

Book 1



ACER-N

ASEAN COMPARATIVE EDUCATION RESEARCH NETWORK CONFERENCE

PROCEEDING
ASEAN Comparative Education
Research Network Conference
[ACER-N 2016]

The ASEAN Teachers :
Towards Standardization of Quality and Qualifications

November 30th – December 01st 2016

Grand Inna Muara Hotel Padang, Sumatera Barat, Indonesia

Organized by :
Kopertis Wilayah X
(Sumatera Barat, Riau, Jambi and Kepulauan Riau)

In Collaboration With :
Universitas Negeri Padang
Fakulti Pendidikan Universiti Kebangsaan Malaysia
STKIP PGRI Sumatera Barat



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Isteti Murni *et al.* (2016)

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PREFACE

The 4th ASEAN Comparative Education Conference Network (ACER-N) that is hold on November 30th – December 1st 2016 has chosen 300 papers that are presented in Inna Muara Hotel Padang, Sumatera Barat Indonesia.

The main purpose of this conference is to provide a forum to cover the participants in discussing and sharing experiences, information, and findings of their researches in education, economic, and culture which are described in the main theme of this conference: " The Asean teacher towards standardization of qualifications ".

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Chief Editor

Kopertis Wilayah X (Sumatera Barat, Riau, Jambi dan Kepri)
STIE Haji Agus Salim Bukittinggi, Sumatera Barat, Indonesia

PREFACE

We are pleased to present this collection of papers submitted to the 4th International Conference of ACERN, November 30, 2016 in Inna Muara Hotel, Padang – West Sumatra. This is the first ACERN conference held in West Sumatra. The conference was an open gate for us to start the information, experiences, researches as well collaboration between various academics and non-academics institutions worldwide. This expands our mutual knowledge and experiences. Kopertis Wilayah X (Sumatera Barat, Riau, Jambi dan Kepri)

The total of 300 papers from Indonesian, Malaysian and Brunei participants contributed to this proceeding and we also attached the abstract and biography from the keynote speakers within the proceeding. The proceeding also presents a wide variety of research on education from various subjects. The papers use various approaches and strategies for research in education. It will give us different perspectives and knowledge for the development of educational research.

A great team effort also became a big support to the successful of the conference and proceeding. We are grateful to have a hard working organizing committee as well as committed editors and board of experts who gave us the important inputs and reviews of this proceeding. We would like to express our great gratitude to all institution and universities that are Fakultas Pendidikan UKM, Universitas Negeri Padang, and STKIP PGRI Sumbar who organized this event and the proceeding publications. Finally, we also express our appreciation to Bank Syariah Mandiri, Bank Nagari, and Bank Tabungan Negara who supported this event. Thank you for all your contributions. We do hope that you experience a stimulating seminar and informative proceeding with many opportunities of future contacts, collaborative research and application.

Dra. Skunda Deliarosta, MPd
Head of Organizing Committee
Kopertis Wilayah X (Sumatera Barat, Riau, Jambi dan Kepri)

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TABLE OF CONTENTS

Title Pages i
Supported by ii
Editorial Boards iii
Preface iv
Table of Contents v

BOOK 1

No	Presenter	Title	Pages
1	Ade Marlia	THE IMPROVEMENT OF ACTIVITY AND LEARNING RESULT THEMATIC BY PROBLEM BASED LEARNING APPROACH AT SECOND CLASS IN ELEMENTARY SCHOOL 05 BANDAR BUAT PADANG CITY	1-13
2	Adi Heryadi, Rini Eka Sari, and Galuh Setia Winahyu	DEVELOPING ANTI-CORRUPTION PERCEPTIONS OF ELEMENTARY SCHOOL STUDENTS THROUGH ANTI-CORRUPTION TRAINING	14-21
3	Adila Jefiza	PRE-SERVICE TEACHER EDUCATION: AN ANALYSIS OF THE PROBLEMS	22-28
4	Adri Nofrianto, Novyta	PROBLEM SOLVING: HOW IT CAN CONTRIBUTE TO STUDENTS CREATIVITY?	29-37
5	Adzanil Prima Septy	TOWARD ASEAN TEACHER STANDARDIZATION, A LESSON FROM INDONESIA TEACHER TRAINING AND CERTIFICATION	38-46
6	Afdaleni	USING SOCIOAFFECTIVE LEARNING STRATEGIES TO IMPROVE STUDENTS' FOREIGN LANGUAGE ABILITY	47-52
7	Rahmi, Ainil Mardiyah, Ratulani Juwita	THE STAGE OF PROTOTYPE DESIGN ON STUDENTS' WORKSHEET ALGEBRA LINEAR ELEMENTARY - BASED GUIDED DISCOVERY	53-58
8	Alfaiz, Monalisa	PERCEIVED SELF EFFICACY AS A PREDICTIVE OF STUDENT READINESS AND CREATIVITY IN	59-67



