First Implementation of MOOC for Basic One health Training to Control Zoonoses in Indonesia

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Abstract: *Collaboration among health professionals in controlling the spread of various infectious diseases is crucial for tracking and responding to zoonotic threats. Limited training that openly and en masse to reduce cases of zoonotic diseases remains an unresolved issue. MOOC for Basic One health Training is here to provide a solution to this problem. This research aims to describe the implementation of a MOOC for basic One health training for the first time in Indonesia. This research makes an essential contribution by applying practical experience in One health approach training using the latest technology. A total of 539 participants have registered from all over Indonesia, with a completion rate of 81%. Most of the participants are women from community health centers. All participants who passed filled out the post-course survey. Microsoft Excel is used to organize and analyze the data. This study obtained positive feedback, with 94.6% of participants agreeing and strongly agreeing that they had a satisfying learning experience. By providing open and free learning, MOOCs have met educational needs. Learning from the progress of online education will help healthcare workers who are busy with their daily tasks at the workplace. According to this study, MOOCs receive positive feedback and can be applied in healthcare sector training.*

Keywords*: massive open online course, one health training, zoonoses,*

INTRODUCTION

One of the recent implementations of technology in education, the Massive Open Online Course (MOOC), has transformed classical learning design into online learning by providing broad access to learning materials and the opportunity to join from anywhere and anytime (Dwyer et al., 2022; Hooley et al., 2020; Oh et al., 2020; Wang et al., 2021). Although the number of MOOCs in the field of global health is rapidly increasing, it was only in 2016 and 2017 that three MOOCs addressing One health were released (Bolon et al., 2020; Ruiz de Castañeda et al., 2018a). The MOOC is a beneficial online platform to raise public awareness about the relationship between human, animal, and ecosystem health. This platform also assists scientists, health professionals, and decision-makers by offering advanced and specialized education (Floss et al., 2021; Gómez & Gómez, 2021).

The presence of One Health training encourages interdisciplinary, inter-institutional, and inter-professional collaboration at local, national, and global levels (Linder et al., 2020). The current synergy between fields does not yet meet the needs of society regarding the spread of various relatively new infectious diseases; it is necessary to track and respond to zoonotic threats (Cabero-Almenar et al., 2023). The isolation of training and education within each profession, as well as the insufficiently widespread training to reduce cases of zoonotic diseases, exacerbates this problem (Bendezu-Quispe et al., 2017; Machalaba et al., 2021). Therefore, the presence of MOOCs in basic one health training enhances the competencies of personnel in one health as an effort to control zoonotic diseases.

The implementation of MOOCs, which prioritize a larger scale as a manifestation of commitment to the transformation of health human resources by providing extensive opportunities for health workers to improve their competencies, is one of the modern approaches that are currently supporting health training in Indonesia (The Ministry of State Apparatus Empowerment and Bureaucratic Reform of Indonesia, 2023). MOOCs have proven to be a driver of innovation, facilitating new approaches in training to improve the quality of healthcare services by implementing various innovations in learning (Silén-Lipponen et al., 2022). The delivery of content using MOOCs can provide a flexible modality to reflect dynamic characteristics (Farrow et al., 2022). MOOCs present an opportunity for the fields of education and health due to their relatively low cost. Their success depends on the quality of the content, teaching strategies, and focused courses (Dolores-Maldonado et al., 2021). In addition, the high potential number of course participants provide an opportunity to unite various diverse health professions, allowing trainees to gain a global perspective (Dimitri et al., 2023; Roopnarine et al., 2021; Silén-Lipponen et al., 2022).

The Health Training Center at Ciloto, the Technical Implementing Unit in the Health Training Sector at the Ministry of Health, and the initial initiator training using MOOCs has released Basic One health Training (Balai Besar Pelatihan Kesehatan Ciloto, 2023). The implementation of One Health Basic Training MOOC serves as evidence that Indonesia has actively contributed to enhancing the competencies of human resources in the health sector to control zoonoses. The difficulty in studying the effectiveness and suitability of Basic One health Training MOOC for the long term presents a unique challenge in redesigning and developing the MOOC according to needs. This research aims to describe the implementation of MOOC for One Health basic training. By becoming the first to offer MOOC Basic One health Training to manage zoonotic diseases in Indonesia, our initiative fills a significant need in interdisciplinary training for zoonotic disease control. Unlike previous attempts, this study uses the MOOC platform to provide a technology-driven, scalable, and accessible approach, offering valuable data on how well it empowers healthcare professionals to fulfill their daily responsibilities. This study is crucial because it fills a need for scalable and

easily accessible interdisciplinary training for medical professionals, facilitating efficient responses to zoonotic hazards and encouraging the integration of environmental, animal, and human health approaches. This research makes an essential contribution by applying practical experiences in conducting One Health approach training using the latest technology.

