



# Development of Adaptive MOOC Models in Universities

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**Abstract.** The existence of activity restrictions as a follow up to the case of COVID 19, private universities whose learning is not yet based on technology have obstacles to implement online learning policies. Lecturers and students are not ready so the ability to adapt to carry out online learning is low. MOOC is a trend of integrating technology with education where education can be free anytime, anywhere. The development and utilization of MOOCs can encourage students to learn independently online. Based on several studies, MOOC based learning system is suitable for use in online learning and practicum based facilities in covid 19. The purpose of this research is the development of adaptive MOOC model as a technology that anticipates distance learning in higher education. The stages of this research method are Four-D Model which consists of 4 stages of development, namely Define, Design, Develop, and Disseminate. The results of this study stated that MOOC is an adaptive technology that can be mastered by students well and quickly. MOOC can be an alternative to complement and replace traditional learning. MOOC can be a learning tool that is flexible to space and time as well as to user profiles related to age, educational background and educational institution. Learning with MOOC educates students to learn independently to construct the material they get. MOOC has proven to have increased student curiosity and become a learning technology that is close to the younger generation who are accustomed to using technology in their daily lives.

**Keywords:** MOOC · Learning media · Adaptive technology

## 1 Introduction

On March 11, 2020, WHO decided Cases of COVID-19 as a pandemic. Based on decision the Minister of Education and Culture appealed through circular letter Number 36962/MPK.A/HK/2020 related online learning. Furthermore, the Directorate General of Dikti also appealed through decision letter Number 262/EE 2/KM/2020 related Emergency Learning. Universities leaders are encouraged to regulate learning from home and get done in form online learning. Policy the strengthened by circular letter Number 302/EE 2/KR/2020 that the study period in higher education ending in the Even Semester 2019/2020, can be extended.

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A. Kusuma Wardana (Ed.): UPINCESS 2022, ASSEHR 695, pp. 351–360, 2023.

[https://doi.org/10.2991/978-2-494069-39-8\\_33](https://doi.org/10.2991/978-2-494069-39-8_33)

Impact policy the seen in private universities whose learning not yet based on technology. Lecturers and students not yet ready so that ability adapt for carry out low online learning. In the Revolutionary Era Industry 4.0, happening changes big in method communicate. For adapt changes, Higher education in many countries has change policy them. Based on Education policies in developed countries it, looks a underlying trend program development at the higher education level.

In this trend, MOOC plays a role important change education high in the world. Development teaching and learning based on technology this is priority highest in all developed and developing countries. Moment this many universities in developed countries are able to reach rating top because standard high education, flexibility in system education, curriculum, and outreach programs. Sector education in low income countries low like India at first depend on learning stare advance traditional. However After the lockdown, the Indian government has reach success education via MOOC [1].

MOOC is a trend of Technology integration with education where education can be free when course, anywhere. Online learning is one of the process indicator in clustering of Indonesian universities. UPY has e-learning based on moodles that connected with SPADA Indonesia. Based on the data, point of UPY's e-learning usage on October 19 2021 was 3,818. This point is quite low compared to some other universities. E-learning UPY's has many course, but the level of activity is very low. Many lecturers don't use UPY e-learning but prefer to teach through google classroom. Googleclassroom considered to have ease in simplicity features that students can access.

The trend of MOOC continues to be developed and utilized around the world [2]. The development MOOCs as means of online learning has the advantage that the material has open access and many options according to interests, talents and skills. The MOOCs system also facilitates recognition in the form of certificate.

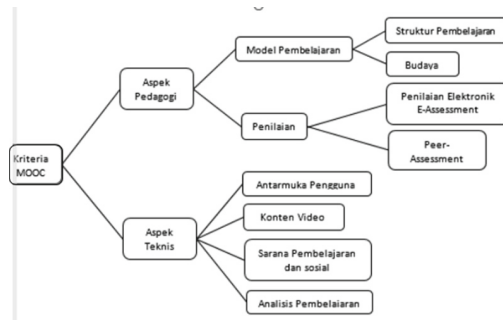
Based on study Yulia [3] the result of the MOOC user satisfaction level falls within the good criteria. This is in accordance with the research of Eko Risdianto et al [4] who conducted an analysis of student response to the MOOC based learning system found that development of learning with MOOCs is appropriate for learning during a pandemic. In addition, based on research by Agus Suyetno [5], it was found that MOOC can be a means of practicum -based learning.

Based on the above description, UPY needs analyze further related to the development and utilization of UPY e-learning. The development of MOOCs is an online learning trend that continues to grow in the world and likewise in Indonesia. Therefore UPY also needs to develop MOOC as a pilot project and experiment to develop online learning best practice.

## 2 Literature Review

The MOOC has the length of the Massive Open Online Course. Massive means a large number of users. Open means open access for anyone without limitations of space and time and is not limited to any knowledge that the user has. Online means learning is done through the internet. While the Course in question is a form of learning that resembles a course (Fig. 1).

