

# Increasing/Improving Semester (VII) Students Activities and Learning Outcomes in the Study Program of Technical Fabric Design through the Course of Learning and Jigsaw Instruction Technique

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## Abstract

The problem of low learning activities coupled with limited learning outcomes of students in the technical fabric design in the seventh (VII) semester has been handled through the course of learning and jigsaw instruction technique. Based on this, the study focused on: 1. Establishing whether the use of Jigsaw technique could increase semester seven (vii) students learning activities on the undergraduate program of technical fabric design through the course of learning and jigsaw instruction technique, and 2. Finding out whether the use of Jigsaw technique could improve semester seven (vii) students learning outcomes. The research hypotheses were: 1. The use of the jigsaw instruction technique in the seventh semester could improve students learning activities, 2. The use of Jigsaw technique could lead to the improvement of the learning outcomes of the undergraduate students of the technical fabric design program. This research was conducted in three (3) cycles, each cycle consisting of 3 (three) meetings. Data was collected through observation and questionnaires and it was later on analyzed using qualitative descriptive analysis. The results were: 1. Application of the jigsaw learning technique could increase learning activities of semester seven students. This was demonstrated by an increase in student learning activities by 47.62% from the initial observation of 25% to 72.62%, 2. Application of jigsaw technique led to the improvement of learning outcomes in the seventh semester of the undergraduate program of technical fabric design. This was showed by an increase in students' results from an average of 2.50 to 3.33.

**Keywords:** Instruction, Jigsaw Technique, Learning Activities, and Learning Outcomes

## A. Introduction

One of the expected outcomes that would be achieved from the lecture in college is an independent student including independent learning. Students are expected not solely to depend on the lecturer; it means that students should be active in the learning process. Semester Credit System (*SKS*) applicable in Higher Education manifested in two types of learning, that are face to face learning with the lecturers (college), and student learning activities are carried out without the presence of the teacher-structured learning and entail independent activities. Both types of learning are in dire need of high learning activity of students.

In face-to-face learning activities, students do not only sit, pay attention and listen to explanations from the lecturer, but also required to think, ask questions that have not been understood, give opinions, answer the lecturers and other students' questions, and even criticize the opinion of lecturers and friends. In addition, they are expected to be able to apply their learning experience in the activities of their daily living, both on campus and off campus. Students also need to be emotionally involved in the study, to understand the problems that they face and try to find solutions. This kind of situation does not only occur among few students, but almost on every student.

But in reality, the above described learning process only happens to few students. Based on my experience as a lecturer, it is only about 30-40% of the students who are active during lectures, and most of the student tend to remain silent, hear or listen to the explanation of the lecturer or friends opinion, there are even those students who do not know that there are certain activities that can interrupt them from following the lectures, such as talking to a friend seated nearby. This still happens in the presence of even those lecturers who endeavor to motivate and offer opportunity to students to actively ask, answer questions or provide opinions, thoughts and ideas to solve any problem that arises during lectures. This is one of the problems faced by the undergraduate program of technical fabric design mostly in the seventh (VII) semester. For example, according to my observation of 14 students, it was established that only about 2 to 3 students were active during the lecture period.

Besides the problem of the low level of students learning activities, another problem is the poor quality of the learning outcomes. Based on the head of department, the average grade of students' grade was 2.70. This was further confirmed by the preliminary tests performed on the students taking a course of learning and instruction who on average scored 2.50.

Of course, this low activeness in learning of students, cannot be isolated from the influence of the various

factors, which are both internal that is they originate from the students themselves as well as external factors, that is, factors from outside the student (Biggs & Tefler, 1987: 141-163; Winkel, 1991: 200-210). Internal factors that can affect the learning activities include: attitude, motivation, concentration, intelligence, emotional intelligence, talents and interests. While external factors such as learning materials, learning resources, learning environment, and the factor of teachers (lecturers) also greatly influence students learning. By understanding the factors which influence the active involvement in learning is one of the efforts to find a solution.