METHOD

Desigining the Course and Methods

The initial interest in creating this MOOC arose from a shared goal to realize multisectoral collaboration between scientists, the government, and professional organizations (human, animal, and environmental health) to jointly prevent future pandemics (Setiyo, 2023). This course combines these diverse perspectives into a cohesive theme that focuses on how animals, humans, and the environment can live healthily. The training's learning objectives include teaching participants how to explain the fundamental ideas of One Health, its stakeholders, its interdisciplinary components, its core competencies, and how to implement One Health in their respective fields of work.

Experts in the field of health and learning technology from BBPK Ciloto and the Ministry of Health have developed this MOOC. The One Health Basic Training MOOC is a free six-week course designed to help participants understand the One Health approach in their respective health duties. The content review is meticulously compiled and designed with consideration of a comprehensive literature review that emphasizes an appropriate cognitive load for healthcare professionals (Cabero-Almenar et al., 2023). There are six learning topics available, designed sequentially to enhance knowledge retention, improve analytical skills, boost motivation and academic performance, and encourage a sense of relevance and interconnectedness in learning (Bingham & Davis, 2012). This course design simplifies complex information to suit the characteristics of the participants (Dwyer et al., 2022). The summary of the learning design is in Table 1.

Table 1. MOOC Learning Design for Basic One Health Training

Topic	Sub Topic	Media	Duration
One Health Policy	- Main points of INPRES No. 4 of 2019 - Main points of the regulation Permenko PMK No. 7 of 2022 on Guidelines for the Prevention and Control of Zoonoses and New Infectious Diseases - Main points of the regulation on human, animal, and environmental health	- Infographic - Short Video - Quiz	1 week / 3 hours of learning
Basic Concept of One Health	- Definition of One Health - Objectives and Benefits of the One Health Approach - Scope of the One Health Approach	- Infographic - Short Video - Discussion forum - Quiz	1 week / 3 hours of learning

Topic	Sub Topic	Media	Duration
Study of disciplines in the one health approach	- The relationship between one health and the study of general medicine - The relationship between one health and the study of veterinary medicine - The relationship between one health and the study of biology - The relationship between one health and the study of forestry - The relationship between one health and the study of management, ethnic sociology, communication, and other social sciences	- Article - Short Video - Discussion forum - Quiz	1 week / 5 hours of learning
Stakeholders in the one health approach	- Stakeholders and their roles in the One Health approach - Stakeholders in the public health sector in the One Health approach - Stakeholders in the animal health sector in the One Health approach - Stakeholders in the environmental sector (including wildlife) in the One Health approach - Stakeholders in other related sectors and their roles in the One Health approach	- Article - Short Video - Quiz	1 week / 5 hours of learning
Core competencies of One Health	- System thinking in the One Health approach - Resource Management in the One Health approach - Cultural and Trust Approaches in the One Health approach - Leadership in the One Health approach - Values and Ethics in the One Health approach - Collaboration and Cooperation in the One Health approach - Communication and Informatics in the One Health approach	- Article - Short Video - Discussion forum - Quiz	1 week / 7 hours of learning
Implementation of one health in the field of health duties	- Application of One Health in Epidemiology and Risk Analysis - Application of One Health in Outbreak Investigation - Application of One Health in Infectious Disease Management	- Article - Short Video - Case Study - Discussion Forum - Quiz	1 week / 3 hours of learning

Each of the six topics is in various media, including infographics, short videos, and case studies, as well as links to relevant articles for further reading. Each topic also includes formative learning activities in the form of interactive quizzes. At the end of each topic, participants must pass a quiz (≥80%) to proceed to the next topic. This quiz is specifically related to the previous topic and consists of five questions with true/false or multiple-choice formats, with no limit on the number of attempts participants can make. This training is comparable to 26 hours of learning, with each subtopic representing roughly one hour of study time. This course can exceed the minimum entitlement (20 hours) for healthcare workers to develop competencies, taking into account the performance and competency assessments of individuals each year (Pemerintah

Republik Indonesia, 2020). Participants can finish each subtopic because there are no time restrictions on the subjects' availability. All MOOC participants receive a completion certificate in digital format.

