The Model of Instructional Design Based on Self-Regulated Learning using Modular Object Oriented Dynamic Learning Environment (MOODLE)

Mawardi[1][*] Haris Mudjiman[2] Sri Anitah[1] Asrowi[3]
1.The Faculty of Teacher Education and Pedagogy, Satya Wacana Christian University, Indonesia
2.The Faculty of Teacher Training and Education, Sebelas Maret University Surakarta, Indonesia
3.The Post Graduate Program, Sebelas Maret University, Surakarta, Indonesia
[*] E-mail of the corresponding author: mawardiu@gmail.com

Abstract
The objectives of this research are (1) to develop a model of self-regulated instructional design by using MOODLE; (2) to investigate how far an instructional model can develop students' self-regulated learning; and (3) to investigate the effectiveness of the instructional design model in increasing students' study competency moderated by their self-regulated learning. This research used the R & D research method. The procedure of the research consisted of three phases, namely: preliminary study, model design and development, and model effectiveness assessment. In the preliminary study, literature reviews on MOODLE instructional design and self-regulated learning theories and a small-scale field survey were carried out to get an idea of the instructional design model on the basic concepts of Civic Education presently applied. In the phase of model design and development, a model draft was developed to be validated by experts before limited and extended field tests were executed. In the phase of model effectiveness assessment, an experiment using the model of the Matching-only Pretest-Posttest Control Group design and factorial design was conducted. There were 76 participants in this effectiveness assessment, consisting of 36 university students and 2 lecturers as the experimental group, and other 36 university students and 2 lecturers as the control group. The research instruments used test questions to measure the variable of the students' learning result competency and rubric scales of learning independence to measure the learning independence covariance. The data analysis technique used the techniques of Independent Sample t-Test and ANCOVA. The results of R & D are as follows: 1) The instructional design is executed through the following steps: identifying core competencies, carrying out instructional analysis, carrying out students' characteristic analysis, formulating in-between competency, developing online evaluation instruments, developing instructional strategy, developing Learning Object Materials (LOM), designing and executing online formative evaluation, revising the program, and designing and executing summative evaluation. 2) The model of the instructional design based on self-motivated learning using MOODLE promotes a higher learning autonomy than the instructional design model using CD-ROM and e-mail. 3) The model of the instructional design based on self-motivated learning using MOODLE effectively increases students' learning result competency moderated by their self-motivated learning and is better than instructional design model using CD-ROM and e-mail.
Keywords: instructional design, self-directed learning, and MOODLE

1.   Introduction

One of the pedagogical competency components that must be mastered by teachers is the ability to design the process of teaching/learning well. A well-designed instructional design will effectively help to achieve the proposed learning results. A good instructional blueprint is a blueprint of the components of learning system designed based on certain learning theories rather than on the teachers' intuition only (Knirk & Gustafson, 1986:7; Clark & Mayer, 2008:7). The components of learning system encompass learning objectives, learning materials, learning strategies, learning media, and teaching/learning evaluation. Nonetheless, in reality, there are many teachers who do not carry out the design well. The reflective question posed by Dick, Carey & Carey (2009:10) seems relevant."... If you are a teacher, you may find yourself saying, "I could never use this instructional design to prepare all my instruction," and you would probably be correct".

The preliminary study and the analysis on the documents of the syllabus and lesson plan for the course of basic concepts of Civic Education shows that: (1) 75% of the lecturers who lecture the basic concept of Civic Education have not yet oriented on the theory or instructional design model using system approach in designing the teaching/learning process such as Dick & Carey model, *ASSURE* model or Kemp model; (2) 48% of university students state that the material packaged in the form of CD does not help to master the basic concept of Civic Education; (3) The instructional strategy designed by the lecturers still uses one source exploration strategy, namely the material from the CD, instead of using strategy that can increase the learning motivation, eagerness, and learning independence; (4) The instructional media design using e-mail and CD does not help the students much in achieving the teaching/learning objectives; and (5) The evaluation design still uses the objective test as the main instruments and also tutorial assignments through e-mail. This does not give the

students many authentic experiences.

The findings of the preliminary study give contribution in analyzing the need for instructional design model. According to Dick, Carey, & Carey (2009: 17-33) the need analysis can be executed by identifying instructional goals using front-end analysis. Basically, the front-end analysis is the analysis of the beginning and the end of the teaching/learning process as the starting point in developing the instructional design. The front-end analysis is carried out by using instruments to identify the teaching/learning problems, in order to determine the correct instructional process. (Dick, Carey, & Carey. 2009: 22; Morrison, Ross & Kemp. 2004:27). There are three logical steps in analyzing the teaching/learning needs, namely: 1) setting the standard or the objective of the teaching/learning process as a reference for the desired status, 2) determining the actual status of the teaching/learning process, and 3) identifying the gap between the desired status of the teaching/learning achievement standard and the actual status. The gap is the educational system problem or the need that have to be solved.

