MOOCs as a Distance Education Contingency Plan: A Moroccan University's Experience during COVID-19

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Abstract

This scientific paper presents an evaluative study of Massive Open Online Courses (MOOCs) in Business Intelligence. These courses were made available through the digital distance learning platform of Sultan Moulay Slimane University in Beni Mellal to maintain educational continuity during the closure of educational institutions due to the COVID-19 pandemic. An 8-week MOOC was developed and delivered through the university's distance learning platform. Data was subsequently collected from server login records, registration logs, and an evaluative questionnaire at the end of the course to provide insights into learners' behaviors and experiences. The results showed a fourfold increase in participation compared to the pre-pandemic period, although final certification rates remained low at 22%. Participants expressed positive evaluations, indicating that MOOCs supported continuous learning despite lockdowns. Furthermore, the recommendations included improving mobile accessibility, providing flexible deadlines and social features, and personalized assessment for each learner to enhance engagement effectiveness, highlighting the need for pedagogical and technological innovation.

This paper presents an educational case study for the use of MOOCs in distance learning in an emergency contextvaluable guidance for integrating MOOCs into emergency planning to enhance distance education capabilities and flexibility in universities worldwide.

Keywords

Distance Education, MOOC, COVID-19, Moroccan University, Educational Continuity, Resilience.

ملخص

تقدم هذه الورقة العلمية دراسة تقييمية لدورات التعليم عن بعد المفتوحة عبر الإنترنت (MOOC) في مجال ذكاء الأعمال، والتي كانت متاحة عبر المنصة الرقمية للتعلم عن بعد التابعة لجامعة السلطان مولاي سليمان ببني ملال بهدف الحفاظ على استمرارية التعليم خلال فترة إغلاق المؤسسات التعليمية بسبب جائحة كوفيد-19. ولقد تم تطوير دورة MOOC مدتها ثمانية (8) أسابيع وتقديمها عبر المنصة التعليمية عن بعد التابعة للجامعة،حيث تم تجميع البيانات من سجلات الدخول إلى الخادم، وسجلات التسجيل، واستبيان تقييمي في نهاية الدورة بهدف توفير رؤى حول سلوكيات وتجارب المتعلمين. وقد أظهرت النتائج زيادة في المشاركة بأربعة أضعاف مقارنة بفترة ما قبل الجائحة، على الرغم من أنّ معدلات الحصول على الشهادات النهائية ظلّت منخفضة عند 22%. وأبدى المشاركون تقييمات إيجابية، مما يشير إلى أن دورات MOOC دعمت التعلم المستمر بالرغم من فترة الإغلاق. كما شملت التوصيات المقدمة تحسين إمكانية الوصول عبر الأجهزة المحمولة، وتحديد مواعيد نهائية مرنة، وتوفير ميزات اجتماعية، وتقييم شخصي لكل متعلم من أجل رفع فعالية المشاركة، مع تسليط الضوء على الحاجة إلى الابتكار البيداغوجي والتكنولوجي. وتستعرض هذه الدراسة حالة تطبيقية تعليمية لاستخدام دورات MOOC للتعلم عن بعد في سياق الطوارئ، حيث تقدّم نتائجها إرشادات مفيدة لإدماج دورات MOOC في التخطيط للطوارئ لتعزيز قدرات التعليم عن بعد والمرونة في الجامعات حول العالم.

كلمات مفتاحية

التعليم عن بعد، دورات التعليم الجامعي الضخمة المفتوحة عبر الإنترنت، الجامعة المغربية، استمرارية التعليم، القدرة على الصمود.

Introduction

The rapid onset of the COVID-19 pandemic has significantly disrupted educational systems globally, propelling the urgent adoption of remote learning strategies to maintain educational continuity. In this context, Massive Open Online Courses (MOOCs) have been spotlighted as a critical tool for sustaining educational access and quality, particularly in developing countries facing the unique challenges of the digital divide and resource constraints. This study meticulously examines the utilization of MOOCs at Sultan Moulay Slimane University (USMS) in Morocco, a country that, despite such challenges, has shown remarkable agility in leveraging digital technologies to enhance its educational framework.

Morocco's commitment to integrating Information and Communication Technologies (ICTs) into higher education is evidenced by initiatives like the GENIE program (Zaatri *et al.*, 2020), the Moroccan Virtual Campus (CVM), and the establishment of the Maroc

Université Numérique (MUN) platform (Bachiri et Mouncif, 2023). These efforts underscore the nation's strategic approach to embracing ICTs for educational enhancement and professional training, aligning with Agenda 2030's emphasis on lifelong learning and quality education for all (Owens, 2017). The study aims to illuminate the strategic deployment of MOOCs by USMS during the pandemic, exploring how this initiative has contributed to educational continuity, the experiences and behaviors of learners, and the broader implications for distance education in developing contexts.