		COLLEGE TASKS	
9	Alfatory Rheza Syahrul, Syailendra Eka Saputra, Dina Amaluis	ANALISIS FAKTOR-FAKTOR YANG MEMPENGARUHI MINAT WISATAWAN MENGUNJUNGI OBJEK WISATA PANTAI DIKOTA PADANG	68-89
10	Ali Asmar	DEVELOPMENT HANDOUT BASED ON CONSTRUCTIVISM IN THE LEARNING MATHEMATICAL AT FIFTH CLASS OF ELEMENTARY SCHOOL	90-98
11	Anna Cesaria, Lucky Heriyanti Jufri, Rosma Yulian Tary	THE DEVELOPMENT OF MATHEMATICS STUDENTS WORKSHEET BY USING GUIDED DISCOVERY APPROACH ON MATERIAL OF RATIONALIZING DENOMITATORS FRACTIONS SHAPPED ROOT FOR THE FIRST GRADE STUDENTS IN SENIOR HIGH SCHOOL 15 PADANG	99-103
12	Anna Louis Tan Ling Ling, Norafzan Marjuki Melor Md Yunus	VOCABULARY ENHANCEMENT THROUGH VOCKET TO IMPROVE READINGAND WRITING SKILLS	104-112
13	Anzar Abdullah	EDUCATION CURRICULUM LIBERATING AND EDUCATING (CRITIQUE OF THE NATIONAL EDUCATION SYSTEM IN INDONESIA)	113-124
14	Armiati	CHARACTERISTICS TO ENHANCE LEARNING CAPABILITIES MATHEMATICALLY COMMUNICATION STUDENTS	125-131
15	Arwizet K, Nizwardi Jalinus	EFFECT OF COLLABORATIVE LEARNING MODEL-JIGSAW TYPE TO MOTIVATION, RESPONSIBILITY AND LEARNING RESULTS OF STUDENTS ON THERMODYNAMIC LEARNING IN VOCATIONAL EDUCATION	132-142
16	Asmawati, Jasril	TRAGEDI GERAKAN 30 SEPTEMBER 1965 DALAM NOVEL KUBAH DAN RONGGENG DUKUH PARUK KARYA AHMAD TOHARI	143-150
17	Aziah Hassan, Norhayati Mohd Noor	PERLAKSANAAN PERKHIDMATAN KAUNSELING KELUARGA DALAM	151-162

EFFECT OF COLLABORATIVE LEARNING MODEL-JIGSAW TYPE TO MOTIVATION, RESPONSIBILITY AND LEARNING RESULTS OF STUDENTS ON THERMODYNAMIC LEARNING IN VOCATIONAL EDUCATION

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Abstract

Vocational education is part of the education that prepares a person to be able to work in specific working groups. Improving the quality of vocational education is inseparable from improving the quality of the learning process. The quality of the learning process is influenced from several components, that is: curriculum, facilities and infrastructure, teaching staff, the quality of learners and the learning model used. This study aimed to explore the effects of different types of collaborative learning model-jigsaw type (experimental group, n=30) with a centered-teacher learning model (control group, n=28) on Thermodynamic learning in vocational education towards the motivation, responsibility and learning results toward a given task. Fifty eight students were selected as research samples who determined by using random sampling. Learning motivation and responsibility data were collected using questionnaire and learning result data were obtained using multiple choices test. Data were analyzed using MANOVA (Multivariate Analysis of Variance) assisted by SPSS for windows. Research results show that: there is a difference in learning motivation and responsibility between students who learned using of collaborative learning model-jigsaw type with students who learned using conventional learning model. And then, there is a difference in learning result between students who learned using of collaborative learning models-jigsaw type with students who learned using conventional learning model. The experimental group have motivation, responsibility a learning score more higher than the control group. And average of the increase of learning results scores for experimental group is 15-20 points from 65 to 84 and for control group is 10-15 points from 65 to 76,2.