Basically, a need is the margin between the desired status and the actual status. Thus, the equation used to calculate the teaching/learning needs is: Need = desired status - actual status (Dick, Carey, & Carey. 2009: 22). Following the instructional need analysis model proposed by Dick & Carey, there are discrepancies in designing and executing the basic concepts of Civic Education as follows: 1) 75% of lecturers, when designing the teaching/learning process, have not yet oriented on the instructional design model using system approach in designing the teaching/learning process such as Dick & Carey model, *ASSURE* model or Kemp model. 2) The discrepancy of the students' learning activeness average reaches up to 30%. 3) The discrepancy of the students' learning independence reaches up to 20%. 4) The average discrepancy in achieving the core competency on the basic concept of Human Rights, comprehending the basic concept of globalization, and describing the basic concept of international relationship reaches up to 42%.

Upon examining the disparities in designing and executing the basic concept of Civic Education, it can be concluded that the aforesaid disparities need to be solved. An alternative of the instructional design model believed by the researchers to be able to fulfill the instructional needs of the basic concept of the Civic Education is the model of the instructional design based on self-motivated learning using MOODLE. The chosen model fulfills the following elements: 1) In choosing the teaching/learning program (syllabus and lesson plans), it is oriented to the instructional design model by using Dick & Carey system approach. 2) The packaging of the teaching/learning material facilitates a flexible access for the students. 3) The instructional strategy used is multiple strategies, which enable self instruction to occur as mandated by Regulation of the Ministry of National Education Number 58 of 2008 on the management of the *Program Sarjana Kependidikan Guru dalam Jabatan/SKGJ* (Bachelor Program of Teacher Education in Profession). 4) Using the technology, the integrated delivery media is an internet-based pedagogical approach, which motivates the students to follow the course independently, actively and pleasantly. 5) Varieties of evaluating instruments are used to measure and evaluate the students' competencies objectively.

2. Literature Review

Basically, an instructional design model is an effort to systematically develop the teaching/learning components by using certain learning and instructional theories (Soetarno Joyoatmodjo. 2011:66). In the nomenclature of the teaching/learning technology, there is an instructional design model classification, namely: a class-oriented model, a product-oriented model, and a system-oriented model. A class-oriented model is usually aimed at designing a micro-learning level, which usually is only executed every two lesson hours or so. The examples are the ASSURE model (Analyze Learners; States Objectives; Select Methods, Media, and Material; Utilize Media and Materials; Require Learner Participation; Evaluate and Revise). The example of the product oriented model is the Hannafin and Peck model. The Hannafin and Peck instructional design model consists of three steps, namely: the need analysis phase, the design phase, and the development and implementation phase. A system-oriented model is an instructional design model to produce a system that has a wide coverage instead of a complete instructional design system. The example of system-oriented model is Dick and Carey model. The steps are: 1) identifying instructional goal(s), 2) conducting instructional analysis, 3) analyzing learner and contexts, 4) writing performance objectives, 5) developing assessment instruments, 6) developing instructional strategy, 7) developing and selecting instructional materials, 8) designing and conducting formative evaluation of instruction, 9) revising instruction, and 10) designing and conducting summative evaluation (Dick, Carey and Carey. 2009:6).

Upon comparing those three instructional models, it is clear that the Dick and Carey model is more complex and its coverage is wider than the ASSURE model and the Hannafin and Peck model. The Dick and Carey model can be used to design the teaching/learning system for half a semester time. In this R & D research, the researchers use Dick, Carey and Carey model to design the teaching/learning process, considering the fact that the teaching/learning process is designed for half a semester time, consisting of three subjects.

Borg, Gall & Gall (2007:589) states that the ten steps of Dick and Carey instructional design model have

frequently been used in the research as well as in the development of educational scope. The activities derived from the ten steps in developing instructional design created by Dick and Carey result in five major components of the instructional system, namely: components of learning objectives, learning assessment, learning strategy, learning media, and learning material. Furthermore, Borg, Gall & Gall elaborate the steps. Step 1, identifying instructional goal(s), is the initial step to determine the competencies which become the teaching/learning needs. This first step is the foundation in designing the whole learning/teaching components. Steps 2, 3, and 4, namely: conducting instructional analysis, analyzing learner and contexts, and writing performance objectives, simultaneously generate the first component of the teaching/learning system, that is, the performance objectives. Step 5, developing assessment instruments, is a step in developing the assessment instruments that directly leads to the knowledge and skill that have been established beforehand. Steps 6 and 7, developing instructional strategy and developing & selecting instructional materials, are the steps in designing the strategy, the media, and the material needed to achieve the teaching/learning objectives. Consecutively, steps 5, 6, and 7 generate the components of the teaching/learning system: the second (**learning evaluation**), the third (**learning strategy**), the fourth (**learning media**), and the fifth (**learning material**). Simultaneously, Steps 8, 9 and 10 (designing and conducting formative evaluation of instruction, revising instruction, and also designing and conducting summative evaluation) are the steps in designing and exercising both formative and summative evaluations, by referring to step 5 (develop assessment instruments). Formative evaluation has different functions from summative evaluation. Formative evaluation is executed when the program is still in the process of developing, so it can be used as a foothold to improve the program. Meanwhile, summative evaluation is conducted at the end of the program to investigate how effective a certain program to fulfill teaching//learning needs (Scriven In Borg, Gall & Gall, 2007:590).