A priority, MOOC is intended for all Indonesian health professionals who work in environmental health, animal health, or community health centers (Puskesmas and Puskeswan). Enrollment in the MOOC requires no prior knowledge, and it is appropriate for anyone who is driven to enhance healthcare services, especially in order to combat zoonotic illnesses. Prior to its release, the MOOC platform was subjected to a peer review process by the Directorate General of Health Personnel, the Ministry of Health's echelon 1 unit in the field of health training. The MOOC was launched on May 2, 2023, after a number of changes were made in response to this feedback (available at https://youtube.com/live/iWI0ss62eW4). The promotional materials were then distributed to networks of healthcare providers in Indonesia and various social media platforms.

User Analytics

General participant information is obtained through the registration process and exported from the Health Training Center Ciloto Learning Management System (LMS) (https://bbpkciloto.or.id/clc2/). The information obtained includes the participant's institution of origin, gender, and age.

Participant Experience Survey

Participants complete the MOOC and an anonymous survey report about their experience during the course. A link from the LMS takes participants to the survey via Google Forms. Quantitative Likert-type questions and four open-ended questions ask participants to evaluate and comment on various aspects of their experience, including their learning and overall course experience.

Data Analysis

The use of Microsoft Excel in this study is to organize and analyze data. The population consisted of all participants who completed the course (N = 437), with a response rate of N = 202 to the Participant Experience Survey. The components of the participant experience survey include participants' perspectives on learning materials, the MOOC platform, learning time, and the assessment system. This study uses conceptual content analysis and selected quotes to describe the breadth of participants' experiences.

RESULTS

Participant Characteristics

As of mid-May 2023, the One Health Basic Training MOOC had 539 registrations, of 437 (81%) completed the course. The majority of participants are women (67.9%), and most are in the age group of 30–39 years (35.4%). Most participants work at Puskesmas (57.3%), and 24.7%

work at Puskeswan. (Table 2). Characteristics: The number of participants who have completed the MOOC is not much different from the number of participants who have not completed the MOOC.

Table 2. Participant Characteristics

	Variable	Participants yet to complete the MOOC N = 539		Participants who complete the MOOC N = 437	
		Frequency	**Percent**	**Frequency**	**Percent**
Gender	Female	366	67.9%	304	69.6%
	Male	173	32.1%	133	30.4%
Age Group	0-19 years	0	0	0	0
	20-29 years	133	24.7%	101	23.1%
	30-39 years	191	35.4%	150	34.3%
	40-49 years	144	26.7%	121	27.7%
	50-59 years	71	13.2%	65	14.9%
	60-69 years	0	0	0	0
	70-79 years	0	0	0	0
Employer	Puskesmas	309	57.3%	264	60.4%
	Puskeswan	133	24.7%	98	22.4%
	BBKSDA/BKSDA	65	12.1%	51	11.7%
	Other	32	5.9%	24	5.5%

Participants' Efforts in Completing the Quiz

The number of participants attempting the quiz from each topic decreases. Each quiz is retaken by participants who have already passed the quiz and therefore do not need to repeat it to proceed to the next topic. The lowest score was obtained in the third topic quiz on the Study of Scientific Disciplines in the One Health Approach (Figure 1).
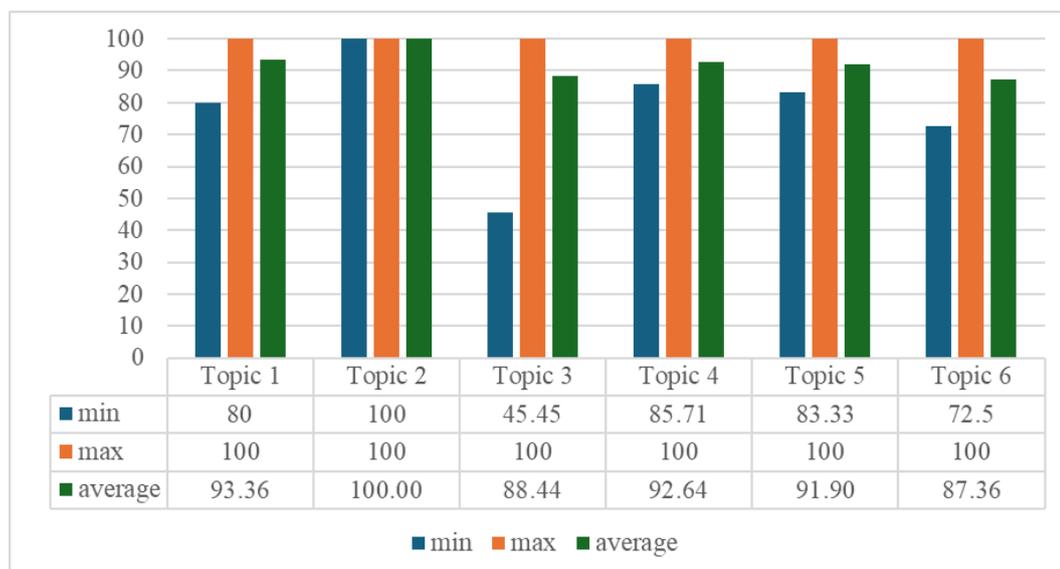

