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Institute
Of Continuing
Education &
Professional Studies

INTERNATIONAL JOURNAL ON **E-LEARNING** *AND* **HIGHER EDUCATION**



VOLUME 14
JAN 2021
ISSN 2229-8223



Content Presentation Techniques for Learning Experience Enhancement in Massive Open Online Course (MOOC)

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Abstract: MOOCs (Massive Open Online Courses) are a new and innovative technique of disseminating knowledge to millions of people all over the world. Despite being a fantastic learning tool with a global reach, MOOCs have their own set of restrictions, resulting in an extraordinarily low course completion rate. Personalization and engagement are lacking in traditional material presentation strategies. Hence, MOOCs must adopt advanced learning approaches in order to create a more engaging experience for the learners. This study introduces Augmented MOOC (A-MOOC), an enriched learning MOOC environment. A-MOOC explores Active Learning, Augmented Reality, and Gamification techniques, and show how these strategies can be combined with MOOC content in both online and offline modes. It demonstrates the favourable influence of creating interactive and more engaging content in the current learning setting to increase learners' motivation to complete a MOOC.

Keywords: MOOC, Active Learning, Augmented Reality, Gamification, Learning Techniques, Self-Instructional Materials

INTRODUCTION

Massive Open Online Courses (MOOCs) are online courses delivered through platforms that aim to provide a variety of pedagogical content to a wide range of audiences. MOOC's inception and expansion have altered the traditional model of knowledge delivery in formal education. MOOCs provide an environment that allow lifelong learners to gain unrestricted access to the current information they require for professional and personal development.

There have been numerous MOOC platforms established to date. Coursera, edX, and Udacity are the three forerunners, followed by a slew of others from around the world. According to Class Central, there are 16,300 courses offered worldwide by various platforms in 2020, with 180,000,000 online enrolled learners. The figure indicates that many institutions have put significant effort into MOOC development, advertising, and course delivery. However, there are still unanswered questions about MOOCs and their efficacy.

Accreditation and certification of learners, a high dropout rate, learning quality assessment, personalization and individual teaching support, learner performance assessment, long-term administration and oversight, and ethical and privacy considerations for learner data are only a few of them (Chauhan et al., 2015). One of the most concerning features of all of these issues is the extremely low rate of course completion (Feng et al., 2019). On average, only ten percent of learners complete the MOOCs they signed up (Khalil et al., 2018). Low motivation is one of the factors that has been recognised as a contributing factor to the situation (Ejreaw & Drus, 2017). As a result, more engagement tactics are required to motivate a learner to stick with a course from start to finish. When learners are more motivated to learn, they are more likely to engage in learning and complete a MOOC (Tang & Chaw, 2019).

This paper focuses on enhancing MOOC content presentation techniques in order to improve MOOC quality. Active Learning, Augmented Reality, and Gamification are the three techniques that were investigated. These techniques have been used in a variety of learning models and have had a significant impact on the learning experience of learners. Active Learning promotes the idea of encouraging learners to interact and become more engaged. Augmented Reality allows people to interact with both real and virtual objects and enhances their ability to grasp and digest information through improved visualisation of the topic, which keeps learners engaged during the learning process. By incorporating exciting game features and aesthetics into the learning environment, Gamification ensures that learners are encouraged to complete the assignment. This paper also emphasised the Augmented MOOC (A-MOOC) concept, which shows how these three techniques can be used in MOOCs in online and offline modes.

The following is a breakdown of the paper's structure. The techniques of Active Learning, Augmented Reality, and Gamification in MOOCs are briefly discussed in Section 2. Section 3 represents the structure and implementation of A-MOOC and explains how these techniques can be used to improve MOOCs. The conclusion is found in Section 4.

CONTENT PRESENTATION TECHNIQUES

This section will go over the three content presentation techniques discussed in detail. The techniques are Active Learning, Augmented Reality, and Gamification. Aside from that, the concept of Self-Instructional Materials in MOOCs was also explored.

