

The Development of a Ubiquitous MOOC Instructional Model for Enhancing Cross-Cultural Competence

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Abstract

The purpose of this study was to develop a ubiquitous MOOC instructional model (U-MOOC model) for enhancing cross-cultural competence. The study conducted research and development research design divided to four phases: (1) to review literature (2) to investigate the environment of learning from 410 undergraduate students, (3) to develop U-MOOC model and revise accordingly to three experts' suggestions, and (4) to try out the U-MOOC model by three lecturers. The result of this research was the U-MOOC model for enhancing cross-cultural competence consisted of six steps: (1) define online learning objectives, (2) analyze U-MOOC environment needs, (3) develop U-MOOC learning activity plan, (4) develop U-MOOC, (5) delivery to multi-cultural learners, and (6) assess learners' learning.

Keywords: Ubiquitous Learning, MOOC, Research And Development, Cross-Cultural Competence, Instructional Design

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การพัฒนาแบบการออกแบบยูบิควิตส์มูคเพื่อส่งเสริมสมรรถนะข้ามวัฒนธรรม

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บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อพัฒนาแบบการออกแบบยูบิควิตส์มูค (U-MOOC model) เพื่อส่งเสริมสมรรถนะข้ามวัฒนธรรม การวิจัยนี้ออกแบบการวิจัยด้วยการวิจัยและพัฒนา (research and development research design) แบ่งออกเป็น 4 ระยะ คือ (1) การทบทวนวรรณกรรมที่เกี่ยวข้อง (2) การสำรวจสภาพแวดล้อมในการเรียนรู้ จากตัวอย่าง คือ นิสิตนักศึกษาในระดับปริญญาบัณฑิต จำนวน 410 คน (3) การพัฒนาแบบการออกแบบ U-MOOC และปรับปรุงตามความคิดเห็นของผู้เชี่ยวชาญ จำนวน 7 ท่าน และ (4) การทดลองใช้รูปแบบการออกแบบ U-MOOC โดยผู้สอน จำนวน 3 ท่าน ผลการวิจัยพบว่า รูปแบบการออกแบบ U-MOOC เพื่อส่งเสริมสมรรถนะข้ามวัฒนธรรม ประกอบด้วย 6 ขั้นตอน คือ (1) การกำหนดวัตถุประสงค์การเรียนรู้แบบออนไลน์ (2) การวิเคราะห์สภาพแวดล้อมของ U-MOOC (3) การพัฒนากิจกรรมการเรียนรู้แบบ U-MOOC (4) การพัฒนา U-MOOC (5) การจัดการเรียนการสอนให้แก่ผู้เรียนต่างวัฒนธรรม และ (6) การประเมินผลผู้เรียน

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Introduction

In the last decades, the exponential growth in handheld devices and wireless technology and increasing of high bandwidth network infrastructures have opened new accessibility opportunities for education (Kinshuk, 2015). The learning has experienced huge changes and provide diverse people opportunities to learn together via the Internet. MOOC is the most diverse online learning that 58 million students worldwide registered from 172 countries on 5 continents (Shah, 2017). The students who have the high cultural competence, would have ability to understand students from different cultures and engage with them effectively. As well, they learn efficiently in MOOCs. National Education Association (2014) has defined “cultural competence is a key factor in enabling educators to be effective with students from cultures other than their own”. Thus, helping educators and students to understand and be aware of cultural differences and to adapt to a new learning environment has become a crucial element in teaching and learning.

Some MOOC platforms allow learners to access a number of digital learning resources throughout a number of mobile devices via wireless Internet. This flexibility has made learners to become ubiquitous learners who use mobile devices to interact and receive feedback with experts and peers. Nearly all university students use their own smartphones every day, thus they have skill to use mobile devices more than desktop computers. It is vital to focus on smartphones and tablets as mobile devices for ubiquitous learning (Kitazawa, Sato, & Akahori, 2016). Moreover, MOOC are normally open enrollment for everyone in any nation and culture who wants to learn in a course (Martindale, 2015).

Many educational administrators favor the idea of MOOCs and make ambitious claims about them. But few understand both the instructional design and implications sufficiently to support teachers to use MOOCs to improve educational access. This study used the research and development research design (R&D) (Richey & Klein, 2014), a type of investigation unique to the instructional design and technology field, to develop a ubiquitous MOOC instructional design model (U-MOOC model) for enhancing cross-cultural competence.

