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UNNES MOOCs: What strengths does the University have and the society needs?

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UNNES MOOCs: What strengths does the University have and the society needs?

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Abstract. The aim of the study reported upon in this paper is to design the Massive Open Online Courses (MOOCs) of Universitas Negeri Semarang (UNNES). An explorative design study was carried out in two main stages, namely the design phase and the implementation phase. The focus of this paper is on the first phase. Preliminary analysis is carried out with discussions and surveys to find out what UNNES is leading and what is the current needs of the society. The findings indicate that UNNES has strengths that are appropriate to the needs of the society, such as (environmental and cultural) conservation, education, and information technology. Based on the procedure specifications and criteria, five online course modules have been created. The results of the review state that the modules are appropriate to be used nationally and can be offered to the public through a national online learning system (SPADA) managed by the Ministry of Research, Technology, and Higher Education of RI. Regulations are established and the system was also designed through this research for the implementation of cross-institutional lectures with credit transfer schemes. The results can become masters in further development and become Academic Document as a recommendation for issuing regulations at universities.

1. Introduction

Advanced technology embodies the concept of "learning everywhere and whenever" to be more comfortable. Here online learning plays a role and has the potential as a disruptor [1]. Online learning can be implemented as an effort to increase access, quality, and efficiency of academic activities. Nowadays, online learning is becoming a more viable and attractive option for students around the world [2].

At Universitas Negeri Semarang (UNNES), online learning has been implemented in several courses in the study program by blending face to face learning with online learning using a learning management system [3, 4]. Online learning is also used as a facility for the implementation of cross-university lectures through credit transfer schemes. Rising demand for open and accessible resources as well as advances in technological and analytical capabilities, Massive Open Online Courses (MOOCs) have become a significant choice for online education [5].

MOOCs are designed and delivered in a variety of ways, depending on the strengths of the organizers and the needs of the target. So, this research was conducted to design the implementation of the MOOCs as one of the strategic steps of Education 4.0 by UNNES.

2. Theoretical Framework

The learning environment is built to facilitate students in developing new knowledge, skills and attitudes. In the learning environment, learner interacts with information through physical facilities, psychological atmosphere, learning technology, media, and methods that is facilitated by the instructor

or teachers [6-7]. Teachers facilitate learning by designing instructions and giving them to students so that information and learning environments can be well managed [8].

In learning mathematics in the 21st century, technology is an important tool and has the potential to be a fundamental tool for learning mathematics and stimulating thinking processes. Schools must provide opportunities for students to have access to technology. However, the use of technology must be well integrated with techniques, curriculum, learning and assessment [9-14]. In Higher Education, several universities provide several alternative models of flexible lecture activities [15]. In general, there are three models of learning activities namely: face-to-face, hybrid learning, or full online.

Learning activity that utilizes networks (Internet, LAN, WAN) as a method of delivery, interaction, and facilitation and is supported by various other forms of learning services is called e-learning. E-learning is instructional content or learning experiences delivered or enabled by electronic technology [16]. There are at least three important things that become requirements in e-learning, namely: (a) learning activities carried out through network (LAN or WAN) utilization; (b) the availability of learning service support that can be used by learning participants, and (c) the availability of tutor service support that can help learning participants when facing difficulties.

Recently, there is an increase in demand for open, accessible learning resources. On the other hand, the development of technology encourages innovation in the field of education, so learning activities become more accessible and efficient but still maintain the quality. Massive Open Online Courses (MOOCs) have become a significant option to answer the challenge [4]. The courses are developed in several ways, depending on learning objectives, target populations and participants backgrounds.

In designing courses, it required the design of MOOCs to provide quality professional development impacting participants. In this research, the principles of Online Professional Development are used in designing courses [1]. These principles are as follows:

a. **Personalization and Choice.** The course should provide enough choice, or personalization among the included activities, such as varied tasks, reflection, so that the participants have the opportunities to choose several options to engage with components that are most useful to them.

b. **Online Community Practices.** The course should facilitate an online community of practice and is not only developed for traditional face-to-face professional development.

In general, this suggests that the development of MOOCs should consider the opportunities for interactions and discussions offered participants to engage in learning to be sustainable and relevant, according to institutional strengths of MOOCs and to suit the needs of the community and national policy. The question is how can MOOCs be developed as one of the strategic steps of Education 4.0 by UNNES?

3. Methods
To address the research questions, a study with explorative design research approach was conducted at the Universitas Negeri Semarang (UNNES) Indonesia in 2019 involving lecturers and students both in UNNES and in other high-level and policy makers at universities as well as public. The design phase begins with a preliminary analysis followed by a series of focused group discussions and designing modules. Data collection was also done through online questionnaires. The results were used to formulate the specification of procedures and criteria that are the basis of policy making and the concept of MOOCs to be created and offered by UNNES. Before use in general, the resulting prototype was tested for practicality, validated by experts and publicly tested.