The teaching/learning objective and learning evaluation components are two components that are directly interrelated and become the target to be achieved in a learning process. The teaching/learning objectives are commonly divided into two categories, namely: the common learning objectives and the specific learning objectives. The common learning objectives are still a general objective, which has not yet described the specific manners to be obtained. On the other hand, the specific learning objectives are more specific and operational. In relation with these learning objectives, Oemar Hamalik (2008:78) states that based on the types of its behavior, the leaning objectives are divided into three spheres, namely: cognitive, affective, and psychomotor.

The teaching/learning evaluation is connected with instrument containing specific criteria to find whether the teaching/learning targets or objectives have already been achieved (Dick, Carey and Carey. 2009:132). In various literatures on learning evaluation, the terms of evaluation, assessment, and measurement are often used interchangeably, while actually those three have different meanings and functions. Henson & Eller (1999:456) affirms that"Measurement and evaluation, though frequently used interchangeable, have different meanings". Evaluation functions more as a tool to identify whether a planned program has been accomplished and whether it is valuable or not, and it can also used to know its execution efficiency level. It answers questions on how well the students' learning results or performances. Meanwhile, measurement is the process of grading or giving scores or an attempt to find out the numerical descriptions of a certain phenomenon which reflects a student competency after the teaching/learning process.

The three components of learning strategy, learning media, and learning materials are three learning system components which become the central point in developing learning/teaching activities based on Moodle. Pujiriyanto (2012:201) states that the teaching/learning activity using MOODLE as a form of e-learning is not merely placing the course material designed by the lecturers in a web-site portal, which are then being down-loaded and read by the students. It is a design made by integrating the teaching/learning strategy, learning material, and learning media based on certain pedagogical model.

In relation to this pedagogical model, Dabbagh & Bannan-Ritland (2005:164) define it as a theoretical structure based on the teaching/learning theory so as to facilitate the execution of the teaching/learning strategy. The pedagogical model has outlook on the teaching prescriptive (how to teach) and the descriptions of the teaching/learning process (how to learn), which can be translated onto the teaching/learning practice. Theoretically, Dabbagh & Bannan-Ritland (2005:165) develop pedagogical model based on the theory of information processing in science acquisition based on constructivism. One of those pedagogical models is Cognitive Information Processing model. This model explains that human brain has parts which work to process information, working as a sensor register and *having* short term memory or working memory and long term memory. Moreover, Dabbagh & Bannan-Ritland (2005:210) elucidate that the teaching/learning strategies are also depicted in the Cognitive Information Processing model. That teaching/learning strategies are divided into four, namely: 1) exploratory strategy, 2) dialogic strategy, 3) supportive strategy, and 4) self-motivated learning strategy as the slice strategy.

Schematically, the teaching/learning strategy based on constructivism-pedagogical model can be examined from Figure 1. The figure shows that the authentic learning strategy as the main strategy encompasses three strategies, namely: exploratory strategy, dialogic strategy, and supportive strategy, and also, self-motivated learning

