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EXPLORING EDUCATION IN THE DIGITAL AGE: INNOVATIONS, INTERSECTIONS AND INSIGHTS

PREFACE

Dear esteemed readers and contributors,

It is with great pleasure and excitement that I extend a warm welcome to you all to this special edition of our journal, dedicated to exploring the diverse and dynamic themes shaping the landscape of education in the digital era. As we embark on this journey of discovery, each theme serves as a guiding beacon, illuminating the innovative intersections of technology and pedagogy.

Our first theme, Teaching based on Artificial Intelligence (AI), Machine Learning (ML), and the Internet of Things (IoT), sets the stage for our exploration by delving into the transformative potential of intelligent technologies in education. From personalized learning experiences to predictive analytics, AI, ML, and IoT hold the promise of revolutionizing traditional teaching methods and unlocking new pathways to knowledge acquisition.

Theme 2 invites us to immerse ourselves in the realm of 360 Learning, Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). Here, we witness the fusion of physical and digital worlds, as learners embark on immersive journeys that transcend the confines of the traditional classroom. Through experiential learning and interactive simulations, VR, AR, and MR technologies redefine the boundaries of education, offering unprecedented opportunities for engagement and exploration.

In Theme 3, we explore the power of Collaborative Teaching, Global Learning, and innovative practices such as Gamification, Maker-Space, and Maker Lab initiatives. This theme underscores the importance of collaboration, cultural exchange, and hands-on experimentation in fostering creativity, critical thinking, and problem-solving skills among learners worldwide.

Theme 4 sheds light on the paradigm shift towards Open and Distance Learning (ODL), Self-Instructional Materials (SIM), and the utilization of Big Data Analytics in Learning. Here, we witness the democratization of education, as learners gain access to high-quality resources and personalized learning experiences irrespective of geographical constraints. Big Data analytics further enhance the educational landscape by providing insights into learner behavior and preferences, enabling educators to tailor instruction to individual needs.

In Theme 5, we explore the evolving role of Social Media Learning as a catalyst for knowledge dissemination, collaboration, and community building. From online forums to multimedia platforms, social media offers a dynamic space for peer-to-peer learning, digital literacy development, and the cultivation of virtual learning communities.

Theme 6 invites us to embrace Design Thinking for new Learning Delivery, emphasizing the importance of user- centered design principles in creating innovative and inclusive learning experiences. Through empathetic design, educators can reimagine learning environments that foster creativity, adaptability, and lifelong learning skills.

In Theme 7, we delve into Andragogy in technology-based learning, Instructional Design, and Best Practices in e-learning. This theme highlights the importance of learner-centered approaches, effective instructional design strategies, and the dissemination of evidence-based practices to optimize learning outcomes in the digital age.

Finally, Theme 8 explores the Development of e-learning systems, materials, and mobile technologies, including the emergence of MOOC-based mobile learning materials. Here, we witness the evolution of educational technologies, as mobile devices and online platforms redefine the boundaries of access and engagement in education.

As we navigate through these diverse themes, let us embrace the spirit of inquiry, collaboration, and innovation that defines our scholarly community. I extend my deepest gratitude to all the contributors who have enriched this journal with their insights and expertise. May this edition inspire new ideas, spark fruitful discussions, and contribute to the ongoing dialogue surrounding the future of education.

Thank you for your dedication and commitment to advancing the frontiers of knowledge in the field of education.

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Theme 4: Open and Distance Learning (ODL)/Self Instructional Materials (SIM)/Big Data Analytics in Learning

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Theme 8: Development of e-learning system/Development of e-learning materials/Development of mobile systems in Learning/Development of MOOC-based mobile learning materials

1. Student Acceptance with the Usage of Padlet in Guiding Research Statistics Analysis
2. MOOC Courses Development: Guidelines for GLAM MOOC

Guest Editors

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MOOC Courses Development: Guidelines for GLAM MOOC

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ABSTRACT
Massive Open Online Courses (MOOCs) have dramatically changed the higher education landscape by providing flexible and accessible learning options to learners globally. Creating efficient MOOCs that meet learners' unique demands becomes crucial in the field of information science, consisting of Galleries, Libraries, Archives, and Museum (GLAM) management, where ongoing upgrades and developments are essential. The development methods used by information science lecturers to produce MOOCs for higher education are thoroughly discussed in this article. This article concentrates on strategies and methods utilized by the School of Information Science MOOC coordinator in designing and delivering MOOCs. It examines the critical factors, including instructional design principles, technology integration, and learner engagement techniques. Furthermore, this article highlights the obstacles lecturers encounter during the development process and creative solutions created to overcome them. In addition to preparing those interested in or supervising the development of MOOC courses, the methods will provide insights for enhancing MOOC design, enhancing learner engagement, and addressing the specific requirements of information science education. This article hopes to contribute to the development and supervision of online learning content and to promote accessible and efficient education in the field of information science.