Keywords: Vocational Education, Collaborative Learning Jigsaw Type, Experimental Goup, Motivation, Responsibility, And Learning Results.

1. Introduction

Vocational education is an education that promotes the development of the ability of graduates enter the workforce and develop a professional attitude (PP No. 29 of 1990). According to Law No. 20 Year 2003 on National Education System that vocational education is an education that prepares students to work in a particular field. S. Good (1959) states that vocational education is a program under which higher education is organized to prepare students to enter the working world certain. Aljufri B. Sharif (2008) also states that vocational education is education that bridges the students to enter and thrive in the world of work.

Along with that, Ralph C. Werich (1988: 20) states "vocational and technical is a specialized program of studies designed to prepare the learner for employment in a particular occupation." Jama (2010: 1) states: "... vocational education should be responsived to the changes in society. In this era of the rapid change of technology, vocational education must play many important roles in order to grabe roles in the world of work ... "In the curriculum of vocational education in 2013 stated that not only aims to produce graduates who are ready to work, but produce insan Indonesia productive, creative, innovative, affective through the strengthening of attitudes, skills and knowledge are integrated.

Of the various opinions on the above it can be concluded that the vocational education (vocational education) is education that prepares students to be able to work in the field and can also develop themselves in the work field. In another sense it can be stated that vocational education is synonymous with delivering education graduates to the workforce, and therefore vocational education has a different character with general education.

Traits seen in the vocational education is the education is based on the demands of the working world. The success of learners views of zoom in the world of work, able to face the challenges of the work, responsive and adaptable to the technological progress and more focused on "learning by doing" and "hands-on experience".

The success of the quality improvement of vocational education is inseparable from the quality of the learning process. Quality learning process, it will produce output that also berkualiatas. In the process of learning, there are important learning components that affect the success of learners. Among these components are: curriculum, facilities and infrastructure, educators, methods or learning models, as well as the quality of the learners themselves.

The learning process not only as a personal process, but also a social process that occurs when each person relates to others and build understanding and knowledge together. Knowledge is found, formed and developed by learners. Educators create conditions and situations that enable learners make up the meaning of learning materials through a process of learning and storing it in memory at any time can be processed and developed further.

A way of packaging the learning process designed by educators influence on the meaningfulness of the learning experience for students. The learning experience is showing

links conceptual elements to make the learning process more effective. Linkages conceptual studied by the relevant field of study will form the concept, so that students will acquire knowledge of wholeness and roundness (Williams, 1976: 116).

Teaching is no longer understood as a process of conveying knowledge from educators to students, but rather as the task of organizing the activities and environments that are complex from learners in achieving the learning objectives. Educators are not the only source of learning. Application of educator-centered learning, in which learners are accustomed to receiving instant science, making it less active in tapping the knowledge of a variety of learning resources. So to work around it is deemed necessary to make learning strategies tailored to the learning material and the basic ability learners. Appropriate learning strategies will nurture students to think independently and foster creativity, and also adaptable to various situations.

However, the current implementation and the learning process that takes place primarily at educational institutions tends to increasingly ignore the element of educating and education. The learning process as if it were replaced by activities that place more emphasis on aspects that are exercises sharpen the brain. Educational activities should integrate the dimensions of cognitive, affective, and psychomotor been ignored. Currently most of the learning process at most higher education institutions more emphasis on aspects of cognitive training alone. Conditions such as the above, in line with the view of Davies (1971) which states: "...we have tended to forget that the real essence of education is learning and not learner- teacher-teaching. Somehow, we have tended to create a mystical position for the teacher in the educational process, and have neglected the individual pupil desire and capacity to create, discover and learn for himself ... "

The learning process is just passing along the information by Dick & Carey (1985) identified as the traditional learning process. Learners taught through textbooks, then they are required to be able to pour it back on when tests or exams. Learning targets like this so that the students passed the final examination. Learning environment is characterized by the presence of competition among learners and have ignored the principle of meaningful learning that is more functional and contextual. Learning methods only pass on their knowledge, the sage on the stage, do not provide opportunities for learners to interact and transact among learners, causing them to lose time to articulate the learning experience. Learning that provide critical thinking exercises (critical thinking) and social interaction (social interaction) portion additionally received only very little time for educators only busy with routine tasks to immediately complete of the curriculum which they are responsible.

