Implementation of Teaching Simulation Project Model to Optimize Prospective Teachers Student Learning Practices

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Abstract: This research is intended to test empirically the teaching simulation project model that has been previously developed by the researcher. The trial was conducted to determine the applicability of the product and its impact according to practitioners on content mastery and learning satisfaction. The research uses the Dick and Carrey development model, continuing from the previously developed model for the first to seventh steps in the first stage. This research is entering the second stage for the eighth to tenth steps by involving three teachers and three classes of prospective teacher-student. The research data were collected using questionnaires, tests, and documentation techniques which were analyzed according to the type of data using quantitative and qualitative descriptive analysis. The results show that the model can be applied in online lectures in fourteen meetings for three cycles combining asynchronous meetings for pre-class and out-class and synchronous for in-class. The teacher and student assessments show good results in terms of applicability and good in terms of their impact according to students on mastery of course content and learning satisfaction.

Keywords: teaching simulation project, learning practices, product implementation, and trial

1. INTRODUCTION

In the teacher training program, educational practice occupies a research trend that is in demand to create a reliable profile of future educators [1]–[4]. Reliable means having competent and adaptive competencies along with the development of science and technology which of course has an impact on changing characteristics from generation to generation, the sophistication of learning systems, speed of change, and access to information [5], [6]. The profile of educators is not only formed from their mastery in various educational subjects and fields of study, but the process in learning also provides valuable and actual experience in the teaching and learning process itself [7]. This is the background of previous research in the development of a teaching simulation project model to optimize the pedagogical and professional competencies of prospective teacher students [8].

Reviewing the teaching simulation project model that was developed in three cycles based on the TPACK framework and a project-based flipped classroom. Each cycle consists of four steps for (a) material orientation, (b) material deepening or project assignment, (c) discussion of results, (d) evaluation and reflection [8]. Referring to the TPACK framework applied for the first cycle which is intended to form mastery of course content, the second cycle is aimed at forming mastery of pedagogy and content application for learning design, the third cycle is aimed at forming mastery of technology and application of content and pedagogy for teaching practice [9], [10]. While the flipped classroom strategy is applied in each cycle for the pre-class pattern (orientation and deepening or project assignment) then in class (discussion) followed by out class (evaluation and reflection) [11]. Project assignments are divided into assignments in learning design and teaching practice.

Learning design and practice are the main targets of model development because in teacher education they both represent pedagogical and professional competencies that students must master in teacher education study programs [12], [13]. These two competencies are formed through a continuous learning process in various subjects, for example in primary school teacher education study programs generally there are subjects in the field of studies such as language learning, mathematics learning, science learning which incidentally even though the field of study is different, the outcomes are still teaching design and practice. Moreover, in the current era of digitalization of learning, prospective teacher students need to be familiar and skilled in learning by utilizing various updated learning technologies [14].

Continuing previous research [8], in this study the teaching simulation project model, will be tested on practitioners, teachers, and students, as a stage of model development. According to the results of expert validation in the previous research stage which showed that the teaching simulation model was valid in terms of basic theory, concepts, syntax, supporting tools, and learning innovation. The trial is intended to determine the applicability and practicality of the model in learning as well as to obtain teacher and student assessments of the steps [15]. The applicability of the model is important to find out whether the syntax or the steps of the model can be implemented in learning. As with previous studies in model development, trials were conducted to determine the feasibility of the product in terms of validity, practicality, and applicability [16]. It is in this process that student involvement also provides benefits in terms of activating the learning process and providing meaningful experiences as prospective teachers [17], [18].

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2. METHOD

Continuing the research in the previous year, this research focuses on field trials that refer to the Dick & Carey development model in the eighth to tenth steps. The testing of the teaching simulation project model was carried out involving three classes of teaching skills courses, a total of 101 students of the Elementary Teacher Education Study Program, Universitas Negeri Malang. The following is the flow of the product trial implementation described in Figure 1.

