The research and development of instructional design model for Massive Open Online Course in Higher Education for Educational Courses

การวิจัยและพัฒนารูปแบบการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์

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Abstract

The research and development of instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses by using Research and Development as a type of research. For objectives, this research aim 1) to analyze method of teaching in Massive Open Online Courseware of learning in Thailand and foreign countries, 2) to develop instructional design model for Massive Open Online Courseware in Higher Education, 3) to study learning outcome and learning behavior of learner by using the developed instructional design model for Massive Open Online Courseware in Higher Education, and 4) to study opinion of instructor and student toward the developed instructional design model for Massive Open Online Courseware in Higher Education. Research samples composed of learners and instructors: Firstly, learners who enrolled in 6 courses by using Thai MOOC system. Including, Creative Movement Activities for Young Children, Human and His Environment, Technique and Method of instruction, Educational Research, Children's Illustration Design, and Technology and Innovation for Education. Secondly, instructors who teach in 6 courses by using Thai MOOC system. Research instruments include: 1) expert interview about instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses, 2) instructors questionnaire about instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses, 3) appropriateness evaluation of instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses, and 4) satisfaction evaluation of instructor and learner about teaching and learning with Massive Open Online Courseware in Higher Education for Educational Courses.

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The research found that 1. There are 7 methods of teaching; lecture, discussion, case study, collaboration, problem based, demonstration, and inquiry based.

2.There are 7 main components of the instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses, 1) introduction to the course, 2) structure of the course, 3) learning Plan, 4) the content of the course used in teaching, 5) learning media, 5) management and tracking of learning, and 6) measurement and evaluation. The steps of the instructional design model compose of 3 steps; first is duration of learning, there is 12 hours in each course and it take up to 6 weeks. The next is content presentation include video, learning materials, more learning resources, handout and end of unit questions, and test. Finally, it is method of teaching and interaction there are method of teaching, encouraging interaction between learner and learner, and encouraging interaction between learner and teacher. The result of appropriateness evaluation from 5 experts found that the instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses can be used appropriately.

3. The learners' outcome in these 6 courses are assessed by an average of 36.85% from all of learner in each course. For the learning analytics, these 6 courses are in the good level.

4. The opinions of instructor and student toward the developed instructional design model for Massive Open Online Courseware in Higher Education are good level.

Keywords: 1. Massive Open Online Course, Instructional Design, Learning Analytics

บทคัดย่อ

การวิจัยและพัฒนารูปแบบการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์ เป็นการวิจัยแบบการวิจัยและพัฒนา (Research and Development) มีวัตถุประสงค์ 1. เพื่อวิเคราะห์วิธีสอนด้วยการเรียนการสอนออนไลน์ระบบเปิดของสถาบันการศึกษาทั้งในและต่างประเทศ 2. เพื่อพัฒนารูปแบบการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์ 3. เพื่อศึกษาผลการเรียนรู้และพฤติกรรมการเรียนรู้ของผู้เรียนที่เรียนโดยใช้รูปแบบการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษาที่พัฒนาขึ้น และ 4. เพื่อศึกษาความคิดเห็นของผู้สอนและผู้เรียนที่มีต่อการเรียนการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษาที่พัฒนาขึ้น กลุ่มตัวอย่างที่ใช้ในการวิจัย ได้แก่ 1. ผู้เรียนที่ลงทะเบียนเรียนในระบบ Thai MOOC จำนวน 6 รายวิชา ประกอบด้วย 1) กิจกรรมเคลื่อนไหวเชิงสร้างสรรค์สำหรับเด็กปฐมวัย 2) มนุษย์กับสิ่งแวดล้อม 3) เทคนิควิธีการจัดการเรียนรู้ 4) การวิจัยทางการศึกษา 5) การออกแบบภาพประกอบสื่อสำหรับเด็ก 6) เทคโนโลยีและนวัตกรรมการศึกษา และ 2. อาจารย์ผู้สอนที่รับผิดชอบสอนรายวิชาในระบบ Thai MOOC จำนวน 6 รายวิชา

