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"The Challenges and Opportunities of Education in the Global Era Beliefs, Evidences, Issues and Trends "



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Contextual Teaching Learning For Improving Refrigeration

and Air ConditioningCourse on The Move To Prepared The Graduates

CONTEXTUAL TEACHING LEARNING FOR IMPROVING REFRIGERATION AND AIR CONDITIONING COURSE ON THE MOVE TO PREPARED THE GRADUATES BE TEACHER IN SCHOOLS OF INTERNATIONAL LEVEL

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ABSTRACT

Subject learning Refrigeration and Air Conditioning (*Refrigeration and Air Conditioning*) for this result has not been fulfilled as expected. Student understanding and mastery of the learning materials is still low. Most students have not been able to connect with the material learned in the application of daily life. There are still many students who had difficulty in understanding the learning material, even if not yet able to understand the depth and quickly forget. Student motivation is also low and passive in the learning process, and a few students to ask questions and respond to questions from the lecturers.

It appears that, strategies and approaches that are applied during the learning process is less according to the characteristics of students and learning materials. The problem is (1) How to find the best way to convey various concepts that are taught so that all students can use and remember the more old concept. (2) How the learning materials can be understood as part of each other and form a single whole. (3) How lecturers can communicate effectively with students who always wondered about the meaning and a pad of things, the relationship of what they learned. (4) How the teacher can open the perspective to think of all the diverse students, so they can learn various concepts and the way to the real life.

Besides, the lecturers need to prepare the strategy so that students have in stock prepare to meet the market demands, which are currently being encouraged by the government, namely stub international school—Rintisan Sekolah Bertaraf Internasional, RSBI— and international school—Sekolah Bertaraf Internasional, SBI—. Strategies which can be used to increase the motivation and the active role of students' in the learn process. Therefore, the need to search for strategies and approaches to learning and learning results in order to match students with appropriate standards of competence that has been set.

In this paper will be discussed about the implementation of a strategy that can be used to overcome the problems above. Strategy is Contextual Teaching Learning (CTL)-based competencies. From the results of the implementation of which appears to have been made that this strategy had a positive impact on the quality of the lectures and also on the results of students to study subjects, Subject Refrigeration and Air Conditioning this.

Keywords: Contextual Teaching Learning (CTL), improving quality of teaching learning process, Refrigeration and Air Conditioning course

BACKGROUND

Subject Refrigeration and Air Conditioning is a course option for students Studies D3 Electrical Engineering Faculty of Engineering University of Yogyakarta (UNY FT) with a weight of 2 SKS Theory. Competencies that are required in the course Refrigeration and Air Conditioning cover is the concept of control and the working principles of cooling engines, Engine components refrigerator, a range of engine cooling, such as refrigerator, freezer, range of AC (window, split, package car, central), cooling load estimation, and narrate the Split AC, and the conservation of energy in the engine cooling (Curriculum FT UNY 2002, 2002).

Student achievement on the Subject Refrigeration and Air Conditioning is not satisfactory, as the picture subjects Refrigeration and Air Conditioning for ganjil semester 2007/2008 is as follows: from 31 students who take the course and Refrigeration and Air Conditioning only as much as 3 students get the score of A (9.6%), the score of B and B-for 5students (16.12%), the score of C + and C as many as 12 students (38.70%), and D score of 11 students (32.25%). The achievement of such concern to researchers as well as teacher, subject Refrigeration and Air Conditioning.

Factors that affect the predicted performance of the students and the low quality of the learning process are: teaching materials, media, student ability, motivation and spirit of student learning, teacher ability, and learning strategies used by lecturers. During this time, the process of learning subjects Refrigeration and Air Conditioning is to use methods of discourse, frequently asked questions and tasks. Delivery learning materials have been using computer-based media in the form of power point and internet. The material for this study was taken from the various sources of learning such as reference books, materials taken from the internet, training materials, and so forth.

It appears that, strategies and approaches that are applied during the learning process is less according to the characteristics of students and learning materials. The problem is how to find the best way to convey various concepts that are taught so that all students' can use and remember the old more concept. Learning how each material is understood as part of each other and forms a single whole. How lecturers can communicate effectively with students who always wondered about the reason and meaning of things, the relationship of what they learned. How can a faculty perspective to think of all the diverse students, so they can learn various concepts and the way to the real life. How do strategies to increase motivation and the role of active students in the learning process. Therefore, the need to search for a strategy and approach to learning is

the best and appropriate in order to overcome the obstacles the process of learning and improve achievement of student learning or achievement of competency standards have been defined.