Besides the problem of the limited learning activities and the poor learning outcomes, so far, the method used is the lecture method is only modified by question and answer techniques. And though this method is enriched by question-answer session, most of the questions and answers are from the lecturers themselves. This results in the learning interactions into two-way interaction (between lecturer - student, student - lecturer). Yet on the one hand, the expected learning interaction is a multi-directional one.

Jigsaw Technique is one of the learning techniques in which students work in groups, learns with and from peers. In this technique, students must be a sources and seekers of information. Thus students will inevitably have to perform a variety of learning activities. If the activity is not performed by students, it will affect the learning outputs. This method is chosen with consideration of: (1) through group activities, activities of student learning will emerge and constantly be improved, (2) to learn through friends and fellow students will be free to ask questions, express opinions, and criticized the opinion of friends, (3) his own friends explanation by using simple language will help students understand the material being studied, compared to an explanation by the teacher, (4) the technique has not been widely used by lecturers in the learning process, and (5) the results of previous research shows that this technique can be improve student learning outputs.

## **B. Research Problem**

The problem in this study was formulated as follow: 1. Does the use of Jigsaw instruction technique increase undergraduate students learning activities?, and 2. Is the use of Jigsaw technique of influence in the improvement of students learning outcomes in the study program of technical fabric design through the course of learning and jigsaw instruction? This research was conducted with the purpose of: 1. To improve and increase undergraduate students learning activities in the program of technical fabric design through the course of learning and jigsaw instruction, 2. To improving semester seven student learning outcomes of the technical fabric design program through the course of Learning and Instructional Jigsaw technique.

Based on the problem background and the purpose of the study, the research hypotheses were: 1. The use of the jigsaw instruction technique in the seventh semester can improve students learning activities, 2. The use of Jigsaw technique can lead to the improvement of the learning outcomes of the undergraduate students of the technical fabric design program. Indicators of success were categorized as: 1. If the student learning activity increased 30% from the initial observation, (2) If the results of student learning has increased from an average value of 2.50 to 3.00 at the beginning of the test.

## **C. Literature Review**

### **1. Learning Activities**

Learning activity is an interaction between the individual and the surrounding situations directed by learning objectives. Continuous interaction raises the experiences and desire to understand something new, that has not been understood, or to those who have no experience. Active learning is not only characterized by the activity of students learning physically, but also mental activity. According Pannen and Sekarwinahyu (1994:6) mental activity is extremely important and major component of active learning than physical activity.

Learning actively (active learning) known as "*Cara Belajar Siswa Aktif*" in Indonesia language abbreviated as CBSA. Dimiyati and Mudjiono (2009:114) define CBSA as a leading learning approach that leads to optimized intellectual-emotional engagement during the learning process, with the involvement of the physical aspect where necessary. Such an opinion is different from that of Silberman (1996:1 - 9) who is of the opinion that active learning does not only involve the physical aspect but also the mental one.

Based on above opinion, it can be concluded that the learning activities involve cognitive, affective, and psychomotor of the learners. The forms of cognitive engagement involve recalling previous lecture materials, using a repertoire of knowledge in problem solving, collecting experimental results, comparing the concept with other concepts, and analyzing the opinions of lecturers or friends. Affective involvement include: appreciation and internalization of values and the material being studied in the context of the formation of attitudes and values, feel happy when successful and feel disappointed when one fails. Psychomotor involvement include: writing, listening, reading, modeling and measuring.

Taking in consideration, the explanation or description about learning activities it is clear that it is important for each student to conduct learning activities. Raka Joni (1992:1) explains that through learning activities, students are expected to be better able to recognize and develop their learning capacity and potential, trained to be creative, systematic thinkers, critical, responsive, and able to solve the problems. Similarly Pannen

and Sekarwinahyu (1994:6-6) says that learning activity is assumed to be an activity that can form the student as a whole person who has the self ability to lifelong learning.

Basically the students as human beings are move and act creatures. So by doing a variety of learning activities that can be fulfilled existence. Thus, if the student is allowed to be a passive one in learning so they will create or find the conditions that make it have to move or act, even though he did not realize the act that would disrupt their learning. Hence the role of teacher was so importance to make students more actively in learning.