	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6
min	80	100	45.45	85.71	83.33	72.5
max	100	100	100	100	100	100
average	93.36	100.00	88.44	92.64	91.90	87.36

Figure 1. Tabulation of Quiz Results

Participant Experience Survey

The results of the participant experience survey are divided into four parts: 1) participants' perspectives on the learning materials, 2) participants' perspectives on the MOOC platform, 3) participants' perspectives on the learning time, and 4) participants' perspectives on the assessment system. Each of these sections is explained in detail in Table 3.

Participant Satisfaction with MOOC

Most participants (94.6%) agreed or strongly agreed that they had a satisfying learning experience, with a high percentage also stating that they found it easy to register and access the courses. 94% of participants reported having a greater understanding of the One Health approach by providing criteria and evaluation procedures that can quantify suitable learning outcomes (Table 3). Participants provided various reasons for their satisfaction with the MOOC, primarily centered around the delivery of information and the course outcomes, including improved new knowledge and understanding.

Table 3. Survey Questions on Participants' Experience in Taking MOOCs

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The provided materials meet expectations	0	0	5 (2.5%)	120 (59.4%)	77 (38.1%)
The available materials are easy to understand	1 (0.5%)	1 (0.5%)	9 (4.5%)	117 (57.9%)	74 (36.6%)
The available media are engaging	0	2 (2%)	4 (2%)	123 (60.9%)	73 (36.1%)
The available media are relevant	0	0	4 (2%)	133 (65.8%)	65 (32.2%)
The MOOC platform registration is easy	0	0	1 (0.5%)	106 (52.5%)	95 (47%)
The MOOC platform is easy to operate	0	0	7 (3.5%)	108 (53.5%)	87 (43.1%)
The MOOC platform is easy to access	0	0	12 (5.9%)	109 (58.9%)	71 (35.1%)
Satisfied with the MOOC learning experience	0	5 (2.5%)	6 (3%)	111 (55%)	80 (39.6%)
Satisfied with the MOOC learning duration	0	3 (1.5%)	13 (6.4%)	105 (52%)	81 (40.1%)
The evaluation criteria and methodology can measure learning outcomes	0	0	12 (5.9%)	136 (67.3%)	54 (26.7%)

Participants answered open-ended questions regarding the MOOC platform, learning time, and other aspects related to the overall implementation of the activity. Free text comments also highlight that participants think the best aspects of MOOCs are the online learning design, content packaging, the way MOOCs are delivered, and free access. Participants have offered the following constructive suggestions.

"Konten kursus harus berkualitas tinggi dan relevan. Pastikan materi pembelajaran mencakup semua informasi yang diperlukan dan mendukung berbagai jenis pembelajaran, seperti teks, video, quiz, dan tugas. Portal harus memiliki alat yang memungkinkan peserta untuk melacak kemajuan mereka dalam kursus. Ini dapat berupa papan peringkat, peta progres, atau laporan berkala."

"Peserta memiliki tingkat pembelajaran yang berbeda. Pertimbangkan untuk memberikan opsi bagi peserta untuk memproses materi pada kecepatan mereka sendiri, dengan memberikan akses lebih lama ke materi jika diperlukan."

"Agar dapat ditambah pelatihan dengan model yg sama dengan materi yg berbeda, karena membuka peluang untuk seluruh kalangan untuk dapat mengikuti pelatihan"

Participants hope to further enliven online and free training for healthcare workers amidst their busy schedules. Flexibility has become the main focus in the implementation of MOOCs, which is considered to facilitate participants in following the courses.

"Terus mengadakan pelatihan gratis dan online seperti ini karena sangat menyesuaikan waktu kerja."