strategy as the slice strategy. The self-directed learning strategy as the slice strategy is a richly featured strategy and potentially able to give authentic experiences to the students (Dabbagh & Bannan-Ritland, 2005:223). It is further elucidated that self-directed learning is an activity carried out by the students to plan, manage, and control one self, and to reflect one's own learning process to achieve a certain desired competency. Meanwhile, Haris Mudjiman (2011:9) defines self-directed learning as an active learning activity, driven by the motive or intention to master a certain competency in order to overcome a certain problem, and built up with the stock of knowledge or competency that one already possesses. Meanwhile, according to Jarvis, self-directed learning is the ability to take an initiative in regulating, managing, and controlling one's own learning process to overcome various problems in learning using various learning alternative or learning strategy. (Jarvis, 1990:167).
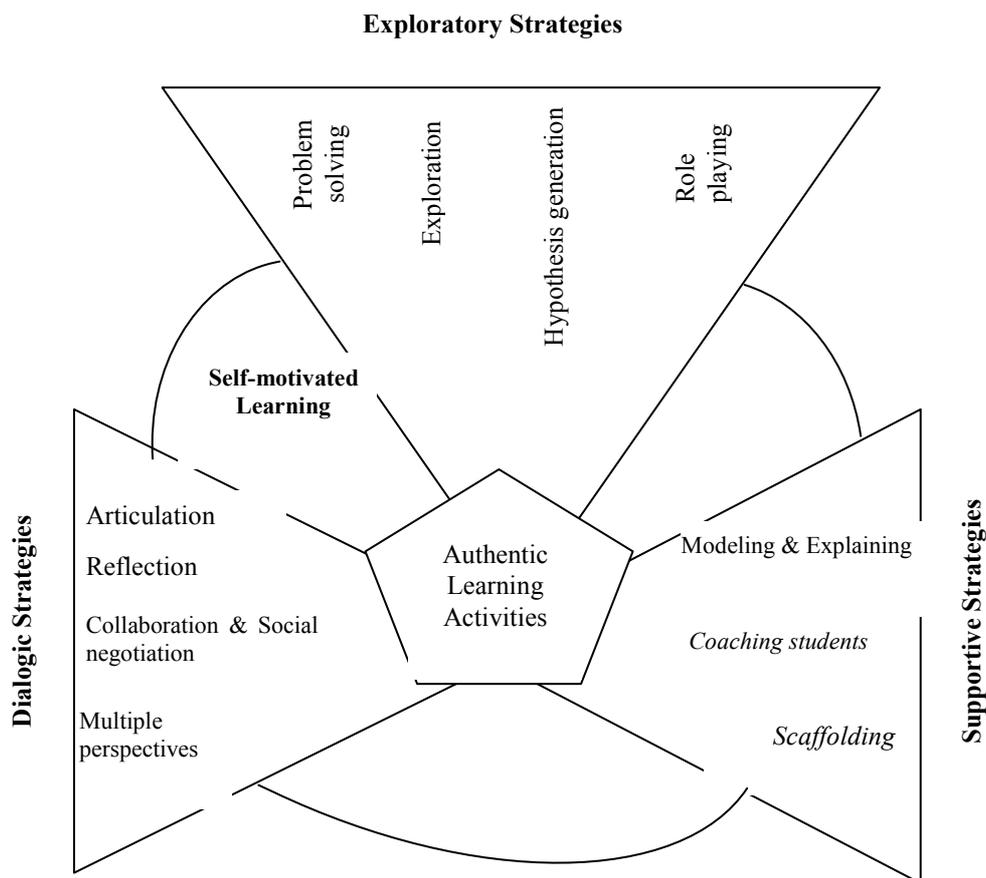
Exploratory Strategies

Figure 1: The teaching/learning strategy based on pedagogical constructivism model (Dabbagh & Bannan-Ritland,2005:207)

Based on the elucidations from various outlooks on self-directed learning as the slice- strategy from the exploratory strategy, dialogic strategy, and supportive strategy (Dabbagh & Bannan-Ritland, 2005:210), as an active learning strategy (Haris Mudjiman, 2011:9), and as a strategy in managing and controlling the teaching/learning process (Jarvis.1990:168), four components of the self-directed learning concepts can be inventoried. Those components encompass: a) the motivation or intention to learn, b) the intention to master or possess certain competency, c) the active learning activity to achieve the competency, and d) the stock of competency obtained previously (constructivism paradigm).

The integration of the component of the technology based media to convey the teaching/learning material into the pedagogical model is carried out referring to Dabbagh & Bannan-Ritland opinions (2005:223, 298). According to Dabbagh & Bannan-Ritland, various web-based technologies can be integrated with self-directed learning strategy. Nowadays, many web-based technologies learning applications, well-known in education technology terminology as Learning Content & Management System (LCMS), have been developed. Some examples of these applications are: WebCT, Blackboard, Virtual-U, Lotus Learning Space, Desire2Learn, Claroline, LON-CAPA, MOODLE, and OLAT. Dabbagh & Bannan-Ritland (2005:224) map the integration and alignment of instructional strategy, web technologies, and web features to give guidance in choosing the

technologies used to impart the materials in the internet based course. As an example, if the teaching/learning strategy chosen is the self-directed strategy, LCMS MOODLE with the following features: asynchronous, hyperlinks, e-mail, search engines, asynchronous discussion forums, online database, and internet chat will be chosen. The comparative research on LCMS executed by Sabine Graf & Beate List as cited by Romi Satria W. (2008:2) find that in general, LCMS MOODLE is in the first place, especially in the categories of Communication Tools, Learning Objects, Management of User Data, Usability, and Adaptation.

MOODLE (Modular Object Oriented Dynamic Learning Environment) is a computer application that can change a learning media in the form of World Wide Web. MOODLE is first developed by **Martin Dougiamas.** According to Limongelli, Sciarrone & Vaste (2011:2) MOODLE is a Learning Content Management System (LCMS) software designed using the pedagogical principle, used to help teacher to construct an effective and fun on-line learning community. In detail, Herman D. Sujono (2010:6) explains that MOODLE is software used to develop on-line course materials; to manage the teaching/learning activities; to manage the teaching/learning results; and to facilitate interaction and communication and to conduct cooperation between lecturers and students. Various researches in international journals on the implementation of LCMS MOODLE show that on-line learning model carried out in the teaching/learning process is customized to the students' needs and learning styles, so they can easily master the concepts of the teaching/learning contents and improve their learning result competency (Girard & Pinar.2011; Ramayah.2010; Chao, Lin Hua & Cheng Chang.2011).