2.1 Active Learning in Massive Open Online Course (MOOC)

Engagement is promoted when active learning is emphasized and supported. Bonwell and Eison (1991) define active learning as any task or activity that involves learners in doing things and thinking about the things they are doing. It is a process whereby learners engage in learning activities that promote application, analysis, synthesis, and evaluation of new knowledge of course contents (Prince, 2004).

Instructors can use a variety of instructional strategies to encourage active learning in MOOCs. Group discussions, problem solving, case studies, reflective scientific writing, and self-assessment are some of the strategies that can be used to actively engage learners in the learning process. Instructors can use digital affordances to drive students to engage in critical thinking and meaningful learning, increase retention and transfer of new material, and improve interpersonal skills by employing these tactics.

A study from Aji et al. (2019) found an improvement in student academic performance as an effect of the implementation of active learning methods. Fernanda Bonafini (2017) investigated the prospects for active learning in MOOCs geared for effective statistics teacher professional development. The findings revealed that active learning allows learners to interact with one another on MOOC content,

exchange their experiences with learning content and teaching technique, and reflect on their practise.

2.2 Augmented Reality in Massive Open Online Course (MOOC)

Augmented Reality (AR) refers to a concept in which the real world is enhanced by combining it with the virtual world. To improve the user's experience, real-world static items are dynamically transformed with context-sensitive virtual information like as video, music, or a visual overlay (Chuhan et al., 2015). AR's most commonly mentioned benefits included increasing learners' motivation, comprehension, and involvement, as well as lowering their cognitive burden.

MOOCs use conventional instruction delivery such as recorded videos, lecture slides, discussion boards, and web-based collaborative tools. These systems facilitate fundamental collaboration among students. However, student involvement with other students and course participation are poor. Immersive environments produced using augmented reality can foster collaboration by creating a shared place for learners, resulting in a more engaging learning experience (Chuhan et al., 2015).

A pilot study at Georgia Tech used Augmented Panorama technology to teach structural reading to participants in a MOOC course. Panoramas give a natural and intuitive experience that simulates the real world for consumers who are interested in certain areas and information (Gheisari et al., 2015). Fauzi et al. (2018) proposed The Augmented Biodiversity Lab, which aimed to combine entertainment and learning by providing learners in the Biodiversity MOOC with an immersive learning experience. Several Augment Reality applications were used to enable learners to explore and discover the intricate anatomical details of selected fauna and flora through the Augmented Biodiversity Lab.

2.3 Gamification in Massive Open Online Course (MOOC)

Gamification is defined as the use of game features in non-traditionally recreational contexts in order to make an impact and solve problems. Points, badges, and leaderboards are common gamification features in education, but rewards, acknowledgements, levels, and feedback are also common (Rughini et al., 2019).

The factors of gamified designs in this educational modality increased social engagement by providing fun, interactive, and significant experiences for participants, resulting in more unique visitors per day and longer average connection time in activities, according to Zichermann and Cunningham (2011). Rughiniş (2013), who describes how gamification improves productive engagement for specific types of participants in e-learning environments, shares this viewpoint. Chang and Wei (2016), on the other hand, identified 40 gamification mechanics typologies in MOOCs from Coursera, Udacity, and edX, demonstrating that their cross-course inclusion in course activities and challenges boosted student immersion and commitment to gamified content. Through an A/B testing planned task, Vaibhav and Gupta (2014) investigated the use of gamification in a MOOC. In terms of the number of quizzes submitted, the researchers discovered that the gamified quiz attracted a bigger number of learners than those without gamification. In addition, they discovered that the quiz success rate was greater for the cohort who received gamification support, resulting in a modest increase in retention when compared to the control group. Table 1.0 summarises the three learning techniques by providing examples, benefits, and drawbacks for each.