Keywords: GLAM, information science, Massive Open Online Courses development, MOOC strategies

INTRODUCTION

Massive Open Online Courses (MOOC) have revolutionized education by providing individuals with globally accessible and adaptable learning opportunities. In the field of information science, MOOCs have emerged as a potent instrument for acquiring knowledge and skills related to various aspects of information management and organization. Notably, MOOCs that focus on Galleries, Libraries, Archives, and Museums (GLAM) management, as well as content management, have gained prominence and significance. In March 2013, the first Malaysian higher education institution announced its pilot MOOC (Fadzil et al., 2015). In 2014, five additional institutions of higher education, four of which were public universities, began offering MOOCs on two distinct platforms. These initiatives represent a preliminary phase in MOOCs, where Malaysia's approach can be described as exploratory. It focuses less on reaching the widest possible audience, making a significant global impact, or competing with established providers and more on learning to use web-based technology to complement current educational delivery systems at the higher education level and introducing MOOCs.

Universiti Teknologi MARA (UiTM) launched its MOOC development space in 2018 on the Open Learning platform and has since switched to the Ufuture platform. It is an introductory course designed to accommodate the new learning philosophy currently prevalent in society, especially among the younger generations (Spyropoulou et al., 2015). The four primary components of a MOOC are the course description, learning materials, activities, and assessments. These characteristics align with the National E-learning Agenda's emphasis on Blended Learning Mode as a key component. Dasar e-Pembelajaran Negara (DEPAN) is a set of national standards for online education developed by the Malaysian Ministry of Education (Spyropoulou et al., 2015). Notably, the rising popularity of MOOCs at the tertiary education level has the potential to affect self-development, knowledge acquired throughout a lifetime, also known as lifelong learning and additional skill sets acquired by demanding industries, all of which directly raise the yearning for a country to maintain an eloquent population.

Ufuture, the Integrated Academic System of UiTM, is linked with MOOC. When a student enrolls in a course, and a professor is assigned to teach it, both the student and the professor gain immediate access to the MOOC. The first day of a semester is the first day of MOOC use. Based on their course roster, both students and instructors can utilize the MOOC's features. Furthermore, instructors can simultaneously add and update course content and related learning materials. In addition, most classroom activities that take place throughout the semester are made available via MOOC.

CURRENT ISSUES IN TEACHING AND LEARNING

Tong et al. (2022) defined blended learning as a combination of e-learning, in-person instruction, and independent study. Its prevalence has increased in recent years as a result of the development of online education. In addition, there are online discussions, communications, and remarks from instructors and peers (Abdurashidova, 2022). During the pandemic, this method has become standard in higher education, minus physical communication, where it is prohibited (Tamin & Mohamad, 2020) for 24 months (2020 to early 2022), where it has increased awareness and interest in the benefits of alternative knowledge delivery and its adaptability. Some challenges from previous studies where Jono et al. (2016) stated the below issues have expressed views on learning and instruction that result in reform in this context:

i. Lack of space and time
ii. All communications are not archived for future reference
iii. Communication in groups
iv. Motivate students to self-learning
v. Low and medium levels of student interaction and accountability
vi. Difficult to share ideas and responsibilities

Subsequently, educational activities have used technology to augment the learning process and foster autonomous thinking. Student assessment and automatic evaluation offered by various learning systems can aid students in enhancing their current knowledge and facilitate acquiring new material. This fosters a more conducive atmosphere for both individuals by accommodating the unique learning styles of each student. It also promotes the prompt utilization of online resources or direct assistance from the teacher for students encountering difficulties in specific subjects (Leito et al., 2015). Ng (2014) has enumerated several benefits of learning through MOOCs, as depicted in Figure 1. The benefits of online learning comprise reducing reliance on class instructors (Gregori et al., 2018), providing more opportunities for student learning (Zulkifli et al., 2020), and saving costs by eliminating the need for physical class planning and execution (Wang et al., 2019). This includes reducing in-person class time (Bordel et al., 2021), enhancing student learning and retention (Goopio & Cheung, 2021), allowing designers and learners to meet learning objectives through multiple channels (Julia & Marco, 2021), increasing the effectiveness of transformation and deep learning through continuous learning (Yousef & Sumner, 2021), and promoting social learning, cooperation, engagement, and informal approaches (Razmerita et al., 2020).