By situating the investigation within Morocco's evolving educational landscape against the backdrop of a global shift towards online learning, this introduction outlines the study's objective to delve into MOOCs' role during educational disruptions. It sets the premise for introducing specific research questions in the following section, focusing on MOOCs' operationalization, learner engagement, and strategic considerations for future educational resilience. This research endeavors to enrich the discourse on emergency remote teaching and learning, offering empirical insights and pragmatic recommendations for educators, policymakers, and institutions navigating similar educational challenges.

The remainder of this paper is structured as follows: in the second section, we will discuss many related studies in the fields of educational continuity in the age of COVID-19, as well as the possibility of the usage of MOOCs in digital education. In the third section, we will discuss the educational continuity plan of Sultan Moulay Slimane University, whose objective is to continue the training of its students through distance learning, its strategy, and its capabilities. The fourth section describes the settings data and steps of creating and designing the MPPBIE MOOC on the MUN platform. In the fifth section, we evaluate the demographics, personal characteristics, and results of MPPBIE MOOC registrants. Additionally, we will provide an overview of course-end survey results. In the last segment, we will draw conclusions and provide some recommendations for further study in this field.

1. Purpose of the Study and Methodology

1.1. Purpose of the Study

The onset of the COVID-19 pandemic has underscored the critical role of digital learning platforms in maintaining educational continuity. This research focuses on Sultan Moulay Slimane University's (USMS) strategic utilization of Massive Open Online Courses (MOOCs) to navigate the challenges posed by the pandemic. The study is driven by three primary objectives:

To analyze how USMS harnessed MOOCs to sustain educational activities during the pandemic.

To explore the behaviors and experiences of learners engaged with USMS's MOOCs.

To derive actionable recommendations for effectively integrating MOOCs into emergency preparedness and contingency planning for higher education institutions, particularly in developing countries.

1.2. Methodology

This study adopts a mixed-methods research design to provide a holistic view of MOOCs' impact on educational continuity at USMS during the pandemic. This approach allows for the triangulation of data, enhancing the reliability and depth of the findings.

Quantitative Analysis: The quantitative component involves analyzing server log data and enrollment records from USMS's MOOC offerings during the pandemic period. Key metrics such as participation rates, completion rates, and learner engagement levels are examined. Statistical tools and data visualization techniques are employed to identify trends and patterns in MOOC utilization.

Qualitative Analysis: The qualitative dimension of the study is based on data collected from end-of-course surveys and semi-structured interviews with a purposive sample of MOOC participants and instructors. Thematic analysis is utilized to extract insights into the learners' experiences, challenges faced, and the perceived value of MOOCs in maintaining educational continuity. This qualitative inquiry complements the quantitative data, providing a richer understanding of the MOOCs' effectiveness and areas for improvement.

Ethical Considerations: The research adheres to ethical standards concerning participant confidentiality, informed consent, and the responsible use of data. Ethical approval was obtained from the institutional review board of USMS.

Data Analysis: Data from both quantitative and qualitative components are synthesized to address the study's research questions. The integration of these methods provides a comprehensive analysis of MOOCs' role in educational continuity during the pandemic, highlighting effective strategies and identifying challenges that need to be addressed.

2. Literature Review

2.1. Impacts of COVID-19 on Education

The COVID-19 pandemic has created major disruptions across educational systems globally (Bachiri et Mouncif, 2020). A rapid shift to online learning modalities emerged as classroom instruction was suspended to reduce viral transmission (Baticulon *et al.*, 2021). This transition posed numerous challenges including infrastructure limitations, student engagement concerns, and impacts on learning outcomes (Barrot, Llenares, & del Rosario, 2021). Specific issues like loss of international enrollments and declines in university funding also arose (Shahid, 2022; Woo *et al.*, 2022). However, the crisis also catalyzed certain innovations such as expanded virtual simulations for applied disciplines (Callaghan *et al.*, 2021). The impacts have been multifaceted and require ongoing investigation.

2.2. Institutional Remote Learning Responses

Educational institutions implemented a variety of strategies to enable remote learning during COVID-19 closures. Conducting needs assessments and transitioning hands-on courses online were initial priorities (Crisostomo et Gustilo., 2021). Making technology investments and pedagogical decisions balanced continuity in the crisis and future preparation (Sikora *et al.*, 2020). Considering student perspectives and non-academic impacts of the pandemic was also deemed important (Garcia-Penalvo, *et al.*, 2020). Embracing educational technologies played a central role in most institutional responses (Bachiri *et al.*, 2023). However, student feedback indicates room for improvement in communication, engagement, and sense of belonging (Nassar, 2021) . More research is warranted on effective practices.