The integration of the component of the technology based media into the pedagogical model, based on Clark's & Mayer's opinion (2008:15), depends on the material types. Those material types can be sorted into five components, namely: fact, concept, process, procedure, and principle. Fact is essentially a specific and unique occurrence or phenomenon. Concept is a category consisting of many examples. Process is a sequence of occurrences or activities. Procedure is a task carried out step by step. Principle is a task executed based on the existing guidance. Moreover, Clark & Mayer elucidate that in on-line teaching/learning, the teaching/learning materials can be arranged in the forms of texts, pictures, audio, video, or graphs. Materials in the form of text are more appropriate to be integrated into exploration strategy, while materials in the forms of pictures, audio, and video are more fitting when being integrated into the reflection, problem solving, or even Modeling & Explaining strategies.

A hypothetical development model is arranged based on the theoretical orientation of the instructional design models of Dick, Carey and Carey (2009:1), the theory on self-directed learning strategy of Haris Mudjiman (2011:198), and LCMS MOODLE as an instructional delivery media. The hypothetical development model used consists of self-directed learning instructional design steps using MOODLE. These steps cover the following ten stages: 1) identification of the instructional objectives as the core competency based on the competency gaps, 2) instructional analysis, 3) the students' characteristic analysis and tacit knowledge, 4) formulation of the specific instructional objective as an in-between competency, 5) development of the on-line evaluation instruments to find out the achievement of the core and in-between competencies, 6) development of the instructional learning strategies: exploration, problem solving, discussion forum via LCMS MOODLE, and citizenship project, 7) teaching/learning material development in the form of Learning Object Material (LOM), 8) the designing and implementation of on-line formative evaluation, (9) revision of the program, and 10) the designing and execution of summative evaluation to find out the core competency of the overall program.

3.   Method

This research used the research and development (R & D) method. It adopted the Borg, Gall & Gall model (2007:589), a revised edition of Borg and Gall (2003:570). The steps of research and development of Borg and Gall model consist of: 1) Research and Information collection, 2) Planning, 3) Development of Preliminary Form of Product, 4) Preliminary Field Testing, 5) Main Product Revision, 6) Main Field Experimentation Testing, 7) Operational Product Revision, 8) Operational Field Experimentation Testing, 9) Final Product Revision, and 10) Dissemination and Implementation. According to Sukmadinata (2007:184), those ten steps can be simplified into three main stages, of which each consists of several operational stages and one publication stage. Those three main stages are (1) preliminary study stage, (2) model design and development stage, (3) model testing stage and publication stage.

In the preliminary study stage of this research, a literature review was conducted on instructional design model, MOODLE, and self-motivated learning theory, and also a small-scale field survey to get a picture of instructional design model on the Basic Concepts of Civic Education carried out at present. The instruments of this preliminary study used questionnaire as the main instrument and interview guidance as the supporting instrument. The data analysis technique used the descriptive category technique.

In the model design and development stage, a draft model activity, model validation, and limited and extended field test were carried out. The model draft was developed based on the hypothetical model that had been developed. The model was completed with syllabus draft, lesson plan, lecturer guide, student guide, and web portal (http://belajarmandiri.net). The model validation was carried out by using the expert test technique,

which consisted of the experts on tests for instructional design, the experts on content, and the experts on e-learning. The instruments and the data analysis theory in the expert test used the scoring rubric and the data analysis technique used descriptive category technique. The limited field experimentation involved 21 students, 1 lecturer of the basic concept of civic education course, and 2 observers. The extended field experimentation involved 32 students, 1 course lecturer, and 2 other lecturers as observers. The instruments for the field experimentation tests used observation sheets, test questions on the results of the students' learning result competency, and self-directed study scale. The analysis technique used the descriptive test and percentage.

In the model effectiveness experimentation stage, an experiment used the model of the Matching-only Pretest-posttest Control Group design and Factorial design. The participants in this effectiveness test experiment were 76 persons. There were 36 students and 2 lecturers as the experimental group and 36 students and 2 lecturers as the control group. The research instruments used test questions to measure the variable of the students' learning result competency, and the self-directed study scale to measure the students self directed covariance. Prior to the instrument use, the reliability test, validity test, and data normalcy test were carried out. The hypothesis testing using Independent Sample t-Test to test hypothesis 1, in which H_0:"The model of the instructional design based on self-motivated learning using MOODLE increases the students' learning independence higher than the instructional model using CD-ROM and e-mail." Meanwhile, ANCOVA data analysis technique was used to analyze Hypotheses 2 and 3. For Hypothesis 2, H_0: "The impact of the model of the instructional design based on self-motivated learning using MOODLE towards the students' learning result competency moderated by the students' learning independence is similar to the impact of the instructional model using CD-ROM and e-mail." For hypothesis 3, H_0: "There is not any linear correlation between the learning independency and the students' learning result competency."