"Seru juga, bisa mengerjakan kuis tengah malam, dan bisa mengerjakan soal berkali kali sampai lulus"

"Mudah di akses,waktu pembelajaran sangat fleksibel dan materi yang di sajikan / disampaikan cukup mudah di pahami....terima kasih BBPK Ciloto"

DISCUSSION

The development of the One Health MOOC aims to encourage health professionals from various disciplines to appreciate the interconnectedness of animals, humans, and the environment. This program also enables participants to think innovatively about solutions to various priority global health problems. Amidst the limitations of the One Health MOOC platform (Ruiz de Castañeda et al., 2018b), the MOOC for One Health Basic Training serves as an alternative solution to control various diseases caused by the interaction of humans, animals, and the environment (zoonoses) in Indonesia. The majority of participants are from Puskesmas.

These programs demonstrate the central leadership's commitment to local primary healthcare facilities, which are at the forefront of providing superior public health services. These initiatives are in line with company leaders' pledge to encourage staff members to take part in MOOCs (Hendriks et al., 2024). Organizations not only encourage participation in MOOCs, but training programs are beginning to offer the idea as a result of the learning platform's substantial advantages for both teachers and students (Huang et al., 2022). The main benefits reported are improving participants' knowledge and the educator's reputation as an expert in their field (Alyoussef, 2023).

With a completion rate of 81%, MOOCs have proven to be a driver of innovation, facilitating new approaches in training to improve the quality of healthcare services by implementing various innovations in learning (Schettino & Capone, 2022). The delivery of content using

MOOCs can provide a flexible modality to reflect a dynamic nature. MOOCs present an opportunity for the fields of education and health due to their relatively low cost. Their success depends on the quality of the content, teaching strategies, and focused courses (Willging et al., 2022). Additionally, the large number of participants in the course makes it possible to bring together a wide range of extremely different multisectoral professions, giving trainees a global perspective (Schneider et al., 2019).

This high completion rate is also a strong indicator that the course is well-designed and relevant for participants. The course includes quizzes at the end of each topic to ensure participants thoroughly learn the material and can evaluate any missed learning (Gamage et al., 2019). The high quality of the MOOC is supported by our findings that 94.6% of participants who completed the MOOC were satisfied with their experience. The ease of registration, operation of the MOOC, and high accessibility are essential factors in supporting participant completion (Table 3). However, there is still room for platform improvement to enhance the ease of providing easily understandable materials. This fact is evident from the fact that there are still participants who have not completed the third stage of the quiz and are thus unable to finish the learning. This decline in engagement is most likely due to the lack of interaction with fellow learners and facilitators in discussion forums, as suggested by several authors (Liliana et al., 2022; Neha & Kim, 2023; Ponnaiah et al., 2022).

The successful use of MOOCs involves various interactive learner activities to strengthen the MOOC design. To enhance interactivity in online learning, the application of the Community of Inquiry (CoI) Model, which introduces a new understanding of presence in online education, can be implemented (Garrison et al., 2010). The research on the application of the CoI Model to participants in the Cyber Identity Course significantly contributes to the development of their self-efficacy perceptions in technology integration by strengthening both teaching and cognitive skills (SANCAR et al., 2023). The presence of facilitators online (synchronous and asynchronous) can create an interactive and engaging learning experience that serves as an anchor for participants' satisfaction in online learning (Armah et al., 2023). In this study, the primary focus of the online learning platform is to enable participants to interact with the subject content and materials necessary for specific study training.

We must acknowledge that our research has some limitations. First, we did not obtain feedback from those who decided not to complete the course because the Participant Experience Survey can only filled by participants who have completed the entire MOOC. We recommended that future studies gather opinions from these participants, for example, through the implementation of an exit survey, as this can provide insights into how to maintain participant engagement in the MOOC. Second, although we allowed alternative text for each illustration, there is a possibility that some participants had difficulties accessing and finding MOOC content. This challenge can be addressed by conducting effectiveness testing of the previously released platform. Based on these

limitations, future research needs to pay close attention to interactivity in MOOC learning. The implications of this research emphasized the importance of understanding the factors that influence participant engagement in MOOCs. By identifying and addressing existing limitations, such as the lack of feedback from participants who do not complete the course, future research can provide a more comprehensive understanding of participants' learning experiences.

CONCLUSION

This paper aims to describe the implementation of the first One Health MOOC basic training in Indonesia. The success of MOOC implementation with a high course completion rate presents an opportunity for the future development of MOOCs. This study has limitations, including the lack of feedback from participants who did not complete the course and potential difficulties in content accessibility. As a result, we recommend that future studies gather input from such participants and evaluate how the platform works to boost interaction and participation in MOOCs. The community of inquiry (CoI) approach to increase interactivity in learning is an alternative to the development of MOOCs in the future.

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