## **2. Learning Outcomes**

Learning outcomes or achievements can be interpreted as a achieved results or real results obtained by a person after participating in a learning activity. Gagne (1985) classified learning outcomess into five types, which is (1) intellectual skills, (2) cognitive strategies, (3) verbal information, (4) psychomotor, and (5) attitude. Besides Gagne theory, adult learning outcomes theory that still used in the education world of Indonesia is Bloom et al theory. Bloom classified learning outcomes into three domains, which is: (a) cognitive, (b) affective, (c) and psychomotor domains.

A description of the forms of learning outcomes shows that student learning outcomes cover all aspects of the students personality, both knowledge and skills, attitudes and learning outcomes. Thus, student achievement is usually in the form of value, which is an accumulation of the overall personality of a student.

Learning achievement is also learning outcome. Therefore, the determining factor of a student's learning outcomes is a lecturer who should carefully and accurately involve students throughout the learning process. Recklessly determination of learning outcomes, will result in inaccurate and erroneous information about the achievement of students.

### **c. Jigsaw learning technique.**

Jigsaw technique was developed by Elliot Aronson's. This technique is not only designed to increase student responsibility independently, but also required for positive interdependence (mutual help) with a group of friends. Students not only learn the material given, but they must be prepared to teach the material to the group members. Thus the students dependent on each other and must work cooperatively to learn the material and tasks assigned. In addition, students works each other in a mutual cooperation atmosphere and a lot of opportunities to processes the information and to strengthen the communication skills. (Lie, 2004:69).

In the use of jigsaw technique, formed heterogeneous groups composed of 4-6 students. Learning materials text given to students and they are responsible for mastering the material and be able to teach other group members (Arends, 1997; Slavin, 1995; Silberman, 1996).The members of the different groups that are representative of the group meet to discuss the same topic (discussion among experts), help each other to learn their topics assigned. Furthermore, these students return to their respective groups (the origin group) for explain to a group of friends who have learned the material. Thus the Jigsaw technique, there are two kinds of groups, the experts and the origin group. An experts group is representatives from the origin. They are responsible for studying a particular topic within the group of experts, and then return to their origin groups to explain the topic to his friends.

### **d. Jigsaw Technique in Improving Student Learning Activities and Outcomes**

Students participate in learning determined by lecturer methods in the learning process. That will be stimulating the emergence of student learning activities. Lecture method, for example, has a low stimulation of the students learning activities, then discussion or experimental methods. Therefore every lecturer should use this method to stimulus of student activities in the learning process.

Noting the explanation of the jigsaw technique, it can be assumed that this jigsaw technique can create conditions that will stimulate students to perform a variety of learning activities. Jigsaw technique allows students to learn from and among friends. Thus they are more free to ask questions, provide to answers the questions of friends, express or criticize the opinion of friends. These activities are limited or even do not when students dealing with lecturer. For dealing with the lecturer (students perspective) cannot be separated from the evaluation problems. In general, students do not want to have a bad score, so they are more likely to silence, and receive lecturer explanation of learn.

Various activities performed by students in learning will help them to better understand the material they have learned. A clear understanding and mastery of the material impact on the acquisition / learning outputs expected.

## **D. Research Method**

The method used in this research was Classroom Action Research (CAR), through procedures: planning, action, monitoring and evaluation, analysis and reflection. Implementation of actions that the application of the Jigsaw

learning technique implemented within 3 (three) cycles. Every learning steps are same for each cycle, but differ in terms of material.

This research was conducted on 14 students of VII semesters S1 fabric craft technique in Gorontalo State of University. students learning activities data is obtained through observation sheet. Observations conducted on learning activity indicators, which is: (1) ask, (2) answer the teacher or friend questions, (3) give an opinion, (4) respond to the teachers or friends opinions. Each application frequency of indicators counted by each students. Then give a score. Scoring as follows: If the 4 indicator appears = 100 score, if 3 indicator appears = 75 score, if two indicators appear = 50 score, if one indicator appears=25 score, if none of the indicators appear = 0 score. Student outputs data obtained through achievement test. The process of learning data gained through observation sheet that contains an overview of indicators jigsaw learning technique.