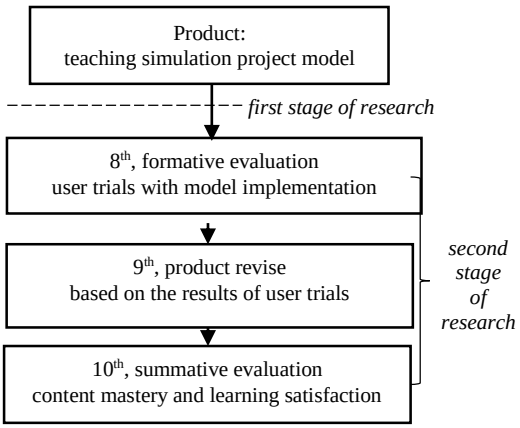

Fig. 1. Trial Design of the Teaching Simulation Project Model

During the application of the product to the trial, data were collected using a mixed questionnaire technique (open and closed questions), tests, and documentation. The questionnaire in the form of an offline form adapts to the implementation of online learning that is used to collect data on the assessment of the teaching simulation project model, the impact of applying the model according to practitioners on learning satisfaction. Tests are used to measure students' mastery of course content. Documentation is used to collect supporting evidence in the form of participant test results, study journals, and the process and results of applying the model in courses. The resulting data was separated into quantitative and qualitative data which were analyzed descriptively. Quantitative descriptive analysis is used to analyze product test user assessment data by converting it into a percentage and based on the specified score qualification, while qualitative descriptive analysis is used to analyze data on criticism or suggestions from users on the implementation of the product. The following is a grid of questionnaires and test instruments in Table 1.

TABLE I. GRID OF TEACHING SIMULATION PROJECT MODEL TESTING INSTRUMENTS

Indicator	Code	Descriptor
Technique: Questionnaire		
applicability	I_1	Suitability of activities for lectures
	I_2	Ease of activities in lectures
	I_3	Applicability of material orientation
	I_4	In-depth application of the material
	I_5	Applicability of material discussion
	I_6	Applicability of learning journals
	I_7	Applicability in learning systems
	I_8	Syntactic organization of the model
Technique: Test		
content mastery	1st	multiple choice and essays: teaching skills
	2nd	essay: learning design
	3rd	performance: teaching simulation
Technique: Questionnaire		
learning satisfaction	S_1	ease of learning
	S_2	convenience in learning
	S_3	motivation to learn

3. RESULT

a. Model Application

The teaching simulation project model is applied in the teaching skills course for fourteen meetings. The model is fully implemented online synchronously and asynchronously in SIPEJAR UM according to the conditions of the Covid-19 pandemic which is still ongoing now. The following is the design for the implementation of the teaching simulation project model that was successfully applied in lectures in Table 2.

TABLE II. DESIGN APPLICATION MODEL

Topic	Week	Description	Syntax
Orientation	1	This meeting discussed the nature of learning skills, the concept of lesson study, and peer review	Cycle 1
Types of Teaching Skills	2	At this meeting, an independent deepening of the material was carried out on the skills of explaining, asking, and strengthening	
	3	At the meeting, the material was explored independently about variation skills, opening and closing lessons, teaching groups, and individuals as well as conducting self-assessment by filling out and collecting the first study journal.	
	4	At this meeting, a discussion of the results and reflection of learning was carried out	
	5	At this meeting, an initial evaluation was carried out.	
Design of Teaching Skills Application in limited situations	6	At this meeting, it was discussed about the learning design format, designing the use of integrated learning skills, as well as the analysis of guidelines and instruments for assessing basic learning skills	Cycle 2
	7	At this meeting, independent work was carried out to complete a learning design project that integrates teaching skills. At this meeting, a self-assessment was also carried out by filling out and collecting the second study journal	
Midterm exam	8	At this meeting, the Mid-Semester Examination will be held.	
Design of Teaching Skills	9	At this meeting, peer assessment of learning plans in groups and learning reflections was carried out	Cycle 2
	10	At this meeting, a middle evaluation was carried out.	
The practice of Applying Teaching Skills	11	At this meeting, learning simulations and learning skills simulation formats were carried out	Cycle 3
	12	At this meeting, independent work was carried out for a teaching simulation project and the collection of learning journals 2	
Assessment of Design and Practice of Teaching Skills	13	At this meeting, peer assessment of group learning simulations and learning reflections was carried out	
	14	At this meeting, the results of the simulation of learning skills were strengthened.	
	15	At this meeting, a final evaluation will be carried out.	
Final exams	16	At this meeting, the Final Semester Examination will be held.	

In the first cycle, student activities consisted of deepening material through asynchronous online meetings, followed by synchronous online meetings for material discussion, and ending with discussions and initial evaluations through synchronous and asynchronous online meetings. In this activity, students get assignments to be collected every week which will be discussed during learning reflections to strengthen mastery of course content. After the initial evaluation, students were asked to fill out their first study journal to document and reflect on their learning outcomes. In this cycle, the output achieved is students' theoretical knowledge related to the types of teaching skills. The following Figure 2 shows the activity in the first cycle for orientation.