เครื่องมือที่ใช้ในการวิจัยประกอบด้วย 1. แบบสัมภาษณ์ผู้เชี่ยวชาญเกี่ยวกับการออกแบบรูปแบบการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์ 2. แบบสอบถามความคิดเห็นผู้สอนเกี่ยวกับการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์ 3. รูปแบบการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์ 4. แบบประเมินความคิดเห็นของผู้เรียน/ผู้สอนที่มีต่อการเรียนการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์

ผลการวิจัยพบว่า 1. ผลการวิเคราะห์วิธีสอนที่พบในการจัดการเรียนการสอนออนไลน์ระบบเปิดสำหรับมหาชน (MOOC) จากเอกสารและงานวิจัยทั้งในประเทศและต่างประเทศ มีดังนี้ 1) การสอนแบบบรรยาย 2) การสอนแบบอภิปราย 3) การสอนแบบกรณีตัวอย่าง 4) การสอนแบบร่วมมือกัน 5) การสอนโดยใช้ปัญหาเป็นฐาน 6) การสอนแบบสาธิต 7) การสอนโดยใช้กระบวนการสืบเสาะหาความรู้ 2. รูปแบบการออกแบบการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษารายวิชาด้านครุศาสตร์/ศึกษาศาสตร์ ประกอบด้วย 7 องค์ประกอบหลัก คือ 1.ข้อมูลเบื้องต้นของรายวิชา 2. โครงสร้างรายวิชา 3. แผนการเรียนรู้ 4. เนื้อหารายวิชาที่ใช้ในการเรียนการสอน 5. สื่อการเรียนรู้ 6. การจัดการและการติดตามการเรียนรู้ และ 7. การวัดและประเมินผลการเรียนรู้ และขั้นตอนของรูปแบบดังนี้ 1) กำหนดระยะเวลาในการเรียน แต่ละรายวิชามีชั่วโมงการเรียนรู้ 12 ชั่วโมง และใช้ระยะเวลาในการเรียนรู้ไม่เกิน 6 สัปดาห์ต่อรายวิชา 2) กำหนดการนำเสนอเนื้อหาประกอบด้วย 2.1 วิดีทัศน์ 2.2 เอกสารประกอบการเรียน 2.3 แหล่งเรียนรู้เพิ่มเติม 2.4 แบบฝึกหัด/คำถามท้ายหน่วย 2.5 แบบทดสอบ 3) กำหนดวิธีสอนและปฏิสัมพันธ์ ได้แก่ 3.1 วิธีสอน 3.2 ส่งเสริมปฏิสัมพันธ์ระหว่างผู้เรียนกับผู้เรียน 3.3 ส่งเสริมปฏิสัมพันธ์ระหว่างผู้เรียนกับผู้สอน ผลการประเมินความเหมาะสมของรูปแบบฯ จากผู้เชี่ยวชาญ จำนวน 20 คน พบว่ารูปแบบฯ มีความเหมาะสมสามารถนำไปใช้ได้ 3. ผลการเรียนรู้ของผู้เรียนทั้ง 6 รายวิชาผ่านเกณฑ์การประเมินผลโดยเฉลี่ย ร้อยละ 36.85 จากจำนวนผู้เรียนทั้งหมดในแต่ละรายวิชา ส่วนผลการวิเคราะห์ข้อมูลของผู้เรียน (Learning Analytics) ทุกรายวิชาอยู่ในระดับดี 4. ความคิดเห็นของผู้สอนและผู้เรียนที่มีต่อการเรียนการสอนออนไลน์ระบบเปิดสำหรับสถาบันอุดมศึกษาที่พัฒนาขึ้นอยู่ในระดับดี

คำสำคัญ : การเรียนการสอนออนไลน์ระบบเปิดสำหรับมหาชน การออกแบบการเรียนการสอน การวิเคราะห์ผู้เรียน

