

# Developing Information and Technology Based Learning Model in Curriculum and Instruction Subject to Improve Students' Learning Achievement

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**Keywords:** Learning Models, Information Technology, Learning Outcomes.

**Abstract:** This research was intended to develop information and technology based learning model to improve students' learning achievement. The method used for this study was Research and Development. The result has discovered that: (1) the perception of lecturers and students toward the learning process is good, the student's motivation is low, the condition of the learning facilities and infrastructure is quite good, the condition of student learning result is good, and the student perception towards the utilization of information technology in learning before the research is good, (2) this learning model includes instruction planning, implementation, and evaluation. Each learning stage uses information technology, and (3) effective information technology-based learning model to improve students' learning outcomes. The implications are that (1) the lecturers need to apply the information technology-based learning model in the curriculum and instruction subject, (2) Indonesia University of Education needs to respond to the challenges and demands of ICT development according to the needs of the world-class university; (3) there should be training for lecturers about the application information technology-based learning model, and (4) there should be research with the course scope and the more various classifications of learning outcomes.

## 1 INTRODUCTION

In UPI Academic Senate Resolution Number 001/Senat Akd./UPI-SK/VIII/2011 on The Basic Provision of UPI Curriculum Development 2011 Edition, in Chapter III on Curriculum Structure and Course Distribution, there is a Profession Basic Course group, aimed at equipping prospective students with the basic skills of the teaching profession. It is stipulated in the appendix, especially Article 9 paragraph (1) point b that "Profession Course (MKP) is a group of courses in the study program of teaching staff aimed at developing profession skills, and consists of Profession Basic Courses (MKDP)" (Kurikulum UPI, 2011: 7). Furthermore, in Article 12-point b.1) it is argued that the MKDP for teacher education consists of several courses, *Landasan Pendidikan, Perkembangan Peserta Didik, Bimbingan dan Konseling, Curriculum and Instruction, and Pengelolaan Pendidikan*. In accordance with the authors' courses and inputs and considerations from various parties,

this study focuses more on Curriculum and Instruction course.

In accordance with the vision, mission and objectives of Indonesia University of Education (UPI), as well as the implications of the UPI Academic Senate provisions, each student of the education program must take the MKDP-Curriculum and Instruction in semester 3 (three) or 4 (four). In this course, students learn to understand, apply, and analyze the various theories, concepts, foundations, principles, procedures, models, and Curriculum and Instruction evaluations, both theoretically and practically, through various classroom practice exercises. Students are also drilled in classroom teaching practices using a mini teaching approach and instructional models in accordance with the characteristics of their respective study programs. Based on the preliminary study of learning process (read: lectures) in MKDP-Curriculum and Instruction at Indonesia University of Education. It shows the weakness of interaction between lecturers and students in the learning process, so that student learning outcomes are less satisfactory. Some of the

phenomena that appear can be seen from various sides, among others, are as follows.

First, from the students. When lecturers present lecture materials, students' attention is often unfocused, as there are students who are opening up their laptops and playing games, some are chatting with their friends, some are eating and drinking, many students who arrived late beyond the provisions that have been agreed upon, and even sleeping (sleepy). The underlying phenomenon is certainly a lot, such as the interest to study the course is low, the motivation to learn less, and strongly suspected student perception of the subject is not good (assuming the course is only complementary or additional course). It could also be that students are still confused about the purpose and function of the course, while the lecturers themselves do not or have not explained from the beginning of the meeting on what, why, and how the position of MKDP-Curriculum and Instruction in the context of UPI curriculum structure. The result of the group discussion with the lecturers concluded that there is a tendency of student perception toward this subject is not important or just to complete the amount of credit only. For students, the important thing is to pass a course with a high score.

Second, from the lecturers. In conducting classroom learning activities, lecturers often perform monotonous activities (coming, sitting, discussing, and closing). This is because lecturers use less methods and learning media, thus it makes the students become saturated and bored. In general, lecturers only use expository approach, so that students get some problems to obtain optimal services. Implementation of teaching methodology is considered to be only in the form of teaching for passing the exam (teaching to test), while the demand for the development of student competence as a whole tends to be neglected. In fact, the demands of the learning process in each educational unit (including the LPTK) must be in accordance with the standard of the process, which is "... organized interactively, inspiration, fun, challenging, motivate learners to participate actively, and provide sufficient space for initiative, creativity, and independence in accordance with the talents, interests, and physical and psychological development of learners" (PP.19 / 2005 on National Education Standards) Chapter IV, Article 19, paragraph (1).

