MOOCs continuance: The role of openness and reputation	Learning Engagement and Persistence in Massive Open Online Courses
Jung	Zhao	Charo	Alraimi	Jung
2019	2020	2020	2014	2018
Quantitative	Quantitative	Quantitative	Quantitative	Quantitative
Course design (12)	Interactivity (3)	goal setting	perceived openness	academic self-efficacy
Course content (11)	Media richness	task interest	perceived reputation	teaching presence (15)
Assessment	Sociability	academic discipline		preceived usefulness
				preceived ease of use
				Certification for course achievement
				Pathways to further study

Online learning performance and satisfaction: do perceptions and readiness matter?	Factors influencing the pursuit of personal learning goals in MOOCs	Massive Open Online Course Completion Rates Revisited: Assessment, Length and Attrition	Grit and Intention: Why Do Learners Complete MOOCs	Interactions in MOOCs: The Hidden Part of the Iceberg
Wei	Henderix	Jordan	Wang	Cisel
2020	2019	2015	2018	2018
Quantitative	Quantitative	Quantitative	Quantitative	Quantitative
online learning Self-efficacy	work family life	Course first start date	grit	interaction reduces isolation and low retention rates (3)
	prior e-learning experience	Course Length (12)	goal orientation	
		assessment type		

The impact of student misconceptions on student persistence in a MOOC	Learning through engagement: MOOCs as an emergent form of provision	What's in It for Me? Incentives, Learning, and Completion in Massive Open Online Courses	The effect of tutor-specific and other motivational factors on student retention on Icelandic Online	Rules of Engagement: Strategies to Increase Online Engagement at Scale
Chen	Walji	Reeves	Kolburn	Trumbore
2019	2016	2017	2019	2014
Quantitaive	Qualitative	Quantitative	Quantitative	Quantitative
student misconception of course (14)	teacher presence (15)	Free and Paid Certificates	intention to complete	student collaboration (3)
prior knowledge of subject	social learning (3)		tutor specific factors (4)	cohesive assignments
intention to complete	peer learning (3)			learning communities (3)
better english skilles				
US location				
higher age				
earn certificate				
score and time spent on assessment				

Effects of social-interactive engagement on the dropout ratio in online learning: insights from MOOC	Student's social e-reputation ("karma") as motivational factor in MOOC learning	Learner engagement, retention and success: why size matters in massive open online courses (MOOCs)	Going over the cliff: MOOC dropout behavior at chapter transition	Similarity and difference in fee-paying and no-fee learner expectations, interaction and reaction to learning in a massive open online course
Wang	Marco	Padillarodriguez	Chen	Cross
2018	2019	2019	2020	2016
Quantitative	Quantitative	Quantitative	Quantitative	Quantitative
shorter courses	participation (3)	shorter courses higher retention (12)	Chapter transitions	Fee paying higher expected study time
social-interactive engagement	rewards			
Learner experience	social reputation			
high difficulty level	karma			

What makes MOOC users persist in completing MOOCs? A perspective from network externalities and human factors	Decoding Engagement in MOOCs: An Indian Learner Perspective	The Importance of Teacher's Presence and Engagement in MOOC Learning Environment: A Case Study	An Empirical Study on the Users' Continuance Intention about MOOC: Based on Attachment Theory	Students' preferences and views about learning in a MOOC
Li	Kaveri	Goh	Zhu	Abeer
2018	2016	2017	2018	2014
Quantitative	Quantitative	Mixed	Quantitative	Qualitative
network benefit	love of learning (8)	teaching presence (3)	word of mouth	linguistic competence in (6)
user preference	comfortable with learning new things	training and support (3)	personalisation	prior subject knowledge
motivation to achieve		interesting learning content (8)	telepresence	broad-mindedness
		consistent feedback (15)	funcational attachment	self-regulation and self-efficacy
		interaction among facilitators (15)	emotional attachment	communication skills