These advantages serve as driving forces for information science lecturers to continue developing technology-based teaching materials and utilizing MOOCs' benefits in their individual teaching and learning. According to Brahler et al. (1999), the need for faculty to be more productive, as well as the changing roles and difficulties facing higher education, are the primary motivations behind the creation of more innovative and effective teaching techniques. Notably, MOOC development among lecturers in the field of information science will be subjected to several simple phases that prioritize the success of MOOC materials completely.

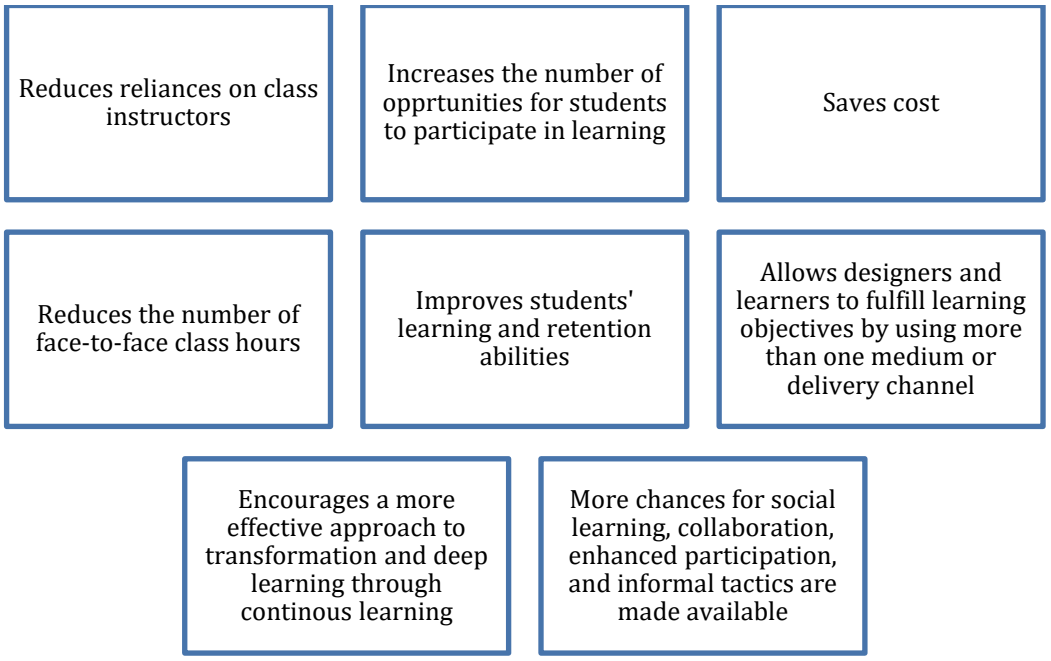

Figure 1. MOOC advantages

METHODOLOGY

The method used from 2019 to 2023 was based on the MOOC coordinator's tacit knowledge in the field of information science, and it tracked the progress of MOOC creation among the people given that responsibility. The cumulative ideas of information scientists include the creation of MOOCs, with a core emphasis on the management of GLAM. The GLAM concept, from the perspective of information science, involves activities involving management, strategies, and techniques involving bibliographic and curation tools. This is to further promote Information and Communications Technologies (ICT) needed to preserve, enrich, and open up our cultural and informational heritage as well as content in various online platforms and to ensure education and life-long training for the benefit of today's citizens and future generations (Tausch et al., 2020). The number of MOOCs created by developers who signed up for the 2020-2023 period indicates the method's efficacy. Furthermore, the MOOC coordinator will be the person in charge of MOOC-related management, such as registration, platforms and applications training, monitoring progress, and reporting. All of these will be conducted according to the pace and time taken by each registered MOOC courses team, reaching out into the scheduled time frame to progress the development. Due to this, the steps in making a MOOC should be known and translated in a way that fits the needs of the developer. Figure 2 below depicts the courses involved in MOOC development circa 2020-2023.

PHASES OF MOOC IMPLEMENTATION

A MOOC is developed throughout several separate phases, all of which are necessary for producing a thorough and efficient online learning experience. These stages often consist of the following, as displayed in Figure 3.