Research Objective

The purpose of this study was to develop a U-MOOC instructional model for enhancing cross-cultural competence.

Conceptual framework

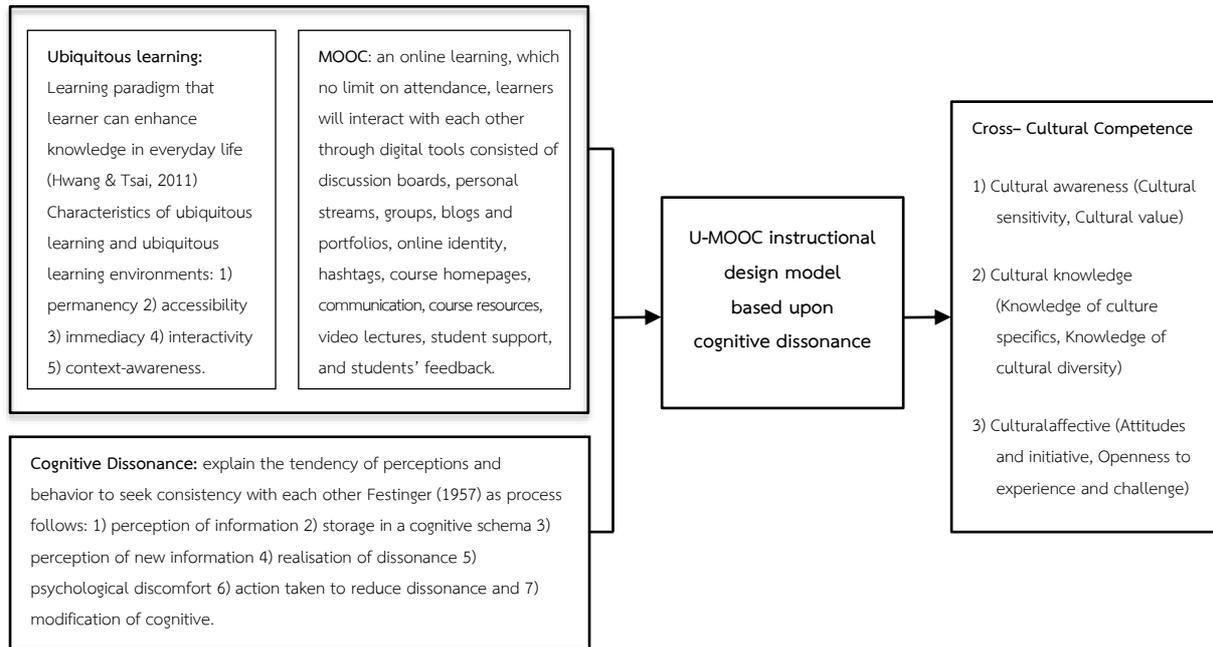


Figure 1 Conceptual framework

Literature Review

Cross-cultural Competence

Cross-Cultural competence is knowledge, skill, and behavior to adjust oneself for another culture in global society. In the classroom, the students who have high cultural competence, would be able to understand their own worldviews (Bennett, 1993) and communicate with diverse students for achieving the learning goals (Rasmussen, 2013). Cross-cultural competence could be measured by a scale for measuring cross-cultural competence. Cross-cultural competence was divided into four components (Abbe, Gulick, & Herman, 2007; Chunpen, 2013; Gabrenya Jr, Griffith, Moukarzel, Pomerance, & Reid, 2012; Ross, 2008; Seeberg & Minick, 2012): cultural awareness (cultural sensitivity, cultural value), cultural knowledge (knowledge of culture specifics, knowledge of cultural diversity), cultural affective (attitudes and initiative, openness to experience and challenge), and personal skills (interpersonal skills, communication skill, cognitive skill).

Massive Open Online Course (MOOC)

Massive open online course (MOOC) is an online learning with no limit on attendance. Learners can interact with each other through digital tools by interactive web (Plangson, Na-Songkhla, & Luetkehans, 2016). MOOC was designed to worldwide and learners should be able to participate without any restrictions (Plasencia & Navas, 2014). Learners can also usually interact with a MOOC at whatever level they desire, and even drop out, or come back to the archived course materials later (Martindale, 2015). There are three learning characteristics on

MOOCs: Accessibility – As free and open registration, Interaction – A course provide combination of passive and active learning, and Freedom – Anyone can participate in an online course free of charge.

