Effectiveness of Massive Open Online Courses (MOOCs) Using Tudiamipa at Stated University of Medan

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IJASR 2022
VOLUME 5
ISSUE 1 JANUARY – FEBRUARY **ISSN: 2581-7876**

Abstract: Massive Open Online Courses (MOOCs) are present as a solution to the problems faced at the time of the Covid-19 pandemic. MOOCs is an online-based learning system that can be accessed through the internet network, so that learners today can-do teaching and learning activities no longer limited by space and time as they please. Therefore, it is necessary to develop Massive Open Online Courses (MOOCs) using Tudiamipa and see how effective it is. Based on the results of descriptive analysis, then converted in the Value Conversion Table and obtained the results of the percentage of functionality instrument feasibility of 99% while for the results of the percentage of usability instruments of 90.8% with excellent interpretation. Assessments from expert validation of the material obtained an average value of 3.84. Based on this data it can be concluded that this material in the category is very feasible. Based on the results of descriptive analysis of trial results by System Experts, then converted in the Qualitative Conversion Table of The Feasibility Percentage and obtained the results of the percentage of system feasibility in terms of functionality characteristics (sub-characteristics suitability and accuracy) of 100% and have a very decent interpretation. . This User trial was conducted in August 2020. User trial was conducted by 30 people including 10 lecturers and 20 students. The results of the trial of the aspect of learning media that have been developed we can see in the table below; the average value of learning media validation results is 3.66. based on this data it can be concluded that the content material developed is very good. The results of a small trial conducted on 30 students obtained results as can be seen in the table below. The average small class trial result was 3.55. Based on this data it can be concluded that the content developed is very effective and worth using.

Keywords: MOOCs, learning media, online learning

1. Introduction

During the Covid-19 Pandemic the Government made circular Letter No. 4 of 2020 governing the learning process during the Covid-19 Pandemic. Circular Letter No. 4 of 2020 which discusses the mechanism of National Examination (UN), learning process, graduation exam, Class increase exam, new student admission (PPDB), and use of higher education operational assistance during the Covid-19 period (Pusdiklat Kemdikbud., 2020). In learning activities in schools in this circular explained that, first the learning process is done online, secondly learning is focused on life skills education, third learning activities can vary, fourth there must be evidence or products of learning activities from home are given qualitative feedback.

Referring to the regulations of the Ministry of Education, the learning process during Covid 19 is carried out at home through online and out-of-network (offline) means. But not all learners and educators have facilities to access learning media optimally, besides that only 10% of teachers have good IT skills. (Sutarsih & Hasyyati, 2018).

Addressing this problem needs to be done to develop a teaching and learning process that can be accessed anywhere and teaching materials that include skills. It needs to be designed a distance learning process that can include skills. Massive Open Online Courses (MOOCs) are present as a solution to the problems faced at the time of the Covid-19 pandemic. MOOCs is an online-based learning system that can be accessed through the internet network, so that learners today can-do teaching and learning activities no longer limited by space and time as they please.

MOOCs are learning media that are not tied to a particular area. During the use of MOOCs learners can follow learning in other countries that provide MOOCs services. With these advantages, massive open online courses are

expected to be utilized to the maximum to obtain learning information from other countries, so that people have high competence to compete with other countries. There are currently various MOOC platforms available on the internet that provide subject areas with quality materials where most MOOC providers come from abroad and are presented with English. At the beginning of its appearance, MOOC received an overwhelming positive response. In 2011 one of the MOOC staffed by lecturers from Stanford University in the United Kingdom recorded the number of applicants for one of its course materials reached 160,000 people from all over the world (Williams, Stafford, Corliss, & Reilly, 2018). Some of the existing MOOCs platforms include, Coursera, Udacity, edx, Khan Academy, and Duolingo (Jacoby, 2014). The organizers of these MOOCs majors are offered by leading universities from all over the world. These majors usually have the same time as the semester and the same curriculum as students in those majors entirely at the university. In Indonesia, MOOCs have been present at some of the largest universities, namely IndonesiaX released in 2015 by partnering with several domestic and foreign universities such as Harvard, ITB, UGM, ITS, UI, UT and UNPAD.

In Indonesia online courses have not been so popular. A survey conducted by dailysocial.id showed only about 21% of respondents who had used MOOC both in Indonesian and English. The reason for participants not using MOOC was because they did not have free time, limited internet connection problems, and the existence of fees for certain subject matter. But the survey revealed that MOOC received a positive response that 91% of respondents agreed that MOOC can help participants in understanding university subjects (Zebua, 2017).

