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iJET International Journal of Emerging Technologies in Learning

iJET | eISSN: 1863-0383 | Vol. 18 No. 19 (2023) | OPEN ACCESS

https://doi.org/10.3991/ijet.v18i19.38129

PAPER

Imagineering MOOC Instructional Design Model to Enhance Creative Thinking and Creative Health Media Innovation

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ABSTRACT

The research aims to redesign and develop the Imagineering MOOC Instructional Design model (I-MOOC ID model) to enhance creative thinking and creative health media innovation. The exploratory sequential design mixed-method research method was used, and it was divided into three phases: (1) investigation and synthesis of the composition of the I-MOOC ID model based on qualitative research methods by using scoping reviews; (2) redesign and validation of the I-MOOC ID model based on quantitative research methods through measurement of items with the Content Validity Index (CVI); and (3) assessment of the suitability of the I-MOOC ID model based on quantitative research methods. The findings indicate that: (1) The I-MOOC ID model is composed of five compositions: 1) educational stakeholders; 2) the Imagineering learning experience cycle, which consists of nine steps: inspire, imagine, design, develop, present, publish, improve, evaluate, and reflect; 3) the MOOC learning platform; 4) the course syllabus; and 5) authentic assessment; (2) The I-MOOC ID model has five main processes and 16 sub-processes; and (3) The experts agreed with the overall model in terms of the instructional design based on integrating technological pedagogical content knowledge (TPACK) in the digital age to develop learners' learning outcomes and rated the suitability of the model as most suitable, with a combined mean of 4.72. The standard deviation was 0.47.

KEYWORDS

Imagineering, MOOC, Instructional Design model, creative thinking, creative health media innovation

1 INTRODUCTION

Digital health media and technologies were highlighted as viable methods for promoting digital health literacy among citizens in regard to health promotion, health care, and disease prevention in response to issues raised by the 2019 coronavirus pandemic

Nittayathammakul, V., Rattanasak, S., Wannapiroon, P., Nilsook, P., Arora, R., Thararattanasuwan, K. (2023). Imagineering MOOC Instructional Design Model to Enhance Creative Thinking and Creative Health Media Innovation. *International Journal of Emerging Technologies in Learning (iJET)*, 18(19), pp. 84–102. https://doi.org/10.3991/ijet.v18i19.38129

Article submitted 2023-01-16. Revision uploaded 2023-06-09. Final acceptance 2023-07-13.

(COVID-19). The global pandemic COVID-19 has given rise to a new challenge in various sectors, including public-private partnerships (PPPs) between educational and public health organizations to develop and promote digital health literacy among citizens [1].

Imagineering is a novel concept in instructional management that places an emphasis on the unique development of learners in the 21st century, enabling them to study independently, be creative, and generate innovative ideas. Imagineering is a term coined by the Walt Disney Company to combine imagination and engineering. It refers to the process of creative and innovative thinking that combines imagination, design, and practical implementation to create new experiences or solutions [2]. The traditional Imagineering procedure comprises six main steps: 1) Imagination, 2) Design, 3) Development, 4) Presentation, 5) Improvement, and 6) Evaluation [2]. A tangible Imagineering learning task encourages students to start their projects by using their initial ideas and continue by implementing the process at each step, from the formatting of the informational task to the media and digital technology used, and from the selection process to the management and use of the tool to effectively communicate with others [2–3].

Massive Open Online Courses (MOOCs) are online learning platforms for the public that enable users to attend classes without limitations in terms of space and time. MOOCs are a well-known learning innovation, and they have played a crucial role in the education management system across the globe in the digital era [4].

In the digital era, educational and health infrastructures are critical to promoting digital health literacy among people of all ages. These infrastructures have four similar components, as follows [1–3, 5–7]:

1. P1: Policy refers to the regulations, standards, and guidelines established by educational and health organizations. These policies define the goals and expectations regarding health education. Privacy, data security, ethics, and access to digital resources are addressed by these policies, especially in the digital age. Policies ensure that educational and health infrastructures align with best practices and legal requirements, thereby promoting the safe and efficient use of digital technologies within the context of health education.
2. P2: People are a vital element in educational and health infrastructure. This includes stakeholders who are instructional designers, health educators, public health academicians, health professionals, policymakers, administrators, students, patients, village health volunteers, and community members. People play distinct roles in promoting health education. In the digital age, public and private sectors in education and health aim to expect instructional designers, health educators, public health academicians, and health professionals in their organisations to have digital competencies and creative thinking to produce creative health media innovation. Policymakers and administrators are responsible for creating an enabling environment that supports integrating technological pedagogical content knowledge (TPACK) to promote digital health literacy for target groups. Students, patients, and community members are the beneficiaries and end-users of creative health media innovation.
3. P3: Process refers to the standard operating procedures, protocols, strategies, pedagogies, and workflows employed within educational and health institutions to promote health education. It involves the development and implementation of interventions, pedagogical methods, and assessment practices that incorporate digital technologies.
4. P4: Platform refers to the digital technologies utilized within educational and health infrastructures to facilitate digital education. These platforms encompass

a wide range of technologies, such as MOOC platforms, telehealth platforms, mobile health apps, digital health portals, and communication tools. Platforms provide the infrastructure for accessing, creating, sharing, and facilitating interactive learning experiences.