Data analysis was carried out by: (a) Student learning activities data analyzed by using percentage, to calculate increasing of student learning activities in each cycle, (b) student learning outputs data were analyzed by calculating the average of students results in each cycle, (c) data on the learning process were analyzed by using qualitative analysis.

## Results and Discussion

### 1. Research Results

This research was conducted in three (3) cycles, each cycle consist of 3 (three) meetings. Cycle I discussed the 3 (three) subjects which is: Affecting Learning Factors, Principles of Learning and Motivation. Cycle II discussed some major topics: Learning, Contextual Teaching and Learning Approach and Curriculum Development. Cycle III discussed some major topics: Evaluation of Learning Basic Concepts, Teaching and Learning Evaluation Results and Learning Issues. Implementation of the action in each cycle is described as follows:

#### a. Cycle I

The results in the first cycle were described as follow:

**Analysis of Learning Activities:** Learning activities that created by lecturers will affect the learning activities of students. Learning activities measured aspects: (1) a class presentation, which includes information learning objectives, students motivating, linking learning with prior knowledge, (2) the formation of the group, (3) determination of the representative group, (4) expert group discussions, (5) material presentation by the experts group, (6) evaluation, (7) the award, and (8) inference. The observations of the learning activities described as follows:

At the 1<sup>st</sup> (*first*) meeting, class presentation step consists of 4 aspects, implemented of linking a learning with prior knowledge aspect are not used, because teachers focus on learning strategies explanation that will be implemented at the meeting.

The formation of expert groups and determining the representative group step, both step determined by the lecturer's authority. This condition occurs because the lecturers seek a heterogeneous group in terms of student ability, the representative of the groups are students with high ability.

In expert group discussions step, it was mostly active. This is caused by the condition of students who appointed expert group are capable students. In that step their explanation seem less clear caused it is the first experience to peer teach for them. Group award and inference step was not implemented by lecturers. This is caused teachers too focused on evaluation of learning outputs attention achieved by each student.

At the 2<sup>nd</sup> (*second*) meeting, class presentation step that consists of 4 aspects there are two aspects that are not used, the motivate students activities and linking learning with prior knowledge. This is caused lecturers too focused on explain learning strategies activities.

In determination of group formation and representative steps, both have been done democratically, that these two activities implemented by students after receiving explanation of the terms from lecturer and determination of the expert group. In the expert group discussion step, there are some passive students, they just only listen to the explanation of his friend without comment. Furthermore, in material presentation of the experts group step, it turns out they are categorized less obvious explanation, it is because they are too fixated on the explanation the sentences in the book. Lecturer has been done the evaluation step, the group awards and conclusions.

For activities on 3<sup>rd</sup> meeting, the observation shows the same conditions with the observation of the 2<sup>nd</sup> meeting.

**Analysis of Student Learning Activities:** Student learning activities measured from aspects (1) ask, (2) answer, (3) opinion, (4) response. Scoring is determined as follows: if 4 indicator appears, 100 scores; if 3 indicator appears, 75 scores; if 2 indicator appears, 50 score, if one indicator appears, 25 score; and if no one indicator 0 score.

Before this jigsaw technique in teaching performed, preliminary observations on student learning activities should be done. These observations were held on the 3rd meeting where lectures using a lecture method with question and answer. Based on observations show that students' learning activities are on average



25%. Based on program have been made, then the meeting of the four learning lectures conducted by using a jigsaw. The lecture was conducted by Lectures Events Unit "Satuan Acara Perkuliahan" (SAP) has been prepared.

During the lectures conducted observations of student learning activities that show an average 46.39%. The observations also showed an increase of student learning activities at each meeting.

**Analysis of Student Learning Outcomes:** Student learning outputs measured from student in the end of meeting evaluation score. Determination of value adjusted on assessment guidelines applicable in the State University of Gorontalo, which is, levels of mastery 85-100% = A, 70-84% = B, 55-69% = C, 50-54% = D, and less than 54 % = E.

Based on test results, obtained an average student results at the meeting of 1, 2, and 3 at 2.41 (C). It was also found that the learning outcomes of students have increased at each meeting. At the 2nd meeting these learning output has highly increase. According to the researcher' analysis this is related to the material discussed at the meeting concerned the concept of matter, in this case " Learning' Concept ".