Attrition in MOOC: Lessons Learned from Drop-Out Students	MOOCs Completion Rates and Possible Methods to Improve Retention - A Literature Review	Examining the Relations among Student Motivation, Engagement, and Retention in a MOOC: A Structural Equation Modeling Approach	RESEARCH ANALYSIS ON MOOC COURSE DROPOUT AND RETENTION RATES
Gutl	Khalil	Xiong	Gomez
2014	2014	2015	2016
Quantitative	Qualitative	Quantitative	Quantitative
changes in job (7)	Lack of time (7)	student motivation (8)	problems with the course structure
insufficient time	Lack of learner's motivation	monitoring activities	limitation in the use of information and communication technology
difficulty with the subject matter	feeling of isolation		limited English proficiency
unchallenging activities	lack of interactivity		Family reasons
	insufficient background and skills		low time disposition
	hidden costs		

Understanding the massive open online course (MOOC) student experience: An examination of attitudes, motivations, and barriers	Learner retention in MOOC environment: Analyzing the role of motivation, self-efficacy and perceived effectiveness	Influence of Students' Perceived Ease of Use, Perceived Usefulness and Time Spent Towards Students' Continuance Intention Using MOOC Among Public University Students	The effects of metacognition on online learning interest and continuance to learn with MOOCs
Shapiro	Sujatha	Daneji	Tsai
2017	2018	2017	2018
Qualitative Analysis	Quantitative	Quantitative	Quantitative
Lack of time	motivation (8)	perceived usefulness	enhancing learner's metacognition (15)
previous bad experience with subject	perceived effectiveness	perceived ease of use	
inadequate background	self-efficacy	time spent not significant	
lack of resources, money, internet, etc			

The impact of student misconceptions on student persistence in a MOOC	Learning through engagement: MOOCs as an emergent form of provision	What's in It for Me? Incentives, Learning, and Completion in Massive Open Online Courses	The effect of tutor-specific and other motivational factors on student retention on Icelandic Online	Rules of Engagement: Strategies to Increase Online Engagement at Scale
Chen	Walji	Reeves	Kolburn	Trumbore
2019	2016	2017	2019	2014
Quantitaive	Qualitative	Quantitative	Quantitative	Quantitative
student misconception of course (14)	teacher presence (15)	Free and Paid Certificates	intention to complete	student collaboration (3)
prior knowledge of subject	social learning (3)		tutor specific factors (4)	cohesive assignments
intention to complete	peer learning (3)			learning communities (3)
better english skilles				
US location				
higher age				
earn certificate				
score and time spent on assessment				

Appendix 6 – Interview Questions

Interview Questions

Presented below are research questions used as a guide for interviews explained in chapter 6.

Research Question

What causes the change in user intention to stay with or dropout of MOOC?

- What is your: name? age? gender? education level? Profession?
- How do you fair yourself with the use of technology for learning?
- Was it your first MOOC? If not, what others have you taken????
- What was your original intention of using MOOC?
  - When you first joined MOOC, did you intend to complete the course? Why?
- Did your intention change as you used MOOC?
  - Did your intention to use the MOOC change as you took the course? Why?
- What benefit did you get out of using MOOC?
  - What did you expect to gain from the MOOC?
  - Could it have been more beneficial? How?
- How did you find the MOOC platform to be in terms of quality of the platform?
  - How was the response time?
  - Did you find the MOOC easy to use?
  - How easy/difficult was it to navigate the course platform?
  - Does the platform function well all the time?
  - How user-friendly was interface of the system?
- How did you find the service provided by MOOC provider?
  - How timely did your queries get answered?
  - How reliable do you the system to serve your queries?
  - How do you find the solutions/feedback provided to you?
- How do you find the quality of the information/content provided in the course?
  - Did you find the information/content easy to understand?
  - Did you find the information/content on MOOC useful?
  - What were the good things about the course?
  - How should the course be improved?
- Did you find the MOOC useful?
  - How does the MOOC improve your performance/productivity/effectiveness/etc?
- Was the platform fast enough?
  - How fast did the system respond to requests?