The Imagineering MOOC instructional design model (I-MOOC ID model) is specifically designed to enhance creative thinking and promote creative health media innovation for stakeholders in educational and public health organizations that play roles in promoting digital health literacy. We anticipated that the implementation of the I-MOOC ID model, focused on creative thinking and creative health media innovation, would effectively enhance the expected learning outcomes of stakeholders. The assumption consists of two parts:

1. Creative thinking enhancement: It is assumed that by applying the Imagineering pedagogies and the media symbol system of MOOCs to the instructional design, learners can develop and enhance their creative thinking skills. The research assumes that individuals have the potential to improve their creative thinking skills through the Imagineering learning experience cycle on a MOOC learning platform. Through this cycle, learners are expected to develop and enhance their creative thinking skills, allowing them to generate innovative ideas, think critically, and approach problem-solving in a creative and imaginative manner. This assumption is based on the belief that the combination of Imagineering pedagogies and the media symbol system of MOOCs can effectively support and promote creative thinking. The Imagineering pedagogies, which involve imagination, design, development, presentation, improvement, and evaluation, are assumed to provide learners with a structured learning process to engage in creative problem-solving and ideation. The media symbol system of MOOCs refers to the multimedia and interactive features of the online learning platform, which are assumed to facilitate learners' engagement and active participation in the learning process.
2. Increased creative health media innovation: It is assumed that the utilization of the "I-MOOC ID model" will foster the development of creative health media innovation. By engaging learners in hands-on activities through the Imagineering learning experience cycle on a MOOC learning platform in iteration. Creative thinking is considered a mediator variable in this process. The model aims to stimulate their creativity and inspire them to create innovative digital health media content. It is expected that this approach will result in the production of novel and effective media resources for educational and public health organizations in the implementation of digital health media project initiatives.

Thus, stakeholders, especially policymakers, administrators, and instructional designers in educational and public health organizations that are not familiar with, have never experienced using, or want to adopt the Imagineering learning experience cycle on a MOOC learning platform, can study the model, and start an early instructional design practice by integrating TPACK to improve creative thinking and creative health media innovation for their health workforce that plays roles in promoting digital health literacy.

The highlight of this paper is the exhibition of how clear and easy it is to use the main processes and sub-processes to create outputs from the Imagineering MOOC Instructional Design model (I-MOOC ID model) to enhance creative thinking and creative health media innovation for the health workforce that is responsible for health education management.

2 CONCEPTUAL FRAMEWORK

The conceptual framework for redesigning and developing the I-MOOC ID model to enhance creative thinking and creative health media innovation integrates six concepts: Imagineering, MOOCs, TPACK, instructional design, creative thinking, and creative health media innovation, as shown in Figure 1.

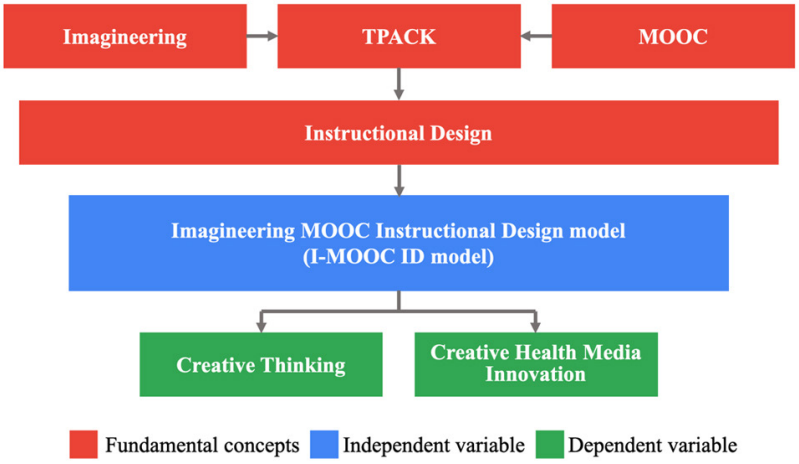

Fig. 1. Conceptual framework

Figure 1 conceptual framework revolves around enhancing creative thinking and creative health media innovation through the implementation of the I-MOOC ID model. This framework aims to benefit the health workforce responsible for health education management, with a specific focus on health education. The conceptual framework consists of three parts:

1. The fundamental concepts were divided into three categories: 1) Imagineering is a novel pedagogy that places an emphasis on the unique development of learners in the 21st century, enabling them to study independently, be creative, and be innovative [2–3]. 2) MOOCs are online courses designed to be accessible to a large number of participants via the Internet. They provide direct access to interactive educational materials, such as video lectures, quizzes, and discussion forums, allowing learners to study at their own pace [4]. 3) TPACK stands for Technological Pedagogical Content Knowledge. It is the framework that emphasizes the intersection of three types of knowledge: content knowledge, pedagogical knowledge, and technological knowledge, to enhance expected learning outcomes [7].
2. The independent variable was the Imagineering MOOC Instructional Design model (I-MOOC ID model) in order to enhance creative thinking and creative health media innovation for the health workforce that is responsible for health education management, especially digital health literacy. A health workforce is indeed a group of individuals who possess content knowledge about health. They are trained professionals with expertise in various aspects of health, including health promotion, health care, and disease prevention.
3. The dependent variables were creative thinking [9] and creative health media innovation [10–12]. Because the health workforce's creative thinking will help people of all ages receive health education via creative health media innovation, creative thinking and creative health media innovation are therefore defined as the health workforce's expected learning outcomes that play roles in promoting digital health literacy for the target groups in various contexts.