Based on some of the above phenomena, it is deemed necessary to have a special study on the use of appropriate learning model and in accordance with the development of science and technology today, including the demands of lecturer competence as well

as the characteristics of teacher education students at Indonesia University of Education. Furthermore, "21<sup>st</sup> Century Partnership Learning Framework", in BSNP (2010), describes some of the competencies and / or expertise that Human Resources must possess in the twentieth century:

1. critical-thinking and problem-solving skills;
2. communication and collaboration skills;
3. creativity and innovation skills;
4. information and communications technology literacy;
5. contextual learning skills;
6. Information and media literacy skills.

One of the learning model that is considered appropriate and relevant to the demands of the above-mentioned competencies is the information technology based learning model. This learning model can facilitate lecturers in conducting MKDP-Curriculum and Instruction. Students will also be more interested and motivated to follow the lectures well, because the lectures become more practical and varied, so that students will get better learning outcomes. In addition, the learning-based model makes the learning atmosphere more dynamic, interactive, and conducive.

To find and use the learning model in question, there must be a strong desire (interest and motivation) of the lecturer to build a conducive and effective learning process. As what Rosemarie Sutjiati (2010: 2) claimed:

1. The global understanding that if you want to change the world, you must start from the classroom first, and if you want to change the classroom should change the teaching staff first.
2. Previous studies have suggested that there is a positive impact of teachers who are ready and educated towards students in the classroom.
3. It is alleged that half of the number of educators in developing regions is still not in accordance with the standards of educators of their respective countries.

The information technology-based learning model that will be developed in this research is in line with the policies and programs set out in the UPI 2011 strategic plan (Renstra) 2011 - 2015 on "development of Information and Communication Technology based learning", whose infrastructure has been built in UPI campus environment.

## 1.1 Problem Statements

The main problem in this study is the information technology-based learning model such as whether or not it can improve student learning outcomes in

MKDP-Curriculum and Instruction at the Indonesia University of Education?

More specifically the problem is:

1. How is the MKDP-Curriculum and Instruction in Indonesia University of Education? The question includes:
  - a. What are the lecturers' and students' perceptions on the MKDP-Curriculum and Instruction in Indonesia University of Education?
  - b. How is the students' motivation in MKDP-Curriculum and Instruction in Indonesia University of Education?
  - c. How is the MKDP-Curriculum and Instruction facilities in Indonesia University of Education?
  - d. How is the learning condition in MKDP-Curriculum and Instruction before the research is conducted?
  - e. What are the students' perceptions on the implementation of information and technology in MKDP-Curriculum and Instruction learning activities?
2. What kind of information technology based instruction suitable for improving the students' learning outcomes in MKDP-Curriculum and Instruction in Indonesia University of Education? The question entails:
  - a. What kind of information technology based model is appropriate in improving learners' outcomes in MKDP-Curriculum and Instructions in Indonesia University of Education?
  - b. What kind of information technology based model is appropriate in improving learners' outcomes in MKDP-Curriculum and Instructions in Indonesia University of Education?
  - c. What kind of information technology based evaluation model is appropriate in improving learners' outcomes in MKDP-Curriculum and Instructions in Indonesia University of Education?
3. How effective is the information technology based learning in MKDP-Curriculum and Instruction in Indonesia University of Education?

## 1.2 Research Objectives

The general objectives of this research are (a) to find empirical data about the perception and motivation of lecturers and students as well as the condition of facilities, infrastructure and learning outcomes of

students in MKDP-Curriculum and Instruction at Indonesia University of Education; (b) to develop information-based learning model in MKDP-Curriculum and Instruction in an effort to improve student learning outcomes at Indonesia University of Education, and (c) to test the effectiveness of information technology-based learning model in MKDP-Curriculum and Instruction in an effort to improve student learning outcomes at Indonesia University of Education.

## 2 RESEARCH METHOD

This research uses quantitative-positivistic approach with "Research and Development" method. Technically there were three utilized methods; descriptive, evaluative and experimental methods. Pretest-Posttest Control Group design was used as the experimental design. In RandD, there are three stages of research that must be taken, namely preliminary study, model development, and validation test. In the preliminary study stage, three main activities were conducted, i.e. reviewing literature / library study, pre-survey (field), and initial product preparation (draft model).