4.   Result and Discussion

The results of the research on the stage of model validation show that respectively the percentage averages of test scores by experts are as follows: 1) The average percentage of the test score on syllabus or program mapping by the instructional design experts is 82%. 2) The average percentage of the test score on on-line lesson plan by the instructional design experts is 80%. 3) The average percentage of the test score on the teaching/learning materials by the teaching/learning material experts is 74%. 4) The result of model validation by e-learning experts shows that the average percentage of the test score on the lay-out aspect by the e-learning experts is 80%, on the access aspect is 87%, on the interaction aspect is 88%, on the material design aspect is 71%, and on the navigation control is 90%.

Based on the findings of the validation tests made by the experts in instructional design, material, and e-learning, it can be concluded that overall, the quality of the model of the instructional design based on self-motivated learning using MOODLE is good, and its validity level is high. However, there are some aspects that must be and have been revised. Revisions on syllabus and on-line lesson plans have been executed on the following: 1) the term of program mapping is changed with the term of syllabus; 2) some variations have been added to the multimedia lay-out in the syllabus, for example, a video on media globalization is added to topic 2, Globalization; and 3) the indicator design in the on-line lesson plans has been improved by sorting double concepts indicators.

Revisions on the basic concepts of Civic Education teaching/learning materials have also been carried out as follows: 1) the order of the material presentation has been revised to comply with the basic competencies formulation; 2) the regulation articles listed in the teaching/learning materials have been discussed; 3) some variations have been added to the materials explanations by adding illustrations, pictures, and diagrams; 4) argumentative cases have been added into the teaching/learning materials; 5) concept maps have been included into each topic. Revisions on MOODLE e-learning have also been carried out to comply with the experts and colleagues suggestions, namely: 1) the URL address has been moved from the portal of http://pjjpgsd.uksw.edu to http://portalbelajarmandiri .net; 2) the portal name for the program (SKGJ PGSD UKSW) has been changed into *Portal Belajar Mandiri*; 3) pictures, audio, and video illustrations have been added to the material presented; 4) the background has been improved by changing the coloration; 5) the forum and chatting facilities have been arranged as such to stimulate students curiosity; 6) links to actual topics have been added; 7) bandwidth quota has been added, from 500 MB to 1GB.

The results of the research on the limited and extended field experimentation tests show several phenomena. The observation of the students' learning process activity shows that in the limited test, the chatting activity only achieves 43% and in the extended area it achieves 63%. The percentage of the students who do the task in the limited study reaches 100%, with better task quality, the average scores are 69.1 in the limited study and 78.84 in the extended area test. The results on the level of study independence in the limited test show that the average score of the learning independence reaches 65.67. The scores range from 56 to 75. The frequency of the students with prominent learning independence level (≥ 80) is not present. In the extended test, the score is 72.25. The scores range from 61 to 83. The frequency of the students with prominent learning independence level (≥ 80) is 21.9%. The finding shows that there is an increase of 6. 58% in the average score of the learning independence

score.

The pre- and post-test results in the limited experimentation show that the scores increase. The average pre-test score is 65.58, while in the post-test, the average score rises to 73.95. Meanwhile, it is known from the data in the extended experimentation that the average pre-test score is 64.72, while in the post-test the average score rises to 70.69. The students give responses on the on-line instructional quality of the basic concept of the civic education in the limited as well as the extended experimentations. On the aspects of lay-out, material development, and navigation control, they judge them to be very good, whereas on the aspects of access and interaction, they evaluate them to be in the good category only.

The focus group discussion (FGD) carried out on December, 13, 2013 to discuss the results of the limited experimentation results in the following recommendations to improve the program: (1) improve the teaching/learning materials, (2) upgrade the layout and the coloration, (3) attract the students eagerness, (4) discard irrelevant features, and (5) discuss the students guide at the beginning of the teaching/learning process. The second FGD carried out on December, 20, 2013 after the extended experimentation generates the following recommendations for improvement: (1) add task in the nature of citizenship project, and (2) give detailed feedback during the teaching/learning process so that the students can improve the task.

Referring to the suggested recommendations in the limited field of study FGD, the researchers make several model revisions: (1) revising the material by solidifying the contents and adding illustrations and concept maps, (2) revising the lay-out and coloration, changing the previous white front page back-ground with other colors, (3) discarding WIKI and survey features, and (4) discussing the students' guide at the beginning of the teaching/learning process in the next experimentation. Revisions based on the extended experimentation FGD recommendations are as follows: (1) add task in the nature of citizenship project, (2) give detailed feedback during the teaching/learning process in the effectiveness stage.

Based on the discussions on the model draft development, validity test by the experts and users, and limited and extended experimentations, it can be concluded that on the whole, the levels of quality and validity of the product of the model of the instructional design based on self-motivated learning using MOODLE are good and have the high validity level. Therefore, the model becomes the operational model, and it can be used as an alternative for basic concept of the Civic Education learning at Bachelor Program of Teacher Education in Profession.