3 RESEARCH OBJECTIVES

1. To investigate and synthesize the composition of the Imagineering MOOC Instructional Design model (I-MOOC ID model) to enhance creative thinking and creative health media innovation.
2. To redesign and validate the I-MOOC ID model to enhance creative thinking and creative health media innovation.
3. To assess the suitability of the I-MOOC ID model to enhance creative thinking and creative health media innovation.

4 LITERATURE REVIEWS

4.1 Imagineering pedagogy

The term "Imagineering" is a portmanteau that combines the words "imagination" and "engineering". Imagineering is creating mental images and incorporating imaginative components into practice. Imagineering is a revolutionary pedagogy in which learning management is specifically designed to meet the needs of learners in the 21st century. It places a particular emphasis on self-directed learning and collaborative learning so that creativity and the ability to develop "inventions" into "innovations" can be promoted and fostered [2].

The authors in [3] propose a web-based learning system employing project-based learning and Imagineering that relies on the digital operation and can be performed on all types of communication devices to support and promote collaboration and activities within the system, which can be summarized as follows: (1) The system architecture consists of three main elements, i.e., 1.1) Stakeholders; 1.2) System Components, i.e., Learning Process, Activity, System Element, and Communication Tools; and 1.3) Database; (2) The learning process within the system consists of six steps, which correspond to the Imagineering learning process, i.e., 1) imagine; 2) design; 3) develop; 4) present; 5) improve; and 6) evaluate; and (3) The web-based learning system can be divided into three systems: 1) The student system; 2) The lecturer system; and 3) The administrator system.

4.2 Massive Open Online Courses (MOOCs)

MOOCs emphasize the use of digital technology, particularly the internet and digital devices, to facilitate learning and teaching by customizing content to suit the needs of the learners or by allowing learners to learn at their own pace [4]. MOOCs can be categorized into two types [4]: 1) cMOOCs (connected MOOCs) is a network for self-organized patterns of collaborative learning in which learners have roles andresponsibilities for collaborating and sharing ideas as well as knowledge. The goal oflearning is to establish a collective intelligent network or to share common learning interests, with a focus on knowledge transfer between instructors and learners. 2) xMOOCs (extended MOOCs), which are intended to promote academic knowledge development through the pre-design and pre-preparation of materials based on a clearly defined curriculum. The lesson structure includes student orientation, learning activities, and evaluation. Instead of utilizing social media platforms, xMOOCs make use of a custom-built learning management system. While MOOCs

gained popularity and have many advantages, there are also some concerns associated with their usage.

Concerns related to MOOC usage [4]: 1) Dropout rates: MOOCs typically have high dropout rates. Since they are open to anyone with an internet connection, many individuals enroll without a strong commitment to completing the course. The lack of accountability and structure can lead to a significant number of participants abandoning the course before completion. 2) Quality and credibility: While there are reputable platforms offering MOOCs, the quality and credibility of courses can vary. Some courses may be developed by individuals or organizations without sufficient expertise or credentials, leading to concerns about the accuracy and reliability of the content. It's important for learners to research the credentials of course providers before enrolling. 3) Access and technological barriers: Despite the "open" nature of MOOCs, access to them can be limited for individuals who don't have reliable internet connectivity or access to suitable devices. Furthermore, not all learners may possess the necessary technical skills to navigate online learning platforms or troubleshoot issues, which can hinder their learning experience.

4.3 Instructional Design (ID)

In the digital age, the science of instructional design (ID) relates to the proposal, selection, and utilization of a generic or specialized model in context for the analysis, design, development, management, and evaluation of learning innovations based on the systems approach. Learning innovation is a type of intervention that attempts to elicit a flexible and appropriate cognitive, social, and educational presence in a human-centered and goal-oriented approach to learning efficiency and effectiveness. The practice of instructional design in the digital landscape to support lifelong learning includes resource mobilization, learning theories, learning strategies, and symbol systems in emerging media. This clearly demonstrates how important it is to integrate technological pedagogical content knowledge (TPACK) to facilitate lifelong learning for everyone [1, 3, 8, 38].

4.4 Creative Thinking (CT)

CT is the score obtained from the Reisman Diagnostic Creativity Assessment (RDCA). It is a free online self-report creativity assessment that gives users quick feedback and is diagnostic rather than predictive, with the goal of making users aware of their creative strengths: fluency, flexibility, elaboration, originality, resistance to premature closure, tolerance of ambiguity, convergent and divergent thinking, risk-taking, and intrinsic and extrinsic motivation, as well as definitions of score classifications (very high, moderately high, average, low, very low) [9].

4.5 Creative Health Media Innovation (CHMI)

The CHMI score is obtained by evaluating learners' creative health media innovation after carrying out the Imagineering process via a MOOC learning platform to enhance creative thinking and creative health media innovation. The Creative Health Media Innovation Holistic Scoring Rubric (CHMI-HSR) was designed to evaluate new or improved products. It consists of six components, namely, initiation and feasibility, novelty and uniqueness, objective, usage, efficiency, and cost value [10–12].