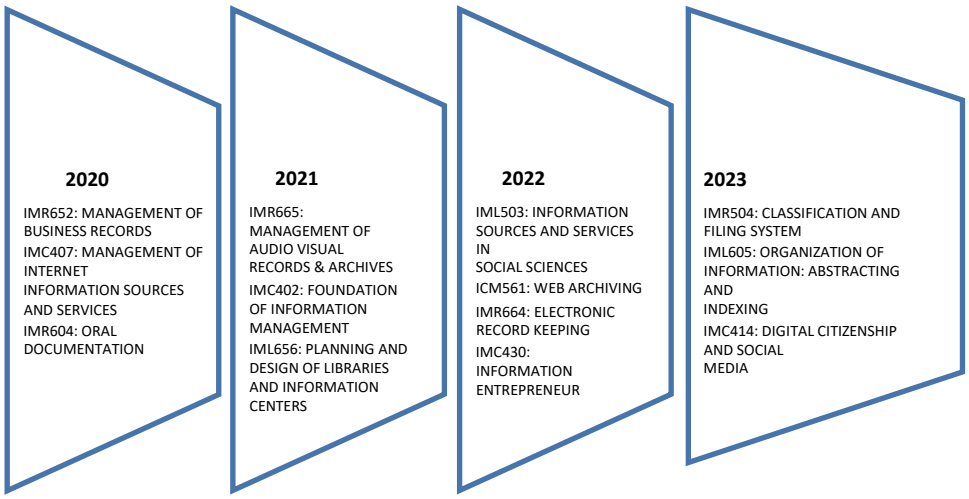

Figure 2. MOOC courses from the year 2020-2023

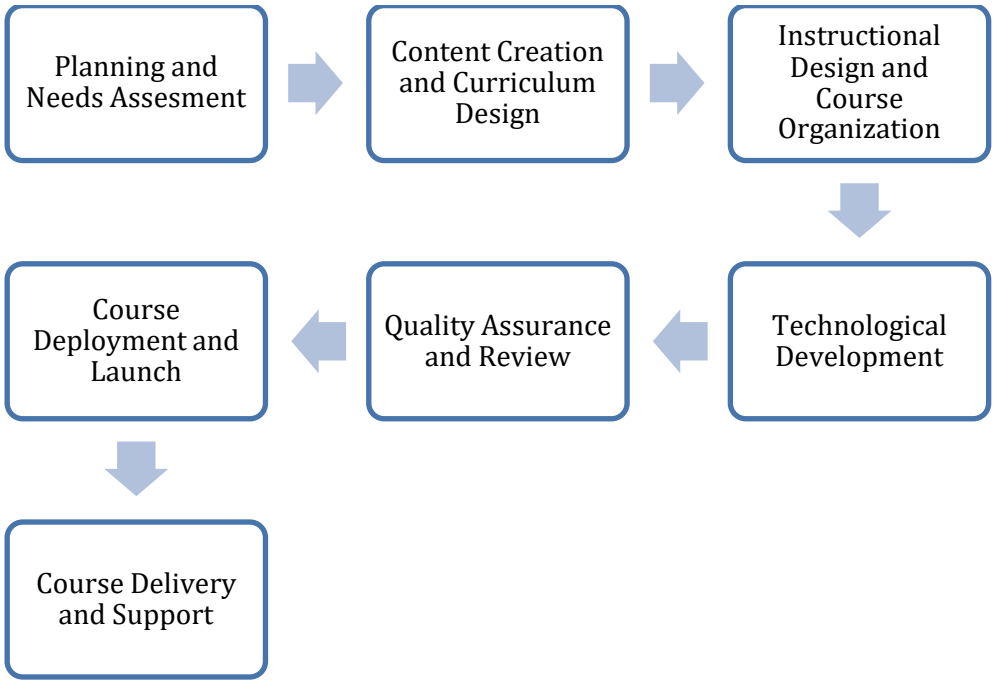

Figure 3. MOOC development phases

It is the expectation of selected MOOC creators that the coordinator will be an expert in all aspects of MOOC development to whom they can direct queries as they arise during the course of MOOC creation, along with abiding by rules and regulations provided by the Institute of Continuing Education and Professional Studies (iCEPS), the entity tasked with delivering and supervising UiTM's MOOC development.

Phase 1: Planning and Needs Assessment
The course development team identifies the target audience, learning objectives, and the particular needs and requirements of the course at this early step. To ascertain the knowledge and skills that participants in the MOOC should master, they conduct a detailed needs assessment. Goal-setting, defining the course's scope, and creating a development schedule are also part of this phase.