Ubiquitous learning (u-learning)

U-learning emphasizes the “anywhere and anytime learning” and makes use of mobile technology to access learning content and integrates in the learners’ everyday lives (Kinshuk, 2015; Richey, 2013). There are five major characteristics of u-learning; (1) permanency refers to learners are able to reach the information until they delete it, (2) accessibility refers to learners are able to access from anywhere at any time, (3) immediacy refers to learner are able to retrieve information immediately, (4) interactivity refers to learners are able to interact with experts, teachers, or peers through synchronous or asynchronous communication, and (5) context-awareness refers to the environment can be adapted to the learners’ real situation to provide adequate information for the learners (Bomsdorf, 2005; Y. M. Huang, Chiu, Liu, & Chen, 2011; Peters, 2010; Yahya, Ahmad, & Jalil, 2010).

Instructional design

Instructional Design is a systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, and information resources and evaluation. The following describes components of an instructional design (Dick, Carey, & Carey, 2015; Gagné, Briggs, & Wager, 1992; Gerlach & Ely, 1971; Morrison, 2011; Richey, Klein, & Tracey, 2011): (1) Identify Objective method, (2) Task analysis, (3) Learning Analysis, (4) Context Analysis, (5) Define Objective, (6) Design and conduct Evaluation of Instruction, (7) Selection of media, (8) Determine Content, (9) Design Instructional strategies, (10) Design the Message, (11) Developing Assessment Instrument, (12) Development Instructional Materials, (13) Delivery System for Instruction, (14) Evaluating Instruction, (15) Empirical try out of courseware with learner population.

Research and Development

The research was executed in four phases: (1) to review literature (2) to investigate the environment of learning, (3) to develop U-MOOC model, and (4) to try out the U-MOOC model.

Phase 1: To review literature

Research Method

Literature review was conducted from database about developing of U-MOOC model for enhancing cross-cultural competence based upon eight principles: (1) systems theory, (2) learner characteristic, (3) learning environment, (4) learning theory, (5) teaching method, (6) communication theory, (7) instructional media, and (8) assessment.

Research Results

U- MOOC model for enhancing cross- cultural competence is based upon eight principles: (1) systems theory, (2) learner characteristic, (3) learning environment, (4) learning theory, (5) teaching method, (6) communication theory, (7) instructional media, and (8) assessment.

(1) Systems theory refers to the operational concept, referring to a scientific, systematic, and rational procedure for optimizing outcomes of an organization of structure (Richey et al., 2011). There are four stages in the systems approach (Silvern, 1972 cited in Richey et al., 2011): 1) Analysis 2) Synthesis 3) Modeling 4) Simulation.

(2) Learner characteristic refers to learners' background data for analyzing U-MOOC learner in order to design U- MOOC compatible for higher education level. Learner characteristic consists of 15 factors: age, educational level, reading level, motivation, prerequisite knowledge, prerequisite skills, facility with a computer, familiarity with the web, typing ability, access to computers, access to web, time availability, dominant culture, and subculture.

(3) Learning environment refers to the contexts around the learners, which bring to design U- MOOC activities for support learning everywhere every time. Learning environment could be divided into two parts: *part I ubiquitous learning* is a learning paradigm that learner can enhance knowledge in everyday life using a combination of PC, tablet, or smartphone. This paradigm consists of five factors: 1) permanency 2) accessibility 3) immediacy 4) interactivity 5) context-awareness. *Part II MOOC* is a paradigm of online learning environment, which no limit on attendance, learners will interact with each other through digital tools by interactive web to share and create knowledge in small groups-based approach.

(4) Learning theory refers to apply the cognitive dissonance theory to design a U-MOOC by provide information that contrasting with previous knowledge or experience. Moreover, learners will find the ways to reduce the dissonance until they feel delight. The cognitive dissonance theory consists of seven steps: 1) perception of information, 2) storage in a cognitive schema, 3) perception of new information, 4) realization of dissonance, 5) psychological discomfort, 6) action taken to reduce dissonance and 7) modification of cognitive.

(5) Teaching method refers to apply learning methods to design a U-MOOC for encourage learners to effectively learn as course objectives. The U- MOOC consists of five teaching methods: 1) lecture, 2) role-playing, 3) experiential learning, 4) answering and asking questions, and 5) case studying.