5 RESEARCH METHODOLOGY

The research methodology employed in this study was mixed-methods research according to an exploratory sequential design [13]. For this study, it was determined that a mixed-methods research design with an exploratory sequential design was the best option. According to [13], this research design made it possible to comprehensively study, redesign, validate, and evaluate the I-MOOC ID model in order to enhance creative thinking and creative health media innovation through the collection of both qualitative and quantitative data. This method ensured a thorough investigation of the model's composition, validity, and applicability by comparing and synthesizing the existing literature and incorporating expert judgements. It provides a deeper understanding of the research topic, incorporates different perspectives, and enhances the credibility and applicability of the study's findings. Therefore, an exploratory sequential design is appropriate for the present investigation when there are limited existing models or knowledge about the topic. The research procedures were divided into three phases, as follows.

5.1 The first phase

To investigate and synthesize the composition of the I-MOOC ID model used to enhance creative thinking and creative health media innovation, the researchers collected and analyzed qualitative data using scoping reviews of research articles in the ERIC, PubMed, Scopus, Web of Science, ACM, and ThaiJO online databases. The research instruments used were 1) research quality evaluation forms, 2) data record forms, and 3) data analysis forms.

5.2 The second phase

To redesign and validate the I-MOOC ID model used to enhance creative thinking and creative health media innovation, the researchers collected and analyzed quantitative data using the Content Validity Index (CVI). The research instruments used were 1) a diagram and details of the I-MOOC ID model (draft version) and 2) a content validation form built on a 4-point Likert scale for the Content Validity Index (CVI). [14–15]. This phase was divided into three steps: 1) Synthesis of the diagram and details of the I-MOOC ID model (draft version); 2) Validation of the synthesized I-MOOC ID model by five experts who held doctoral degrees or the equivalent, worked as instructors or researchers, and had at least three years of relevant experience; and 3) Calculation of the average of all I-CVIs, in which it was found that the S-CVI was at an acceptable level (S-CVI/Ave ≥ 0.90) [14–15].

5.3 The third phase

To assess the suitability of the I-MOOC ID model adopted to enhance creative thinking and creative health media innovation, researchers collected and analyzed quantitative data from expert judgment using purposive sampling. The research instruments used were: 1) the diagram and details of the I-MOOC ID model (revised version); and 2) the suitability evaluation tool of the proposed I-MOOC ID model, which was built on a 5-point Likert scale: most suitable, very suitable, moderately

suitable, less suitable, and least suitable. Consequently, data was collected in this phase from 12 experts who held doctoral degrees or equivalent, worked as instructors or researchers, and had at least three years of relevant experience. These experts consisted of four experts in instructional design, four experts in educational technology, and four experts in health media education, who were instructed to consider and evaluate the suitability of the model.

6 RESEARCH RESULTS

6.1 The results of investigating and synthesizing the composition of the I-MOOC ID model in order to enhance creative thinking and creative health media innovation

An investigation of the Imagineering processes was conducted by performing several studies, as shown in Table 1 [3, 11, 16–21]:

Table 1. Investigating the processes of Imagineering

Processes of Imagineering	[3]	[11]	[16]	[17]	[18]	[19]	[20]	[21]
Cognitive phase								
Inspire Stage								•
Imagine Stage	•	•	•	•	•	•	•	•
Design Stage	•	•	•	•	•	•	•	•
Associative phase								
Develop Stage	•	•	•	•	•	•	•	•
Present Stage	•	•	•	•	•	•	•	•
Publish Stage			•					
Autonomous phase								
Improve Stage	•	•	•	•	•	•	•	•
Evaluate Stage	•	•	•	•	•	•	•	•
Reflect Stage								•

Table 1 indicates that Imagineering consisted of 12 steps, and after researchers synthesized the new processes of Imagineering, there were three phases, as follows:

1. The cognitive phase consists of three sub-steps:
    1. Inspire: This step involves gathering information, exploring ideas, and seeking inspiration for the digital health media project initiative. It may involve conducting virtual field trips, brainstorming, and identifying key concepts or themes to be addressed.
    2. Imagine: In this step, the creative process begins. Ideas generated during the inspiration phase are developed further, and potential solutions or approaches for promoting digital health literacy are envisioned.
    3. Design: Once the ideas are formed, the design step focuses on structuring and planning the media project for specific target groups. This includes outlining the content, creating a visual layout or user interface (UI), determining the user experience (UX), and considering technical aspects.