4. Results
The research begins with a preliminary analysis, followed by focus group discussions and surveys. Several modules were also developed in this study. The results are the standard of the design of modules and its development, Learning Management System development, the product of the module development, an academic document used as the basis for the formulation of regulations of UNNES on MOOCs.

4.1. Standard of modules and its development

Modules for open online courses are developed by starting with analyzing the public needs tailored to the strengths of UNNES that can be offered to the public. The online courses offered are also tailored to the needs and competencies expected to be achieved by the participants of the course in the era of the 4th Industrial Revolution. From the results of the analysis, the open online course modules are designed involving lecturers of related courses and accompanied by the technical (IT and learning media) team.

This stage produces the standard of open online course modules design that is further developed by the technical team following the design that has been planned. The development of the module is adapted to the National online learning standards SPADA-IdREN, reviewed and validated by experts, tested gradually from small group simulations, and continued cyclically for its implementation in larger groups, and could then Implemented nationwide through SPADA-IdREN is intended for the public.

4.2. Learning Management System development

To support the implementation of national online learning, the system was developed with an integrated development scheme as shown in Figure 1.
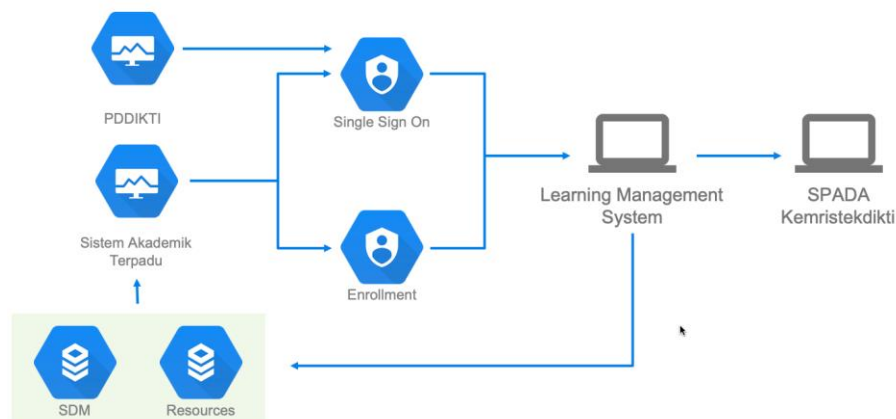

Figure 1. Integrated system development

4.3. Online Course Implementation Strategy

Lecturing using Open online course modules is implemented in collaboration with partner institutions. There are several institutions that are ready to become partners for UNNES, such as Universitas Negeri Makassar, Universitas Samudera (UNSAM) Langsa Aceh, Universitas IVET Semarang. In addition to offering to students in partner institutions, courses are also offered to the public who are interested and need lectures on offer.

Online courses offered by UNNES for students in partner institutions in credit transfer schemes are based on mutual agreements. Students taking online courses organized by UNNES facilitated by UNNES lecturers. The Tutorial is also organized by providing a distance learning centre held on the campus of partner institutions. The online lecture is also applied to the PERMATA SAKTI program (the Indonesian Student Exchange Program with a credit transfer system using information technology) with a scheme of three months of lectures at the partner institution and 3 months in origin institution.

4.4. Development of online modules

The online modules are developed from the modules that are already available in the UNNES's LMS (eLENA). Based on Elena's usage Data in 2019, there are 2,546 online course modules. These modules are then analyzed for compliance with the standard and are cross-checked with survey results on the strength of UNNES and community needs.

Through surveys, lecturers and unnes students reported that the appropriate topics to be proposed for MOOCs were varied. These topics are proposed with different backgrounds as well, such as current needs, national policy, university vision, environmental issues, culture, and nationality. The survey showed that 18% of respondents proposed educational topics including educational media, 16% raised environmental conservation issues, 14% related to cultures, 12% attention to entrepreneurship, Mathematics & Natural Sciences, ICT & Digital Literacy, and Sport, respectively 8%, social sciences as much as 6%, and 10% proposed other topics.

In addition to paying attention to university strengths, community needs are also an important concern in offering MOOCs. Results of surveys involving parties outside of UNNES show that 17% of respondents expect UNNES to offer MOOCs on education, 13% attention to environmental topics, 12% with respect to citizenship, 11% culture, 11% Digital Technology & ICT, 9% mathematics and natural sciences, 7% sports, 6% social sciences, and 7% other topics.