Phase 2: Content Creation and Curriculum Design
The next step is to construct the curriculum and develop the course content after the objectives and scope have been decided. To build the course, identify essential themes, and create learning resources, including lecture videos, reading materials, quizzes, and assignments, subject matter experts collaborate closely with instructional designers. In this phase, the course material is also accurate and relevant, and it is aligned with the desired learning outcomes.

Phase 3: Instructional Design and Course Organization
During this stage, the course material is divided into modules or units while considering the course's overall flow and the topics' natural growth. The best instructional approaches and multimedia components are selected by instructional designers who also produce the course plan and learning exercises. In order to encourage active learning and learner engagement, they also consider the utilization of interactive components, discussion forums, and assessments.

Phase 4: Technological Development
The technology development stage includes creating the platforms and digital infrastructure needed to deliver the MOOC. To accomplish this, an LMS or specialized online platform must be established. These platforms must be able to oversee substantial numbers of enrollments and offer the capabilities required for material delivery, evaluation, and student tracking. The development team also ensures that the course is compatible with a range of browsers and devices to offer participants a seamless learning experience.

Phase 5: Quality Assurance and Review
A detailed quality assurance process is conducted prior to the MOOC's introduction to evaluate the course content, instructional design, and technical capabilities. Multiple testing iterations and input collection from instructional designers, subject matter experts, and prospective students are part of this process. Consequently, the course must fulfill quality requirements, align with the learning objectives, and offer a rewarding and efficient learning environment.

Phase 6: Course Deployment and Launch
After quality control and review, the MOOC is prepared for deployment and launch. Learners can access the course through the specified online platform or LMS. To reach a broad audience, the launch step involves advertising the course through various platforms, including social media, newsletters, and educational institutions. Following enrollment, students can start their educational journey.

Phase 7: Course Delivery and Support
Instructors or facilitators are essential for leading students, moderating discussions, and answering their questions during the course delivery phase. Students gain access to the course material, participate in activities, finish examinations, and engage in online discussions. Other than that, learners are also provided with access to support tools, including help desks, forums, and FAQ sections to assist them during their learning process.

The production phase of the MOOC in the GLAM environment for this faculty is facilitated by various tools and materials that have been gathered specifically for the developers' usage. This effort aimed to streamline the collaboration between developers and MOOC development, ensuring an integrated and efficient process.

MOOC TOOLS AND MATERIALS

A MOOC developer must be aware of the dynamic materials developed with the aid of online apps and ensure that they are usable for all levels of the targeted learners when empowering technology-based learning and teaching materials. Constantly developing technologies have necessitated that people learn a variety of new skills in order to perform jobs and address issues in digital contexts, as Andrew (2019) noted. Considering the capabilities of each MOOC developer with varying technical skills, constant hands-on training is required from time to time. The underlying infrastructure for hosting and managing MOOCs is provided by LMS platforms (Turnbull et al., 2021) like Moodle, which provide services including user administration, assessment tools, forums, progress tracking, and content organization. For UiTM, MOOC developers will develop the content courses on the Ufuture platforms, as observed in Figure 4.