Introduction

At present, various aspects of education, e.g., teaching innovation and instructors' classroom design, have changed considerably. For instance, instructors have to reach groups of students more frequently in order to keep up with the changing characteristics of learners toward the 21th century. An exit from a conventional state university system and the change toward an autonomous university model is also one factor triggering changes in Thai education. In addition, teaching materials and techniques have also changed alongside the changing era. Massive open online courses (MOOCs) present a new technology-based teaching model that

supports unlimited number of learners who are interested in particular subjects. The MOOCs are available for internet-based learners worldwide. Online teaching materials highlight both designed lessons and open resources while leaning activities and evaluation are designed to challenge learners who are eager to acquire knowledge. Learners can control their learning by themselves while interacting with others during learning activities, with the evaluation being based on actual context of mutual learning. The MOOC model is a modern teaching model designed for facilitating the learning. The model highlights more applications of new technologies for learning and teaching. A number of MOOCs are available in reputable universities worldwide and those who complete the course requirements receive formal certificates (Laisakul, 2014). In regard to the teaching techniques, content in the MOOCs is presented in various forms including filmed lectures. Multimedia material is also another practical form for online learning as it is accessible through the internet and available for self-learners at their convenience anytime and anywhere. The MOOC model differs from the conventional classroom-based learning in a way that it tries to convey simplified content to learners through the multimedia platform. The content is presented through the web page technology (Laohajarutsang, 2002).

The Thai Cyber University Project is responsible for sharing resources among universities and institutions at other levels to enhance Thai education quality. The Project offers some learning content for free. The project also expands the outcome to basic education levels and creates a central database system for the purpose of information sharing, e.g., sharing of contents, free software and etc. The open online learning resources are willing to allow the Thai Cyber University Project to act as a central agency to facilitate linkages for domestic uses. During an initial stage, it is crucial that universities' online courses should be appropriately designed. The design of open online courses requires systematic planning, with analysis of learning components, learning and teaching theories, learning materials and activities and evaluation being taken into account. The online courses should be systematically and carefully designed as to ensure that key content is conveyed to online learners with similar quality and standard as in classroom instructions. It is, therefore, essential that the instruction under the MOOC model be designed to suit the learning management and content. It should also be highlighted that universities offering online course are currently encountering difficulty in designing and managing the instruction for the MOOC model. Therefore, it is justified to conduct a research and development on instructional design for the MOOC model on the subjects offered by faculty of education in universities in order to

respond to the policy of Thai Cyber University Project that is responsible for supporting the resource sharing among higher education institutions and institutions at other levels. This is aimed at enhancing Thai education by developing efficient instruction techniques for MOOCs available at universities.

Research Purposes

1) To analyze method of teaching in Massive Open Online Courseware of learning in Thailand and foreign countries.

2) To develop instructional design model for Massive Open Online Courseware in Higher Education.

3) To study learning outcome and learning behavior of learner by using the developed instructional design model for Massive Open Online Courseware in Higher Education.

4) To study opinion of instructor and student toward the developed instructional design model for Massive Open Online Courseware in Higher Education.

Research scope

1) The sample was selected by purposive sampling from learners enrolling for six Thai MOOCs: 1) 115 learners from Creative Movement Activities for Young Children; 2) 153 learners from Human and His Environment; 3) 282 learners from Technique and Method of Instruction; 4) 259 learners from Educational Research; 5) 226 learners from Teaching Illustration Design for Children; and 6) 270 learners from Technology and Innovation for Education. Selected samples by purposive sampling.

2) The instruments were 1) expert interview about instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses (IOC=0.5-1); 2) instructors questionnaire about instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses (IOC=0.66-1); 3) appropriateness evaluation of instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses (IOC=1); and 4) satisfaction evaluation of instructor and learner about teaching and learning with Massive Open Online Courseware in Higher Education for Educational Courses (IOC=0.66-1).