The survey shows that there is some suitability between strengths that can be offered by UNNES to the needs of the community, including topics related to education, ICT, and conservation. The educational topic is considered to the background of UNNES as LPTK (Institute of Teacher Education) and the community has acknowledged the strengths. Information and communication technology (including digital literacy, big data, etc.) is a necessity that is in accordance with the current era. Meanwhile, conservation is part of UNNES vision that can be offered as an advantage and recognized by the community because of the UNNES Commitment in carrying out conservation both in culture and environment.

The survey results were discussed to decide what online modules are the potential to be developed. The findings indicated that development of online modules for Massive Open Online Courses (MOOCs) in accordance with the excellence of the university and the needs of the community, namely the education-themed modules (Consideration: UNNES as Institute of Teacher Education), Conservation (Consideration: UNNES Vision), ICT/Digital literacy (Consideration: trends in 4th Industrial Revolution Era), Citizenship (Consideration: National issue), entrepreneurship (Consideration: Today's community needs).

As a result, four online modules have been developed in accordance with the specifications of procedures and criteria. These modules are available in the eLena (UNNES Learning Management System) and some of them have passed the review by the Kemenrsitekdikti Quality Assurance Team and are declared worthy to be published nationwide through the SPADA (Kemenristekdikti Learning Management System). One of them is a module for Modeling in Mathematics Learning can be accessed via   https://lmsspada.ristekdikti.go.id/course/view.php?id=1916&sesskey=ey6Q1cS3MN.   Some interfaces of the module are presented in Figure 2.
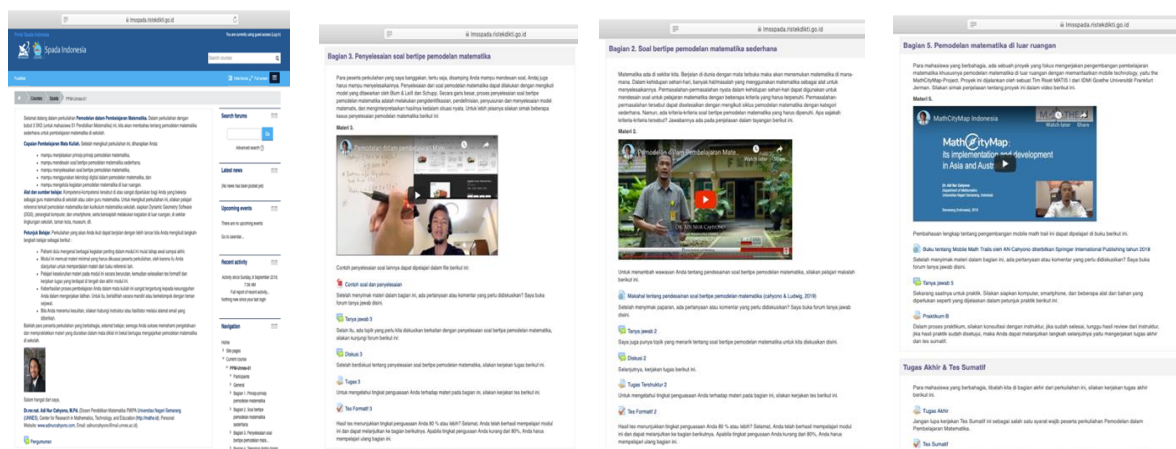

Figure 2. Interfaces of Online Module

Review results stated that modules designed have fulfilled the principles of personalization and choice as well as online Community Practices [1]. The course provides enough choice, or personalization among the included activities, such as varied tasks, reflection, so that the participants have the opportunities to choose several options to engage with components that are most useful to them. The course also facilitates an online community of practice and is not only developed for the traditional face-to-face professional development.

4.5. Regulation and Quality Assurance

This regulation is used to legalise the development of online modules for MOOCs, cooperation, the use of the Learning Management System, and its implementation and also its monitoring and evaluation. MOOCs are held using the LMS owned by UNNES, called eLENA (http://elena.unnes.ac.id) and SPADA Kemenrsitekdikti (http://spada.kemenrsitekdikti.go.id). Related to the regulations, this research recommends UNNES to prepare several documents, such as the standards of Learning Management System used and its content; development mechanisms of the online module and learning objects; Mechanism and facilitation of online lectures, as well as issuing certificates or transcripts of online lecture grades. Implementation of online learning between institutions also must be based on the MoU and get permission from the ministry.

5. Conclusion

This institutional research has resulted in the design of UNNES open online modules. Standards for preparing and organizing online learning have also been formulated through this research. The study also produced four modules for MOOCs that fulfilled the principles of personalization and choice as well as online Community Practices. In addition, academic documents as the basis of regulations and guidelines for organizing open online learning. UNNES MOOCs can be offered to all students UNNES as well as to students at partner institutions or the public. It is implemented as an effort to increase access, quality, and efficiency of academic activities. Advanced research is needed for further development.

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