Design and Development of MOOCs to Develop Civil Apparatus Competence for the Banten Provincial Government Toward Banten Corporate University

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ABSTRACT

Competency development is important for every employee and should be empowered for them. Competency development through training consists of classical training and non-classical training. One form of non-classical training is independent learning and self-development through online learning, such as Massive Open Online Courses (MOOCs). The purpose of this research is to figure out the learning process either before and after the development of MOOCs and to develop an information system for training and independent learning as one feature of LMS Banten Ceria in the form of a Massive Open Online Course (MOOC) as an online learning platform with the principle of independent learning or self-directed learning in order to support the Corporate University program in the Province of Banten. This research has a mixed-methods design that blends qualitative and quantitative methodologies. The 4D Thiagarajan model is used in this study, along with research and development methodologies. The result show that MOOCs are effective in developing the competencies of the civil apparatus in the Province of Banten. The difference in average between the pre-test and post-test scores is 20 points. The learning process after using MOOCs shows improvements in knowledge and competence. Hence, the system of online learning will support the BPSDMD Banten Provincial Program as it becomes a corporate university.

Keywords: *Development MOOCs, Design MOOCs, Civil Apparatus Competence*

INTRODUCTION

Competency development is important for every employee and should be empowered for them (De Vos, A., De Hauw, S., & Willemse, 2015). Indeed, competency development can help employees be more productive and efficient, and can expand their knowledge and skills (Lustri, 2007). Based on Law Number 5 of 2014, Civil Apparatus has the right to obtain competency development at least 20 Lesson

Hour/Year (Devi & Tarigan, 2022); (Mulia, 2023). Civil Apparatus Competency Development is detailly regulated in LAN Regulation Number 5 of 2018 and Number 10 of 2018 (Darmayanti, 2022). Based on those regulations, competency development through training consists of classical training and non-classical training (Tanjung, 2022); (Iskandar, 2022).

Classical training is a face-to-face learning process in the classroom with reference to the curriculum (Sangadji et al., 2022); (Andrayani et al., 2022). Basri and Johannes (2022) state that non-classical training is a learning process outside the classroom such as such as exchange of civil servants with private employees; apprenticeship/work practice; benchmarking or study visits; remote training; coaching; mentoring; detachment; assignments related to priority programs; e-learning; independent learning/self-development; team building; and other pathways that meet the requirements of non-classical training. One of non-classical training is independent learning/self-development by using online learning such as Massive Online Open Course (MOOC). The MOOC term was framed by Stephen Downes and George Siemens in 2008 and is based on the "connective" distributed peer learning model (Baturay, 2015).

Massive Open Online Courses, or MOOCs, are free online courses in a variety of areas that are provided by the best institutions and schools. The first MOOC was a Stanford University experiment in which Sebastian Thrun and Peter Norvig made their "Introduction to Artificial Intelligence" course available online, free of charge, to anyone. Soon after enrolling more than 160,000 students from 190 different countries, Udacity was established. Due to this, MOOC providers like Coursera, edX, etc. began to appear. As of February 2016, edX offers approximately 650 courses from 93 institutions, and Coursera offers 1,800 courses through partnerships with 138 universities and organizations. MOOC is the industry leader in online education and is growing quickly. Numerous more MOOC sites are emerging not just in North America but also in Europe and Asia after the advent of prominent MOOC sites like Coursera and edX (Lee et al., 2016).

Several research has been done on MOOC related to user experience MOOC (Nurhudatiana & Caesarion, 2020), MOOC Influences (León-Urrutia et al., 2018), The Exposure of MOOC Usage in Indonesia (Lubis et al., 2020), The Use of MOOC (Fang et al., 2022), (Chacón-Beltrán, 2014); (Baturay, 2015); Design and Develop MOOC (Seidametova, 2018); (Norazah Mohd Nordin & Ngau Chai Hong, 2009); (Rafiq et al., 2019); (Lee et al., 2016), The Role of MOOC (Paduppai et al., 2021), The Principles of MOOC (Drake et al., 2015), Challenges Teaching and Learning Using MOOC (Zulkifli et al., 2020) and so on. These many MOOC-related studies have been conducted in both the business sector and in general educational institutions. While research on MOOCs is still hard to come by in the public sector, even though several public institutions have developed the system, they rarely make their findings public.