To overcome the obstacle of learning and achievement is to improve student achievement of competency need to apply the model of contextual learning. Through contextual learning concepts are expected to study the material can be integrated in the context of real life in the hope that students can understand what he learned better and easier.

CONTEXTUAL TEACHING LEARNING (CTL)

Contextual learning, according to Blanchard, is a conception of learning that helps teachers / lecturers in the course link the material with real life, and motivate students' to create relationships between student knowledge learned with their lives (Edy Supriyadi, 2007). Through contextual learning concepts are expected to study the material can be integrated in the context of real life in the hope that students can understand what he learned better and easier. In contextual learning, faculty associate in the context of the framework that he teach in order to improve student learning of meaning (Ome'ara, 2002). Context is very important for all learning situations.

According Nurhadi (2003), there are seven main components of learning that underlie the application of contextual learning in the classroom, including techniques for the study of cooling and the Air; constructivism (*constructivism*), asking (*questioning*), find (*inquiry*), community learning (*learning community*), model (*model*), reflection (*reflection*), and the actual assessment (authentic assessment). Contextual learning in the curriculum can be applied to any subject whatever, and that in any classroom situation.

a. Constructivism

Constructivism learning theory is that the people, or build up their understanding of new experiences based on knowledge and trust them early. Learning was done well when the lecturers to give students the opportunity to capture new knowledge or understanding.

b. Questioning

Use questions to lead students to think better, than just giving students' information to deepen students' understanding. Students learn to ask questions about the phenomenon, to learn how to prepare questions that can be tested, and learned to ask each other about evidence, interpretation, and explanation. Questions used to encourage lecturers, guide, and assess students ability to think.

c. Inquiry

Inquiry is the art and science to ask and answer questions, through a systematic series of activities. Answer these questions are obtained through the cycle up allegations, preparing the hypothetical, how to develop a hypothetical test, making further observations, and preparing the concept and theory based on data and knowledge.

d. Learning Community

Learning community is a group of students who are bound in the learning activities that occur in the process of learning more. Community study closely related with the study group (Cooperative learning). Through study groups, students can convey specifics thought, discussion, and exchange ideas that can eventually accommodate the new knowledge. All students must have opportunities to talk and share ideas, listen to other students' ideas carefully, and work to build the knowledge with friends in the group. This concept is based pad idea that learning together is better than learning individually.

e. Modeling

Modeling is an example how the process so that people, think work, and learn. Modeling does not make students rarely need to think hard to give voice and demonstrate what the students will be done. At the time of learning, teachers often make the model so that students learn how. Lecturers show how to do something to learn something new. Lecturers are not the only model. Model can be designed to involve student

f. Reflection

Reflection allows the way of thinking about what students have learned and to help students describe the personal meaning of their own students. The realization of the reflection can be applied, for example, at the end of the learning lecturers while leaving time so students do reflection. This can be: direct statements about what students today, notes or journal in the student book, student impressions and suggestions about learning today, notes or journal in the student book, student impressions and suggestions about this day of learning, discussion, the works.

g. Authentic assessment

Authentic assessment is a term / terminology that wash created to explain the various strategies or methods of alternative assessment (Nurhadi, 2001). Various methods allow students to demonstrate ability to complete tasks, solve problems, or the knowledge of how to simulate a situation that can be found in the real world outside the school environment. Assessment strategies that match the criteria, is meant a combination of several techniques that are tailored to the assessment of the competency claim.

COMPETENCY-BASED EDUCATION

Competency-based education —Kurikulum Berbasis Kompetensi, KBK—applied for the complete lack of conventional education at this time that reality tends to focus on the control subjects without touching the application for real life and just educate the students to just know something, not to the core, all the more to the charity in daily life. Conventional educational practices tend to be abstract, textual, verbal, artificial, and virtual. Meanwhile, the PBK tend to be more real, actual, concrete, real, and touching reality.

According to Slamet PH (2006) Competency-Based Education —Pendidikan berbasis kompetensi, PBK— is an education that is based on competency standards to be achieved, and is required by the students. After the PBK students will be able to do something. PBK so do not just educate students to recognize the value (logos), but also educate them to fathom the values in the conscience (ethics), and more than that the students are expected to apply the values learned in life days (patos).