At the model development stage, limited trials and wider tests are conducted. The limited trial was conducted on one class and one study program, namely the Citizenship Education program (PKn-A), while for the wider trial, the sample was taken from three faculties: FIP, FPIPS, and FPBS. From every faculty, one program was taken as the sample using cluster random sampling, they are: (a) FIP: PGSD-D program, (b) FPIPS: PKn-A Program and (c) FPBS: Vernacular -B Program. The programs were different in the limited trials. The lecturers were three.

In Validation phase, quasi experimental were used in Pretest-Posttest Control Group Design framework. "In quasi-experiments, the selection of subjects is done by choosing an existing group of subjects (intact group) and no random assignment" (Moh.Ali, 2010: 104). Furthermore, pretest results with posttest in both groups were compared by: (a) comparing pretest with posttest in the experimental group, (b) comparing pretest with posttest in the control group, (c) comparing pretest between experimental groups and controls, (d) comparing posttest between the experimental group and the control group, and (e) comparing the gain of the experimental group with the control group.

The population were (1) all students in education program of UPI enrolling MKDP-Curriculum and Instruction in semester IV, and (2) all lecturers

teaching MKDP-Curriculum and Instruction in UPI. The sample was done relevant with the research steps. In the preliminary study phase, sampling was conducted using purposive sampling, while in the model development stage (for limited testing and wider testing) and validation test (experiment), the students were selected based on the study program using cluster random sampling

Data collection techniques to be used in this study were questionnaires, document analysis, observation, interviews, and achievement test. The data analysis was done through Chi-Square, Percentage and t-test. And hypothesis test was then carried out.

- ❖ Ho:  $\mu_1 = \mu_2$ , there is no differences between pretest and post-test means score.
- ❖ Ha:  $\mu_1 \neq \mu_2$ , there is a significant difference between pretest and post-test means score.

To test the effectiveness of the information technology-based learning model, the mean *gain* in the experimental group with the mean gain (gain) in the control group will be compared using the t-test formula. The statistical hypothesis that was tested was formulated as follows:

- ❖ Ho:  $\mu_E = \mu_K$ , there is no significant differences between pretest gain score ( $\mu_1$ ) in experimental group ( $\mu_E$ ) and the gain score in the control group ( $\mu_K$ ).
- ❖ Ha:  $\mu_E \neq \mu_K$ , there is a significant difference between pretest gain score ( $\mu_1$ ) in experimental group ( $\mu_E$ ) and the gain score in the control group ( $\mu_K$ ).

**Test Criteria:**

If Ho is rejected and Ha is accepted, it means that the information technology based instruction is more effective in improving students' learning outcomes in MKDP-Curriculum and Instruction than the conventional instruction. And vice versa.

### 3 FINDING AND DISCUSSION

#### 3.1 Preliminary Study Findings

##### 3.1.1 Lecturers' Perception

The result of preliminary study shows the lecturer's perception toward the learning process of MKDP-Curriculum and Instruction in Indonesia University of Education as a whole is in good category. The perceived aspects include student attendance, material suitability of Curriculum and Instruction with the teacher competence, utilization of information technology, lecturer qualification,

student activeness, learning difficulties, and assessment system.

##### a. Students' Perception

The students' perceptions on the MKDP-Curriculum and Instruction in Indonesia University of Education is in good category. The perceived aspects include the presence of lecturers, lecture materials, lecturer activities, learning resources, faculty appearance, learning activities, learning atmosphere, time, learning difficulties, and assessment systems.

##### b. Learning Motivation

Most of the students' motivation in MKDP-Curriculum and Instruction (68.52 %) is in low category. Only small number (22.22%) is in High category and the others are in medium category. In terms of the category, almost half (40.74%) are in the "low" category, nearly half (27.78%) of the "very low" category, a small (18.52%) "Moderate" category, 26%) the "high" category, and a smaller (03.70%) belongs to the category "very high".

##### c. Learning Facility Condition

Based on the results of interviews with the heads of curriculum and education technology, FIP-UPI, the condition of facilities and infrastructure in MKDP-Curriculum and Instruction are good enough, such as classroom, desk and chair of lecturers, student seats, white board, in focus, light, air, electric current, and wall paint. The local library was also good and sophisticated.

With regard to the condition of lecturers who are registered as lecturers of MKDP-Curriculum and Instruction, obtained data that the number of lecturers with the qualifications of Professors 12 people, Doctor Curriculum Development 12 people, Non-Curriculum Development Doctor 4 (four) people, Master of Development The curriculum is 12 people, and the Non-Curriculum Development Master is 8 (eight) people. This condition illustrates that the number and qualifications of lecturers are good.