BPSDMD Province Banten as the Human Resources Development in the Province of Banten use both classical and non-classical training methods. BPSDMD Province Banten has the Learning Management System called LMS Banten Ceria. But there is no MOOC feature in the system which can make it easy for civil apparatus in Banten Province to develop their competencies independently not only in the office but also anywhere they can access.

This research is important to achieving the goals of BPSDMD Banten Province, which is committed to becoming a Corporate University. As a result, it's vital to set up

the facilities and infrastructure, in this case IT-based learning in the form of MOOC, which will eventually become one of the aspects of Corporate University.

The problems in this research include: 1) How was learning at BPSDMD in Banten Province before the MOOC existed? 2) What are the steps for developing MOOC at BPSDMD Banten Province? and 3) How is learning at BPSDMD Banten Province after MOOC?. The purpose of this research is to figure out the learning process both before and after the development of MOOC and to develop an Information System for Training and Independent Learning as one feature of LMS Banten Ceria in the form of a Massive Open Online Course (MOOC) as an online learning platform with the principle of independent learning or self-directed learning in order to support the Corporate University program in the Province of Banten.

METHOD

This research has a mixed-method design that blends qualitative and quantitative methodologies (Sugiyono, 2018). Qualitative methodologies are performed to observe and investigate the learning process before and after the development of the MOOC. While qualitative methodologies are employed to assess the MOOC's validity and effectiveness. The 4D Thiagarajan model is used in this study along with research and development methodologies. This methodology breaks down the various stages of research into four stages: Define, Design, Develop, and Disseminate (Thiagarajan et al., 1974). According to Sugiyono (2018), the Define stage is a needs analysis activity that is carried out through field research and literature studies. It involves deciding what product will be developed along with their specifications, At this point, the researcher employed an interview method to gain an overview of the learning process at BPSDMD Banten Province and to determine what information could be included as content in the MOOC.

Activities to develop a predetermined product are found in the Design stage. The researcher has created the first version of the product (a prototype) at this point. Thiagarajan classify the development stage into two activities: expert appraisal and developmental testing. A method to validate or evaluate a product design's viability is expert appraisal. Experts in the field conduct an evaluation in this activity. Developmental testing involves conducting product design trials on the intended audience. In this trial, the intended user of the product is surveyed for response information, reactions, or remarks. The product is improved using the trial data. The product is tested repeatedly until it produces effective results after being revised.

The Dissemination stage is the final stage. The tested product is now spread for the benefit of others. This is the stage in which product that have been developed on a larger scale are used. The development approach in this work is illustrated in Figure 1 below to aid comprehension.

Figure 1. 4D Thiagarajan Research Model on MOOC Product
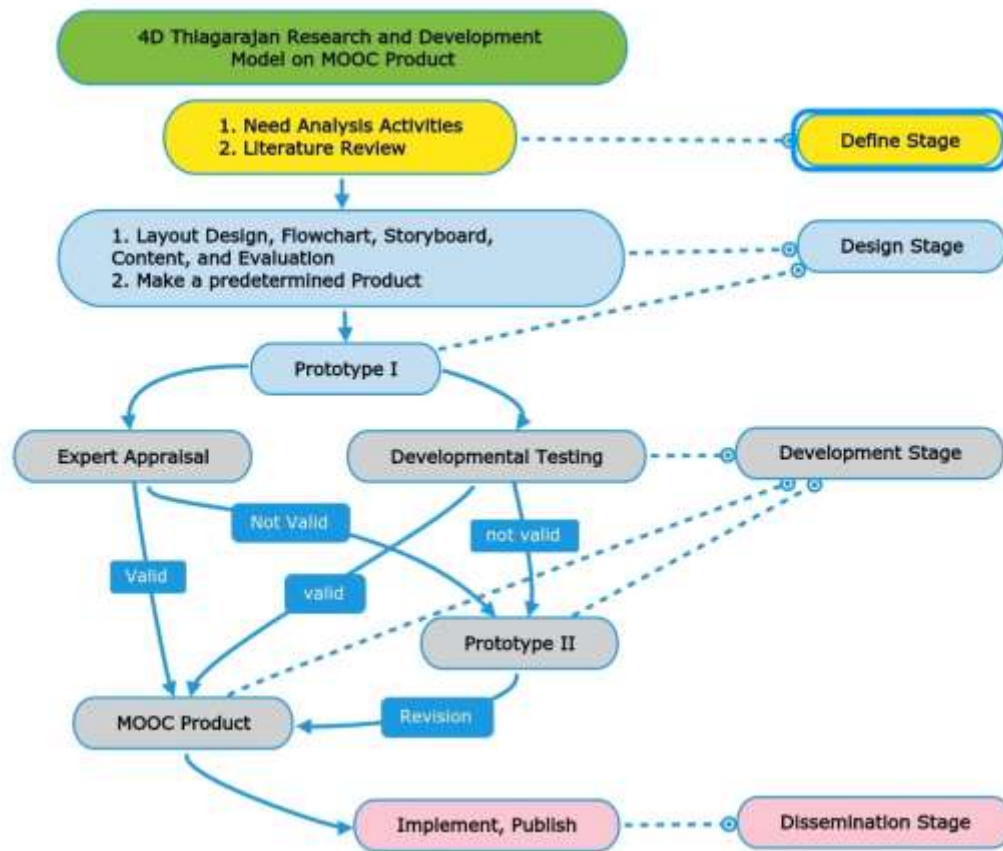
Two experts evaluated the validity of the prototype generated through the literature review. Validation data includes both quantitative and qualitative information. Quantitative statistics are scores acquired from the validator on a scale that includes components of the MOOC's validity and practicability. Meanwhile, qualitative data can be found in the form of ideas, comments, and criticisms, both written and spoken. Both quantitative and qualitative validation results are used as material for revision in enhancing the MOOC (prototype II). In addition, Table 1 shows the assessment component of this development of MOOC.