The definition of competency is the ability to do something different with just the ability to know things. Competence in which (a merger) of the three main unsure: knowledge, skills, and attitudes. Thus, people who are competent people who have the knowledge, skills, and attitudes to perform/do something.

PBK has the following characteristics: (1) competency to be achieved by students are identified based on what students should be able to have and do, (2) criteria used to assess each competency that have been formulated, (3) curriculum (teaching materials) developed competency-based standards have been defined, (4) assessment of competency based standards, and (5) learning progress based on achievement of competencies.

PBK as a system composed of a series of components that are related hierarchical as follows: (a) standards of competence, (b) curriculum was developed based on competency standards and competency-based curriculum called / KBK, (c) organizing learning referring to the KBK, (d) evaluation based on standards of competence, and (e) certification of competence to express the mastery level on a particular.

SCHOOLS OF INTERNATIONAL LEVEL

In the book "Quality Guidelines guarantor School/Madrasah on international stages of Primary and Secondary Education in 2007" stated that the School/Madrasah international education (SNP) and expanded with the standard of education to the one member of the State Organization for Economic Co-operation and Development (OECD) and/or other developed countries that have particular advantages in the areas of

education, so have the competitiveness in international circles. From this, SBI is a school that already meet the standards and implementing national education which include: content standards, standard processes, standard graduate competencies, standards and staff's educators, the standard of facilities and infrastructure, standards management, standard costs, and assessment standards. Further aspects of the SNP is strengthened, developed, expanded through the adaptation or adoption of a standard education one of the OECD members and/or other countries that have developed a certain superiority in the field of education and believed to have a reputation of quality has been recognized internationally, and graduates have the ability international competitiveness. Thus, SBI is expected to be able to give assurance that it and the results of education higher than the SNP by default. Guarantee can be shown to national and international communities through various strategies that can be (Kir Haryana, 2009).

Further Kir Haryana (2009) stated that according to the SBI on the draft, then in an effort to facilitate the school in understanding and explaining the operation in education that is capable of ensuring international quality, the SBI can be formulated that are primarily the implementation and fulfilment, of the eight unsure SNP as a key indicator of performance and added at least - in the developed or added or expanded with a case (termed the element X) is the addition of the contents or be strengthening/ expansion of the eight elements of the education system and other key performance indicators as additional international standards from one of the OECD members and/or other advanced countries. This is also in accordance with the policy described in the Education Ministry that is in the framework of achieving the international quality standard, then each school who has been a stub SBI independent or must meet a minimum of key performance indicators (eight unsure SNP) and additional key performance indicator (consisting of various X). Eight unsure SNP is comprised of: standard content, the standard process, a graduate competency standards, standards of teachers and staff's, the standard of facilities and infrastructure, management standards, financial standards, and assessment standards.

To be able to meet the characteristics of the concept of SBI, the school has been implementing and fulfilling the characteristics of the concept of SBI, the school has implemented and meet the eight SNP unsure as key performance indicators of achievement with a minimum of (X) as an additional key performance indicator, then the school can perform at least two ways, namely: (1) adaptation, the adjustment unsurecertain elements are already present in the SNP with the standard of education to one of the OECD members and / or other developed countries that have a certain advantage in

the education field, believed to have a reputation quality that is recognized internationally, and graduates have international competitiveness, and (2) the adoption, or the addition of The / be / strengthening / expansion of unsure-certain elements that have not yet unsure of the SNP still refer to the standard of education one of the members OECD and / or other developed countries that have a certain advantage in the education field, believed to have a reputation of quality has been recognized internationally, and graduates have international competitiveness (Kir Haryana, 2009).

Thus, schools and madrasah will be doing option or adaptation, need to find partners with the schools that are in countries that are members of OECD are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, the United States and other developed countries such as Chile, Estonia, Israel, Russia, Slovenia, Singapore and Hong Kong that quality has been recognized internationally. Can also partner with the centre of training, industry, institutions test / international certification such as Cambridge, IB, TOEFL / TOEIC, ISO, centre of study and multilateral organizations such as UNESCO, UNICEF, SEAMEO, and so forth.

IMPLEMENTATION

Learning strategies that are applied in technical subjects and cooling air system is contextual based learning competency. Contextual learning is a conception of learning that help teachers link the material in lectures with real life, and motivate students to make connections between the knowledge learned with their lives. Through contextual learning concepts are expected to study the material can be integrated in the context of real life in the hope that students can understand what is learned well and easily. In contextual learning, link the lecturers in the context of the framework to enhance the meaning of student learning.