Research Procedure

1. Study online instructional techniques conducted by instructors at the universities that open MOOCs by means of the questionnaire designed for surveying instructors' opinions about the teaching and learning management under the MOOC model.
2. Interview and collect data from experts in MOOC design.
3. Analyze the information obtained from surveying and interviewing the instructors.
4. Draft a designed MOOC model for some subjects available at faculty of education.
5. Have 20 experts assess the appropriateness of the developed MOOC model for some subjects available at faculty of education.
6. Modify the developed MOOC model based on the experts' suggestions
7. Have the developed MOOC model on trail.

Data Analysis

1. Mean, standard deviation, and percentile.
2. Content analysis.

Results

1) The analysis result of instruction methods used for the MOOCs at domestic and international universities

The analysis result from studying documents and research about MOOCs both locally and internationally and interviewing the experts suggested that the instruction methods used for the MOOC model consisted of lectures, discussions, case study, collaboration, problem-based instruction, demonstrations, inquiry process, and socretis method.

The result from synthesis of studying documents, theories, research and interviews with the experts indicates that the lesson content for MOOCs can be presented through a number of videos showing filmed lectures. This reaffirms the result from interviews of the experts, indicating that all teaching methods are applicable for the MOOC model. What method to be applied depends on the content and objectives of each particular subject. One instruction method should be combined with other relevant techniques.

2) The result of development of the MOOC model

There are seven main components of the instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses;

1) Basic information: information about the subject consists of subject name, course description, learning duration and instructors' information.

2) Course structure: The course structure identifies overall course details, i.e., the number of learning units, content, learning timetables and evaluation.

3) Learning Plan: A learning plan identifies detailed learning activities in each section, including content, learning activities, learning duration, teaching materials, measurement and evaluation.

4) Content: Content covers learning hours of not fewer than 12 hours.

5) **Teaching materials**: teaching materials consist of videos, learning documents and learning resources.

6) Learning management and tracking: Learning management and monitoring is a way to organize learning activities by using the MOOC management system for tracking learners' learning details.

7) **Measurement:** Measurement and evaluation can be done in forms of exercises/ questions at the end of each unit and multiple-choice or objective examinations.

The steps of the instructional design model compose of 3 steps;

1. First is duration of learning, there is 12 hours in each course and it take up to 6 weeks. Instructor define the duration that suitable for their instruction.

2. Second is content presentation include video, learning materials, more learning resources, handout and end of unit questions, and test. Instructor should select content materials.

3. Third is method of teaching and interaction. There is method of teaching, encouraging interaction between learner and learner, and encouraging interaction between learner and teacher.

The result of appropriateness evaluation from 5 experts found that the instructional design model for Massive Open Online Courseware in Higher Education for Educational Courses can be used appropriately.