2.3. Challenges and Outcomes of Distance Learning

The abrupt shift to distance learning revealed an array of challenges. Students faced difficulties in understanding instructional objectives and adapting their learning skills (Kusmaryono *et al.*, 2021). Competing work and family commitments also emerged as barriers (Bok, 2021). Teachers experienced psychological distress and fatigue (Jurs and Kulberga, 2021). However, studies also found online learning can match traditional methods in effectiveness (Bachiri and Mouncif, 2023). Students developed self-directed learning skills (Aldoy, 2022) [19]. The rapid growth creates opportunities to improve distance education quality. Key recommendations include addressing non-academic obstacles and providing greater support services for students and faculty (Bok, 2021).

2.4. Gap in the Literature

While several studies have explored the impacts of COVID-19 on education, institutional responses, and distance learning outcomes, there remains a notable scarcity of localized case studies, particularly from developing countries (Tadesse and Muluye, 2020). Additionally, the specific role of MOOCs in maintaining academic continuity during the pandemic has been less frequently addressed in empirical research. This study contributes to filling this gap by offering a detailed examination of the development and outcomes of COVID-19-related MOOCs at a Moroccan university, thereby providing valuable insights into a relatively underexplored area.

3. Covid Pandemic and Educational Continuity in USMS

Taking into consideration the Ministry of National Education's announcement that classes would be halted in schools and universities in order to protect the health of teachers and students from the spread of the coronavirus, USMS has taken strong measures to ensure the continuation of education. Distance learning has replaced courses that were previously offered in person. Students at Sultan Moulay Slimane University are able to access digital educational resources created by university academics using the Moodle platform as well as Microsoft.

The most viewed activities include recordings of virtual classes, assignments, and projects with a participation rate of one hundred percent. The proportion of the aforementioned operations that were carried out at the level of the 12 USMS university institutions.

Prior to the emergence of the coronavirus, the USMS had already established itself as the leader in terms of its subscribers' adoption of information technology. This allowed them to rapidly implement online education across all of its campuses. Thus, we observe a tremendous amount of support from both academics and students at the USMS. The job that was anticipated to take months was accomplished in a few days.

All USMS educational institutions have offered their students intuitive email addresses that incorporate their first and last names, the acronyms of their institutions, and the extension «ac.ma» at the tertiary level. These institutional emails allow students to use software such as Microsoft Teams and research websites, such as the National E-resource platform established by IMIST, which enables remote access to the consortium's diverse worldwide electronic resources. These will assist students, particularly those in master's degree and Doctoral programs, who are required to submit a research paper for their graduation projects, to locate research papers.

There are both officially and unofficially approved educational applications. The first tool recommended is Microsoft Teams and Moodle. Teachers and students have Microsoft Teams accounts to engage and study online across all media formats. 35,538 accounts have been created on the educational platforms «Moodle and Microsoft Teams» of the university, where 3,639 courses, including 760 offered in real-time using Microsoft Teams, have been posted. Moreover, the institution advises MOOCs from MUN (Maroc Université Numérique). Other unofficial software applications include Coursera and social media applications such as Facebook, WhatsApp, and Zoom.

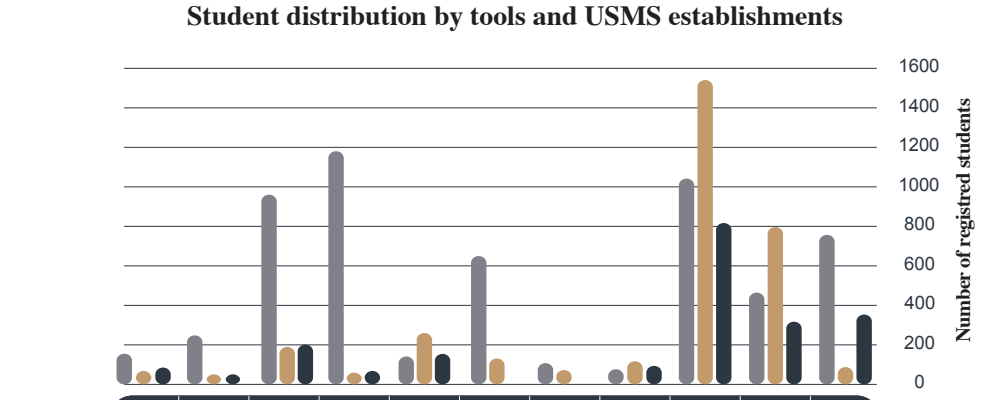
These courses are also accompanied by a set of exercises (directed work) that students must complete and return to their instructors for correction. The objective is to protect the health of the teaching and administrative staff as well as the students from the spread of the Coronavirus while maintaining educational continuity.

According to the statement, students attend lessons designed according to their schedules from the comfort of their homes, and each university is designing its own strategy to promote distance learning.