The learning process needs to pay attention to planting the aspects of soft skills, which include: cooperation, mutual respect opinion, a sense of belonging (sense of belonging), a sense of responsibility (sense of responsibility), honesty and sacrifice. In addition, the learning process is not centralized in addition to the educator (teacher centered learning), also should be able to make learners feel happy and active in the learning process, the learner is required to discover and transform information in learning, check out the information in accordance with the provisions and revise it. The learning process should also be able to increase the motivation of learners to learn, encourage their ability to do important work, improve problem-solving abilities, learn more actively and successfully solve complex problems, improve collaboration,

good communication skills, improving the skills of learners in managing work and responsible to a given task.

Was based on the description above, it is felt necessary to seek a learning model that can make the students to be more active, highly motivated, capable berkerjsama fellow learn and be able to plan the work step in solving the problem given. One model of learning that can be used to answer the above conditions are jigsaw types of collaborative learning model. Model jigsaw type of collaborative learning is a collaborative learning model which focuses on group work of students in the form of small groups. Lie (1993: 73) revealed that collaborative learning is a learning model type jigsaw kolaboartif by way students learn in small groups of four to six people are heterogeneous. Learners work together salaing positive and responsible dependence independently.

Rusman (2008: 203) states that the learning model jigsaw types learners have many opportunities to express opinions and manage information acquired and can improve communication skills. Members of the group responsible for the group's success and thoroughness part of the materials studied, and can deliver it to the group.

According to Arends, RI (1997) notion of collaborative learning is one of the types jigsaw collaborative learning model consists of heterogeneous learning teams consisting of 4 to 6 students. Academic material presented in the form of text and every learner is responsible for the assignment of part of the study material and is able to teach part of the material to the other team members. In a collaborative learning model this jigsaw types learners are given the opportunity to collaborate with other friends in the form of a group discussion to solve a problem. Each group has the academic ability of heterogeneous so that there will be a high-ability learners, two or three learners capable of being, and a less capable learners.

Thermodynamics is a basic science expertise that can help learners to know and understand the scientific concept of energy changes. Thermodynamics is a basic science expertise that its implementation can be found on the System Hydroelectric Power Plant (HEPP), Steam Power (power plant), Gas Power (power plant), geothermal electricity (PLTPB), Motor Fuels and Propulsion System, Pumping and Piping systems, Valves (Valve), heat exchanger Equipment (Heat Exchange), Refrigeration and Air Conditioning systems, and others.

Basically the subjects of Thermodynamics is one of the subjects of theory and quite difficult to understand by learners quickly. This course requires analysis and understanding in order to mengimplemntasiannya world of work. One example of the implementation of the science of thermodynamics in the world of work is on the System of Steam Power (power plant) which calculates the number of burning coal as fuel in steam boilers (boilers), the energy change of steam turbines, the energy changes in the condenser, the energy changes at the pump. In addition to the power plant, Thermodynamics science applications can also be found on hydropower, especially in turbinya and piping systems, the Motor Fuel and sebagainya. Penerapan collaborative learning model jigsaw type in the subject of thermodynamics is expected to increase motivation, response and learning outcomes of students well.

From the description above, this study describes the "effect of collaborative learning jigsaw model type to motivation, responsibility and learning results of students on this learning thermodynamic vocational education". The hope hopefully this research can reveal the

influence of the type of collaborative learning model jigsaw to increased motivation, learning behavior (response) and the learning outcomes of students in the subjects of Thermodynamics. The problems of this research are: 1) whether the application of the model of collaborative learning type of jigsaw in the course of Thermodynamics can increase motivation and responsiveness of learners, 2) whether the application of models of collaborative learning type of jigsaw in the course of Thermodynamics can improve learning outcomes of students.

While the goals of the research are: 1) to reveal whether the application of the model of collaborative learning type of jigsaw in the course of Thermodynamics can increase motivation and responsiveness of learners, 2) to reveal whether the application of models of collaborative learning type of jigsaw in the course of Thermodynamics can improve learning outcomes learners.