In Indonesia online courses have not been so popular. A survey conducted by dailysocial.id conducted to 1023 people showed that 51.11 percent of respondents had known about MOOC, the rest did not know at all. Of the total know-how, the majority (79.77 percent) have never tried to use the service for an alternative to learning. A significant reason why Indonesians have not used the internet to access MOOCs first is because there is no time (45.94 percent), then internet connection constraints (32.94 percent) and service prices that are considered expensive (27.66 percent) (Eka, 2017).

2. Research Methods

Advances in information and communication technology / Information and Communication Technology (ICT) enable the development of online learning resources. Online Learning Resources allow the learning process to achieve in the form of "complex skills" needed in the global era while allowing the existence of Student-centered learning (Mills, 2006).

Web-based learning media supported by databases, is one alternative that can be used as one of the alternatives to effective methods. This web-based learning medium consists of learning materials, audio, and learning evaluation (Pratomo, 2013)]. The results of the website-based learning media trial also showed excellent results, where 93% of participants stated that it was very interesting (Tanjung, Sudarma, & others, n.d.).

MOOCs were first introduced in 2006 and emerged as a popular learning mode in 2012 (Kaplan & Haenlein, 2016). MOOCs presents it as a new model of education and learning, which uses the internet to deliver lecture materials at the world's prestigious colleges and educational institutions, creating a kind of revolution and these people join each other to do sustainable courses. This continuous learning model is referred to as "Massive Open Online Courses" or abbreviated as "MOOCs"(Carr, 2012). By creating a learning model from sharing the world available to anyone, any student can access to programs offered by sharing colleges, educational institutions, and educational organizations. MOOCs is an Online-based learning model that can be accessed by everyone around the world for free (Kop & Carroll, 2011). While there are concerns that this could bring disruption and reduce the quality of education in colleges, MOOCs can redefine the concept of college education by providing new learning opportunities for prospective students at faculty and universities to gain the best possible skills.

The location of this research was conducted at FMIPA Universitas Negeri Medan with research time in the odd semester 2021/2022. The research population is all FMIPA students of Medan State University and the research sample is students who take IT-based education media development design courses at FMIPA Medan State University.

The research method used in this research is Research and Development / Research and Development (R&D). The R&D model to be used in the study refers to the design developed by Borg and Gall (Gall, Borg, & Gall, 1996). 1)

Research and information collecting, 2) Planning, 3) Develop preliminary form of product, 4) Preliminary field testing, 5) Main product revision, 6) Main field testing, 7) Operational product revision, 8) Operational field testing, 9) Final product revision, 10) Dissemination and implementation, and in this study is limited to part seven of the ten parts because the seven steps can answer from the formulation of the researcher's problem.

3. Validation

Media validation is the process of assessing whether the product design of MOOCs system developed has been categorized as effective and efficient in increasing student interest and learning outcomes. At the validation stage the initial product design is consulted to a team of Experts consisting of material experts and media experts.

After the product design is validated by material experts and media experts, it can be known the weaknesses or shortcomings of the Media and MOOCs System so that it can be improved to be better and effective. Product trials are an important part of the development research conducted after the product design is completed. For product trials are carried out by means of small group tests and field trials

Once the product is validated by material and media experts and has been tested in small groups and field trials, it can be known the weaknesses of the product. The weakness was later corrected to produce an even better product.

Research Results

The results of the trials of Instrument Experts, System Experts, and Users can be seen as follows:

Instrument Expert Validation

Instrument validation data can be obtained from the results of filling the questionnaire by the Instrument Expert. Instrument validation is done by 3 validators. The instrument used to validate this system instrument consists of 8 statements. Comments and suggestions obtained on instrument validation serve as the basis for revisions before they are tested to System Experts and Users. Instrument validation data is presented in Table 1 and Table 2

Table 1. Functionality Instrument Validation Data

Instrument Validator	Total score	Expected score	Eligibility percentage	Category
Validator 1	40	40	100%	Excellent
Validator 2	39	40	97.5%	Excellent
Validator 3	40	40	100%	Excellent
Average			99%	Excellent

Table 2. Usability Instrument Validation Data

Instrument Validator	Total score	Expected score	Eligibility percentage	Category
Validator 1	38	40	95%	Excellent
Validator 2	35	40	87.5%	Excellent
Validator 3	36	40	90%	Excellent
Average			90.8%	Excellent

Based on the results of descriptive analysis, then converted in the Value Conversion Table and obtained the results of the percentage of functionality instrument feasibility of 99% while for the results of the percentage of usability instruments of 90.8% with excellent interpretation.

Validation of System Experts (Functionality Characteristics)

Functionality characteristic testing uses the Black Box Testing method where the tester will assess based on the instrument in the form of a test case. The functionality testing instrument contains 126 questions that describe the

sub-characteristics of suitability and accuracy, for security sub-characteristics using web testing tools, while the interoperability characteristics of testing software are combined with portability testing because they have the same character.