In response, well-trained teams are working diligently to guarantee that this instruction delivers the desired outcomes. Teachers and students are completely satisfied with this rapid transition from face-to-face instruction to distant learning, which has maintained pedagogical continuity.

In the context of the global health crisis, Sultan Moulay Slimane University has put in place an educational continuity plan whose objective is to continue the training of its students through distance learning.

Since March 16, the USMS's educational and administrative teams have been deployed to maintain distance learning continuity (as seen in Figure 1).



	EST - Fkih Ben Saleh	EST - Khenifra	ENSA - Khouribga	FP - Khouribga	ESEF - Béni Mellal	EST - Béni Mellal	ENSA - Béni Mellal	ENCG - Béni Mellal	FP - Béni Mellal	FST - Béni Mellal	FLSH - Béni Mellal
Others	26	10	205	18	140	0	0	59	816	289	324
TEAMS	20	5	191	13	236	105	23	95	1525	801	55
MOODLE	119	217	970	1187	125	644	87	31	1070	475	754

Figure 1. Student Distribution via eLearning Platforms and USMS Establishments

Among the tools recommended by Sultan Moulay Slimane University to ensure the continuity of distance education:

3.1. MOODLE

The MOODLE educational platform (deposit of courses and materials, tutorials, and exercises) alone represents 53% of all digital educational resources offered by the USMS. It currently hosts over 5679 online courses.

3.2. Microsoft Teams

The Microsoft Teams Platform (virtual classes, videoconference, remote meetings, document sharing) to which the USMS subscribes, made it possible to provide 3,069 video lessons, which makes up 29% of all USMS digital educational resources.

3.3. Other complementary tools

MOOCs, Zoom, Adobe Connect, Bigbluebutton, institutional portals, YouTube channels, and social networks... are also available to university teachers to diversify interactive and collaborative work with students. 1,887 online courses provided via various complementary tools, which makes up 18% of all digital educational resources.

The broadcast of 57 university courses on the Moroccan national channel Arryadia including 05 round tables. The broadcast of 48 lessons on the airwaves of Casablanca regional radio with 1440 minutes.

4. Developing and Implementing the MPPBIE MOOC: Methodological Overview

MOOCs are the next step in online education. In addition, the degree of craftsmanship and animation is excellent. MOOCs also facilitate participant-to-participant and participant-to-designer engagement (forum, chat, etc.). The benefit of massive open online courses (MOOCs) is that they eliminate time and space constraints: you can take the course whenever and wherever you choose (Fini, 2009).

MOOCs are anticipated to either replace huge amphitheater classes at universities or to be utilized on a small scale as a support for reverse pedagogy in small groups (Wang and Zhu, 2019). We use the term flipped pedagogy when the teacher does not teach the course, which is replaced by a MOOC, but instead intervenes in the interactive class to answer students' questions, provide clarifications, etc. For massive open online courses with a huge audience, we can assume that tutors facilitate group interaction. This is known as a tutored MOOC (Pomerol *et al.*, 2015).

The establishment and execution of the «Setting Up a Business Intelligence Project in a Company» (MPPBIE) MOOC at Sultan Moulay Slimane University (USMS) during the COVID-19 pandemic represent a significant advancement in the use of Massive Open Online Courses (MOOCs) for educational continuity. This section provides an extensive methodological exposition on the design and implementation of the MPPBIE MOOC, incorporating detailed insights from various tables and figures to offer a comprehensive understanding of the process.

4.1. Project Team and Human Resources

The MPPBIE MOOC's development was a collaborative effort that brought together a diverse team of professionals, each contributing their unique expertise to the project. The project manager played a pivotal role in coordinating the efforts of educators, support staff, and technical experts, ensuring that the project's goals were met efficiently and effectively (Figure 2). This multi-disciplinary team approach was essential for the successful integration of the various components necessary for the MOOC's creation.