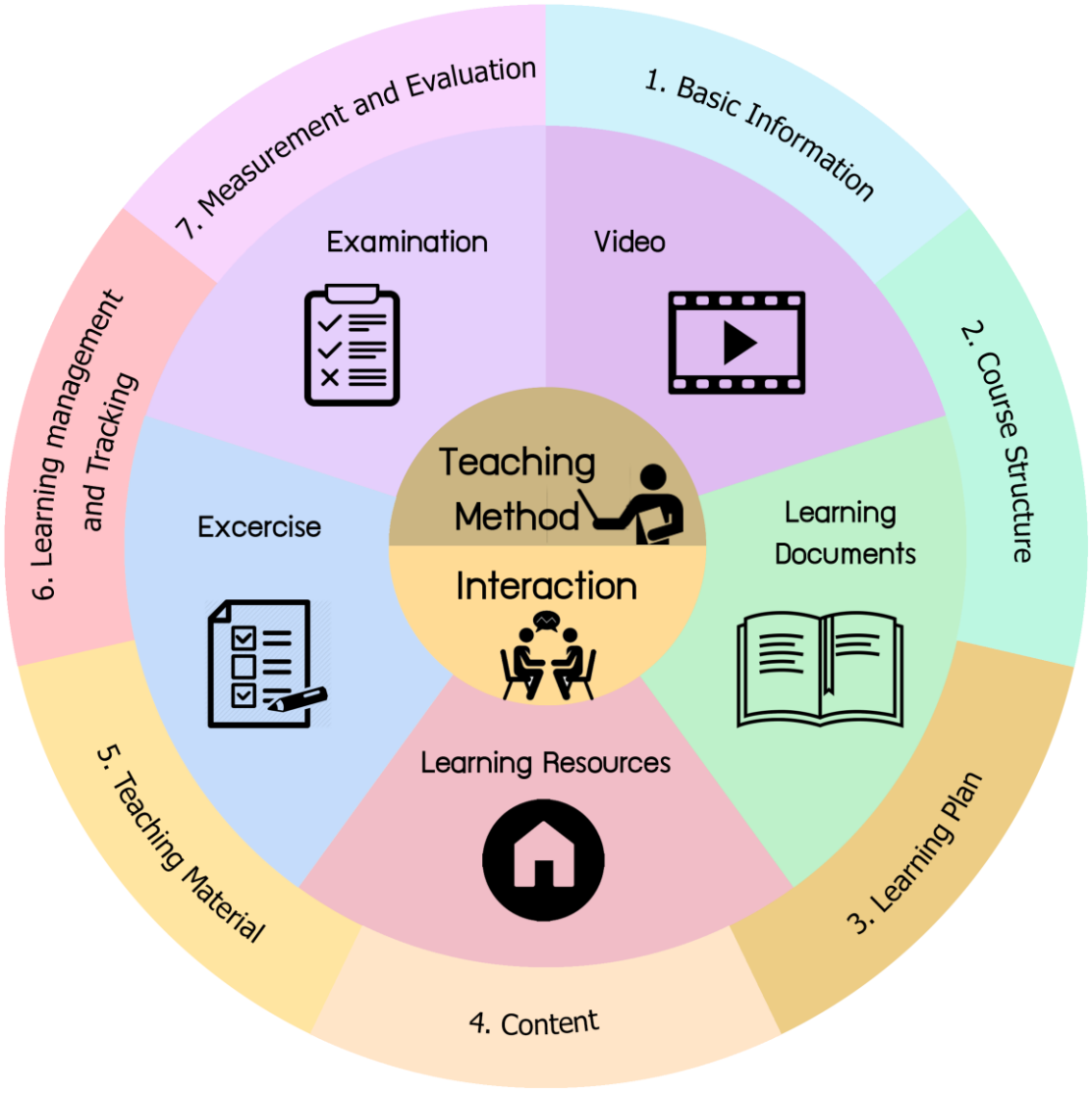

Figure 1. A MOOC Model

3) The results of learning results and learning analytics for all six subjects

3.1) The trial results of the developed MOOC model, for which learners learned the content of the six subjects through online teaching management are discussed below.

1. Creative Movement Activities for Young Children: 55 learners passed the evaluation criteria, which accounted for 43.47 percent of the total 115 learners enrolling for the subject.

2. Human and His Environment: 71 learners, equivalent to 46.40 percent of the total 153 learners enrolling for the subject, passed the evaluation criteria.

3. Technique and Method of Instruction: 91 learners, equivalent to 32.27 percent of the total 282 learners enrolling for the subject, passed the evaluation criteria.

4. Educational Research: 88 learners, equivalent to 33.98 percent of the total 259 learners enrolling for the subject, passed the evaluation criteria.

5. Teaching Illustration Design for Children: 69 learners, equivalent to 30.53 percent of the total 226 learners enrolling for the subject, passed the evaluation criteria.

6. Technology and Innovation for Education: 93 learners, equivalent to 34.44 percent of the total 270 learners enrolling for the subject, passed the evaluation criteria.

3.2) The results of learning analytics for all six subjects.