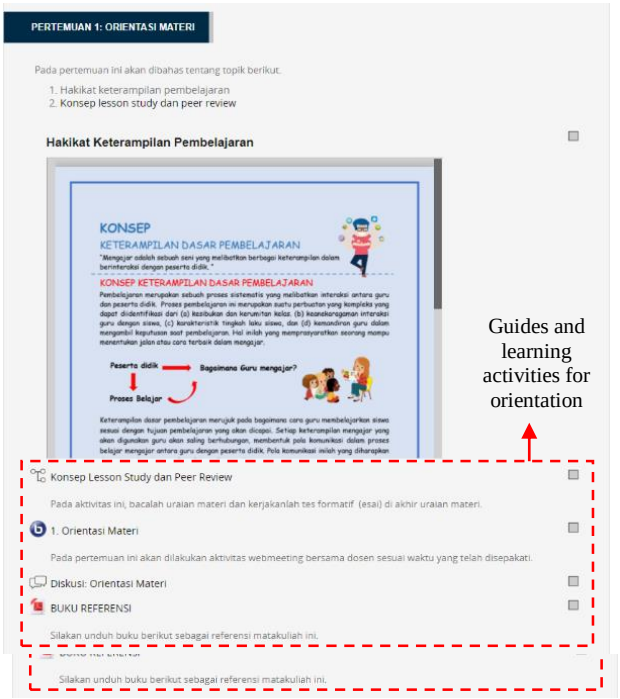

Fig. 2. First Week for Courses Orientation in Cycle 1

In the second cycle, students' activities are aimed at applying their theoretical knowledge in project assignments to develop learning designs to design and integrate types of teaching skills as learning outcomes. Each student is allowed to choose the basic competencies for which the learning design or lesson plans will be designed. At this stage, to optimize student practice activities in preparing learning designs, peer assessment is carried out through the learning design assessment instrument or APKG 1 which focuses on the implementation of teaching skills. In the second cycle, students were also asked to fill in the second study journal as well as the first journal that showed in Figure 3.

In the third cycle, the practice of applying teaching skills in limited situations was carried out as a project for the two courses. The intended limited situation is that participants conduct teaching simulations individually by making learning videos which are then analyzed, assessed through peer assessment, and discussed in synchronous online meetings. It is in this cycle that the student TPACK framework is applied in completing their assignments. Followed by filling out the third learning journal after the final evaluation, students were asked to evaluate their learning achievements from the first to the third cycle and make self-improvements in the mastery of content and practice before taking the final exam. The following Figure 4 shows the activity in the third cycle.

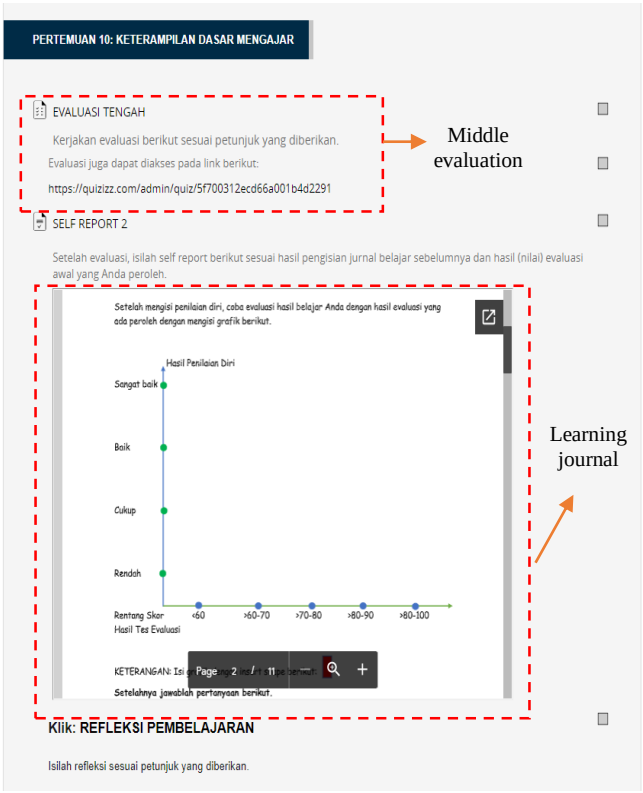

Fig. 3. Tenth Week for Middle Evaluation and Learning Journal in Cycle 2

Fig. 4. The final assignment of the course in the thirteenth week in cycle 3

b. *Trial Results*

From the application of the model in the teaching skills course, the results of the trial were obtained for practitioners, namely teachers and students. The test results show that from the assessment of teachers and students, the model can be applied in lectures for one semester. The test results can be observed in Table 3 below.