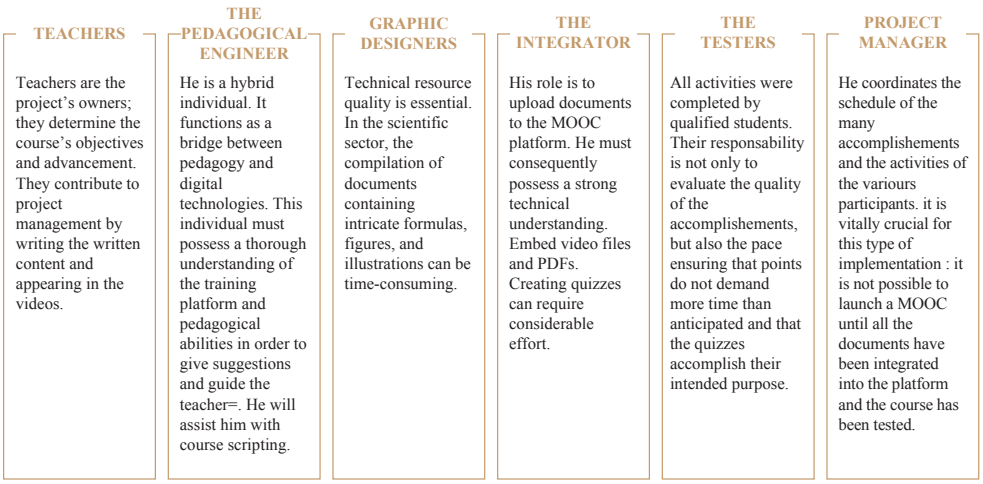


Figure 2. The Pedagogical Staff for the MOOC

4.2. MOOC Development Timeline

A Gantt Chart meticulously outlined the development phases of the MOOC, providing a clear visual representation of the project's timeline from inception to completion (Figure 3). This timeline was critical for task management, allowing the team to track progress and adhere to deadlines. It facilitated the identification of key milestones, such as the drafting of the course script, the estimation of working hours, and the allocation of human resources, leading to the MOOC's timely launch.

Figure 3. Gantt Chart of Phases of MOOC Development Timeline

The MOOC team has established the announcement and course start dates. The timelines have been drastically shortened: the preparation for the oral course begins before the scripting and filming of the first videos are complete, in part because it is difficult to cut their production time. Despite this, we recognize that it already takes approximately five months.

Parallel production of the various documents is possible; it is not necessary to create the textual papers or quizzes before recording the videos. The eight-week MPPBIE MOOC includes one hour of video per week (i.e. four to six sequences). The recording took approximately 34 hours, while the editing took 250 hours, requiring one operator more than two months to finish the task. Therefore, this recording should begin no later than when the course is announced, and preferably before. Teachers' drafting of textual texts is tough to evaluate. We have estimated that an eight-hour video course would take approximately two weeks, or seventy-five hours, based on numerous testimonials. This estimate should be viewed with extreme caution, as it is the duty of the writers, who frequently already have documentation that can serve as a basis. This does not include the formatting of the final text, which depends on the intricacy of the material, the existence of equations and symbols, and the document's iconography. On the basis of samples, specialists must determine the required amount of time. Work can be measured in weeks or days, as shown in Table 1. Some professors are able to produce the final documents, while others are unable to; therefore, the work of integrators and graphic designers can become crucial. Similarly, the duration will vary greatly based on past experience and the papers acquired by the MOOC's instructors.

The development of a massive open online course (MOOC) is far more difficult than the development of a traditional course (Terras and Ramsay, 2015), and it necessitates a structure that resembles industrial projects.

4.3. Content Creation and Pedagogical Design

The pedagogical structure of the MPPBIE MOOC was thoughtfully designed to offer comprehensive training in business intelligence, covering areas such as project management, business management, IT management, and Business Intelligence (BI). The course was divided into nine sections, each aimed at providing participants with the skills and knowledge required to implement a BI project within a company setting (Figure 4). This structured approach to content creation ensured that learners would have a rich educational experience that combined theoretical knowledge with practical application.

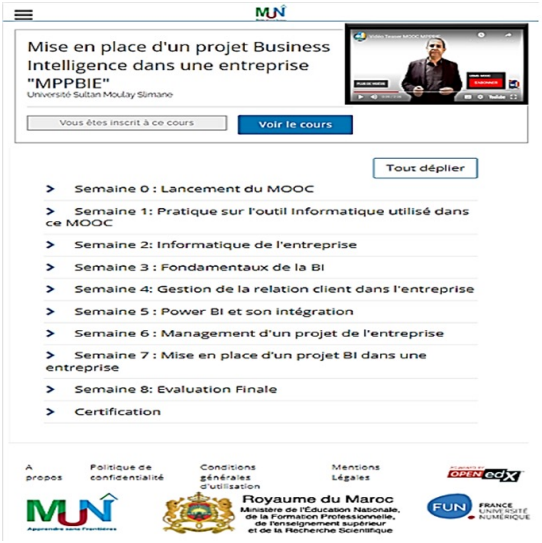


Figure 4. Screenshot of MOOC Delivery

4.4. Promotion and Enrollment

To maximize enrollment, a strategic promotional campaign was initiated, utilizing the reach of the MUN platform to announce the course well in advance. The creation of a syllabus and a «teaser» video provided prospective students with an enticing preview of the course content, requirements, and learning outcomes. These promotional efforts were instrumental in attracting a diverse and engaged learner cohort.

