

Development of a cooperative micro lesson study learning model to teaching creatively and teaching for the creativity of engineering students

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ABSTRACT: This research aims to develop a learning model at a university, which produces prospective teachers. It is expected that the graduates of the university will be able and willing to apply lesson study when they become teachers as they will have the experience of learning by using a cooperative micro lesson study learning model. In the implementation of this model, there is an integration of two elements: first, Jig Saw type of cooperative learning, which provides interactivity, inspiration, fun and challenging learning, and motivates students to participate actively in the learning and to be creative; and second, lesson study, which allows for the collaboration of teachers and the reflection of learning process. This research is a development study. The result of this research is the development of a cooperative micro lesson study learning model. The research instruments were observation sheets and portfolio documentation completed in each cycle of the research.

INTRODUCTION

The learning process at schools should be done in a way that is interactive, inspires, is fun and is challenging, motivating students to participate actively in the learning process. The learning process should also provide space for creativity and autonomy in accordance with students' talents, interests and their physical-psychological development. On the other hand, prospective teachers graduating from universities still generally use the conventional teacher-centred method in their teaching. This might be the result of their learning in universities; they are copying their learning method, which emphasises recitation/memorising rather than a method of learning that is interactive, inspirational, is fun and challenging, and motivates students to be active participants in the learning process, to be creative and have learning autonomy.

Teachers must be aware of the importance of self-competence improvement. Therefore, lecturers should be able to develop and improve their pedagogical competence. So far, teachers' efforts to develop their competence is still limited to participating in seminars on learning models/methods, which are common in the field of education. Thus, the impact is insignificant, because they only learn for one or two days. The mind-set that teachers only passively wait for seminars to be held for changing, and the teaching method should be changed, so that teachers can self-reflect based on learning processes through collaboration and willingness to share with other teachers, as well as openness to the improvement of learning.

Research by the World Bank shows that education only touches upon the low cognitive domains, which include knowledge, understanding and applications, while high-order thinking, such as analysis, evaluation and creation are less developed compared to other countries. Based on the research, it seems that the learning process is not ideal. This might be because the learning process still uses teacher-centred learning methods in which the role of lecturers/teachers is dominant, resulting in less autonomy for students. This can be observed from the low interaction of students and lecturers, especially, when there are problems/questions, which students need to ask/discuss with lecturers. Students tend to be silent, which could be because the students do not understand the issue or what to ask. Such a problem should be addressed, so that the quality of the education process, which produces prospective professional teachers could be improved. One of the methods which can be employed to improve the process is cooperative micro lesson study learning model.

LITERATURE REVIEW

Learning/teaching is an effort to educate students; one important part of learning is planning. The main element of planning is the process of selecting, establishing and developing approaches, methods and teaching techniques, providing meaningful learning materials, as well as measuring/evaluating the success of the learning process in

achieving the learning objectives [1]. Furthermore, learning is a conscious process of changing behaviours, while teaching is a planned effort by managing and providing conditions, which enable students to implement the learning process. Learning is a complex activity [2]. To become a successful teacher, one should be able to use/implement teaching-learning methods as instruments to improve students' involvement in the process of learning and the learning outcomes.

A teaching-learning model can use some methodological and procedural skills, such as conducting research, getting involved in discussions, working collaboratively, creating art and doing presentations [3]. Further, the interactions in the process of learning can run well if students are active, compared to teachers [2]. Thus, good teaching methods are those which can encourage students to learn. It is also viewed that good learning employs multiple methods, which support each other. On the other hand, the appropriateness of the methods depends on the objective, content, and activities of the teaching and learning.

Blended learning is the combination of different training *media* (technologies, activities and types of events) to create an optimum training programme for a specific audience. The term *blended* means that traditional instructor-led training is being supplemented with electronic formats [4]. Therefore, blended learning can be defined as the integration of different teaching media to create optimum learning programmes for students. The term *blended* was firstly used to describe subjects which integrate face-to-face learning with electronic-based learning.

A different learning method is needed for different students. To fulfil various learning needs, blended learning is the most appropriate approach. Blended learning enables professional learning, providing effective, efficient and highly interesting learning. Some advantages, which can be obtained from the application of blended learning include:

- 1) Expanding the scope of the learning/training;
- 2) Easy implementation;
- 3) Cost efficiency;
- 4) Optimum results;
- 5) Suitable to all learning needs;
- 6) Improving the attractiveness of learning [5].

Cooperative learning could be understood as meaning that the process of learning does not have to come from teachers to students. Students can teach other students in the form of peer teaching. Much research has shown that peer teaching is more effective than teacher teaching [6]. Cooperative learning is done by arranging students into small groups. Teachers give problems/cases to the groups to solve. Students in each group study the cases/problems individually, helping each other in evaluating the cases/problems and being critical of their peers' answers. Students learn in groups of four to six members, discussing the cases/materials together.