2. The associative phase consists of three sub-steps:
   1. Develop: This step involves the actual production of digital health media. It includes content creation, multimedia development, programming, and any other necessary steps to bring the envisioned design to life.
   2. Present: Once the media is developed, it is presented to the target groups. This may involve showcasing the media through presentations, demos, or interactive sessions to gather feedback and gauge its effectiveness.
   3. Publish: In this step, digital health media is made publicly available or distributed through appropriate channels. This could include launching a website, releasing an application, publishing an article, or disseminating the media through social media platforms and other relevant platforms.
3. The autonomous phase consists of three sub-steps:
   1. Improve: After the media has been published, it is essential to continuously improve and refine it based on feedback, user engagement, and emerging trends. This step involves gathering data, analyzing user experiences, and making necessary adjustments or enhancements to optimize the effectiveness of the media.
   2. Evaluate: This step focuses on assessing the impact and outcomes of digital health media. It may involve conducting surveys, interviews, or other evaluation methods to gather feedback, measure the effectiveness of the media, and identify areas for improvement.
   3. Reflect: The final step involves reflecting on the entire process of producing the media. Lessons learned, insights gained, and best practices identified during the project are documented. This reflection serves as valuable knowledge for future projects and helps refine the overall Imagineering process.

An investigation of the MOOC composition was conducted by performing several studies, as shown in Table 2 [22–29]:

Table 2. Investigating the compositions of the MOOC

Compositions of MOOC	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
Dimension of Instruction								
Reading material	•	•	•	•		•	•	•
Course syllabus	•	•	•	•	•			
Course outline	•	•			•	•		
Videos	•	•	•	•	•	•	•	•
Slideshows/PPT slides		•	•	•	•	•		•
Simulations/Games		•	•	•		•		•
Independent activities related to content/Links to external online resources	•	•	•	•	•	•		•
Dimension of Interaction								
Discussion forums		•	•	•	•	•	•	•
Wiki		•	•	•				
Q&A/Self-control prompt/Prompt to respond		•	•	•				•
Social media/Chat Communication tools/Announcements		•	•	•	•	•		
Dimension of Individualization								
Quizzes	•	•	•	•	•		•	•
Learning assignment/Task/Project	•	•	•	•		•	•	•
Certificates		•	•	•			•	

Table 2 indicates that the MOOC consisted of 14 compositions, and after researchers synthesized the new composition of the MOOC, there were three dimensions, as follows:

1. The dimension of instruction consists of seven compositions:
   a) Reading Material: This composition involves providing participants with relevant textual resources such as articles, research papers, or digital textbooks to enhance their understanding of creative health media innovation concepts.
   b) Course Syllabus: A course syllabus outlines the objectives, topics, and structure of the MOOC. It provides an overview of the learning outcomes, assignments, and assessments that learners can expect.
   c) Course Outline: The course outline breaks down the content into modules or units, providing a clear structure for participants to follow. It helps learners navigate through the course and understand the sequence of topics.
   d) Videos: Videos play a crucial role in delivering instructional content in an engaging manner. They can include lectures, presentations, demonstrations, or interviews with experts, providing visual and auditory learning experiences.
   e) Slideshows: Slideshows are visual aids that accompany the instructional content. They can include key points, graphics, charts, or diagrams to enhance understanding and aid retention of information.
   f) Simulations: Simulations offer interactive experiences that allow participants to apply their knowledge in real-world scenarios. They provide a practical dimension to the learning process, enabling participants to practice creative health media innovation.
   g) Independent Activities with External Online Resources: These activities involve learners accessing content and resources outside the MOOC platform. It could include links to relevant websites, articles, videos, or interactive tools that further enrich the learning experience.
2. The dimension of interaction consists of four compositions:
   a) Discussion Forums: Discussion forums enable learners to engage in online conversations, ask questions, share insights, and collaborate with fellow learners. They foster peer-to-peer interaction and facilitate knowledge exchange.
   b) Wikis: Wikis allow learners to collaboratively create and edit content related to digital health literacy. They provide a platform for collaborative knowledge construction and encourage active participation.
   c) Learning Prompts: Learning prompts are provided to stimulate creative thinking and reflection. They can be in the form of questions, case studies, or scenarios that prompt learners to apply their knowledge and engage in deeper learning.
   d) Communication Tools: Communication tools such as messaging systems, chat rooms, or video conferencing enable learners to communicate directly with instructors or peers, facilitating real-time interactions and support.
3. The dimension of individualization consists of three compositions:
   a) Quizzes: Quizzes assess learners' understanding of the course material and provide immediate feedback. They can be used to reinforce learning and help learners identify areas where they may need further study.
   b) Learning Assignments: Learning assignments involve practical tasks or projects that learners complete to apply their knowledge and skills. They promote active learning and allow learners to demonstrate their comprehension in practical contexts.

c) Certificates: Certificates serve as recognition for learners who successfully complete the MOOC.

An investigation of the MOOC instructional design process was conducted by performing several studies, as shown in Table 3 [30–37]:

Table 3. Investigating the MOOC instructional design processes

Processes of MOOC Instructional Design	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1. Analysis Process								
1.1. Analysis of context and educational stakeholders	•	•		•	•		•	•
1.2. Determination of content topics	•	•	•	•	•	•	•	•
1.3. Determination of learning outcomes and learning tasks		•	•	•	•	•	•	•
1.4. Selection of pedagogical approaches and instructional technology	•	•	•	•	•	•	•	
1.5. Selection of learning assessment and evaluation	•	•	•	•	•	•	•	•
2. Design Process								
2.1. Design and writing of the course syllabus	•	•	•	•	•	•		•
2.2. Design and preparation of learning activities	•	•	•	•	•	•	•	•
2.3. Design and validation of learning assessment tools	•	•		•	•	•	•	
3. Development Process								
3.1. Installation and configuration of courseware on the MOOC learning platform.				•	•			•
3.2. Development and pre-customization of the learning experience on the MOOC learning platform.	•	•	•	•	•	•	•	•
3.3. Testing of courseware functionality on the MOOC learning platform		•		•	•	•	•	•
4. Realization Process								
4.1. Massive open online course enrollment and orientation		•	•	•	•	•	•	
4.2. Learning management via MOOC delivery	•	•	•	•	•	•	•	•
4.3. Tracking, monitoring, and supporting learners		•	•	•	•	•	•	•
5. Evaluation Process								
5.1. Formative assessment	•	•	•	•	•	•	•	•
5.2. Summative assessment	•	•	•	•	•	•	•	•