4.5. Timeline and Task Management

The development process was characterized by a series of well-defined tasks, each with specific start and end dates, ensuring a structured and efficient workflow (Table 1). This included the creation of course materials, video recording and editing, document formatting, and the integration of quizzes and assignments. The timeline facilitated the parallel production of various course components, optimizing the use of resources and time.

Table 1. Time Allotted for each MPPBIE MOOC Task

ID	Name	Start Date	End Date	Duration
1	Teaser	July 05, 2019	July 12, 2019	6 days
2	Scenarisation	May 01, 2019	July 05, 2019	48 days
3	Syllabus: design	July 05, 2019	July 12, 2019	6 days
4	Announcement	July 19, 2019	oct 18, 2019	66 days
5	Oral lesson preparation	Apr 30, 2019	Aug 12, 2019	75 days
6	Video: recording	May 17, 2019	Aug 26, 2019	72 days
7	Video: Editing	May 17, 2019	sept 10, 2019	83 days
8	Video: Integration	July 26, 2019	sept 16, 2019	37 days
9	Documents: writing	Apr 30, 2019	July 26, 2019	64 days
10	Documents: formatting	May 16, 2019	Aug 19, 2019	68 days
11	Documents: iconography	May 09, 2019	Aug 19, 2019	73 days
12	Integration: corpus	May 09, 2019	July 29, 2019	58 days
13	Integration: documents	May 15, 2019	Aug 23, 2019	73 days
14	Integration: Quizzes	May 15, 2019	Aug 23, 2019	73 days
15	Testing	July 30, 2019	sept 24, 2019	41 days
16	Error corrections	July 30, 2019	oct 04, 2019	49 days
17	Start of the MOOC	oct 18, 2019	Jan 10, 2020	61 days

4.6. Learner Engagement and Assessment

The course design included weekly tests and a project-based assessment to measure learner understanding and engagement. These assessments were crucial in providing feedback to learners and instructors, enabling continuous improvement of the course content and delivery.

The structured assessment framework also played a vital role in achieving the course's learning objectives and ensuring a high level of learner satisfaction.

The development and implementation of the MPPBIE MOOC at USMS exemplify a comprehensive and collaborative approach to MOOC design and delivery. Through strategic planning, resource allocation, and pedagogical innovation, the project team successfully created a MOOC that not only addressed the immediate challenges posed by the COVID-19 pandemic but also set a precedent for future online educational initiatives. This elaborate methodological exposition underscores the importance of a well-coordinated effort in harnessing the potential of MOOCs to enhance educational accessibility and quality.

5. Findings and Discussion

The deployment of the «Setting Up a Business Intelligence Project in a Company» (MPPBIE) MOOC by Sultan Moulay Slimane University during the COVID-19 pandemic represents a pivotal case study in the utilization of Massive Open Online Courses (MOOCs) for educational continuity. This section delves into the findings derived from server log data, enrollment records, and end-of-course surveys, alongside a comprehensive discussion that integrates these insights with the broader literature on distance education and MOOCs.

5.1. Demographics of Enrollees

During the course registration procedure, people are asked for their age, gender, nationality, level of education, and affiliation. The majority of participants in the second session of the MPPBIE MOOC were male academics with a bachelor's degree or higher. The majority of registrants were between the ages of 21 and 25. Beni Mellal-Khenifra (25.7%) and Settat-Casablanca (14.9%) had the highest enrollment rates, followed by Rabat-Salé-Kénitra (11.6%) and Marrakesh-Safi (11%). MPPBIE MOOC registrants represented 10 countries from Europe and Africa (3.8 percent). Figure 5 displays the regions with the highest enrollment numbers.

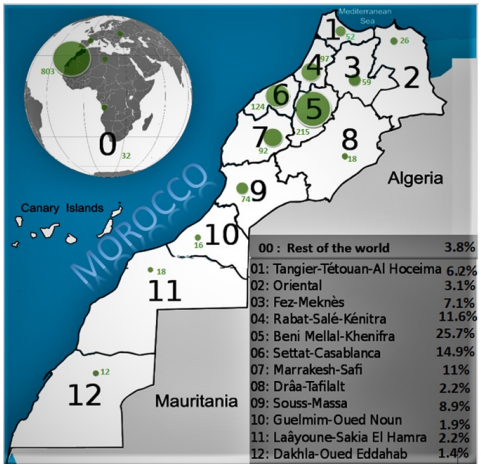


Figure 5. Map plots Representing Regions with the Number of MOOC Enrolments

5.2. Personal Characteristics of MPPBIE MOOC Registrants

535 (64 percent) of the 835 participants who identified their gender were male, while 300 (36 percent) were female. All registrants have declared their gender (see Figure 6).