Through this approach, students are trained to respect the opinions of others. This is also a practice for the students to express their ideas to other members. Thus, it would be beneficial for both parties, both those who have high or low abilities. Those who have low skills would be assisted, because they interact with those having higher skills. On the other hand, those having higher skills will feel satisfied, because they could become tutors for their peers.

Jig Saw is designed to increase the responsibility of students of their own learning and the learning of other students. Not only do students learn the given materials, they also have to teach/share the materials with other members of their group. Therefore, students depend on each other and have to learn collaboratively to learn the given materials [6].

Lesson study derives from a Japanese word *jogyokenkyu*, which means a systematic process used by Japanese teachers to examine the effectiveness of their teaching to improve the learning outcomes. Each cycle of lesson study is implemented in three stages, which are planning, doing and seeing/reflecting. Those three stages are continuous. In other words, lesson study is a continuous way to improve the quality of education [7].

The improvement of lecturers' professionalism through lesson study is bottom-up, because case/problem-based training materials used by lecturers will be reviewed collaboratively and sustainably. The expert/speaker in the lesson study should act as a facilitator, not as an instructor. The facilitator should be able to motivate participants to develop their potential, so that the participants can learn together.

RESEARCH METHODOLOGY

The method used in this research was a literature study that employed a research and development approach. The developed materials include the planning of learning materials, the implementation of learning, assessment of learning and learning evaluation using cooperative micro lesson study learning model.

Research Objectives

The objective of this research was the development of a cooperative micro lesson study learning model for prospective teachers. For example, a class with 30 students and learning materials consisting of five parts will have five expert

groups consisting of six students and six home groups, each consisting of five students. Each member of the expert groups will return to the home groups to share information learned in the expert groups. Teachers facilitate the group discussions, both in expert groups and home groups.

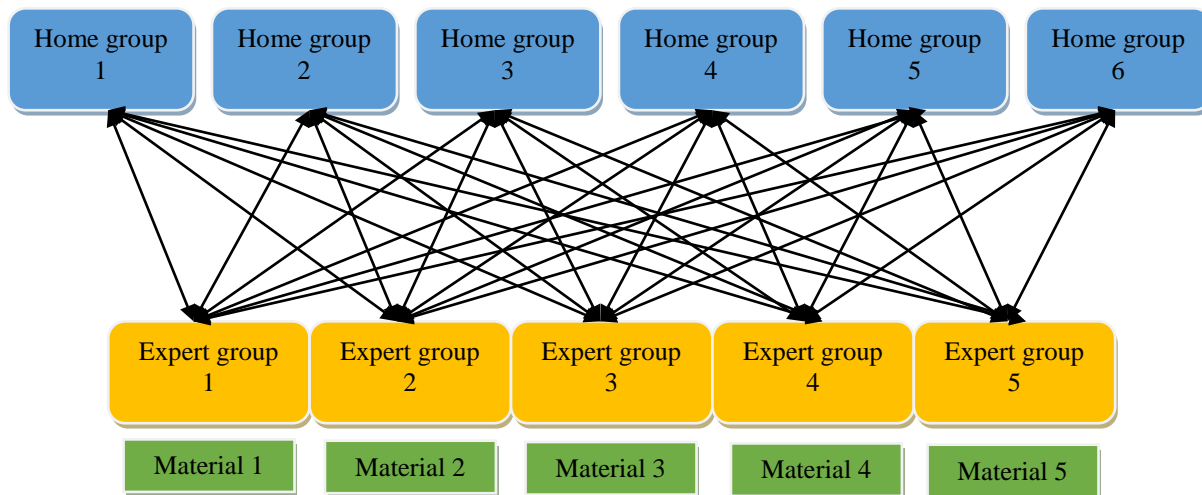


Figure 1. Jig Saw group formation.

After the students have discussions in the expert and home groups, there are presentations by each group. Alternatively, a raffle can be held to select one group to present the results of the discussions, so that teachers can help students align their perceptions of the learning materials which have been discussed. The teachers give a quiz to students individually. They also reward the students throughout the groups based on the individual improvement score from the basic score to the quiz score. The materials should be given to students, divided into some learning materials.

RESULTS

Cooperative Micro Lesson Study Learning Model Development Procedure

The development procedure for creating a cooperative micro lesson study learning model was divided into two stages. The first stage of the implementation was aimed to design the cooperative micro lesson study learning model. The model has three main focuses: a) the development of micro lesson study; b) the competence obtained by students/prospective teachers; and c) the outcomes of the research report of the development of the cooperative micro lesson study learning model.