Table 3 indicates that the MOOC instructional design process consisted of 16 steps, and after researchers synthesized the new processes of MOOC instructional design, there were five processes: (1) Analysis Process: analysis of context and educational stakeholders; determination of content topics; determination of learning outcomes and learning tasks; selection of pedagogical approaches and instructional technology; and selection of learning assessment and evaluation approaches; (2) Design Process: design and writing of the course syllabus; design and preparation of learning activities; and design and validation of learning assessment tools; (3) Development Process: installation and configuration of the courseware on the MOOC learning platform; development and pre-customization of the learning experience on the MOOC learning platform; and testing of courseware functionality on the MOOC learning platform; (4) Realization Process: massive open online course enrollment and orientation; learning management via MOOC delivery; and tracking, monitoring, and supporting learners; and (5) Evaluation Process: formative assessment and summative assessment.

6.2 The results of redesigning and validating the I-MOOC ID model to enhance creative thinking and creative health media innovation

The Imagineering MOOC Instructional Design model (I-MOOC ID model) to enhance creative thinking and creative health media innovation is shown in Figure 2.

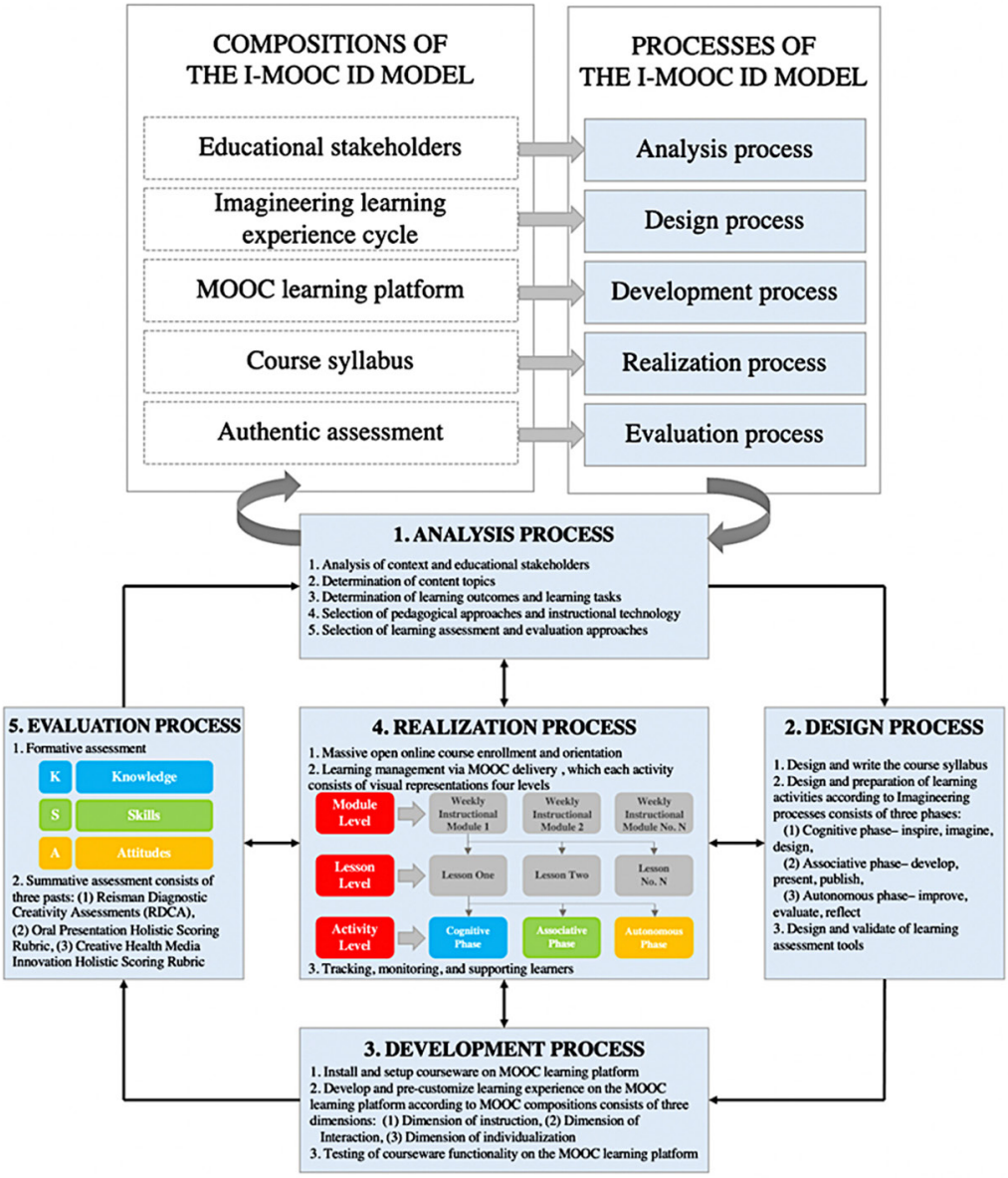

Fig. 2. The proposed I-MOOC model to enhance creative thinking and creative health media innovation