- How easy was it to use the system?
  - Did you have to spend a lot of effort in using the system?

- How does your social network view MOOCs?
  - Do you know anybody else using MOOC?
  - How did you hear about MOOC?
  - What is the general response on MOOC from your peers?

- How satisfied are you in using the system?
  - Did your satisfaction increase/decrease as you went through the course?

Appendix 7 – Thematic Analysis

This part of the report presents a detailed version of Thematic Analysis, presented in Chapter 6 of this report, to explore the reasons for participants' change in intention to stay longer or lesser with the MOOC.

Initial Intentions

Name	Files	References
To Sample The Course	4	5
Test recommendation	1	1
Exploring	3	3
Audit for Free	1	1
To Prepare for Task	2	2
Test Preparation	1	1
Related to Task	1	1
Prepare for upcoming course	1	1
To Improve Job Prospects	2	3
Add to skill	2	2
Add to CV	1	1
To Get Certificate	1	1
To fulfill Course Requirement	8	18
Assigned	7	8
Add-on to a course	6	10
To Explore for Personal Interest	11	22
To Gain More Knowledge	6	7
Learn something different	3	3
Gain Knowledge	3	4
Avail Scholarship	1	1
To Experience Repute	3	4

Stayed Lesser Reasons

Name	Files	Ref
Non-Course Related Reasons	12	44
Due to Personal Mood or Feeling	1	1
Due to Other Tasks	11	27
Workload Elsewhere	3	4
Self paced so other priorities come in	1	1
Other high priority task	5	6
Extra-curricular activities	2	2
Due to Differing Schedule	2	4
Mis-matched Timings	2	4
Course load elsewhere	7	10

Name	Files	Ref
Due to Other Better Options to the Course	1	1
Due to Lack Or Loss Of Interest	6	10
Lack of interest in the topic	2	3
Lack of Interest	3	4
Irrelevant Field	1	1
Decline of Interest in the field	1	1
Boring	1	1
Due to End of Agreement	1	1
Due to Breaks In Between Course	2	4
Loosing Tempo	1	1
Delayed and forgot	1	1
Breaks cause you to forget things	1	1
Breaks cause work to pile up	1	1
Course Related Reasons	13	68
Due to Poor Feedback	1	1
Poor Feedback	1	1
Missing detailed feedback on quiz	1	1
Due to Poor Course Design	9	20
Takes Long	5	11
Long Videos	2	4
Long Course	1	1
Lengthy Lecture Videos	2	4
Lengthy Course	1	2
Slow Paced	1	1
Initially interesting later boring	2	2
Difficulty Level Increase	4	6
Due to Poor Course Delivery	3	9
Bad Teacher	2	6
Lousy Teacher	2	6
Due to Poor Course Content	6	8
Repetition	1	1
Bad Course Content	6	7
Irrelevant Content	1	2
Boring Content	3	3
Boring Assignments	1	1
Due to Mismatch Expectations	9	23
Not Interesting	2	2
Could not Develop Interest	2	2
Inappropriate Level	5	10
Too Easy	1	1
Too Basic	2	4
Too Advanced	4	5
Heavy Course Workload	2	7

Name	Files	Ref
Many Quizzes	1	2
Heavy Workload	2	4
Could not meet deadlines	1	1
Expectations Mismatch	2	4
Dont meet expectations	2	4
Due to Lack of Observation	1	1
Lack of Observation	1	1
Due to Lack of Incentive	2	2
Lack of incentive	2	2
Loss of self-incentive	1	1
Due to Ease of Leave	2	2
Free course makes it easy to drop	1	1
Easy to Leave because no fee	1	1
Due to Difficulty in Using System	2	2