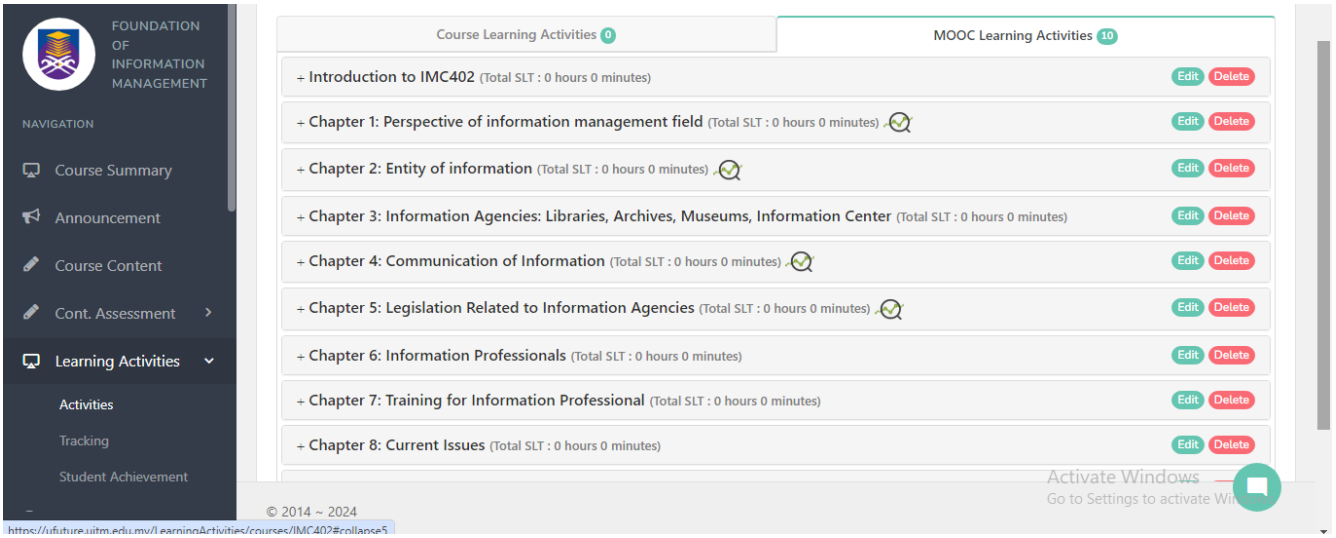

Figure 4. A completed MOOC course on Ufuture platforms

In many MOOCs, video lectures are a crucial element. It is possible for teachers to record, edit, and improve video footage using visual aids, comments, and captions using the program. For the school of information science, the MOOC coordinator has compiled a set of tools according to the usage (as observed in Figure 5.) For information science educators, this guide presented a list of online tools that can aid in the creation of MOOC content. Previously created for the goal of fully online education on MCO 2020, this has assisted many lecturers in figuring out where to begin creating e-content for education. Oliveira et al. (2021) advocated for the creation of a manual or guide for lecturers to serve as a facilitator in the creation of e-content. For information science educators, this guide presented a list of online tools that can aid in the creation of MOOC content. Previously created for the goal of fully online education on MCO 2020, this has assisted many lecturers in figuring out where to begin creating e-content for education. Oliveira et al. (2021) advocated for the creation of a manual or guide for lecturers to serve as a facilitator in the creation of e-content. For educational purposes, visually appealing slide decks can be created using presentation software such as Microsoft PowerPoint, Google Slides, or Prezi.

With the aid of these technologies, educators can structure information presentations, include multimedia components, and organize content. Figure 4 provides a list of prominent tools used for presentations that are suitable for the developers of MOOCs. Meanwhile, interactive and interesting learning materials can be created with the aid of content development tools like Articulate Storyline, Adobe Captivate, or H5P. These technologies make the creation of quizzes, simulations, interactive movies, and other interactive features for the course possible. For information science, where there are many theoretical elements in the syllabus, the coordinator has recommended using the mind-mapping approach. According to Wati et al. (2023), disciplines with numerous theories that require reading and memorization are better converted into mind maps to aid pupils in remembering using their own internal logic. Notably, MOOC development often involves collaboration among instructors, instructional designers, and content creators. Note that tools like Google Drive, Dropbox, Trello, or Slack facilitate communication, file sharing, and project management throughout the course development process. Similar to any other MOOCs, video lectures are a crucial element. Accordingly, teachers can record, edit, and improve video footage using visual aids, comments, and captions using online or web applications.