Table 1. The Assessment Component of The Development of MOOC

Aspects	Instruments	Observed Data	Respondents
Need Analysis	Interview Rubrics	Learning Process Before and After MOOC	Principal of BPSDMD Banten Province
The validity of MOOC	Validation Sheets	MOOC validity in terms of content, presentation, and Language	Experts
The practicality of MOOC	Questionnaire	Response of civil apparatus regarding ease of use	Civil Apparatus
MOOC effectiveness	Pre-Test and Post-Test	The level of Civil Apparatus Competences	Civil Apparatus

RESULT AND DISCUSSION

At the define stages stage the author conducted a need analysis by conducting interviews with the head of BPSDMD Banten Province. Based on the interview with the principal of BPSDMD Banten province in the context of need analysis and learning process, he stated that there are no MOOC features in their Learning Management System (LMS). The Learning Management System (LMS) Banten Ceria is only used to provide the blended learning method. So, the civil apparatus in Banten Province could registered on the training provided by BPSDMD Banten Province as on the schedule. So, it's hard to find the Training which can be accesed by the civil apparatus from their office or from everywhere. He also stated that not all civil apparatus will be able to receive training at BPSDMD Banten Province. Only a small percentage of them are invited in accordance with the annual quota because of the budget limitations. After conducting interviews, the authors conducted a literature review on self-learning systems, the use of MOOC, and other studies that focus on the design and development of MOOC.

In the Design stages, the author communicates with the IT Team to generate layout designs, flowcharts, storyboards, content, and assessments (evaluation) after gathering data on needs analysis based on the interview. At this stage The Author creates a predetermined product MOOCs in Learning Management System Banten Ceria named SIDIK JARI (*Sistem Informasi Diklat dan Belajar Mandiri*), and it called Prototype I as you can see on figure I and II. This MOOC was created with the help of a Moodle-based application. Moodle Application was chosen because Moodle is used as the LMS Banten Ceria's online learning system. The author and the IT specialists discussed about the layout and the flow diagram when creating the MOOC. The user interface's graphic design and content were made by the author.

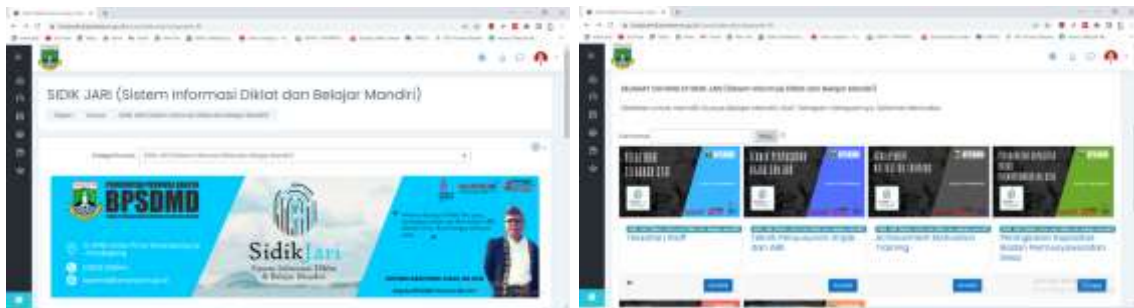Figure 1. The MOOC SIDIK JARI and it's training feature in LMS Banten Ceria