2. Collaborative Learning-Jigsaw Type

2.1. Definition Collaborative Learning-Jigsaw Type

Model jigsaw type of collaborative learning is a collaborative learning model which focuses on group work of students in the form of small groups. Lie (1993: 73) revealed that collaborative learning is a type of jigsaw learning model kolaboartif the way students learn in small groups of four to six people are heterogeneous. Learners work together salaing positive and responsible dependence independently.

Rusman (2008: 203) states that in this jigsaw-type learning model students have many opportunities to express opinions, and manage the information obtained and can improve communication skills. Members of the group responsible for the group's success and thoroughness part of the materials studied, and can deliver it to the group. According to Arends, RI (1997) notion of collaborative learning is one of the types jigsaw collaborative learning model consists of heterogeneous learning teams consisting of 4 to 6 students. Academic material presented in the form of text and every learner is responsible for the assignment of part of the study material and is able to teach part of the material to the other team members.

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2.2. Steps Collaborative Jigsaw mode

Collaborative learning model jigsaw type is also called collaborative learning model experts. Each member of the group faced different problems. However, the problems faced by each group the same, we call a team of experts tasked with discussing the problems faced. Furthermore, the results of the discussion under origin group and delivered to the group members.

Here are the stages of implementation of the collaborative model of learning jigsaw type:

- a. Educators divide all learners in the class into groups.
- b. Each group consisted of 4-6 students with different abilities. This group is called the home group. The number of members of the home group adapts to the number of parts of the subject matter to be studied students according to the learning objectives to be achieved.

- c. Choose learning materials that can be split into parts (theme), and then share with each learner. Each learner was given the task of studying one part of the learning materials.
- d. Each learner with the same learning materials gathered in one group study together in groups called expert groups (Counterpart Group / CG). Here learners discuss the same part of the learning material, and plan how to convey to his friend in the original group.
- e. After students discuss in groups of experts as well as the original group, then performed the presentation of each group to present the group discussion that has been done so that educators can make the perception on learning materials that have been discussed.
- f. Educators provides a test for learners individually.
- g. Educators are looking for ways to reward groups through award scores based on the acquisition value of individual learning outcome.

In the implementation of collaborative learning model this jigsaw type of material should naturally be divided into several parts of the learning materials. Furthermore, it should also be noted that the use of collaborative learning model jigsaw types, to learn new material it is necessary to prepare a guidance and content of the material and sufficiently coherent so that learning objectives can be achieved. In another diagram form can be explained, implementation of collaborative learning model jigsaw types as follows:

1. Students in a class divided into several groups heterogeneously

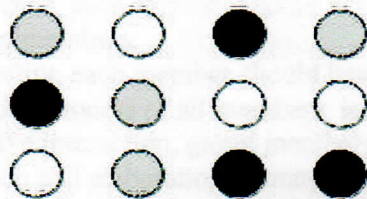


Figure 1. Divide students into groups of heterogeneous

Figure 1 above shows that educators split the group into three different groups. Each group consisted of four students (marked with a different color). Each learner gets a different teaching materials. This group is called origin groups.

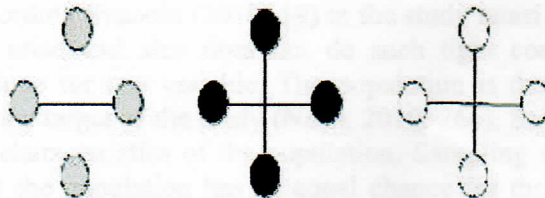


Figure 2. Study group (origin group)

2. Each member of the original group with the same material gathered to learn together (so-called expert group).
Figure 3 illustrates the respective expert groups to discuss different material.

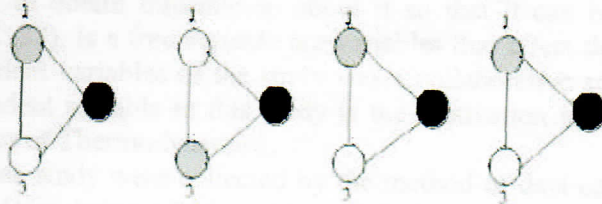


Figure 3. Group collaborative learning (group of experts)