**Journal Analysis of the Research Team:** The journal made the research team describes: (a) The research team has conducted jigsaw learning technique, but there are some aspects that need to be improved, the activity of the experts group, and the experts group presentation of the material to the group, (b) Students favor this technique demonstrated by their activity in the discussion, either in asking, answering, argues, able to respond the opinion of friends, even those directly expressed pleasure with the use of this technique in the study, (c) the time available is still sorely lacking. According to an researchers analysis, it due to students are not familiar with the use of this technique.

**Students feedback Analysis:** Information feedback obtained through direct interviews with students. This is done with the consideration that the interview will be obtained more accurate data, and consideration of a few number of students (14 people). Obtained from the interviews shows: (a) students are very pleased with the application of this technique (80%), (b) Some students want a lecturer repeated peer teaching (20%), (c) student trying to master the material, because the evaluation, (d) adding time to learn, 100 minutes is still less for their discussing and master the material, and (e) the students into groups of experts determined in turn.

**Reflection:** Based on the quantitative and qualitative data analysis on observations of learning activities, student learning outputs, the journal of the research team and student feedback, there are some things that need to be improved, which is: (a) the learning activities, needs to be improved the expert group discussions and giving an explanation to the group by the experts group, (b) timing should be in proportion to each step of learning, (c) the students' learning activities, need motivation from the lecturers to each student so that they really active in learning activities, (d) lecturers should clarity the material to covered the experts group explanation, so that the experts can provide a clear explanation to the group.

## Cycle II

The results in the cycle II were described as follow:

**Analysis of Learning Activities:** Observed Aspect in this cycle II of learning activities continue to refer to observed aspects in the first cycle with respect to aspects that have not been optimal in the first cycle, which is learning activities linking with prior knowledge, expert group discussions, and teaching materials to the group by the group of experts.

The observation of learning activities on the cycle II described as follows: the entire lesson has been implemented as expected. According to the researcher' analysis this is caused by the division of time in proportion to each lesson, and has made an emphasis on the clarity of the material as well as the head of the expert group of the expert group motivation to study the material completely.

**Analysis of Student Learning Activities:** Observed aspects in students' learning activities continue to refer to observed aspects in cycle I. The observations of the students' activities at the meeting 1, 2, and 3 show average 55.91. However, at the meeting of 2 seems lower than to the meetings 1 and 3. According to the researcher's analysis, it is related to the material discussed at the meetings that require in-depth analysis of the student, the material on Contextual Teaching and Learning (CTL). But the average seen no improvement from the first cycle, the first cycle and second cycle = 46.39 = 55.91.

**Analysis of Student Learning Outcomes:** Tests were carried out at each meeting on the second cycle showed an average 3.33 (B). The test results also showed an increase in student learning outputs at each meeting, as well as when compared to the result of students' learning in the first cycle, as well as an increase in the cycle where I = 2.48 (C) and cycle II = 3.33 (B).

**Research Journal Analysis:** Based on journals of the research team obtained the following matters: (a) The research team has carried out a Jigsaw techniques learning steps as expected, (b) Students are enthusiast in learning activities, (c) Distribution of the time at each step of the learning set proportionally, (d) Students are appointed as the experts will get high scores than students become members of the group concerned.

**Information of Students Feedback Analysis:** The results of interviews with students to get the data as follows:

(a) students are very pleased with the application of this technique (100%), (b) Students will be happy if appointed as the experts.

**Reflection:** Based on the data analysis, information can be obtained about things that still need to be improved in the following cycle: (a) attention should be given o students who are impaired through the provision of guidance to understand the subject matter, (b) students need guidance to understand the materials subjects of basic competencies that have been formulated by the lecturer.

### Cycle III

The results of the third cycle studies are described:

**Analysis of Learning Activities:** The results showed that the entire lesson was done. It is caused by both lecturers and students are familiar with this Jigsaw method.