(6) Communication theory refers to apply the agenda setting theory to design a U-MOOC. The theory uses for motivate learners to have the desired behavior by the lecturer planned. Moreover, the lecturer also suggests learners to think and aware of lecturer's information. The agenda setting theory consists of two steps, the first and the second level agenda setting.

(7) Instructional media refers to apply the principles of design, production, and selection to U-MOOC media. The principles support lecturer to transfer knowledge and information to learner. The instructional media of U-MOOC are text and graphic which consist of motivation principle (Keller & Burkman, 1993) and perception principle (Winn, 1993). Also, using principles of multimedia learning for design and organize of multimedia presentations.

(8) Evaluation refers to apply learning evaluation principles to design the evaluation method. The evaluation results will report whether U-MOOC achieve the learning objective or not. U-MOOC evaluation consists of formative evaluation and summative evaluation.

Phase 2: To investigate the environment of learning

This phase aimed to study of undergraduate students' opinions about U-MOOC. Survey research was employed to study undergraduate students' opinions in designing a U-MOOC.

Research Method

A survey was conducted to study undergraduate students' opinions about a U-MOOC for enhancing cross-cultural competence. The participants were 410 undergraduate students randomly recruited from eight government universities across Thailand.

The instrument of this study was a 60-item questionnaire, using the conceptual framework of online learning environment consisted of three major variables: u-learning, massive open online course (MOOC), and instructional design of U-MOOC for enhancing cross-cultural competence. Undergraduate students were requested to specify how well the 60 statements describe themselves on a five-point Likert scale; 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). The content validity of questionnaire was between 0.67 to 1.00. The Cronbach's alpha coefficient (α) of internal consistency was between 0.86 to 0.92 as following respectively: massive open online course ($\alpha = 0.92$), instructional design of U-MOOC for enhancing cross-cultural competence ($\alpha = 0.91$), and u-learning ($\alpha = 0.86$). The descriptive statistics and Pearson correlation analysis were analyzed by using a computer program.

Research Results

The data was measured with three major variables; u-learning, massive open online course (MOOC), and instructional design of U-MOOC for enhancing cross-cultural competence. The descriptive statistics included mean (M) and standard deviation (SD). The criteria was assigned determining the mean score classified into five levels based on Best (1977); *lowest level* represented a mean of 1.00-1.80, *low level* represented a mean of 1.81-2.60, moderate level represented a mean of 2.61-3.40, *high level* represented a mean of 3.41-4.20 and *highest level* represented a mean of 4.21-5.00.

The overall score of the undergraduate students' opinions about *u-learning* was at high level ($M = 3.43$). The range of the undergraduate students' opinions about u-learning was between 3.13 – 3.74.

The overall score of the undergraduate students' opinions about *massive open online course (MOOC)* was at moderate level ($M = 3.35$). The range of the undergraduate students' opinions about massive open online course (MOOC) was between 2.86 – 3.69. The overall score of the undergraduate students' opinions about *instructional design of U-MOOC for enhancing cross-cultural competence* was at high level ($M = 3.70$). The range of the undergraduate students' opinions about instructional design of U-MOOC for enhancing cross-cultural competence was between 3.61 – 3.77.

Table 1 *undergraduate students' opinions*

Variables	<i>M</i>	<i>SD</i>	Level
U-learning	3.43	0.61	High
- Permanency	3.13	0.81	Moderate
- Accessibility	3.74	0.81	High
- Immediacy	3.59	0.75	High
- Interactivity	3.50	0.76	High
- Context-awareness	3.17	0.89	Moderate
Massive open online course (MOOC)	3.35	0.59	Moderate
1. Discussion boards	2.98	1.12	Moderate
2. Personal streams	3.35	0.88	Moderate
3. Groups	3.60	1.07	High
4. Blogs and portfolios	2.86	0.99	Moderate
5. Online identity	3.13	0.91	Moderate
6. Hashtags	3.16	0.96	Moderate
7. Course homepages	3.34	0.87	Moderate
8. Communication	3.46	0.75	High
9. Course resources	3.51	0.83	High
10. Video lectures	3.69	1.02	High
11. Student support	3.67	0.87	High
12. Students' feedback	3.49	0.87	High
Instructional design of U-MOOC for enhancing cross-cultural competence	3.70	0.70	High
- Cultural sensitivity	3.61	0.73	High
- Cultural values	3.77	0.82	High
- Knowledge of culture-specific	3.67	0.85	High
- Attitudes	3.67	0.94	High
- Openness to experience and challenge	3.70	0.88	High
- Interpersonal skills	3.69	0.83	High
- Communication	3.74	0.85	High
- Cognitive skill	3.73	0.83	High

Development

The researcher designed a draft of U-MOOC model based on previous results (undergraduate students’ opinions about instructional design of U-MOOC for enhancing cross-cultural competence) and principles of U-MOOC model from literature review.