TABLE III. RESULTS OF MODEL/CYCLE TRIAL

Indicator	Teacher				Student			
	R	*C1*	*C2*	*C3*	*R*	*C1*	*C2*	*C3*
		%				%		
I_1	3	82	80	84	101	80	84	81
I_2		80	84	80		79	80	80
I_3		82	87	82		79	79	78
I_4		84	79	81		78	81	84
I_5		80	81	81		80	81	81
I_6		79	85	80		81	79	80
I_7		80	80	80		80	81	80
I_8		85	82	79		81	82	85
Mean		81,5	82	81		80	81	81

From this data, participant information was also obtained regarding the indicators of the model trial with the following information. In the first cycle, the participants and the teacher stated that the syntax was easy to follow with descriptions of orientation activities, deepening of material with exploration and analysis tasks to help students understand the types of teaching skills. However, in the second and third steps, participants felt it was a difficult step because, in this step, pre-class activities were carried out independently by reading, exploring, and analyzing. Followed by the discussion of the material, according to the participants, this step provides additional information and confirmation of the material that has been previously studied independently. At the end of the cycle, the use of learning journals according to participants helps in evaluating and making improvements in learning.

In the second cycle syntax, the majority of participants and teachers stated that the learning activities provided starting from the given orientation, project assignments, peer assessment, and discussion of results could be taken and applied in lectures. According to the participants, this step of applying the material that has been studied previously in the task of preparing learning designs makes participants better understand the application of theory to its application. However, participants also explained that the lack of mastery of the previous material was an obstacle in developing scenarios, for example in setting goals, applying learning skills, selecting materials, and others. More specifically, participants stated that peer assessment increased their understanding in preparing learning designs by learning from each other's learning designs.

The results of the third cycle trial show that the syntax of the model can also be taken well by the participants and according to the teacher. Learning activities have the same pattern as the second cycle starting from orientation, project assignments, peer assessment, and discussion of results. Furthermore, participants stated that the third cycle can be taken and is a continuation of the first project task in preparing learning designs, although it was also stated that participants were able to carry out independent simulations and document them in video form because it required repeated retrieval time and good video editing skills.

In general, from the three cycles of the teaching simulation project model, it was assessed that participants could apply it in lectures well, as well as for teachers the steps of the model could be applied well (average score of 80-82, decent qualifications). However, according to the teacher, only in the first cycle need good preparation related to teaching materials that can be used by students to study independently, such as modules or worksheets. In addition, students and teachers also complained about network constraints because learning was carried out online, especially during synchronous meetings because of the conditions for distance and online learning that had to be done during the pandemic.

c. Impact of the Implementation of the Teaching Simulation Project Model According to Students

The impact of the implementation of the teaching simulation project model is known based on students' perceptions of the results and their satisfaction in learning. The application of the teaching project model to learning outcomes as stated by the participants that it was supported by consistent activities carried out every cycle, although some participants stated that it was quite difficult to master the material stating that some parts of the material were difficult to understand during independent study. This statement is evidenced by the results of a fairly good score in the initial, middle, and final evaluations of participants which were carried out through a written test with the score graph in Figure 5 below.

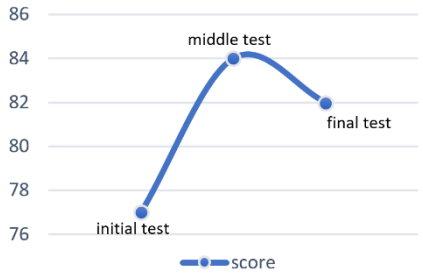

Fig. 5. Test Scores During Evaluation

Furthermore, at the end of the lecture, students' responses to learning satisfaction using the teaching simulation project model showed positive results. Participants feel comfortable, easy, and motivated because the steps are organized so that it is very helpful in the learning process. The following graphs of participant responses are presented in Figure 6.