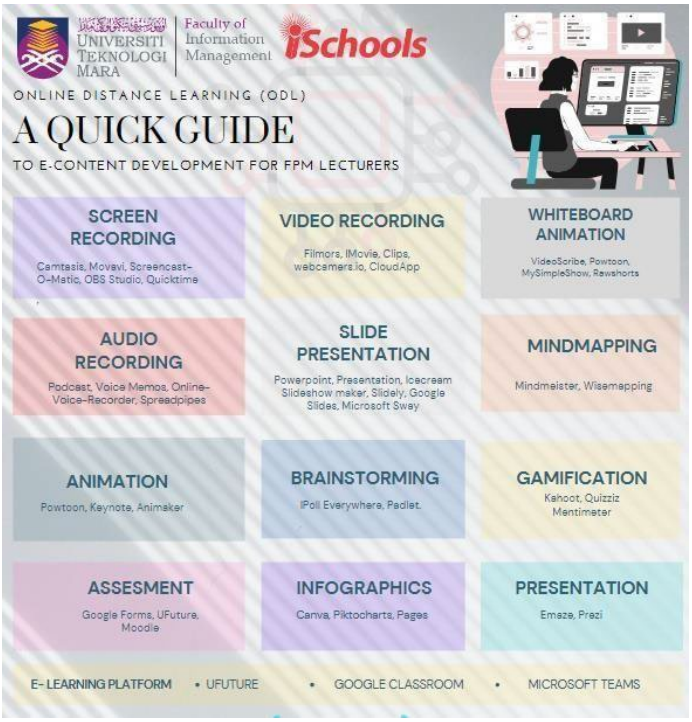

Figure 5. A quick guide to e-content development

Learner behavior, engagement, and progress can be analyzed using analytics platforms like Google Analytics, Learning Record Stores (LRS), or LMS analytics that are already included. These tools support course administrators and instructors in tracking and analyzing data to improve course delivery and pinpoint areas for development. Ufuture has made it a mandatory action for all students utilizing the Ufuture platforms to offer feedback before and after completing a subject each semester. The assessment would be the Entrance and Exit Survey (EES), which compares students' knowledge and competency in the courses they have taken. These will assist professors in assessing raised issues and making required modifications to improve the study experience. At the same time, Student Feedback Online (SuFO) is also collected at the end of the semester to assess a student's happiness with the general characteristics of the topics as well as the facilities involved in the study experience.

GUIDELINES FOR GLAM MOOC DEVELOPERS IN MOOC COURSES DEVELOPMENT

Several factors have been highlighted as contributing to the advancement of MOOC development among information science academics. Enlightenment should be conducted regularly to keep the lecturer or team from becoming overwhelmed by distressing material, and the introduction of excessive applications will generate negative thoughts and diverse, frequently unfavorable responses. Thus, MOOC coordinators must take the lead as providers and facilitators in guiding MOOC developers to ensure that developers can guarantee the smooth operation of their MOOC development. The School of Information Science's MOOC coordinator has responded to the problem of being equipped with the requisite basic abilities for MOOC production in information science.

The Padlet that gathers the ideas, information, guidelines, and list of tools is provided by the MOOC coordinator in order to assist with the MOOC development within the information science lectures (see Figure 6). It is highly referred to by MOOC developers from 2020 to 2023, with the complete MOOC developed and ready to be published on Ufuture platforms. MOOC developers can learn from one another using Padlet. Accordingly, they will be able to view a given subject from various perspectives by gathering and exchanging ideas, which will also aid them in perceiving things more clearly. This aligns with the statement by Mulyadi et al. (2021), which mentioned that the features offered by Padlet can be beneficial for both learners and teachers as it serves as a collecting platform that is dynamic and shareable.

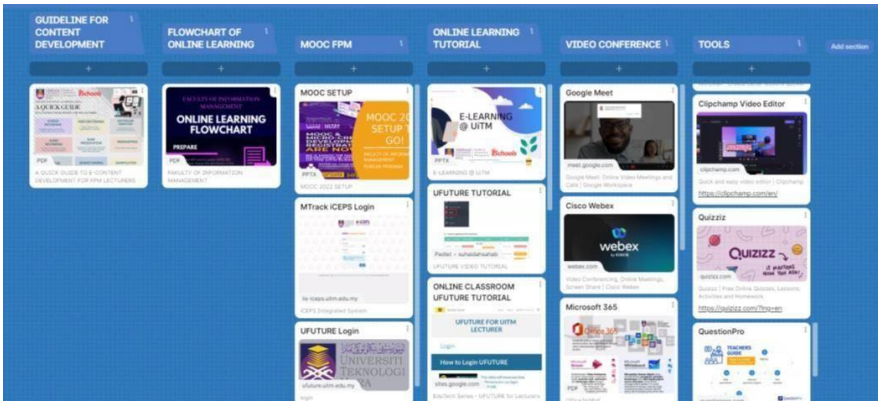

Figure 6. Online Learning Padlet provided by the MOOC Coordinator

MOOC developers must be mindful of time allocation and ensure that technical requirements and information are channeled. This can be accomplished by following up frequently and providing assistance whenever available and necessary. In addition, the MOOC coordinator has decided to utilize a strategy known as SAPUMOTO (*SALAM, PUJI, MOTIVASI, TOLONG*) in response to this. Table 1 below explains the details of this strategy. The first is to approach fellow MOOC developers chosen or volunteered to develop MOOCs that year. It is a simple yet powerful form of communication that ensures continuous engagement. Polite greetings can significantly influence social interactions and relationships (Kim & Kim, 2020). Positive first impressions, rapport-building, improved communication, cultural sensitivity, mood-lifting, encouraging reciprocity, and improved networking and social skills are a few effects of a simple greeting. Correspondingly, it offers uplifting news for the developer, whether in groups, within the MOOC teams, or as individuals. Notably, compliments act as a morale boost and encourage the suitor to want to perform more and finish tasks (Queloz, 2022). Next in the strategy is to motivate with encouragement to achieve the target date or timeline, which is often the most challenging part of the MOOC process. Motivation is also a source of productivity boost that helps the team become