The draft of U-MOOC model for enhancing cross-cultural competence consisted of 13 steps.

Phase 3: To develop U-MOOC model

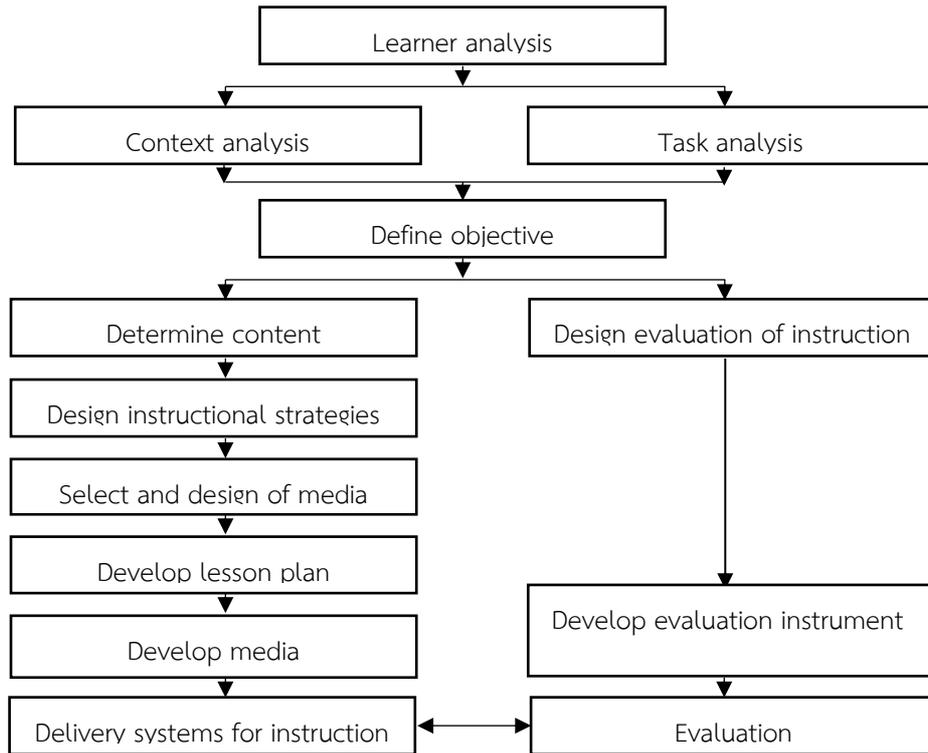


Figure 2 Visual model for the draft of U-MOOC model

Research Method

Questionnaire was conducted in order to check the correctness, appropriateness, and comprehensiveness of the U-MOOC model. It was divided to two parts: (1) components and procedure of U-MOOC model, and (2) Additional comments and suggestions. Scale responses were made on a five-point Likert scale; 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). Next, the questionnaire was sent to seven experts in the related fields. The criterion for recruiting the experts were that (1) the experts in educational technology or instructional design or (2) the scholars in educational technology or instructional design.

Research Results

The overall opinion on components and procedure of U-MOOC model was at a Strongly Agree level ($M = 4.61, SD = 0.33$). Among thirteen procedures of U-MOOC model, the highest average opinion was assessed with the develop lesson plan with an average mean score at a strongly agree ($M = 5.00, SD = 0.00$). The second average was assessed with the

context analysis with an average mean score at a strongly agree ($M = 4.93, SD = 0.19$). The lowest average was assessed with the delivery system for instruction with an average mean score at a strongly agree ($M = 4.29, SD = 0.76$). Moreover, the experts offered vital suggestions to develop U-MOOC model as followed:

Table 2 *Examples of researcher’s reactions from experts’ opinion*

Experts’ opinions	Researcher’s reactions
- Language skill is very important.	- Select only students who proficient in English.
- Should define appropriate software in learning activities such as group communication software.	- Add software recommendation in learning activities.
- The number of members should be four to six people.	- Insert “learners in U-MOOC course should be four to six people per group” in model recommendation.
- The learning group should have diverse culture learners.	- Add the recommendation of selecting learner should have diverse culture learners per group.