Stayed Longer Reasons

Name	Files	References
Non-Course Related Reasons	6	13
No other course options	1	1
Important for career	5	8
To Get Certificate	2	2
Important for the field	1	1
Add to resume	2	3
Add-on to the course	3	4
Complete assignment	1	1
Assigned	1	1
Course Related Reasons	14	82
Teaching Related	8	16
Teacher Developed Interest	5	9
Different from the usual approach	1	1
Catchy teaching methods and tools	4	6
Right level of course	1	2
Practical	1	2
Applicable	3	3
Learning&Knowledge	12	33
More Knowledge	3	5
Learning Element	4	6
Interesting content	9	17
Personal Interest in the topic	7	8
Interesting Content	4	5
Interest Increased	2	2
Good Quality Content	2	2

Name	Files	Ref
Ease of understanding	4	4
Different from the usual course	1	1
Interactive	7	14
Practice Right Away	2	3
Like the community	1	1
Interactive Course	6	7
Human connection	1	1
Good System Quality	7	9
Easy to use	6	7
Good Service Quality	2	2
Flexible	2	2
Self-paced	1	1
Clear Expectations	2	2
Informed Effort Required	1	1

Appendix 8 – Journals for Systematic Review

The top five journals in Education Technology were searched from Social Sciences and Engineering and Computer Science categories. The results are presented below.

Date of Google Search : 30/May/2020

Social Sciences -> Educational Technology

1. Computers & Education
2. British Journal of Educational Technology
3. The International Review of Research in Open and Distributed Learning
4. The Internet and Higher Education
5. Journal of Educational Technology & Society

Engineering and Computer Science -> Educational Technology

1. Computers & Education
2. British Journal of Educational Technology
3. The International Review of Research in Open and Distributed Learning
4. The Internet and Higher Education
5. Journal of Educational Technology & Society

Appendix 9 – Information Sheet

Reasons for leaving MOOC on the first day

Information Sheet

Dear participant,
You are being asked to take part in a research study that aims to explore participants reasons for leaving a MOOC on the first day . This study is part of a research initiative by Usman Nazir. You will be expected to answer questions pertaining to the topic. This study has received favourable reviews by the University of Reading.

Your participation
In this study, you will be asked to answer questions about your experience with taking a MOOC. Please answer the questions in accordance with your experience with MOOC. Your participation should not take longer than 5 minutes.

Data Storage
All data is stored Google forms. Backup copies are made on a local hard drive and never shared with anyone outside the research team. Data is destroyed after five years as part of the International data protection act.

Right to withdraw
You can stop being a part of the research study at any time with no need for an explanation. You have the right to ask that any data you have supplied to that point be withdrawn or destroyed, you also have the right to omit or refuse to answer or respond to any question that is asked of you. You have the right to have your questions about the procedures answered, before, or after the experiment.

Risks
There are no foreseeable risks.

==Cost, reimbursement and compensation==
Your participation in this study is voluntary and no monetary compensation will be given for this study.

==Confidentiality/anonymity==
The data we collect does not contain any personal information and any records of this study (either hard copy or electronic) will be kept private. In any sort of report we make public we will not include any information that will make it possible to identify you. Research records will be accessed only by the researchers.

For further information

Contact: Usman Nazir / Dr. Stephen Gulliver

/ s.r.gulliver@henley.ac.uk

/ +44 (0) 118 378 4422

Recording Consent

1. I have read the accompanying Information Sheet relating to the project.

2. I understand the purposes of the project and what will be required of me, and any questions I had have been answered to my satisfaction. I agree to the arrangements described in the Information Sheet in so far as they relate to my participation.

3. I understand that participation is entirely voluntary and that I have the right to withdraw from the project at any time, and that this will be without detriment.

4. I understand that the study has been reviewed by the School of Management Research Ethics Committee and has been given a favourable ethical opinion for conduct.

The consent will be audio recorded before the interviews

Appendix 10 – MOOC Providers

MOOC Providers

There are dozens of MOOC providers offering thousands of courses available around the world. Presented below are some of the top MOOC providers by course offerings and learners in 2022, i.e., Coursera, edX, FutureLearn and Swayam (Dhawal, 2021). The list presented below also contains those providers that the participants mentioned in qualitative and quantitative parts of this research.