Most participating learners were school/ university students. Given that the instruction was conducted by instructors of Faculty of Education of Silpakorn University, most learners joining the program were university students, both from Silpakorn University and other universities where instructors introduced and promoted the available online courses. Furthermore, given the fact that most subjects available for the designed MOOCs were the subjects that the instructors already conducted for Faculty of Education, a large number of students were thus interested in enrolling. Another interesting aspect was that the open online teaching model is something new for students, so it could attract a lot of students' attention. Furthermore, the designed MOOCs were launched during the university break, which made it even more convenient for students as they could access to the online learning conveniently from home. Most learners accessed to the MOOCs once a week as the instructors introduced one lesson weekly. This implied that learners should access to the online class on a regular basis. Learners normally spent approximately 30-40 minutes per one session as the content presented in a video for each subject lasted around 15 minutes per lesson; the filmed lectures were followed by other teaching activities, such as questions, discussions, and review of additional teaching documents. To complete the course requirements, learners were required to access to participate in the online class sessions as specified by each subject.

4) The results of opinion of instructor and student toward the developed instructional design model.

The opinions of instructor and student toward the developed instructional design model for Massive Open Online Courseware in Higher Education are good level.

Conclusion and Discussion

The developed MOOC Model for faculty of education is based on the results of analysis and synthesis of various documents and research and the results acquired from interviewing 20 experts. The developed model consisted of seven elements. This reconfirms the view suggested by Asawapoom (2004, p. 55)that a good course design should consist of seven elements: 1) objectives, 2) basis theories, 3) working system and mechanism, i.e., the course model should be systematically designed with clear working mechanisms and steps; 4) the way the developed model works, i.e., mission, procedure, and necessary activities should be identified as to achieve objectives; 5) the model valuation, i.e., identifying methods, guidance and tools for assessing the success of the developed model; 6) explanations of particular terms for the model, i.e., defining specific terms to ensure the same understanding; and 7) identification of conditions required for application of the developed model. Moreover, in the elements of the developed model, there is basis information for MOOC management, which is specified by the Thai Cyber University Project. This is relevant to the results from document analysis and interviews of experts in the MOOC model. In addition, this is also relevant to the research findings by Thinawes &Thammetar (2006) that the teaching design comprises five elements: 1) learning results, 2) content structure design; 3) forms of teaching material; 4) learning activity design; 5) learning evaluation for a large number of learners.

The results of learning analytics for learners enrolling for the six subjects, based on the number of total learners enrolling for each subject suggest that the designed MOOC model is relevant to the teaching management policy of the Thai MOOC, which is an open education system that allows learners and general interested learners to learn through the Internet system without any conditions or limitations that may hinder the learning. This particular learning model requires no admission fee, no admission test and no limitation of the number of learners. It should be noted that the learning in each subject under this particular learning model must be organized by not less than one round, with no fewer than 10 percent of the total learners enrolling for the subject being able to complete the course requirements. The MOOC model requires questions and answers posted to the web board and the questions must be answered within 24 hours by the instructors or teaching assistants. It is also compulsory that teaching management, learner evaluation results and other evaluation results be reported (Thai Cyber University Project, Higher Education Commission [TCU], 2017). In regard to the requirement that no less than 10 percent of the total learners enrolling for the subject shall complete the course, for all six subjects, the average of 36.85 percent of the total

learners managed to complete the course requirements. Apparently, the number exceeded the minimum requirement specified by the Thai Cyber University Project. The fact that around 36.85 percent of the total learners managed to complete the courses may have been attributable to learners becoming more interest in leaning by themselves. Being self-motivated to learn, learners are keen on learning and acquiring more knowledge by themselves. As this is a non-formal education, not a compulsory one, learners are thus self-motivated to learn and complete the courses' requirements. Kritpolviman (2015, p. 5) said that the Thai MOOC model would act an education center for various subjects in education systems, i.e., formal, information and non-formal education systems. This new learning model will help expand education opportunity and lifelong learning through quality and efficient information technology networks. Furthermore, learners' ability to pass and complete the evaluation criteria for each subject is made possible by their own motivation and determination.

Recommendation

1. To apply the model, instructor should analyze content and learners in order to select the teaching method that suitable for instruction.

2. Teacher assistance are needed for Massive Open Online Course to motivate and track students.

3. For future research, the researcher should expand to another subjects in ThaiMOOC..

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