The results in Figure 2 reveal that the proposed I-MOOC ID model to enhance creative thinking and creative health media innovation, which was newly synthesized [3, 11, 16–37], consisted of five main processes and 16 sub-processes based on the integration of technological pedagogical content knowledge (TPACK) [38] to develop learners' learning outcomes in the digital era, as shown in Table 4.

Table 4. Main processes, sub-steps, and outputs of the I-MOOC ID model to enhance creative thinking and creative health media innovation

Main Processes	Sub-Steps	Outputs
1. Analysis	**1.1.** Analysis of context and educational stakeholders	The findings of the contextual analysis as well as the basic requirements of stakeholders in educational and public health organizations
	1.2. Determination of content topics	Identification of a content topic list based on stakeholders' needs
	1.3. Determination of learning outcomes and learning tasks	Identification of learning outcomes and learning tasks based on stakeholders' needs
	1.4. Selection of pedagogical approaches and instructional technology	Selection of a MOOC learning platform according to context analysis and education stakeholders' needs
	1.5. Selection of learning assessment and evaluation approaches	Choosing how to test and evaluate learning based on content topics
2. Design	**2.1.** Design and writing the course syllabus	Course syllabus designed according to constructive alignment
	2.2. Design and preparation of learning activities	Learning activities, according to Imagineering processes, consisting of three phases: (1) The cognitive phase: inspire, imagine, and design, (2) The associative phase: develop, present, and publish, and (3) The autonomous phase: improve, evaluate, and reflect
	2.3. Design and validation of learning assessment tools	Learning assessment tools, according to authentic assessment, consisting of three parts: (1) Reisman Diagnostic Creativity Assessments (RDCAs), (2) Oral Presentation Holistic Scoring Rubric, and (3) Creative Health Media Innovation Holistic Scoring Rubric
3. Development	**3.1.** Installation and configuration of courseware on the MOOC learning platform	Customized courseware on the MOOC learning platform, according to the composition of the MOOC, consisting of three dimensions: (1) Dimensions of instruction (reading material, course syllabus, course outline, videos, slideshows, simulations, and independent activities that involve accessing content via links to external online resources), (2) Dimensions of Interaction (discussion forums, wikis, learning prompts, and communication tools), and (3) Dimensions of individualization (quizzes, learning assignments, and certificates)
	3.2. Development and pre-customization of the learning experience on the MOOC learning platform	
	3.3. Testing of courseware functionality on the MOOC learning platform	On the MOOC learning platform, quality courseware consists of visual representations at three levels: module, lesson, and activity.
4. Realization	**4.1.** Massive open online course enrollment and orientation	The number of students who sign up for and attend the orientation
	4.2. Learning management via MOOC delivery	The results of activity learning management, in which each activity is represented visually at three levels-module, lesson, and activities
	4.3. Tracking, monitoring, and supporting learners	The accessibility, interactivity, creativity, and productivity observed while learners were learning via the MOOC learning platform
5. Evaluation	**5.1.** Formative assessment	The results of the learning progress of learners according to authentic assessment
	5.2. Summative assessment	The results of the learning achievement and creative health media products of learners, and the number of learners who met the grading criteria and received a certificate on the MOOC learning platform

One important suggestion from five experts in the second phase of research indicates that the use of MOOCs may be adopted as part of hybrid or blended learning to alleviate the problem of the dropout rate of courses since blended learning encourages more interactions among learners and instructors [39]. Furthermore, during the second phase of the research, as experts validate the I-MOOC ID model to enhance creative thinking and creative health media innovation, there are additional recommendations for policymakers and administrators to play vital roles in addressing concerns related to the usage of Massive Open Online Courses (MOOCs) in educational and public health organizations, particularly in the context of health education management. They play the following important roles: 1) Policy Development: Policymakers are responsible for formulating guidelines and policies that govern the integration and utilization of MOOCs in educational and public health organizations. They establish workflows to regulate content quality, data privacy, accessibility, and accreditation standards. Policymakers also consider issues related to educational equity and learning access to ensure that MOOCs benefit diverse populations. 2) Resource Allocation: Administrators, in collaboration with policymakers, allocate necessary resources such as funding, technological infrastructure, and faculty support for the successful implementation of MOOCs. They assess the organization's needs, identify gaps, and ensure that sufficient resources are available to support MOOCs for the health workforce that is responsible for health education management, especially digital health literacy. 3) Quality Assurance: Policymakers and administrators are responsible for ensuring the quality and relevance of MOOCs used for enhancing creative thinking and creative health media innovation for the health workforce. They may engage in partnerships with reputable MOOC providers, subject matter experts, and instructional designers to enhance the quality of the courses. 4) Collaboration and Partnerships: Policymakers and administrators foster collaborations with various stakeholders, including educational institutions, public health organizations, professional associations, and MOOC providers. They engage in dialogue and collaboration to address concerns, share best practices, and leverage expertise to maximize the benefits of MOOC usage. These collaborations facilitate the development of a comprehensive and well-rounded health workforce's creative health media innovation skills, which will help people of all ages receive health education.