The model effectiveness test is actually an experiment to test the potential of the model of the instructional design based on self-motivated learning using MOODLE in improving the learning independence and increasing the students' learning result competency when compared with other models. There are three hypotheses to be tested to investigate the effectiveness of the model. Thus, the effectiveness test discussion is focused on the discussions of three research hypotheses, and at the same time answering the question on how far the teaching/learning treatments increase the students' learning independence and how far the effectiveness of the treatments can increase the students' learning result competency moderated by their learning independence.

The result of the testing of Hypothesis 1 (H_0) that states that "The model of the instructional design based on self-motivated learning using MOODLE increases the students' learning independence, which is not higher than instructional model using CD-ROM and e-mail" is rejected and Ha is verified, meaning that the instructional design model using MOODLE increases the students' learning independence higher than instructional model using CD-ROM and e-mail. The significance of the treatment is based on the T data count finding amounting to 3.970 with p = 0.000 (p = 0.002 <α= 0.050), the average levels of self-motivated learning of the experiment groups reach 73.86, and the supporting groups reach 69.53. This means that the average rate of the learning independence of the experiment group which gets the self-instructional design model using MOODLE is higher than that of the group that gets instructional model using CD-ROM and e-mail on the control group.

The model capability in fostering the learning independency comes from the factors of learning design that can foster motivation to learn as the basic component in learning independency. This learning independence grows because learning through the on-line learning portal is felt fun. The motivation also increases since there is guidance or support from the facilitators to use features such as chatting, message and links to various certain URL to get information or material sources connected to the teaching/learning material. The empirical phenomena in this on-line learning/teaching is based on Haris Mudjiman's opinion (2011:4), that fostering the self-directed learning ability in educational context is related to the aspect of fostering the intention to learn and the development of the learning technical ability in the student. This opinion is in line with the research conclusions of Song & Hill (2007) that the effectiveness of self-directed learning depends on the level of self-direction (personal attribute).

The intention to learn is developed by giving a pleasure of learning. The development of technical learning ability is developed through the training and technical guidance in learning given by the teacher, including how to find the needed learning sources. The growth of learning independence is fostered by an awareness that the self-directed learning experience will become a life-long provision (life-long learning). A life-long learning is needed because problems will always appear in each person's life, and experiences in problem-solving in formal

education will help to solve problems in one's life. An effective and efficient problem-solving needs learning activity based on learning intention or motivation and learning skill experiences possessed previously (Haris Mudjiman, 2011:5). The R & D findings on the instructional design model that foster the learning independence are in line with Usta's research findings (2011). Usta's research finds that there is a positive and significant correlation (r = 0.207) between the attitude toward on-line learning and the independent learning skills.

The result of the testing of Hypothesis 2, in which (H_0) states that "The impact of the model of the instructional design based on self-motivated learning using MOODLE toward the students' learning result competency moderated by the students' learning independence is similar to the impact of the instructional model using CD-ROM and e-mail." is rejected and H_a is verified, meaning that compared with the instructional model using CD-ROM and e-mail, this experimental model gives a greater impact on the students' learning result competency moderated by the students' learning independence.

The treatment significances are shown by F $_{count}$ on the variance of the instructional design model as many as 10.296, in which p equals 0.002 (p = 0.002 <α= 0.050) and the average comparison of the scores that have been adjusted (μ-adj) to the learning result competency of the students who have the high and low learning independences in the experiment group exposed to the treatment of instructional design model by using MOODLE and the control group using CD-ROM and e-mail. The average or μ-adj of the learning result competency of the students who have the high learning independence in the experiment group is 73.862, and that of the low learning independence is 72.583. In the control group, μ-adj of the learning result competency of the students who have the high learning independence equals to 64.130, while μ-adj in the low level learning independence is 61.536. It is clear that μ-adj of the experiment group having both the high and low learning independences are higher than that of the control group (73.862 > 64.130; 72,583 > 61,536).

The capability of the experiment model to give a higher impact to the students' learning result competency is a synergy of the integration of the instructional design model, the basic concept of the civic education, learning independence strategies, and the delivery technology. The instructional design model of Dick, Carey & Carey (2009) that is adopted as the main instructional design model in this R & D is a systemic model, compared favorably to others that emphasize on the hard-ware products. According to Soetarno Joyoatmojo (2011:66), the systemic instructional model has advantage in making the teaching/learning effective because of three reasons. First, the teaching/learning clarity as the objective will clarify the teaching/learning stages and the way to implement it. Second, the close interconnection among each system component especially between the teaching/learning objective and strategy will facilitate the actualization of the teaching/learning objective. Third, the teaching/learning process using the system approach is an empirical and replicable process. The capability contribution is shown from the aspect of component design of the basic concept of the Civic Education, that there is a shift in the Civic Education teaching/learning tradition in general, from the one that tends to be normative and is able to indoctrinate to something that tends to be argumentative based on internet technology (Nurul Zuriah, 2005; Winarno Narmoatmojo, 2012). While the contribution of the learning independence strategy component in its synergy has made this experiment model effective in increasing the competency of the students' learning result, because the steps of learning independence effectively equip the students in achieving their teaching/learning competency. The R & D findings on the effectiveness of this Civic Education instructional design based on self-directed learning is in line with the research findings made by Stewart (2007) that states that there is a positive linier correlation between learning independence and the GPA of the civic engineering students of Griffith University - Gold Coast, Australia (r = 0.70). The students who have the high level of learning independence will get the high GPA and vice versa.