Table 1: Summary of Learning Techniques

Technique	Examples	Advantages	Disadvantages
Active Learning	<ul style="list-style-type: none"> • Simulations • Research • Creative projects • Case studies • Problem-solving activities 	<ul style="list-style-type: none"> • Provides the context that helps learners recognize the relevance of the learning • Promotes better retention of learning • Deepens understanding and enhances learners' ability to transfer knowledge to "real-life" situations • Engages the learner more, and is thus usually more enjoyable • May address a greater variety of learning styles 	<ul style="list-style-type: none"> • Often require more time for the instructor to prepare well • Less efficient than didactic learning for presenting foundational knowledge • May be frustrating for learners who are not prepared to participate
Augmented Reality (AR)	<ul style="list-style-type: none"> • Simulations to explore specific sites • Remote virtual laboratories • View scientific phenomena • 3D object creation 	<ul style="list-style-type: none"> • Promotes collaborative learning • Increases proximity to virtual objects • Enables visualizing the unviewable processes • Promotes pervasive learning • Friendly for all age groups • Helps visually impaired learners by augmenting virtual audio objects 	<ul style="list-style-type: none"> • Design, implementation, and integration of AR with learning systems is challenging • Requires more time & effort • Needs technical expertise with domain specific knowledge.
Gamification	<ul style="list-style-type: none"> • Points • Leaderboards • Badges • Levels • Stories • Goals • Feedback • Rewards • Progress • Challenges 	<ul style="list-style-type: none"> • Develops problem solving skills • Strengthens critical thinking • Builds team working skills. • Makes routine work interesting • Enhances learner experiences • Spur learner motivation 	<ul style="list-style-type: none"> • Categorizing appropriate gaming elements for specific audience is difficult • User dissatisfaction arises if unsuitable game tactics or approaches are used • Demands training of instructors to integrate games meaningfully into their total learning activities.

AUGMENTED MASSIVE OPEN ONLINE COURSE (A-MOOC)

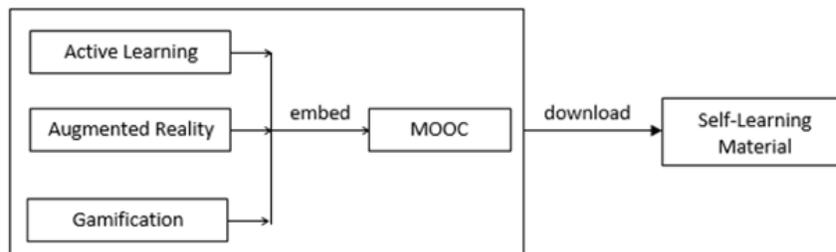
Augmented Massive Open Online Course (A-MOOC) is an enriched MOOC learning environment. It is a concept that investigates the adoption of three different learning techniques in MOOCs. In this study, the term “augmented” refers to the use of several types of learning strategies to

improve the MOOC learning experience by enhancing learner engagement and motivation. A-MOOC, on the other hand, demonstrates how MOOCs may be used both online and offline modes. The structure of A-MOOC is depicted in Figure 1

3.1 A-MOOC Structure

The MOOC's entire content design was infused with Active Learning, Augmented Reality, and Gamification approaches. The additional features of A-MOOC include the ability to download and print all of the MOOC's learning activities. This would allow learners to continue their MOOC learning activities even when they are not connected to the internet.

Figure 1 : A-MOOC Structure



The remaining sections will explain how these techniques were implemented.

3.2 Active Learning in A-MOOC

Learner involvement and engagement in the learning process are essential components of active learning (Prince, 2004). Different types of learning activities are available in MOOCs. The essential task is to grasp the concept of the course being delivered. The learning movies, which were made using video design-related methodologies, cover all of the major concepts. Using “bite-size” movies that cover the major concepts or learning objectives is one of the ways. Learners can better follow the presentation of materials by employing optional subtitles on video. To avoid an online stall or crash, learning videos can also

be downloaded. Learners will be able to adjust the speed of the video presentations. Additionally, slides or notes summarising the major concepts taught are provided to aid learners throughout their learning process.