Coursera:

It is a US based MOOC platform established in 2012 by two Stanford University Professors Daphne Koller and Andrew Ng (Leighton, 2021). Both of the professors were also involved in the popular Artificial Intelligence course that is thought to throttle MOOC movement into mainstream (Staff, 2012). Andrre and Daphne both left Stanford to establish Coursera and were well supported by established universities like Stanford University, Princeton University, University of Michigan and University of Pennsylvania for their course offerings (Waters, 2012). The course offerings have vastly expanded since then. In 2021, it was reported that there are more than 150 universities offering over 6000 courses on Coursera (De Leone, 2021).

Coursera in the start-up phase raised 16 million dollars funding, which was later followed by several rounds of funding and in 2020 the company announced that it had raised 130 million dollars funding updating its valuation to 2.5-billion-dollar company (Adams, 2020). Coursera earns money through certificate offerings and authenticating successful course completions. It also has programs where it charges fees for assessments and grade assignments (Fain, 2013). In 2016, Coursera opened an enterprise product called Coursera for Business, which is targeted at servicing the corporate world for its training needs through custom subscription-based offerings to its specialised courses for corporates (Sawers, 2016). It is also working with non-profits and governments that include Pakistan, Singapore, Malaysia, Mongolia, Kazakhstan and Egypt (Sawers, 2017). In 2021, Coursera filed for an IPO (De Leon, 2021).

edX

edX was founded in 2012 by professors in MIT and Harvard. Its first ever course on circuits and electronics attracted more than 150 thousand students from more than 160 countries around the

world. Stanford university soon joined edX and within a year it had reached 1 million learners world-wide (Conway, 2013). It offers course completion certifications, micro-degrees and master degrees. It also has corporate and institutional offerings around the world. Companies like Microsoft and General Electric continue to upskill their workforce using edX platform (Crimson, 2018). Open edX is an open source platform where the source code of the platform can be found on GitHub, which means the source codes are freely available to other institutions who wish to make a similar offering in educational technology space (Cicero, 2013). edX is a not-for profit venture that offers course content for free. However, it does charge fee for certificate of completion and degrees. In 2018, edX announced a verified and audit track to the learners. The main difference among them is that for verified track graded assignments with feedback, verified certificates of course completion and unlimited course content access shall be provided for a fees. Whereas, for audit track these features will not be available (McKenzie, 2018). In 2021, 2U, an American educational technology company, acquired edX (Whitford, 2021).

FutureLearn

FutureLearn was established in 2013 by The Open University with the goal of providing online courses from the world's best educational institutions (Bowden, 2021). 'The Secret Power of Brands' was the first course to be introduced by the platform. The course was developed by the University of East Anglia, and it had its initial student quota capped at 10,000 (Parr, 2013). In the year 2016, FutureLearn became the first educational platform which allowed students to earn credits towards a degree backed by a top university from the UK, using their smartphones and tablets (Moules, 2016). In 2019, the Australian company, Seek Group had invested £50 million in FutureLearn, in exchange of 50% stake in the company (Lederman, 2019). According to Bowden (2021), FutureLearn stands at the fifth position as the most popular MOOC provider based on its 15 million learners. Additionally, the platform offers 1100 active courses to its users. FutureLearn courses are composed of lecture recordings and texts that the students can go over per their convenience. Certain courses conduct online quizzes and give homework assignments. Official examination is accessible to those students who pay for certification. However, there are some courses that include a free digital certificate in addition to a free upgrade (Bowden, 2022).