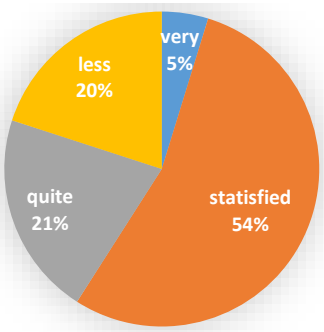

Fig. 6. Learning Satisfaction According to Users

Based on the results of the application, this teaching simulation project model has its advantages and disadvantages as a learning model. Its advantages include (a) learning syntax focuses on building design skills and teaching practice, (b) systematic learning syntax from the first to third cycles, (c) optimizing personal learning through project assignments and collaboratively through peer assessment, and (d) encourage participants to develop design skills and learning practices. The teaching simulation project model also has weaknesses, including (a) it requires active learning and independence of students in learning, (b) it requires complete learning tools such as a guide to drafting a design or simulation according to an independent learning base or a complete instrument for peer assessment, and (c) requires teacher skills in utilizing technology to construct student TPACK.

4. DISCUSSION

The teaching simulation project model is designed to be applied in courses that require teaching practice activities which also include learning design. In this study, the model was applied to teaching skills courses which have the aim of equipping prospective teacher students with various skills in teaching such as opening and closing lessons, explaining skills, asking questions, and others [19], [20]. Following the TPACK framework used in the model development base, to master these skills requires good mastery of content, pedagogy, and technology from students, especially for online learning, as well as other courses that have the same achievement [9], [10]. An organized framework makes it easy for students as learners to organize their learning process, especially if students are involved in it as is the case in the teaching simulation project model, students need to know and understand the steps they will take [21], [22].

This is what underlies the model has three cycles that are implemented each with the same syntax but with different outputs. The first cycle is aimed at constructing mastery of content as an important factor that determines the success of prospective teacher students in teaching. Good content mastery will affect the readiness and fluency of teachers in teaching and foster self-confidence [23], [24]. The results of the study even show that low content mastery is one of the main problems for teachers in positions during professional education [25]–[27]. Furthermore, in the second cycle, the pedagogical knowledge of prospective teacher-students is formed through learning design activities and continued in the third cycle through teaching simulation activities which are also aimed at forming technological knowledge in learning. Indeed, in practice, design and simulation become a series of activities in teacher education related to instructional teaching and learning [7], [28].

In the results of the trial, from teacher and student assessments, it was stated that the three cycles of a systematic model could be applied in lectures and help prospective teacher students to practice teaching. This shows that in designing lecture activities, the regularity and systematicity of the material, assignments, and discussions carried out will help students to learn better [2]. Added to this is the existence of a learning journal that can be intended for students to be actively involved in knowing their achievements and making the necessary improvements in learning. This student involvement will form good self-regulated learning according to the results of related research which indeed proves that good self-regulated learning will have a positive impact on the achievement of learning objectives, especially for online learning which is based more on personal learning [28], [29]. However, in practice, the use of learning journals must be truly reflected in each cycle of the teaching simulation project model with teacher assistance to provide the necessary feedback.

A well-implemented model shows a positive impact according to students which can be observed from the results of learning satisfaction data that show qualifications in terms of comfort, convenience, and motivation in learning. This needs to be an awareness for teachers to pay attention to student satisfaction in learning will foster motivation to learn better and of course can have an impact on learning outcomes [16], [30]. The results of the study itself also showed a good average during the application of the model in three evaluations per cycle. The relationship between interest and learning outcomes itself has been widely studied that both have a positive relationship in achieving learning goals [31], [32]. This relationship emphasizes that for students at any level, learning needs to be well designed and implemented through the latest models and tools, especially for students in teacher education study programs. It has been mentioned before, that during the training of prospective teachers, prospective teachers are actually observing, learning, and can imitate and even develop how ideally teaching and learning are carried out.

5. CONCLUSION

The teaching simulation project model has been successfully tested empirically through the application of the model in teaching skills courses. The application of the model was carried out for fourteen meetings for each: the first cycle of four meetings, the second and third cycles of five meetings with a pre-class, in-class, and out-class pattern. The results of teacher and student assessments show that the assessment of the model achieves proper qualifications on applicable indicators, including the suitability of activities for lectures, ease of activities in lectures, the applicability of material orientation, in-depth application of the material, applicability of material discussion, applicability of learning journals, applicability in learning systems, and the syntactic organization of the model. During the application of the model, students' mastery of content for the courses was also investigated which showed good results theoretically and practically from the initial evaluation for the first cycle, the middle evaluation for the second cycle, and the final evaluation for the third cycle. This is an explanation in the indicators of student learning satisfaction during lectures with the teaching simulation project model, the majority of whom stated that they were satisfied in terms of ease, comfort, and motivation to learn. Although in its application the teaching simulation project also has weaknesses among its advantages as a learning model.

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