3. After each member of the group of experts to master the material being discussed, then they go back to the original group to teach other members of the original group dikelompoknya, all teaching materials they have discussed on kelompok expert.
 4. After the students discuss in groups of experts as well as the original group, then performed the presentation of each group to present the group discussion that has been done so that educators can make the perception on learning materials that have been discussed.
 5. Educators provides a test for learners individually.
 6. Educators are looking for ways to reward the efforts of the individual and the group.
- The key success factors that must be considered in the application of collaborative learning model jigsaw types are:
1. Positive interdependence, each member should have the interdependence that can benefit and harm other group members.
 2. Individual accountability, each member should have a sense of responsibility for the progress of the learning process of all members, including himself.
 3. Face-to-face promotive interaction, group members do a face to face interaction that includes the discussion and elaboration of material for discussion.
 4. Social skills, each member should have the ability to socialize with other members so that the retention of material can be obtained collectively.
 5. Processing and Reflection Groups, groups should conduct an evaluation of the learning process to improve the group's performance.

3. Research Methods

This research is an experimental all (quasi experiment) using The Posttest-Only Control Group desian. According Syaodin (2010: 59) in the study quasi control is not performed for all the variables that arise and also does not do such tight control on pure experimentation. Controlling only done for one variable. The population is the target of the whole person or object that will be the target of the study (Nana, 2010: 266). Samples are part of the population that has the same characteristics of the population. Sampling was done randomly means that every individual in the population has an equal chance for the research sample (Nana, 2010: 253). Population and sample in this research is the study program students D3 Mechanical

Engineering, Faculty of Engineering, University of Padang who take Subjects Thermodynamics totaling 58 people. These samples included 58 students who obtained to test the equivalence of each class in advance. Equivalence test carried out by the use of SPSS version 17 o'clock for Windows with significance level of 5%.

The research variables are everything bebentuk any shape defined by the researchers to be studied in order to obtain information about it so that it can be withdrawn kesimpulan it (Sugiyono, 2012: 38). Is a free variable are variables that affect the dependent variable. Which became independent variables of the study was a collaborative study with the type of jigsaw. While the dependent variable in this study is the motivation to learn, learning responses and learning outcomes of Thermodynamics.

The data in this study were collected by the method of data collection guidance tailored to the data of each formulation of the problem. Relating to the cases examined in this study, it is no data of each formulation of the problem. There are three main types of data that is required in this study associated with the formulation of the problem, namely: learning motivation, response and learning outcomes obtained Thermodynamics learners must be valid and reliable. Data motivation to learn and the response of learners in the learning of Thermodynamics collected through questionnaires and data collected Thermodynamics learning outcomes by providing test results to learn thermodynamics in the form of multiple choice questions with four choices.

The research instrument used in this study adapted to the type and nature of the data sought. Grating instruments were adjusted taking into account the characteristics of each data. Preparation of the lattice made to ensure kelengkapan and validity of the instrument. Grating instrument learning motivation made by researchers with reference to the theoretical concepts of motivation to learn and responses in learning from the experts. Grating instrument learning outcomes Thermodynamics prepared with reference to the foundation of the curriculum at D3 Mechanical Engineering concerning the achievement of learning outcomes (learning outcomes) to be achieved in learning thermodynamics.

Before this instrument is used it must first be tested instrument to test the validity of the content and realibilitasnya. To determine the validity of the content carried by experts (expert). The instrument has been assessed by experts subsequently tested in the field. The purpose of pengujian instrument is to determine the validity and reliability of the instrument, and the power level of difficulty depending on the instrument response motivation and learning and learning outcomes of Thermodynamics. Statistical analysis was used to test the hypothesis is to use a technique MANOVA with a significance level of 0.05 aided 17:00 SPSS for windows.

4. Results and Discussion

Description of data to analyze trends grouped first learning motivation and response that followed the model of collaborative learning jigsaw type. The second achievement of learning outcomes that follow Thermodynamics learning using jigsaw-type model of collaborative learning. The third achievement of learning outcomes that follow the teaching of Thermodynamics with conventional models. Recapitulation of the calculation of a score of four variables can be seen in Table 1 below:

Table 1. Summary of Results Score Calculation Motivation, Response and Learning Outcomes Thermodynamics