Based on Yousef [6], MOOC evaluation is based on two aspects, namely pedagogy and technical aspects. The pedagogical aspect is the aspect that measures the quality of



**Fig. 1.** MOOC quality classification

the MOOC. Several studies have found that good design can help increase the level of involvement of MOOC participants and enable effective pedagogical principles to be beneficial to students [7]. The instructional design of MOOCs encourages the desired learning outcomes [8]. Educational institutions should start reforming the MOOC design process to help users achieve good learning outcomes [9]. Educational organizations must respond to the need to strengthen the integration of concepts, beyond their mastery as individual concepts [10].

Several studies discuss the learning design and views of MOOC students. Pilli [11] lack of instructional design can affect the quality of learning. Learning design and learning environment are major factors influencing the experience and quality of learners [12] and [13]. In Stracke's research [14] emphasizes the need to focus on learners' perspectives at the micro level, demanding specific learning opportunities and different learning experiences. Alumu [15] assesses that continuous feedback from students is also important in creating more effective MOOCs.

Other studies discuss the pedagogical tools and theories used in MOOCs. A qualitative study by Toven Lindsey [16] exploring the various pedagogical tools used in 24 MOOCs, found that the various pedagogical practices currently used in MOOCs tend to lead to an objective-individual approach. Ossiannilsson [13] that "MOOCs rely on connectivity and shared construction of knowledge through connection and negotiation". Pilli [11] considers the facilitation of independent and community learning processes to be a strategic component and demands different types of assessment and personalized feedback as a guide for learners.

Some studies focused on the taxonomy and context of MOOCs that go beyond the classic distinction between cMOOC and xMOOC. Conole G [12] describes five different types of MOOC: associative, cognitive, constructivist, situational, or connective. Albelbisi [17] proposed a distinction between the three dimensions of cues, processes, and product for MOOC research, while Gregori [18] conducted research on the pedagogical aspects of five MOOCs. Based on 4,202,974 indicators of student behavior variables and MOOC features, it is known that teacher-student interaction and video quality in MOOC are the main factors that students can complete learning using MOOC. Margaryan [19] conducted a study of 76 MOOCs based on aspects of teaching and instructional design and found that although MOOCs are generally well designed and set up, the quality of

instructional design is still low. Research conducted by Brahim [20] found that students have the perspective that doing learning outside the classroom through social media, online courses, school websites and private lessons using MOOC has a very positive impact. Hsu, L. [21] stated that technology will assist teachers in carrying out teaching. However, there is no technology that can be a solution to learning problems. Teacher quality is the main determinant of learning success. Teachers must have an understanding of technology, content and pedagogy. This understanding must be used to develop appropriate strategies in various learning problems. Al-Imarah [22] concluded that MOOC based on the evaluation of impact, market opportunities and implementation aspects is a promising innovation.

So the pedagogical development MOOCs that facilitate the process of independent and community learning as well as the development of various types of assessment and personalized feedback as a guide for learners can create more effective MOOC. In context, MOOCs that provide a nuanced understanding of the complex relationship between technology, content, and pedagogy are required for high quality teaching. On the aspect of MOOC learning design that emphasizes on instructional design and that design can help increase the level of involvement of MOOC participants can improve the quality learning.

In addition Wang and Zhu [23] study that developed flipped learning -based MOOCs in higher education showed that students in the average MOOC class performed better than students in traditional classes. In addition, based on a combination of quantitative and qualitative data shows that most students have a pleasant experience of this MOOC based flipped learning.

The research of Conijn [24] related to the performance of students who use blended MOOC in graduate student learning showed positive results on student learning outcomes. Suyetno [5] developed a MOOC on welding materials found that developing MOOC on welding materials found that the implementation, execution, and evaluation of MOOC can be a medium that facilitates practical activities. The MOOC has a feasibility with a percentage of 83.22% and has an ease of use with a percentage of 84.40%.

### 3 Research Methodology

This research use development research (R&D). The development model used in this study is the Four-D [25]. This model consist of 4 stages of development namely Define, Design, Develop, and Disseminate with step following :

1. Set and define learning requirements.
2. Design learning device.
3. Produce development product
4. Promote product development

### 4 Research Results

Before develop MOOC, based on surveys and a review of the relevant literature, the researcher found some requirement before developing a MOOC system in universities.

1. The MOOC system must be accessible via mobile. MOOC is a learning application that can be accessed anywhere and anytime. Users of learning applications are generally between the ages of 25 and 35. At this age, users generally use mobile phones more for all their activities.
2. The MOOC system must also be configured with various menu settings for various user profiles according to the MOOC purpose. MOOC can be used for university students who develop MOOCs as well as for partner universities, MOOC can also be set for general users if the MOOC is intended for general users without a university label.
3. MOOC system for continuous courses, must have automatic daily task list. If the daily task list has not been reached on that day, the user cannot continue to the next topic. This daily task list is tailored to the diverse profiles of MOOC users according to MOOC development goals.
4. The MOOC system must also have a menu related to learning instructions and troubleshooting in the event of a system error. So when users encounter problems related to technical use or system errors, users can solve them independently.
5. The MOOC system must be an intermediary medium between users so that MOOC users can interact with each other if there are problems that cannot be solved independently. In addition, the menu can also be used if there are topics that are not understood only by studying through MOOC. Users can discuss with each other on difficult topics.