On the effectiveness of the self-directed strategy, Dabbagh & Bannan-Ritland (2005:207) states that self-directed learning is a slice strategy and that the alignment of the teaching/learning strategy is carried out based on constructivism pedagogical model. As a slice, there are the strengths of exploratory, dialogic, and supportive strategies in the self-directed strategy. The exploratory strategy enables the students to explore the materials from various sources (such as accessing the materials through internet, either as an independent search or as one prepared by the lecturer through links to certain portal addresses and do problem solving activities through on-line discussions). The dialogic strategy enables the students to carry out a collaborative, articulative, and reflective learning. The supportive strategy enables the students to learn based on the scaffolding technique. The teaching/learning materials using LCMS MOODLE technological contribution towards the effectiveness of the instructional design model using MOODLE is seen from the Moodle's potency. Potentially, MOODLE fulfills the selection criteria made by Engkos Koswara N (2008:2) that states that a selection should be based on the students' needs, teaching/learning strategy, and the limitation in its execution.

Both on the high and low levels of learning independence in the R & D instructional design, it is interesting to find that there are not any significant differences on the learning result competency of the students who have both the high and low levels of learning independence (F = 0.137, p=0.712 >α = 0.050). The same case happens on the interaction variance of the instructional design model; there is not any significant difference between the students with the low level of learning independence and those with high level of learning independence (F count

0.136, p= 0.713 >α= 0.050), meaning that the learning result competency of the students who have the high level of learning independence is the same as that of the students who have the low learning independence. In other words, all students, either those who have the high level or those who have the low level of learning independence have the same opportunity to achieve better learning result competency when treated with instructional design model using MOODLE. Similar finding is obtained from the experimental research carried out by Hui & Umar (2011), which states that there is not any significant remembrance difference in students who have the high and low levels of self-motivated learning in receiving the treatment using a combination of metaphor and pair programming and those who only receive a pair programming method.

The result of the testing of Hypothesis 3, in which (H_0) states that "There is not any significant linear correlation between the learning independency and the learning result competency of the students in the teaching/learning process using MOODLE," is rejected and H_a is verified, meaning that there is a significant linear correlation between the learning independence and the competency of the students' learning result in the teaching/learning process using MOODLE. The significance is obtained from the result of ANCOVA, in which F count equals 7.435 at the significance level of 0.008. The coefficient of regression β equals 0.689. Because β = 0.689 >β = 0 and the count significance is 0.008 <α= 0.050, there is a linear regression. This result of the covariance analysis describes the impact difference between different instructional design treatments, and also informs the linear correlation between the learning independence as a covariance variable and the competency of the students' learning results as a free variable. Based on the parameter of estimation and generic formulae of simple regression equation Y = a + bX, in which a is the constant (α) and b is the coefficient of regression (β), thus the regression line is **Y = 10.985 + 0.689 x level of learning independence**. This equation can be used to predict the students' learning result competency based on their learning independence. For example, from the equation of Y = 10,985 + 0,689*BM, the scores of the students' learning result competency (Ŷ) can be predicted. If LI (learning independence) = 76; then **Ŷ = 10.985+0.689*76 = 63.35m**, meaning that the students' learning independence score of 76 can predict the students' learning result competency as 63.35.

The finding of this research is similar to the result of Ruseno Arjanggi & Titin Suprihatin (2010) that there is a positive effect of the peer tutoring instructional method to the teaching/learning process using self-motivated learning. The peer tutoring instructional method contributes 17.4% to the increase of the learning result based on the students' self-motivated learning. This research is also in line with the finding of Wenny Hulukati (2011), that the developed learning independence model based on andragogy to raise the competency of the early childhood educators is effective to increase the educators teaching competency.

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5.   Conclusion

The steps of the instructional design development based on self-directed learning using MOODLE are: 1) identifying the general learning objectives as the core competency based on the competency gap, 2) carrying out the instructional analysis, 3) executing the students characteristics and previous tacit knowledge analysis, 4) formulating the specific instructional objectives as an in-between competency, 5) developing on-line assessment tools to find out the core competency and in-between competency levels of achievements, 6) developing teaching/learning strategy 7) developing the teaching/learning materials in the form of Learning Object Materials (LOM), 8) designing and executing on-line formative evaluation, 9) carrying out program revision, and 10) designing and executing summative evaluation.

The model of the instructional design based on self-motivated learning using MOODLE develops the students' learning independence, higher than the instructional design using CD-ROM and e-mail.

The model of the instructional design based on self-regulated learning using MOODLE effectively increases the learning result competency of the students moderated by learning independency, moderated higher than the instructional system used CD-ROM and e-mail.

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