**Analysis of Student Learning Activities:** The observations of the students' learning activities showed an increase at each meeting, which averaged the results obtained: 76.62. It is larger than the second cycle average 55.91. According to research journals, high student learning activities in the third cycle is caused by the high motivation of the students to learn by using a jigsaw. Based on interviews with students, they expressed very interested and motivated to learn, because they are more free to argue, ask or respond due to occur between peers and use their own language. Thus, they are easier to understand the material covered in each meeting.

**Analysis of Student Learning Outcomes:** Student learning outputs at the third cycle obtained through tests showed an average of 1.2 and 3 meetings of 3.33 (B). It appears that student learning outputs has increased at every meeting, although the average on third cycle is the same as second cycle, where the cycle II and cycle III = 3.33, the value that was more improved than the first cycle, is 2.41.

For more information, scores mean well for students' learning activities and outputs from initial observations up to the third cycle described on table 4.1 below:

**Summary of Student Learning Activity and output Average Score Table**

Cycle	learning activities	Learning output
preliminary observations	25%	2,50
Cycle I	46,39%	2,41
Cycle II	55,91%	3,33
Cycle III	72,62%	3,33

Based on the table above it can be concluded that the use of jigsaw techniques in learning can improve learning activities and outputs student on VII semester Fabric Craft technique study program in Instruction and Learning subject.

## 2. Discussion

The results of this research indicate that the use of jigsaw techniques in learning can improve student learning activities. Thus the hypothesis "Using Jigsaw techniques, learning activities. The student of Fabric Craft technique on Semester VII in instruction and Learning subject can be improved", is acceptable. In addition Jigsaw Technique improved student learning outputs. Thus the hypothesis is acceptable. Linked to predetermined performance indicators, which is "student learning outputs has increased 2.50 to 3.00 average scores" has been reached, even exceeded the target.

Based on the experience of researchers for conducting this research, the jigsaw technique can create conditions that will stimulate students to perform a variety of learning activities. Through the jigsaw technique and the students learn from their peers. Thus they are more free to ask questions, answer of questions friend, an opinion or respond to the opinion friends. This condition will help them to understand the materials that have been studied. This experience is consistent with the theory outlined in Chapter II.

Another thing that student occurred to learn the jigsaw technique is a motivation to try to understand the material completely, cause of learning activities evaluation are held in individually, in addition to the award of group. So there is not only individual competition but also group.

The successful use of the jigsaw technique is certainly not out of the lecturer role. Lecturers are required to prepare a written material to be discussed in the group. In addition, the activity requires lecturers to check the results of the evaluation at each meeting. It would be difficult if a large number of students. However, this condition can be overcome with the delivery of the results of the evaluation will be conducted at the next meeting. In this way the lecturer will have enough time to correct the results of evaluations that have been conducted.

This research learn on the use of jigsaw techniques in learning can be detailed as follows: (a) Students are more active in the learning process / lecture that impact on improving learning outputs, (b) Students are more motivated to learn because in each end of the course held individual evaluation, (c) There are competition among

the students both individually and in groups, (d) Lecturer act more as a mentor, motivator, facilitator, and control in the learning process, (e) Developing social behavior of students, cause of they learn each other .

#### D. Conclusion

Based on the research result, conclusions can be formulated as follow:

1. Application of jigsaw technique can improve the students learning activities. This was indicated by improved student learning activities in technical fabric design program where there was an increase of 47.62% different from the initial observation, from 25% to 72.62%,
2. Application of the jigsaw technique in teaching can improve student learning outcomes. This was demonstrated by an increase in students learning outcomes during pretest done on the course of learning and jigsaw instruction technique there was an improvement in the score from 2.50 (C) to 3.33 (B) on average.

#### E. Recommendation

According to the research findings the recommendations are:

1. The jigsaw technique should be applied in learning at every level of education, since this technique can stimulate students to think effectively through discussion among friends, so that the material can be understood more meaningful. In addition, the application of this technique can help students in developing social skills,
2. It is time for students to learn with learning techniques demanding independence in learning, where students learn independently without much reliant on lecturer, and
3. For the researcher should be able to do this research as a class action under different conditions, both in terms of number of students and characteristics of matter.

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