6.3 The results of assessing the suitability of the I-MOOC ID model to enhance creative thinking and creative health media innovation

Table 5. Suitability assessment results of the I-MOOC ID model to enhance creative thinking and creative health media innovation

Details of the I-MOOC ID Model	Mean	SD	Suitability Level
Compositions of the I-MOOC ID model			
1. Educational stakeholders	4.58	0.64	Most suitable
2. Imagineering learning experience cycle	4.92	0.28	Most suitable
3. MOOC learning platform	4.75	0.43	Most suitable
4. Course syllabus	4.83	0.37	Most suitable
5. Authentic assessment	4.67	0.47	Most suitable

(Continued)

Table 5. Suitability assessment results of the I-MOOC ID model to enhance creative thinking and creative health media innovation *(Continued)*

Details of the I-MOOC ID Model	Mean	SD	Suitability Level
Processes of the I-MOOC ID model			
1. Analysis process			
1.1. Analysis of context and educational stakeholders	4.58	0.64	Most suitable
1.2. Determination of content topics	4.67	0.47	Most suitable
1.3. Determination of learning outcomes and learning tasks	4.75	0.43	Most suitable
2. Design process			
2.1. Design and writing of the course syllabus	4.75	0.43	Most suitable
2.2. Design and preparation of learning activities	4.83	0.37	Most suitable
2.3. Design and validation of learning assessment tools	4.58	0.64	Most suitable
3. Development process			
3.1. Installation and configuration of courseware on the MOOC learning platform	4.58	0.64	Most suitable
3.2. Development and pre-customization of learning experience on the MOOC learning platform	4.92	0.28	Most suitable
3.3. Testing of courseware functionality on the MOOC learning platform	4.58	0.64	Most suitable
4. Realization process			
4.1. Massive open online course enrollment and orientation	4.67	0.47	Most suitable
4.2. Learning management via MOOC delivery consisting of visual representations three levels–module, lesson, and activities	4.83	0.37	Most suitable
4.3. Tracking, monitoring, and supporting learners	4.92	0.28	Most suitable
5. Evaluation process			
5.1. Formative assessment	4.58	0.64	Most suitable
5.2. Summative assessment	4.67	0.47	Most suitable
Overall	4.72	0.47	Most suitable

In Table 5, the results of the suitability assessment of the I-MOOC ID model to improve creative thinking and creative health media innovation showed that, overall, the model was most suitable, with a mean score of 4.72 and a standard deviation of 0.47 indicating that the experts' opinions were relatively consistent, making the data reliable.

7 CONCLUSION AND DISCUSSION

The Imagineering MOOC Instructional Design model (I-MOOC ID model) to enhance creative thinking and creative health media innovation has five main processes: 1) The analysis process, which focuses on contextual analysis, as well as the

basic requirements of stakeholders in educational and public health organizations; 2) The design process, which primarily focuses on designing learning activities according to the Imagineering learning experience cycle, which consists of three phases: the cognitive phase (i.e., inspire, imagine, and design), the associative phase (i.e., develop, present, and publish), and the autonomous phase (i.e., improve, evaluate, and reflect); 3) The development process, which places an emphasis on customizing courseware structure for MOOC learning in three dimensions: instruction, interaction, and individualization; 4) The realization process, which focuses on tracking, monitoring, and supporting accessibility, interactivity, creativity, and productivity while learners are learning via the MOOC learning platform based on the course syllabus; and 5) The evaluation process, which mainly concerns formative assessment to promote the learning progress of learners and summative assessment to promote the learning achievement and creative health media products of learners according to authentic assessment.

Our model is designed to be flexible enough to be adapted to a wide range of educational and health infrastructures. The experts agreed with the overall model in terms of instructional design based on the integration of technological pedagogical content knowledge (TPACK) to develop learners' learning outcomes in the digital age and rated the suitability of the model as most suitable, with a combined mean of 4.72. The standard deviation was 0.47, which was in the range of 0 to 1, meaning that the data could be considered reliable; therefore, it could be concluded that the experts had comparatively similar opinions and regarded the model as most suitable.

Enhancing creative thinking and creative health media innovation within the health workforce can have multiple benefits. It can lead to the development of more engaging and accessible health education materials, improved communication of health information, and the ability to adapt to technological advancements and changing digital landscapes. Ultimately, this can contribute to better health outcomes and increased health literacy among the individuals and communities served by educational and public health organizations in the future.

8 ACKNOWLEDGMENT

The researchers would like to thank the Research and Development Institute (RDI), Rajamangala University of Technology Suvarnabhumi (RUS), the Innovation and Technology Management Research Centre, the Science and Technology Research Institute (STRI), King Mongkut's University of Technology North Bangkok (KMUTNB), and Praboromarajchanok Institute, Ministry of Public Health, for supporting this research.

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