and sustain productivity (Xiao & Hew, 2023). For MOOC developers in GLAM, using a motivational approach can go a long way. Last in the SAPUMOTO strategy is to offer help whenever required. Supportive gestures ensure that the coordinator is well equipped with MOOC-related solutions and can guide the use of any applications online or web-based content creation that is often not the GLAM cup of tea (for some). Thus, offering help whenever needed ensures the team involved becomes open, and often, the way to discover the challenges they face and solutions can be offered.

Table 1. SAPUMOTO Strategy

Steps	Details
Salam (Greet)	Ensure to greet extensively and be personal. If it is someone's birthday, wish them, or acknowledge the time they have taken to read the message or attend a physical meeting.
Puji (Compliment)	Provide progress statistics and compliment any achievement made by the team. Ensure the team falling behind catches up and asserts their need for help.
Motivasi (Motivation)	Always address their difficulties and feelings, and combat negativity by providing positive earlier outcomes if necessary.
Tolong (Offer help)	Most MOOC developers are new and estranged from the technology used for MOOCs.

It can be argued that the SAPUMOTO technique consistently yields favorable outcomes, with the MOOC developers and team frequently meeting the deadline on time and contributing to the School's MOOC courses. Below is the achievement of MOOC by the School of Information Science tabulated into percentages from 2020 to 2023.

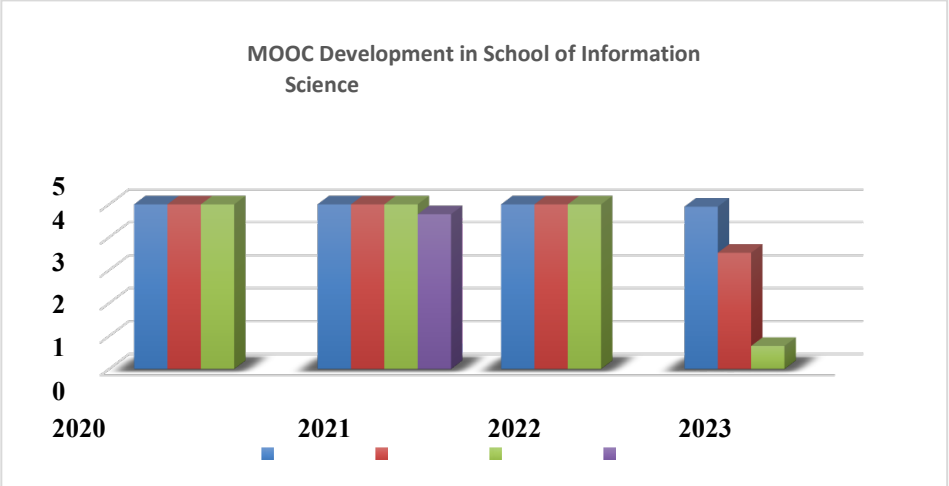

Figure 7. Result of MOOC development in the School of Information Science for the year 2020-2023

CONCLUSION

In the digital age, the establishment of Information Science MOOC courses at UiTM has enormous promise for both learners and educators. This post has provided helpful insights into the course coordinator's advice and ideas for MOOC developers. Accordingly, developers can create and administer extremely successful and engaging MOOCs that respond to the requirements and preferences of varied learners, especially in GLAM areas. The strategies presented encompass various aspects, including content design, interactive elements, assessment methods, and learner support systems (Chatwattana, 2021). Note that the significance of technology in the creation of MOOCs cannot be understated. Thus, integrating cutting-edge technologies and platforms can improve the learning experience and offer easy access to course materials. Furthermore, incorporating multimedia and interactive elements can also capture learners' attention and keep them engaged throughout the course (De Notaris, 2019). Moreover, continuous feedback and improvement are required to refine course content and distribution methods. By following the course coordinator's ideas, efficiently harnessing technology, and employing the SAPUMOTO strategy, UiTM can strengthen its position as a leader in offering accessible and meaningful education in the digital sphere.

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Conflict of Interest

All authors declare that they have no conflicts of interest.

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Authors' Contributions

All authors discussed the results and contributed to the final manuscript.

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