Figure 2. Prototype I of MOOC SIDIK JARI

In the Development Stage, Author asked two experts to validate the Prototype It doing some developmental testing to several employees in BPSDMD Banten Province as you can see on figure 3. Based on the findings of two experts validations of Prototype I, the average percentage score for all areas, namely content feasibility, presentation, and language, was 85.5%. They said that it needs minor **revision** on the layout and several process in the MOOCs. Both experts stated that the instrument of Pre Test and Post Test need to be included in each material and the chapter of Prototype I, also need to be changed. The Chapter is turned into Session, each session consists of Pre-Test, Material, Presentation, Video and Post Test. The outcomes of developmental testing by several civil apparatus at BPSDMD Banten Province, which concluded that it would be preferable if the menu in the MOOC were transformed to a session, supported the results of the expert validation.

Figure 3. Developmental Testing of MOOC
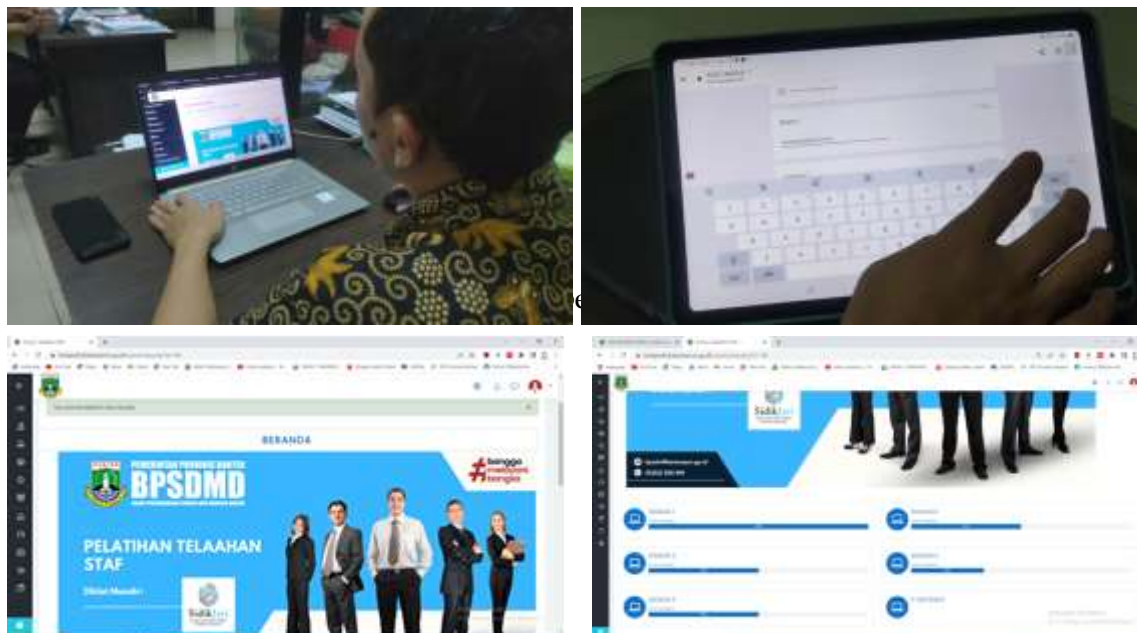
The average percentage score for all areas, including content feasibility, presentation, and language, after Prototype II was revised and then again validated by experts was 94.5%. Based on the defined validity criteria, this improved prototype of the instructional material in the form of a MOOC can be regarded as valid. Each chapter's menu has been transformed into a session based on advice and input from experts and several civil apparatuses. This indicates that the MOOC is usable after considering the validator's suggestions and comments. Additionally, civil apparatus in the BPSDMD Banten Province were subjected to trial actions.

The time schedule for the product testing was from the middle of May to the middle of June 2022. The civil apparatus was also given a questionnaire to evaluate the effectiveness of the MOOC and a test, including a pre-test and post-test of each session, to assess their competencies as an indicator of the effectiveness of the MOOC. After the trial period, civil apparatus received a questionnaire to assess the viability of the MOOC. The questionnaire consists of 12 statements that are assessed on a Likert scale of 1-4 and include efficiency, efficacy, usability, user experience, consistency, and accessibility. The results of acquiring a questionnaire score are displayed in Table 2.