Development

The U-MOOC model was revised based on based on the experts’ opinions and suggestions, as the result, the U-MOOC model for enhancing cross-cultural competence consisted of six steps: (1) define online learning objectives, (2) analyze U-MOOC environment needs, (3) develop U-MOOC learning activity plan, (4) develop U-MOOC, (5) delivery to multi-cultural learners, and (6) assess learners’ learning.

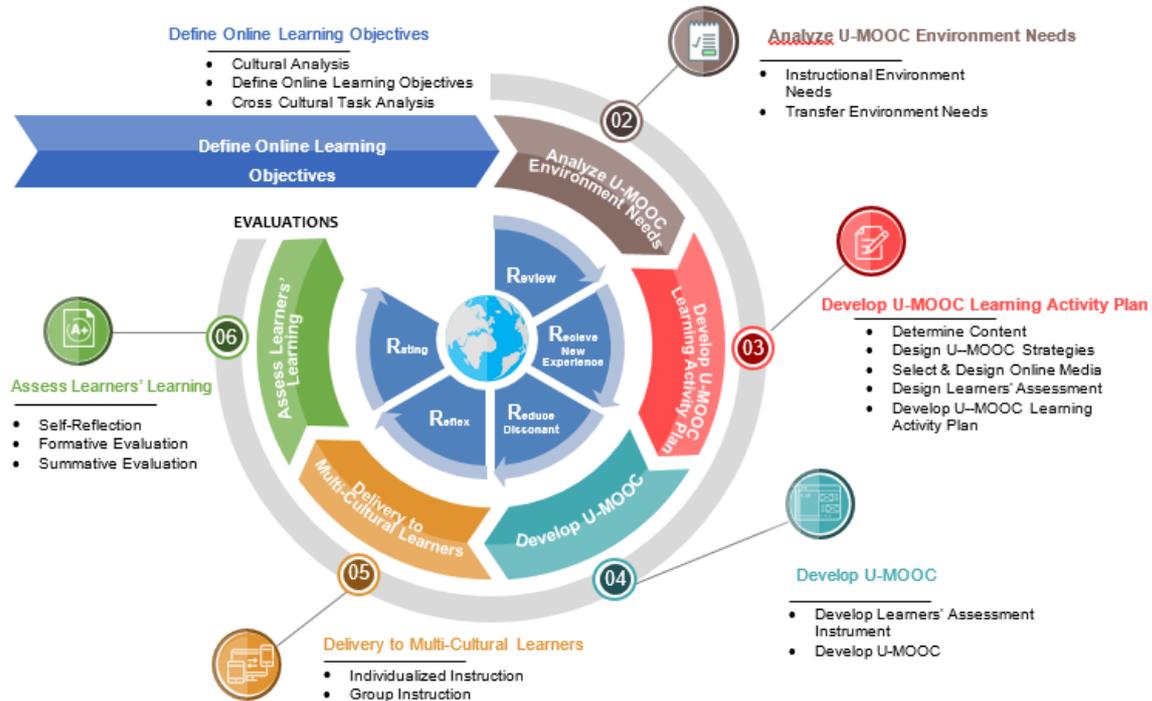


Figure 3 U-MOOC model

Phase 4: To try out the U-MOOC model

Research Method

The U-MOOC model manual was developed in order to try out the U-MOOC model. The U-MOOC model and U-MOOC model manual were tried out by three lecturers. Then, three lecturers produced their own course outline or U-MOOC instructional models. Afterwards, they were asked about the problem and suggestion for fulfilling the U-MOOC model such as information about what were the difficulties/obstacles to generate U-MOOC instructional model, the suggestions and recommendations for improving U-MOOC model and U-MOOC model manual.

Research Results

The result of this phase was suggestions and recommendations from lecturers in trying out the model. They were as followed:

- Lecturers should use the cross-cultural competence scale, developed by the researcher because they do not expert in scale development.
- U-MOOC course has two groups of lecturers (Thais and foreigners) thus the activities should be designed for both groups.
- The activities to design an instruction should be in one page because lecturers can see the overall activities.