PLANNING

The first step is planning the aspects needed in the implementation of learning with the cooperative micro lesson study learning model, including:

- a. Discussions involving model lecturers, expert lecturers and observer coordinator lecturers on the set of learning instruments, which will be used so that lesson plans, learning media, learning materials and observer sheets can be produced.

Table 1: Grouping of observer class and Jig Saw class.

	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Observer group	Introduction	1	1	2	2	3	3	Mid semester test	4	4	5	5	6	6	Prep final test	Final semester test
Jig Saw group		2, 3, 4, 5, 6	2, 3, 4, 5, 6	1, 3, 4, 5, 6	1, 3, 4, 5, 6	1, 2, 4, 5, 6	1, 2, 4, 5, 6		1, 2, 3, 5, 6	1, 2, 3, 4, 6	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		

- b. Planning the concept of group divisions of classes used in the research:

For example, in one class there are 30 students; therefore, the class can be divided into six groups, with five students in each group. Meeting 1 is planned for introducing the method of teaching, which will use the cooperative micro lesson study learning model. The meeting is also used for selecting which groups will be the

observer groups, so that all students have the opportunity to become observers and become members of the cooperative groups.

c. Planning the setting of seats for the research:

Appropriate setting of seats will allow good implementation of learning with Jig Saw, and ease the observer in filling the observation sheet. The seat design for the Jig Saw group will be in the middle of the room. The model lecturer will be in front of the class and the expert lecturer will be on the right side with some of the observers. Some of the other observers will be at the back.

d. Dividing the time for lecturing, which is 100 minutes into some activities:

Early situation conditioning; first home group discussion; expert group discussion; second home group discussion; home group presentation; doing the task; conclusions of materials from the model lecturer; feedback of lecture activities from the expert lecturer; feedback of activity from the observer; reflection of the lecture; planning the next lecture.

With an appropriate schedule, the implementation of the lectures will be as expected and will match the scheduled time. Thus, the expert lecture can give a sign or warning when the lecture has passed the scheduled time.

DO - Implementation

The implementation of the lecture can be explained as follows:

1. Class Meeting 1:

First, an introduction about the use of the cooperative micro lesson study learning model is given by the model lecturer, so that students understand and do not feel confused during the implementation. Next, the group is divided into six and the seats are arranged according to the plan. Then, the simulation of the lecture using the cooperative micro lesson study learning model is done. The last activity is distributing materials to all groups for the next discussions. All activities are video recorded to allow reflection.

2. Class Meeting 2:

After Meeting 1, in Meeting 2 students do the assigned tasks/assignments. In the meeting, Group 1 becomes the observer group, while Groups 2, 3, 4, 5 and 6 participate in the lecture activity using cooperative type Jig Saw from materials presented in Meeting 1. Therefore, students must learn the material prior to Meeting 2. The model lecturer directs the lecture, while the expert lecturer and observer document the activity and take notes of what happens in the classroom. After the materials are given, reflection is done based on the observation sheet. The expert lecturer and observer give feedback on the activities which have been done. Next, based on the feedback and reflection, planning for the next meeting is designed.

3. Class Meetings 3 to 7:

In Meeting 3, the plan that has been completed in Meeting 2 is implemented. The implementation of the lecture is similar to Meeting 2. Group 1 becomes the observer and other groups do the Jig Saw. At the end of Meeting 3, there is reflection and planning for Meeting 4 that is based on feedback and observations from previous meetings. The meetings occur continuously until meeting 14. The observer group is changed based on the schedule, so that all students get the opportunity to observe. All activities are documented for the evaluation of the activities.

4. Class Meeting 8:

The mid semester test is done in Meeting 8.

5. Class Meeting 15:

Preparation for the final semester test is given, reviewing materials which have been given to students.

6. Class Meeting 16:

The final semester test is done. From the test, the understandings of the materials by students can be identified.

SEE - Reflection

Reflection is done at the end of the lecture based on the evaluation sheet, which must be filled by the observer during the lecture. With the feedback from the observer, drawbacks of the learning process can be identified. Therefore, solutions can be found/formulated to address the drawbacks. The last step is to plan the next meeting based on the improvement.

CONCLUSIONS AND SUGGESTIONS

The basic principle in the development of the cooperative micro lesson study learning model is the integration of lesson study and cooperative learning. The cooperative model that is suitable for lectures is Jig Saw, because this model emphasises learning, which is interactive, inspiring and is fun, challenging students to actively participate, creative and improve students' autonomy. On the other hand, lesson study is implemented in a small scope. Therefore, it could be described as micro lesson study, which only involves one model lecturer, one expert lecturer and one observer group from students. In every cycle, the observer group will be replaced by other groups in order to provide an opportunity to all students.

With the application of this model, students will have more learning experiences compared to learning with other methods. Besides being subjects of the cooperative Jig Saw model, they also become instructors and observers in the implementation of lesson study.

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