Table 2. Description of Civil Apparatus Questionnaire Score Data

Data Description	Score
Average	39,2
Standard deviation	3,28
Varians	10,21
Highest Score	46
Lowest Score	34
Ideal Maximum Score	48
Ideal Minimun Score	12
Total Respondents	30

According to table 2, the average score of the questionnaire is 39.2 out of a maximum score of 48. The standard deviation of 3.28 implies that the typical respondent provides a value that is not significantly different from the average. This signifies that the average respondent is positive about the MOOC's use. Furthermore, based on the calculation, the MOOC's level of practicability is 79.83%, placing it in the good category. This indicates that the MOOC is useful or simple to use.

After acquiring valid and practical MOOCs, civil apparatus are given a Pre-Test and Post-Test to determine whether the instructional materials in the form of MOOCs are effective or not in terms of civil apparatus competences. The preceding test questions were also checked with the same validator as the validator for material experts before being deployed. Content validity is the result of validation, and the validity coefficient is derived using the Gregory index. Based on the calculations, a validity coefficient of 0.71 was obtained. As a result, the validity of this test instrument is moderate. Table 3 provides a description of the test result data obtained:

Table 3. Description of Civil Apparatus Test Score Data

Data Description	Pre-Test Score	Post-Test Score
Average	52,5	72,5
Standard deviation	11,07	8,2
Varians	122,55	97,55
Highest Score	77,5	85
Lowest Score	32,5	37,5
Ideal Maximum Score	100	100
Ideal Minimum Score	0	0
Total Respondents	25	25

Based on table 3, We can observe an improvement in understanding of the material being studied. The difference between the pre test and post test average values is 20 points. This demonstrates that the use of MOOCs in improving civil apparatus understanding and competence is effective. This finding is comparable to those of other prior MOOC research, such as Wang (2020) and also Woon (2019), who suggested that students' judgments of usefulness should be used to develop courses, increase teaching efficiency, and improve MOOC learning accuracy.

However, despite the convenience, effectiveness, and efficiency of MOOCs, the success of learning is also supported by the main factor, namely the presence of a teacher who is a determining factor for the success of a training, which is consistent

with Evianto (2020) findings, which state that training participants believe that learning infrastructure factors are the most important determining factor for success, followed by the widyaiswara/online instructor factor. While training participants evaluated the training material and learning design variables to have the least influence on the successful implementation of the MOOC.

MOOCs can also be used to create new knowledge, converting tacit and wisdom knowledge into explicit knowledge (Baporikar, 2014) that is recorded in the Knowledge Management System (Maria, 2021). Knowledge Management System is the main pillar in Corporate University (Maria & Kumar, 2016), which is a very effective and successful human resource competency development strategy, particularly in the private sector (Holland & Pyman, 2006).

The Dissemination stage comes after the Define, Design, and Development stages are finished. At this point, the author held road performances in numerous urban districts and regional apparatus organizations to implement and publish the MOOC Products. However, due to time restrictions, not all urban districts in Banten Province received this dissemination phase. The Government of Pandeglang Regency, the Government of Serang Regency, and the Government of Cilegon City were a few of the city areas that were visited. In order to learn more about the experience and reactions of the head of BPSDMD Banten Province and other civil apparatuses in the Province of Banten, the author also conducted a number of interviews with them at this point. The head of BPSDMD Banten Province and numerous civil apparatuses in the Banten Province both responded that this MOOC will simplify the learning process for all civil apparatus in Banten Province as they developed their competences as civil servants.

This will be advantageous for BPSDMD Banten Province's efforts to become a Corporate University as well. Since a Knowledge Management System, which will include this MOOC, is one of the foundational elements of a Corporate University as mentioned by Wang et al (2010), that knowledge systems and processes are one of the Corporate University's four conceptual frameworks (Prince & Stewart, 2002). Moreover, MOOCs are a type of learning infrastructure that can give ease for Civil Apparatus to learn and advance their skills wherever they are.

The main findings of this research are MOOC in BPSDMD Province Banten has been develop by using 4D stage namely Define, Design, Develop and Disseminate of Thiagarajan RnD Model and those MOOC is effective in developing the Competences of Civil Apparatus in The Province of Banten, the difference average of Pre-Test and Post-Test score is 20 points. The learning proces after using MOOC show the improvements in knowledge and competences, so this system of online learning will support the BPSDMD Banten Provincial program as it becomes a Corporate University.