Gender of MPPBIE MOOC registrants

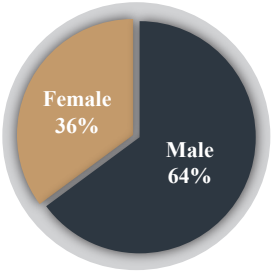


Figure 6. Gender Distribution of MPPBIE MOOC Participants

The bulk of the 835 participants who disclosed their age range were between 20 and 40 years old. Figure 7 displays the distribution of participant age ranges.

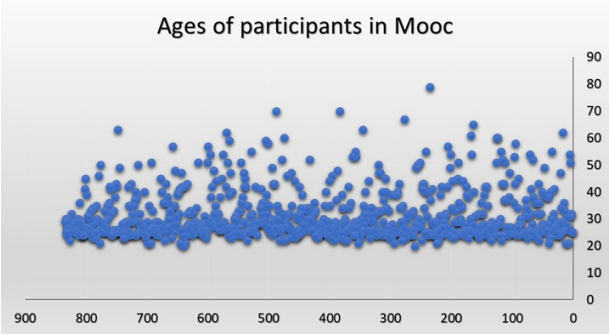


Figure 7. Scatter Plot: Ages of Participants in MPPBIE MOOC

51.7% of respondents with a master's or professional degree, 30.5% with a bachelor's degree, and 6.1% with a Doctorate were gleaned from the responses to the education question (n=815). The majority of the 815 participants who disclosed their affiliation were from academia (88.4%), while 11.5% identified as persons or unaffiliated. Figure 8 depicts the comprehensive set of replies for education.

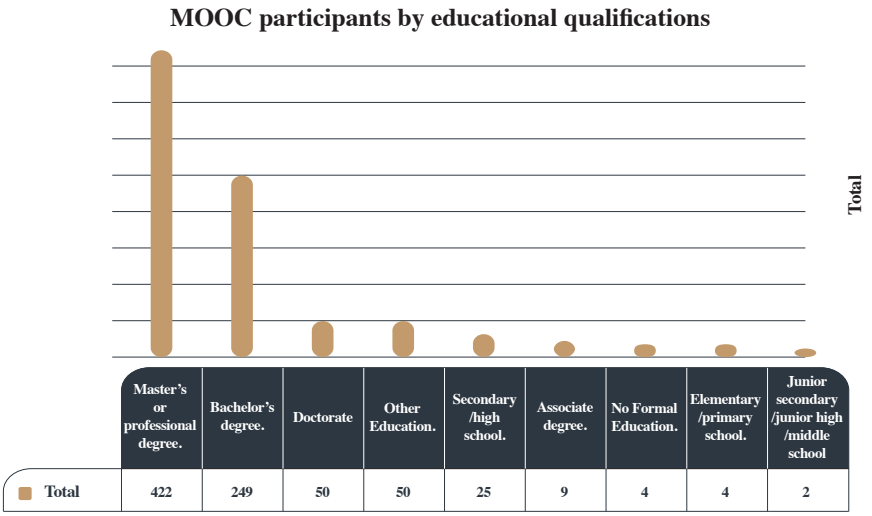


Figure 8. Academic Credentials of MPPBI MOOC Participants

5.3. Weekly Tests

Each of the six weeks contained a 10-question multiple-choice examination. A minimum score of 60 percent was necessary on the quiz to qualify for a certificate. Participants who did not attain this level were permitted two attempts. A significant factor for earning an MPPBIE

MOOC certificate is completing a project in week seven and passing peer review in week eight. As shown in Table 2, quizzes 1 and 2 continue to be difficult, and the standard deviation reveals a large range of participant scores.

Table 2. The volume of Students who Attempted each Test, as well as their Mean Scores

Standard Deviation	Average Score	Number of Students	Mooc Assessment
2,80	55%	587	week 1 (MCQ)
2,90	56%	435	week 2 (MCQ)
2,65	60%	419	week 3 (MCQ)
2,32	65%	374	week 4 (MCQ)
2,38	64%	320	week 5 (MCQ)
2,29	63%	245	week 6 (MCQ)
1,69	73%	150	Week 7 (Assignment)
1,15	85%	145	Week 8 (peer review)

Peer evaluation in week 8 entails placing the MOOC participant in the position of corrector by requesting that they examine the work of their colleagues with a critical eye (their peers). This assessment method's pedagogy is learner-centered. It can also take the form of formative feedback intended to advance the learning process.

5.4. Overview of Course-End Survey Results

The 65 individuals who completed the End-of-Course Survey are eligible for further examination. The replies to survey questions regarding general satisfaction with the MPPBIE MOOC reveal that respondents were ecstatic about and appreciative of this educational opportunity. Over 91 percent of respondents strongly agreed that MPPBIE MOOC accomplished the learning objectives. 88 percent strongly agreed with the statement, «The content of the course was of high quality.»