Development

There were examples of researcher's reactions from the suggestions and recommendations as followed:

- Some users lack of scale developing skill and it is a waste of time to create a cross-cultural evaluation, the researcher should prepare it for users.

- Create overall design activities and precise activities for lecturer.

Additionally, the researcher revised U-MOOC model and U-MOOC model manual again to be as a complete U-MOOC model.

Discussions

1. Learning objectives

This study found that the first step was defining learning objectives that initial step of instructional design involved in the explanation what students should learn. Define learning objectives are specific statements defining about what students will be able to do when they complete a unit of instruction (Dick et al., 2015). Furthermore, Brown and Green (2015) recommended that the learning objectives should describe the action taken by the learner that could be measured by an observer.

2. U-MOOC environment needs

This study found that analyze U-MOOC environment needs is the process of collecting and analyzing data to identify learning environment, which effect to U-MOOC learning. The finding was congruent with R. Huang (2016) who stated that ubiquitous learning environments have potential to provide effective learning in different devices any different situations. For example, the learner can interact with friends in any environment by using the mobile technology. Wong, Milrad, and Specht (2016) recommended that the student will need to be able to access relevant information as soon as possible. Moreover, the learner could access to multiple devices that enable the flow of learning across boundaries between formal/informal spaces and the transitions between school/university/work/home settings to support personal learning journeys.

3. U-MOOC learning activities

The U-MOOC learning activities was key of succession in learning. The U-MOOC learning activities was a design of activity sets in order to achieve learning objective. Branch (2009) stated that the learning activities was an attempt to organize a set of learning events to assist the understanding and improving knowledge and skills for learners. The lecturer should produce self-instructional media in the first attempt at instructional design (Dick et al., 2015). The online media should allow the students to learn the new information without any intervention from a lecturer or fellow students (Dick et al., 2015). This study found that instructional media in U-MOOC would increase the quality of learning. Instructional media in U-MOOC was an online only, thus media that selecting should be a digital content. Parker and Masri (2015) stated that online discussion and presentation tools offer hybrid opportunities to assist course designers to move from a contemporary face to face model toward an online offering.

4. U-MOOC

This study found that the overall results of massive open online course (MOOC) was at moderate level. However, there are variables were at high level such as groups, video lectures, student support, and students' feedback. The results related to Dron and Anderson (2015) explained that groups were powerful for collaboration, the development of trust and shared support with clear directions and goals. Bates (2015) explained that video was a better media than text or audio, its ability to offer text, sound, it can even provide dynamic or moving pictures. Instructional designer or teacher who uses U-MOOC model should has experienced in video production or should know enough to make appropriate recommendations and assess the other work (Brown & Green, 2015). Nevertheless, many researchers such as Dick et al. (2015) would suggest that it is common for instructional designer to be an instructional media developer, or at least have knowledge of a variety of media formats. Even though instructional designers or teachers have unskillful of media production, they maybe find supporter as a team. The finding was congruent with Brown and Green (2015) who stated that it is rare for an instructional designer to work alone, many instructional design projects require that instructional designers work in teams.

5. Multi-cultural learner delivery

This study found that delivery to multi-cultural learners is a process of delivery website that developed in all step to instruction. According to result of Instructional design of U-MOOC for enhancing cross-cultural competence, the overall score was at high level. Participants reflected that cross-cultural competence was very important. The results related to Culhane (2012) proposed that cross-cultural competence can prove very advantageous, as it equips individuals with the requisite knowledge, skills, abilities, and personal characteristics that enable them to function effectively in culturally diverse situations.

6. Learning assessment

This study found that Assess learners' learning was a process of learner evaluation consisted of formative evaluation, summative evaluation, and self-reflection. The findings were supported by Plasencia and Navas (2014) stated that MOOC should be structured as a course that includes assessments to test the learning level of the knowledge taught. Merrill (2007) stated that the technology of instructional design involves the use of verified theory to the development of instructional products designed to assist students to gain desired instructional outcomes.

Recommendations

1. The U-MOOC model was design as linear process. Lecturer who will use this model should be make understand all steps before design U-MOOC course.
2. Students in the U-MOOC should have various culture in the course in order to exchange their culture opinions and lead to discuss for reducing the culture dissonant. Additionally, the course should be designed in English to support worldwide students.

3. The data was collected only faculty of education, which is weak in generalization to the all other faculties. Consequently, future research should collect data from students of various faculties in order to increase the power of generalization or external validity.

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