The finding of this research is totally different among previous findings. Eventhough the method used in this research was 4R Thagarajan model which is widely used by scholar, the platform, the design, the user interface and the content in developing the MOOC is different among others. The purpose of this research is to figure out the learning process both before and after the development of MOOC and to develop an Information System for Training and Independent Learning as one feature of LMS Banten Ceria in the form of a Massive Open Online Course (MOOC) as an online learning platform with the principle of independent learning or self-directed learning in order to support the Corporate University program in the Province of Banten by using Moodle-Based Platform. Seidamentova (2018) divided the process into four stages: preproduction, production, postproduction, and maintenance. She showed

a typical MOOC development plan, which included rules for developing course content, video content implementation, and role development. She uses the video content matrix of the quasi-MOOC "Ruby on Rails Web Framework for Beginners" as an example.

Singelmann (2019) proposes using machine learning analytics to provide participants in a Cardiovascular Engineering Innovation-Based Learning course with relevant personalized feedback. As students create learning objectives and progress through the course, the system will track their behaviors, allowing the system to learn and make recommendations for the learner. Lee et al. (2016) applied the ADDIE model to create a MOOC design model that would improve the current practice of MOOC creation in Korea by defining simple course development methods and guiding techniques. Rafiq et al. (2019) applied the ADDIE and ASSURE to develop its MOOC for Communicative English (CE) Training.

Others research try to figure out the role, effectiveness and eficiency of MOOCs. Fang et al (2022) explore the advancement and the foci of investigation of MOOCs and open online courses for language learning: a review of journal publications from 2009 to 2018. Zulkifli et al. (2020) performed research to determine the main obstacles to the implementation of MOOCs at one Southern Zone Polytechnic. Wang (2020) combines the technology acceptance model with the idea of planned behavior to provide a theoretical model of the mechanism underlying MOOC learning performance. Nurhudatiana & Caesarion (2020) evaluated the user experience of two popular MOOC platforms, Coursera and Udemy, using the seven dimensions of the UX honeycomb, which include usefulness, usability, desirability, findability, accessibility, credibility, and value. Lubis et al. (2020) examined the MOOC phenomena in Indonesia, including its historical evolution, the number of participants and platforms, and the distribution of courses by subject. MOOCs reflect a postindustrial style of teaching and learning that has the potential to undermine and replace institutions' business models that rely on attracting and maintaining students for location-bound, proprietary types of campus-based learning. (Mazoue, 2013).

The findings of this study indicate that the learning process at BPSDMD Banten Province has improved. The existence of this MOOC substantially helps ASN Banten Province by allowing them to study anywhere, at any time, and without the need for a lot of time and money. Furthermore, the BPSDMD head establishes a policy requiring each Widyaiswara to create content to go along with the materials in the MOOC in accordance with their particular areas of specialization. After the MOOC was developed, he issued a decree related to the policy of implementing Fingerprint MOOC for Banten Provincial Government apparatus and also state civil servants in city districts.

This study is limited to MOOC design and development with a single subject matter of "Telaahan Staf". Due to time and energy constraints, the author did not perform a more in-depth analysis of the effectiveness and efficiency of this MOOC using other resources. Only the findings of the pre-test and post-test are used by the author to assess the effectiveness and utility of MOOCs in improving the learning process. As a result, the authors recommend that the usability, user experience, efficacy, and efficiency of this MOOC be researched further in order to achieve better outcomes and develop it in the future.

CONCLUSION

The MOOC was created in the BPSDMD Province of Banten using the Thiagarajan RnD model's Define, Design, Develop, and Disseminate stages. The fact that there was a difference of an average of 20 points between the scores on the Pre-Test and Post-Test indicates that this MOOC was successful in enhancing the abilities of the civil apparatus in the Province of Banten. This online learning system will assist the BPSDMD Province Banten program as it transforms into a Corporate University because the learning process after using MOOCs shows advances in knowledge and competencies.

This study has several limitations. There are still many shortcomings in the construction of the MOOC at BPSDMD Banten Province because not every training materials can be uploaded into the MOOC. It is hoped that the widyaiswara will be eager to assist with fill up the materials, create learning videos, and design pre-test and post-test instruments for each subject they teach. MOOCs, as one of the learning infrastructures of BPSDMD Banten Province, can be used as a platform for obtaining tacit knowledge held by Banten Provincial leaders of government organizations. As a result, it is strongly recommended that the leaders of government organizations in Banten province collaborate and contribute so that all tacit knowledge can be collected in the KMS throughout time.

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