The end-of-course survey also asked for recommendations and input of an open-ended nature. Participants used their open-ended replies to provide suggestions for the development and expansion of the course's design and to define the course's value to themselves and other participants.

There were numerous demands for additional courses, other MPPBIE MOOC offerings, and a continuation or advanced MOOC. Some responses mentioned recommending the course to

others. It was suggested that the MOOC be offered frequently and that this opportunity be made available to communities around the world.

A second topic that emerged from participant input was that the MPPBIE MOOC should be offered over a longer period so that students can complete all course activities and get a certificate.

In pandemic times, this learning practice continues to be well-received, despite low registration and participation numbers. Survey respondents expressed their enthusiasm for the course and planned to put it into practice in the future. The MPPBIE MOOC shows a small increase in quiz participation and an overall certification rate of 22% of all active participants who choose the more difficult Certificate of Completion based on the Blended Learning assignment and peer assessment.

5.5. Discussion

MOOCs, or Massive Open Online Courses, have played a crucial role in education during the COVID-19 pandemic. The use of MOOCs and ICT has been perceived as fundamental by teachers, especially in organizing school activities during the pandemic (Salas-Rueda *et al.*, 2022). In the medical field, MOOCs have been irreplaceable in providing education, particularly in higher education, before and after the pandemic (Zhu *et al.*, 2023). However, there is a concern about whether learners from economically disadvantaged regions have been able to capitalize on MOOCs during this time (Ma and Lee, 2023). MOOCs have been recognized as a safe and effective way to provide training to large numbers of people, especially in fields, such as computer science, during the pandemic (Bachiri *et al.*, 2023). The effectiveness of MOOCs in teaching medical students about COVID-19 has been evaluated using the RE-AIM framework, emphasizing their role in medical education during the pandemic (Yilmaz *et al.*, 2021).

The willingness of students to complete MOOCs during the pandemic has been found to be influenced by the perceived usefulness of the courses, confirmation of prior expectations, and satisfaction with the learning experience (Rekha *et al.*, 2023). Additionally, the pandemic has led to a surge in MOOC users, but there has also been a high dropout rate (Rahmawati *et al.*, 2022). MOOCs have been seen as a suitable platform for online learning and practicum-based facilities during COVID-19 (Rahmawati *et al.*, 2022). Furthermore, MOOCs have been increasingly used as a convenient platform for education during the pandemic, particularly in limited-resource settings (Findyartini *et al.*, 2021).

The role of MOOCs in promoting deep learning during the pandemic has been explored, highlighting the importance of metacognition in this context (Elbyaly and Elfeky, 2022).

MOOCs have also been used to respond to isolation and upheaval during the pandemic, with a focus on adult learners (Impey and Formanek, 2021). The pandemic has influenced the development and application of MOOCs, leading to increased participation but also affecting retention and dropout rates (Ahonen and Pekkarinen, 2020). MOOCs have been recognized as an efficient alternative mode to provide teacher professional development programs, particularly in emergency situations like the COVID-19 crisis (Jimoyiannis *et al.*, 2021).

In conclusion, MOOCs have been instrumental in providing education and training during the COVID-19 pandemic, particularly in the fields of medicine, education, and professional development. While they have facilitated access to learning opportunities, there are challenges such as high dropout rates and concerns about accessibility for learners from economically disadvantaged regions.

6. Summary and Conclusion

This study provides an instructive case study of a developing world university leveraging MOOCs to enable educational continuity during the COVID-19 crisis. The significantly increased enrollment compared to pre-pandemic highlights the scalability value of MOOCs for remote learning access. However, the low final certification rate of just 22% indicates persistent challenges with student motivation and sustained engagement.

Positive learner feedback shows MOOCs can support perceived learning despite limitations. However, barriers to completion remain, likely exacerbated by the self-directed asynchronous MOOC model. Optimizing course designs and pedagogies for the local context is critical, including enhanced mobile delivery, collaboration features, and regular personalized feedback.

6.1. Suggestions and Limitations

This exploratory single case study offers useful insights but has limitations. The small student sample from one university restricts generalizability. Reliance on self-reported data can introduce biases. The low survey response rate provides an incomplete view of learner perspectives. The short-term nature limits insights into long-term impacts.

6.2. Future Research

Key directions for future research include randomized controlled studies comparing MOOC student outcomes and experiences to traditional modalities, design-based research optimizing MOOCs for motivation and completion, and longitudinal investigations of learning effectiveness. Additionally, research into instructor experiences rapidly transitioning classes could inform enhanced contingency preparation and distance teaching scalability.

In conclusion, this study provides an instructive empirical example of transitioning classes to MOOCs for continuity, highlighting key areas needing pedagogical and technological innovation. It offers practical and theoretical insights for leveraging open online learning in crisis response and inclusive education worldwide.

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