The design of MOOC design in this study is as shown in Fig. 2.

In the MOOC is designed so that users can access web, videos learning, online modules , online learning, learning portal and could discuss with friend nor lecturer in the learning community menu, peer chat and mentoring (Table 1).

After the design of the system, the researcher develop a MOOC for the subject of learning Civics Elementary School 2 which can be accessed at <https://moocupypkn.com/>

In the development MOOC, its quality is then assessed based on pedagogical aspect and technical aspects by materials expert and learning media experts. This MOOC then tested for UPY PGSD students class 2021 with class A3-21 as experiment class and class A4-21 as control class. Based on the test conducted in this study, it is known that

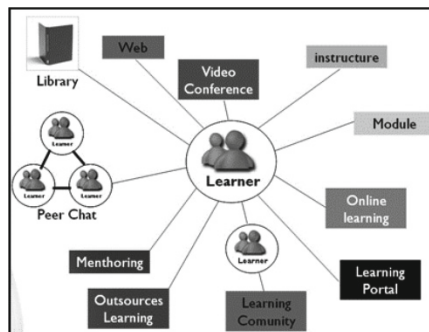


Fig. 2. The design of MOOC

**Table 1.** The Result Independent sample t-test test

	t	df	Sig. (2-tailed)
Different test performance civics class with MOOC and class with googleclassroom	3,614	29	0.014



**Fig. 3.** MOOC developed in this research

**Table 2.** Description of Student Achievement

	N	mean	Std Deviation	Minimum	Maximum
Control Class	30	63	7.54	47.60	83.72
Experiment Class	30	78	10.98	63.00	91.00

the average achievement of students who use MOOC is higher than the achievement of students who use google classroom (Fig. 3).

Based on prerequisite test, it is known that the data are normally distributed and homogeneous. The result of normality test which is using Kolmogorov-Smirnov is 0.378 for control class and 0.674 for experiment class. While the result of homogeneity test which is using levene is known that the performance of experimental class and control class has a significance value of 0.076. So it can be concluded that performance control class and the experiment class have a normal distribution and homogeneous variance. This performance data is eligible for difference testing. Based on difference test results with using t-test independent sample is known that there is difference between the control class and the experiment class.

Based on the Table 2 it is seen that the value of t is 3,614 with a probability 0.005, thus Ho is rejected . So it is concluded that class achievement by using MOOC and googleclassroom has a difference. This is due to the video content approach, where student could easily access it, play and record it so that could studied over and over again until student understand with material. Students can also directly learn interactively

anywhere, work on assignments directly and even ask question to lecturer at the moment the material is broadcast. The coloring in describing the material can also be set, like a laser pointer in a regular face to face classroom. That way students could easily see the points being explained by the lecture. Test presentation on MOOC can vary with essay form or multiple choice .

This is in accordance with the research of Ahmad Natsir Alghifari [26] who stated that the process of content delivery in MOOC is very easy so that users can more understand content learning. Manovri Yeni and Devi Kumala [27] also stated that mooc can be used as a complement to learning in traditional classroom. In addition mooc can also replace the traditional classroom as a whole. Mooc is means flexible learning to space and time. Learners could follow the lesson whenever and wherever they can. By using mooc as a complement class, learners expected to be able to complete the curriculum that they no follow during the traditional classroom. Meanwhile as a traditional replacement class in full with unpaid or paid class fees, students must have more commitment. With flexible time although only a few of mooc that offers a system that really complete, learners can complete the knowledge they no get during school or lectures. With flexible mooc neither limit age of learners who will attend the class, mooc can also worn as a experiment when the learners want try to attend a class that he has never attended before. Muh Bagus [28] the influence of mooc learning model on the learning outcomes of the learners gives a good impact and can improve the learning outcomes of learners. Online learning itself can make learners more effective in the time management hall, learners also do not only depend on teachers or instructors because learners can do independently with the help of the internet.

The online learning model or mooc itself cultivates a greater curiosity towards technological advances that continue to evolve every day and it is expected that learners become more positive individuals in terms of internet use in any case. So that learners can receive the material presented well.

## 5 Conclusion

MOOC is an adaptive learning, innovative and has promising market opportunities. MOOC can be a complementary alternative and a substitute for traditional learning. MOOC can be a flexible learning tool against space and time as well as user profiles related to age, educational background and educational institutions. Learning with MOOC educates students to learn independently to construct the material they get. MOOC has proven to have increased student curiosity and become a learning technology that is close to the younger generation who are accustomed to using technology in their daily lives.

**Acknowledgments.** The research that is the basis of making this article can not be separated from help of various parties for that researcher thanked the University of PGRI Yogyakarta, especially LPPM, and students of PGSD UPY class A3-21 and A4-21 who have participated in helping this research as well as editor and reviewer of seminar proceedings this is what has contained the results of this study.

**Authors' Contributions.** Selly Rahmawati, M.Pd performed the analysis and wrote article.

Beny Dwi Lukito Aji, M.Pd performed conceived and designed the analysis and collected the data.

May Prastika Dewi performed collected the data

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