##### d. Students' Learning Outcome Conditions

The average of student learning outcomes in UPI (2012 Academic year) in MKDP-Curriculum and Instruction before the research was conducted, overall was 3.27 (good). The condition of this learning result must be maintained and enhanced, although in practice the students' learning outcomes are still considered not scientifically stable.



The average and percentage of student learning outcomes of each faculty based on its rank is (a) FPTK = 3,53 (A = 16 = 53,33 % and B = 14 = 46,67 %), (b) FPMIPA = 3,4 (A = 12 = 40 % and B = 18 = 60 %), (c) FIP = 3,3 (A = 9 = 30 % and B = 21 = 70 %), (d) FPIPS = 3,2 (A = 6 = 20 % and B = 24 = 80 %), (e) FPOK = 3,13 (A = 4 = 13,33 % and B = 26 = 86,67 %), and FPBS = 3,1 (A = 3 = 10 % and B = 27 = 90 %).

#### e. Students' Perception

The students' perceptions on the implementation of information and technology in MKDP-Curriculum and Instruction learning activities before the research is in good category. The perceived aspects include the benefits of information technology, forms of information technology, and interest in using information technology.

Based on the preliminary study and literature review, an initial draft of information technology-based learning model was developed, for learning planning, implementation and evaluation.

At the learning planning stage, the researcher made the syllabus and SAP. The syllabus framework consists of two components, namely the identity components and the material topic details for each meeting. While the SAP framework consists of components of course identity, basic competencies, learning outcomes, indicators, learning materials, learning activities, media and learning resources, and evaluation. In accordance with the learning materials in SAP, then Google presentation was used. All the planning of the instruction was saved to Google drive and blog and linked to 4Shared.

In the implementation phase of learning, lecturers begin to open SAP in Google drive and present the material through Google presentation (online), while students open the material in blogspot and 4Shared (online) followed by group discussion (offline). For the deepening of material in group discussions, students are required to open relevant websites on the internet. Students discuss to analyze the material, question and answer with the lecturer, and submit the report of the discussion results (offline).

In the learning evaluation phase, the lecturer arranges the test in the Multi-Choice form through google form (online). To prevent students from opening pretest and posttest indiscriminately, the student must login first using the username and password where previously the student must open the following web address: blackcoklat.com/pretest.

### 3.2 Limited Trial Test Results

Before a limited trial is conducted, researchers first created syllabus and SAP. The syllabus framework consists of two components, namely the identity components and the material topic details for each meeting. While the SAP framework consists of components of course identity, basic competencies, learning outcomes, indicators, learning materials, learning activities, media and learning resources, and evaluation. In accordance with the learning materials in SAP, then google presentation was used. All the planning of the instruction was saved to google drive and blog and linked to 4Shared.

From the first trial test, the means score for pretest was 3.21 and the means for posttest was 6.62 with gain 3.41. The results of the second limited trial obtained the means for pretest 3.64 and posttest 7.74 with gain of 4.1. The results of the third limited trial obtained the means for pretest 4.08 and posttest 8.10 with gain of 4.02. Thus, there is an increase in learning outcomes, both in the first, second, and third limited trials.

### 3.3 Wider Trial Test Results

The first wider test result obtained the means for pretest score for the PGSD-D study program is 2.86 and the posttest was 6.86. The means for pretest score for the PKn-B program is 3.0 and the posttest is 7.55. The means for pretest score for the Vernacular-B program is 2.87 and the posttest is 6.52.

The second wider test result obtained the means for pretest score for the PGSD-D study program is 3.78.86 and the posttest was 7.30. The means for pretest score for the PKn-B program is 3.18 and the posttest is 8.18. The means for pretest score for the Vernacular-B program is 3.84 and the posttest is 7.87.

The third wider test result obtained the means for pretest score for the PGSD-D study program is 3.78.86 and the posttest was 7.30. The means for pretest score for the PKn-B program is 3.55 and the posttest is 8.21. The means for pretest score for the Vernacular-B program is 4.16 and the posttest is 8.84.

### 3.4 Validity Test Result

The formulated hypotheses are:

Ho:  $\mu E = \mu K$

Ho: There is no different learning outcome between students with Information Technology based Instruction and those with the conventional method in MKDP-Curriculum and Instruction.

H1:  $\mu E \neq \mu K$

H1: There is a significant different learning outcome between students with Information Technology based Instruction and those with the conventional method in MKDP-Curriculum and Instruction.