The functionality instrument is validated by 2 expert lecturers where after validation is given some input so that the system becomes more valid. Every function that runs well then, the tester will provide a checklist on the Yes tab, if the function does not run well then, the tester will provide a checklist on tab No.

The results of the trial of each validator are calculated with validation aspects to find out the feasibility of the teaching material and calculated eligibility per part of the material content. From the table below it can be concluded that the assessment of expert validation of the material obtained an average value of 3.84. Based on this data it can be concluded that this material in the category is very feasible. the results of expert validation calculations of the material are shown in the following table.

Table 3. Material expert validation results

Aspects	Average
Content	3,62
Language	3,6
Picture	4
Video	4
Audio	4
Average	3,84

From both testers stated that each testcase performed get results that are in accordance with its function. Analysis of functionality testing using descriptive analysis techniques using the Guttman scale.

Based on the results of descriptive analysis of trial results by System Experts, then converted in the Qualitative Conversion Table of Eligibility Percentage and obtained the results of the system feasibility percentage in terms of functionality characteristics (sub-characteristics suitability and accuracy) by 100% and have a very decent interpretation. Table 4 shows Security Testing Results.

Table 4. Security Test Results

Types of Security	Level of Risk
Malware	Low
Website Blacklisting	Low
Injected SPAM	Low
Defacement	Low
Internal Server Errors	Low

Reliability Characteristics Test Results Data

Reliability testing on information systems is one of them with the Stress Testing method. Stress testing is one of the software testing methods that determine the durability of software by testing it beyond normal usage limits. The purpose of this test is to force a program to crash and find out how it can work again as soon as possible, the crash can be caused by the many access requests from many users at the same time. Here are the results of reliability testing in Webserver Stress Tool 8. Testing using the Webserver Stress Tool with the scenario rule of 5 users will access simultaneously within 60 minutes. The test report resulted in a total of 1,132 clicks on the system and a total error was found.

Portability Characteristics Trial Results Data

Portability testing of this system uses the help of the Web Testing Tool, which is browserstack.com where testing is done by Cross Browser Testing or checking the system using various browsers on the desktop. Based on the results of testing using Browser Stack, the system has supported desktop and mobile applications, the system can run well with no errors in applications with the operating system Windows8, 10, Android, Macintosh, and IOS. These results can be seen in Table 5.

Table 5. Portability Variable Test Results

No.	Operating System	Type	Question	Result
1	Windows 8	Desktop	Can Tudiamipa run properly using the mozillafirefox browser?	No errors were found
2			Can Tudiamipa run well using google chrome browser?	
3	Windows 10	Desktop	Can Tudiamipa run properly using the mozillafirefox browser?	No errors were found
4			Can Tudiamipa run well using google chrome browser?	
5	Macintosh	Desktop	Can Tudiamipa run properly using the mozillafirefox browser?	No errors were found
6			Can Tudiamipa run well using google chrome browser?	
7	Android	Mobile	Can Tudiamipa run properly using the mozillafirefox browser?	No errors were found
8			Can Tudiamipa run well using google chrome browser?	
9	IOS	Mobile	Can Tudiamipa run properly using the mozillafirefox browser?	No errors were found
10			Can Tudiamipa run well using google chrome browser?	

Data of System Trial Results by Users (Usability Characteristics)

User trials are conducted after obtaining valid results against trials that have been conducted by Instrument Experts and System Experts. This User trial was conducted in August 2020. User trials were conducted by 30 people including 10 lecturers and 20 students. User trial results data can be viewed in Table 6. Shows The Usability Percentage Results of Respondents' Responses to Information Systems.

Table 6. Percentage results usability of respondents' responses to information systems

Category	Number of respondents	Percentage (%)
Excellent	26	86.67
Good	4	13.33
Enough	0	0
Less	0	0
Very Lacking	0	0
Sum	30	100

System Trial Results

The results of the trial of the aspect of learning media that have been developed we can see in the table below, the average value of learning media validation results is 3.66. Based on this data it can be concluded that the content material developed is very good.

Table 7 media expert validation results

Aspects	Average
Design of Content	4
Picture	3,66
Video	3,4
Audio	3,6
Average	3,66

The results of a small trial conducted on 30 students obtained results as can be seen in the table below. The average small class trial result was 3.55. Based on this data it can be concluded that the content developed is very effective and worth using.

Table 8 small class trial results

Aspects	Average
Content	3,6
Language	3,5
Message Design	3,7
Picture	3,6
Video and animation	3,5
Audio	3,4
Average	3,55

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