Statistik	A ₁			A ₂		
	Y ₁	Y ₂	Y ₃	Y ₁	Y ₂	Y ₃
Jumlah Subjek	30	30	30	28	28	28
Mean	162,4	160,6	84	139,12	138,6	76,2
Median	153	151	83,6	142	140	76,0
Modus	158	154	90,00	138	138	77,5
Standar Deviasi	8,3865	8,1246	8,6221	7,9421	7,4212	7,97522
Varians	70,33338	66,00913	74,34061	63,07695	55,0742094	63,60413
Rentangan	32	28	26,5	31	28	18,5
Skor Minimum	136	134	68,50	119	134	65,50
Skor Maksimum	168	162	95	150	162	84
Jumlah	4872	4818	2520	3895,36	4496,8	2133,6

Information:

A1 = Learning Collaborative model of the type of jigsaw

A2 = Learning conventional models

Y1 = Motivation of student learning

Y2 = Response of student learning

Y3 = Result studying thermodynamics

The average score of students' motivation and response in the subject of Thermodynamics with learning using jigsaw-type collaborative model is 162.4 and 160.2 are at intervals of greater than 100, including very high category. The average value of the learning outcomes of students in the subjects of Thermodynamics using collaborative learning model type jigsaw 84 is in the interval is greater than 75, including a very high category.

The average score of students' motivation and response in the subject of Thermodynamics by learning to use the conventional model is 139.12 and 138.6. This value also is located in the high category because it is in the interval is greater than 100. While the average value of the learning outcomes of students in the subjects of Thermodynamics using conventional model is 76.2 are at intervals of greater than 75, including high category. However, when compared with the use of collaborative learning model jigsaw type in the subject of thermodynamics odds nearly ten points. If seen from the value of the average pretest conducted on students in the experimental class and control class, the obtained average value is 65. If the score 65 used as a base line, then the average increase student learning outcomes in subjects thermodynamika using models jigsaw type of collaborative learning is a range of 20 points and 11 points a conventional model.

Distribution normality test results data is tested with the technique of Kolmogorov-Smirnov and Shapiro-Wilk using SPSS 17:00 for windows has a significant number greater than 0.05. Thus, all of the data distribution according to normally distributed learning model. Homogeneity test together using test Box'M gives the figure a significance of 0.238 and independently by test Levene's Test gives the figure of 0,118 for the significance of motivation

and response variables studied, the rate of a significance of 0.594 for the variable learning outcomes of Thermodynamics. Based on the analysis it appears that the significance of the numbers generated either jointly or individually greater than 0.05.

It can be concluded that the variance-covariance matrix of the variables and the response motivation to learn and learning outcomes of students Thermodynamics is homogeneous. Correlation test was performed using product moment correlation with a significance level of 5% in order to determine the type of statistics used to test the hypothesis. The test results by product moment correlation of the two data stated are not correlated, then the hypothesis testing can be continued by using MANOVA techniques. Description of the data are grouped to analyze trends: 1) motivation and response study following study using collaborative learning model jigsaw types, 2) learning outcomes that follow learning using cooperative learning model jigsaw; 3) motivation and learned responses that follow the conventional learning model; 4) learning outcomes that follow the conventional learning models.

The results of hypothesis testing in this study proved that: motivation and response to students' Study Program D3 Mechanical Engineering modeled collaborative learning type of jigsaw (experimental group) results were better than the motivation and response to student learning which followed the conventional learning model (the control group).

5. Conclusion

Based on the analysis and discussion as described above, in this study it can be concluded:

- a. There are significant differences of motivation and response learning students studying with collaborative learning model type jigsaw with students studying with conventional learning model grade students in learning thermodynamics in D3 Mechanical Engineering in vocational education.
- b. There are significant differences learning outcomes of students studying with collaborative learning model type jigsaw with students studying with conventional learning model grade students in learning thermodynamics in D3 Mechanical Engineering in vocational education.
- c. There are significant differences of motivation, response and results of learning outcomes of students studying with collaborative learning model type jigsaw with students studying with conventional learning model grade students in learning thermodynamics in D3 Mechanical Engineering in vocational education.

That can be suggested in this study are:

- a. Based on the findings in this study, it is suggested that professors who teach thermodynamics in D3 Mechanical Engineering at the vocational education can use collaborative learning model-jigsaw type .
- b. Suggested to the next researcher to explore further the research results that have been obtained to determine the level of effectiveness of the collaborative model of this type of jigsaw.

- c. Hopefully the results of this penenlitian be a reference for further research on the type of collaborative learning model jigsaw.

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