Swayam

The Study Webs of Active Learning for Young Aspiring Minds (SWAYAM) was established in 2017 by the Government of India in order to facilitate learning in an online setting. The platform

is accessible via mobile and the web and has a wide range of courses from high school to university. Access, equity, and quality are the three basic goals of education policy that SWAYAM aims to achieve. SWAYAM employs a four-step approach for learning. Quadrant-I or the e-Tutorial includes video lectures. Quadrant-II or e-Text is made up of readings related to the video lectures. These include texts, e-books, PDF files, research papers, etc. which can be downloaded from the platform. Quadrant-III or the Discussion Forum is a platform via which students can have their doubts clarified by their course instructors or their team. Quadrant -IV or the Self-Assessment Tests are the problem-solving phase of the course plan. The problems may take the form of MCQs, short and long questions, fill-in-the-blanks, quizzes, assignments, and so on (Majumder, 2019). SWAYAM does not charge a fee for its courses. However, to secure a certification, a fee must be paid. Students are evaluated by a proctored examination at the completion of each course. The students' grades or marks on this exam may be transferred to their academic records (Kapoor, 2017).

Udemy

Udemy was founded in 2010 by Eren Bali, Gagan Biyani, and Oktay Caglar. Its headquarter is in San Francisco, along with offices in Ireland, Turkey, Denver, Brazil and India (Denis, 2020). It can be utilised to develop and enhance skills useful for jobs and acquire technical certification credit. At present, Udemy offers around 40,000 courses, which have been utilised by approximately 10 million students (Staff, 2022). Udemy’s pricing strategy varies for different courses. Some may be free, while others can cost up to $150. Students also have the facility to utilise discounted courses. Udemy for Business is a subscription-based employee training and development platform that includes access to over 5,000 courses, learning statistics, and hosting and distribution privileges for employers. Although, courses cannot be downloaded for offline use, the Udemy mobile app permits the users to access courses offline and listen to lectures in the app's podcast mode while on the go. Learners on Udemy can also view classes via Google Chromecast or Apple TV (Denis, 2020).

Udacity

Udacity is an online education company that offers MOOCs. Udacity places a greater emphasis on work training. Nanodegree is a micro-credential offered by Udacity. Courses that are part of Nanodegrees are occasionally made available for free. Nanodegrees are aimed at in-demand talents in the realm of technology in general. They include both video classes and projects. Some

of these Nanodegrees and courses were developed in collaboration with universities and industry leaders including Georgia Tech and Google (Shah, 2021). Udacity has a list of project-based tech programmes, which means that students develop skills through practicing on real-world scenarios from established firms. Each programme takes 3-4 months to complete, with an average of 5-7 hours per week of study time. Each student receives a personalised study plan as well as a technical mentor who provides unrestricted feedback. Furthermore, Udacity is designed in such a way that customers have a customisable learning path and, best of all, students work on real-world projects from renowned firms. Students get access to all course content for 3-5 months after purchase. Therefore, one must complete all tasks by this period (Nancy, 2022).

Khan Academy

In late 2004, founder Salman Khan started tutoring his niece over phone calls and Yahoo's notepad, Doodle. Other nephews and family friends soon followed suit, due to which he then started uploading his videos on YouTube. Not only did his kith and kin benefit from these videos, but thousands of other people did too, and continue to do so till today (Temple, 2009). Khan Academy is an online learning platform that allows students to learn at their own speed. Math, art, science, history, and other subjects are covered in the course materials. It is not graded based on` age, as is the case in schools, and hence the extra optional platform allows those who are ahead or behind to progress farther. The Khan Academy platform provides elementary, middle, and high school students with access to over 3,400 educational films, as well as quizzes and interactive software. Because it is practically free and available from almost any device with an internet browser, it may be used both in and out of the classroom. The Khan Academy teaches students through videos, readings, and interactive tools. The academy has excellent resources in math, economics, finance and STEM. Engineering, computing, the humanities and arts are now available (Edwards, 2021).

It must be mentioned there are many other MOOC platforms in the world today. Classcentral.com reports the following number of platforms for each region: 8 for United States and North America, 10 for United Kingdom and Europe, 11 for Asia excluding China and at least 7 in China (Shah et al., 2022). The description of MOOCs presented above are only the ones mentioned in the interviews conducted for qualitative part of this study.