A-MOOC also includes activities that require students to put what they have learned into practice. For instance, MindMapping, Fun Activities, and Case Studies are just a few examples. The learners will gain a better understanding of the course as a result of the ongoing exercises. A-MOOC, on the other hand, uses computer-graded quizzes that delivers instant response. Quizzes that work don't just assess recall. Unlike some other MOOCs, A-MOOC focused on the following cognitive processes: understanding, analysing, applying, and evaluating. These activities and quizzes are designed to help students review course material.

3.3 Augmented Reality in A-MOOC

The learning environment is being transformed by augmented reality (AR), which augments the learner's real environment with virtual information. When scanned with AR equipped devices, the overlaid information is hidden beneath the cues, bringing the static environment to life and providing a better learning experience for learners. Adding links to photographs, videos, or text to an image of a real thing on a computer or smartphone screen is known as augmented reality. There are several ways to activate the augmented reality connection, but the simplest and most common is to utilise a QR (Quick Response) code.

Quick Response (QR) and 3DQR codes are used in the A-MOOC. 3DQR code (<https://3dqr.de/>) is a programme designed specifically to view AR using a QR code. The augmented reality learning videos are linked to the 3DQR code, which the learner can scan to watch the videos in AR and 3D perspective. MOOC students can use mobile devices and wearables to immerse themselves in the world of augmented reality. The remainder of the learning activities, on the other hand, are linked to the QR code. This strategy will present learners with a more immersive learning environment, as well as more fun, and hence better engagement.

3.4 Gamification in A-MOOC

The learning process can be gamified to help encourage and engage students. Ranking, course progress, levels, and certification are just a few of the gamification features that can be beneficial. The problem in embedding gamification in MOOCs is to use the proper gamification components in the most effective way. The Gamification aspects were used in a variety of ways by A-MOOC.

In A-MOOC, learners are ranked for each quiz and for the entire course. Every learner's progress and status is displayed in a progress bar, where they may view the activities they have completed and those that are still pending action. Instead of having a long content with no intermediary goals, levels break down the course content into smaller chunks. Each level must be finished before moving on to the next. Levels usually begin with simple information and activities and progress to increasingly harder tasks when each level is completed successfully. Learners will get a sense of success after completing each level. They will be more motivated to learn. Once a learner has completed the course, they will be given a Certificate of Completion.

3.5 Self-Instructional Materials in A-MOOC

Self-instructional materials (SIM) are defined as “any learning resources that may be used by a student without the physical presence of a teacher”. The definition is published in a World Health Organization report titled “Availability and utilisation of self-learning materials in continuing education”. By delivering learning experiences similar to the classroom-based teaching-learning process, self-instructional material performed the functions of an effective classroom teacher. As a result, the invisible instructor embedded in the learning materials assists students in their studies in the same way that a classroom teacher does in face-to-face classes.

Course notes and self-instructed learning activities make up the SIM. Learners can complete all of the MOOC learning activities offline rather than doing them online. When there is no online connection, learners can use A-MOOC SLM. The learner will only need an internet

connection if they want to complete all of the activities in the MOOC. A-MOOC gives learners the freedom to learn at their own pace, whenever, wherever, and however they want.

CONCLUSION

The utilisation of Active Learning, Augmented Reality, and Gamification creates a favorable learning environment for students by keeping them engaged throughout the learning process. These strategies emphasise stimulating participant involvement, facilitating interaction between actual and virtual items to improve content visualisation, and incorporating enjoyable features and aesthetics into the learning environment. The study combines these techniques with MOOC content to create an enriched learning environment which is known as Augmented MOOC (A-MOOC). A-MOOC demonstrates how these strategies were combined in both an online and offline mode. The goal of this combination is to increase learner engagement, which will eventually drive them to complete the course.

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