Furthermore, pretest results with posttest in both groups were compared by: (a) comparing pretest with posttest in the experimental group, (b) comparing pretest with posttest in the control group, (c) comparing pretest between experimental groups and controls, (d) comparing posttest between the experimental group and the control group, and (e) comparing the gain of the experimental group with the control group.

The result revealed that:

Firstly, there is a difference between pretest and posttest in the experimental group, both the PGSD-C study program, the Geography-B course, the Indonesian-A study program or the Chem-A study program. The conclusion is that student learning outcomes in MKDP-Curriculum and Instruction increase significantly from the comparison between pretest score and posttest score in the experimental group.

Secondly, there is a difference between pretest and posttest in the control group, either PGSD-B study program, Geography-A study program, C-language Language study program or Chem-B course. The conclusion is that student learning outcomes in MKDP-Curriculum and Instruction increase significantly from the comparison between pretest score and posttest score in the control group.

Thirdly, there is an average difference in pretest scores, either PGSD-C (exp) with PGSD-B (control), Geography-B (exp) with Geography-A (control), Bahasa-A (exp) C (control) as well as Chem-A (exp) with Chem-B (control). It implies that student learning outcomes in the MKDP-Curriculum and Instruction increase significantly seen from the comparison of pretest group score experiment with the control group.

Fourthly, there are differences in posttest score, either PGSD-C (exp) with PGSD-B (control), Geography-B (exp) with Geography-A (control), Bahasa-A (exp) C (control) as well as Chem-A (exp) with Chem-B (control). It implies that student learning outcomes in the MKDP-Curriculum and Instruction increase significantly seen from the comparison of pretest group score experiment with the control group. The results of this posttest comparison also simultaneously demonstrate the information technology-based learning model in

MKDP-Curriculum and Effective Learning to improve student learning outcomes.

Fifthly, there is a gain difference, either PGSD-C (exp) with PGSD-B (control), Geography-B (exp) with Geography-A (control), Bahasa-A (exp) with C-Region (control) and Chem-A (exp) with Chem-B (control). It implies that student learning outcomes in the MKDP-Curriculum and Instruction increase significantly seen from the comparison of pretest group score experiment with the control group. The results of this posttest comparison also simultaneously demonstrate the information technology-based learning model in MKDP-Curriculum and Effective Learning to improve student learning outcomes.

### 3.5 Findings and Discussion

This model is perfect for lecturers and students to be utilized in MKDP-Curriculum and Instruction. The considerations are:

First, most students are now studying Information and Communication Technology, both through formal and non-formal education. It implies that students already have basic skills in the field of information technology. If the information technology-based learning model is applied, of course the students will be more familiar in utilizing information technology in learning.

Secondly, various opinions and inputs from the lecturer team of MKDP-Curriculum and Instruction, there should be a learning model that is considered suitable for lecturers and students and can be used as an alternative to be applied in MKDP-Curriculum and Instruction. This opinion is certainly not excessive because so far, even since the existence of MKDP-Curriculum and Instruction there has never been a proper learning model to use, in practical sense for lecturers and students. To answer these needs, presumably the model of learning-based information technology can be used as an alternative for the interests of student learning. The authors hope that this information technology-based learning model can be one of the policies of the leadership of the University of Education Indonesia to be standardized and utilized by all lecturers of MKDP-Curriculum and Instruction in the University of Education Indonesia.

Thirdly, the use of information technology applications in this study is very cheap and easy to use by lecturers and students because all applications used are available on the internet. Lecturers and students only need a computer device (laptop), modem and / or hotspot network. The students may

also use smartphone in place for laptop in accessing the internet.

Fourthly, the students may also learn outside the classroom. They can learn anywhere and everywhere. However, it is compulsory that students and lecturers attend the classroom *meeting*.

## 4 CONCLUSIONS

MKDP-Curriculum and Instruction condition is in a wellbeing state although there are some aspects of low motivation from the students that affect their learning outcomes.

Information-technology based learning model is suitable for MKDP-Curriculum and Instruction, starting from the planning, implementation and evaluation by using such software's as *google drive*, *google presentation*, *blog*, *4Shared*, *internet*, and *google form*.

Information technology based learning model is effective in improving learners' learning outcomes in MKDP-Curriculum and Instruction.

The research suggests that UPI leadership establish special policy on the implementation of information technology based learning model in MKDP-Curriculum and Instruction so that students and lecturers may use the model continuously.

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