Some of the activities that have been made include: 1) develop a contextual model of learning based on the competency course Refrigeration and Air Conditioning competency-based, 2) create a scenario of using the competency-based contextual learning, 3) make the observation, 4) prepare equipment learning, and 5) plan evaluation tool.

Instruments and data collection techniques to use: 1) the questionnaire, 2) the observation, 3) interview, and 4) tests and tasks. Questionnaire where used to express opinions in the implementation of student learning. Observations used for the lecturers

and students in the learning process. Interviews were used to reveal students' opinions and responses in the learning process. Tests and tasks used to reveal the material control and achievement in student learning achievement of competency standards have been defined. Analysis of data use descriptive analysis with presentation.

RESULTS OF IMPLEMENTATION AND DISCUSSION

Before the contextual model of learning applied in the competency-based learning, first carried out the plan of making learn in the implementation of the learning process so that it can run with lancer and in accordance with the goals. The plan of the outline contains about: competence and learning goals, scenario learning, learning tools and resources needed, and assessment. Scenario learning is focused on learning that is based on the student, learning an interesting, contextually, and refers to the competencies that are required. Planned learning activities based on seven components of contextual learning is effective, namely: constructivism, or find Inquiry, ask, community learning, model, and authentic assessment.

a. Cycle I

Implementation of the learning process begins with the submission topic "Introduction to Refrigeration and Air Conditioning and application" and the competence of the respondent on topic. Proceed with the preliminary question to the student's ability to reveal the beginning student. Then students are asked to answer the question of brainstorming and opinions written on the blackboard.

At the core of learning students are asked to discuss the topic given. Then representatives of each group to show the results of the discussion group in front of the class. Lecturer as a facilitator and verifying results of the discussion. Next explain lecturers learning materials in a manner with the power point presentation and student handouts distributed. During the presentation lecturers always associate the material with the student context. Besides, the lecturers always provoke students to think that students are able focus to knowledge that is associated with the initial student knowledge. Lecturers also provide the solution of the problems with how to find (Inquiry). Next session is carried out frequently asked questions. Lecturers give questions to students to encourage, guide, and assess students' ability to think. Students are given the opportunity to ask to dig up the information and confirm what is already known and directing, aspects of the unknown, and as a means to perform Inquiry. Next students are shown pictures various engine cooling used applications. In addition lecturer shows one type of engine

cooling, equipment, namely Air Conditioner (AC) that is inserted in the classroom as examples or models. This is so much easier for students to understand the material presented.

Then students are given quizzes or questions to be answered. In addition, lecturers also provide a job to do the questions on the handout for the training are collected at the meeting which for dating. Lecturers do with the assessment that includes the actual, active students, quizzes and tasks. Further feedback to be a task has been given. Finally, students are asked to submit proposals for the improvement of the next.

Evaluation of the success of actions carried out against the process and learning out comes. Monitored the implementation of learning through observation of the implementation of the learning process conducted by the Observer has to understand the principles of contextual learning. Implementation of the observations focused on whether the seven components of contextual learning, has been effective or not in learning. Results observation of the learning process is shown in table 1 below.

Table 1. Results Observed Learning Process

| No. | Effective Implementation of Learning | Components |
|-----|--------------------------------------|------------|
| 1. | Constructivism | Yes |
| 2. | Find | Yes |
| 3. | Ask | Yes |
| 4. | learning community | Yes |
| 5. | Modeling | Yes |
| 6. | Reflection | Yes |
| 7. | Rating actual | Yes |

Has been applied to the seventh component of learning is effective then it also indicates that learning was the walking condition, walking with interesting and fun, active students, and meaningful.

Evaluation of learning outcomes can be seen from the acquisition value is obtained by the students. Assessment conducted with the fact that is in many ways adapted to the characteristics of competence demanded. Assessment carried out on quiz answers, tasks, and student work related to the topic or material on the cycle I. distribution of values obtained by 13 students to be as follows: A-m (4); B (3), C + (3), C (3 people). Acquisition value of the results showed that all students have been successfully, meet the minimum criteria. However, the results still need to be improved so that students who have enhanced the value of C.

To make a reflection on the learning that has been in progress, students are asked to fill out the questionnaire and proposals for further optimizing the process and learning outcomes. Results reflection can be seen in Table 2 below.

Table2. Student Results Reflecting On Cycle I

| No | Description | Percentage |
|----|--|------------|
| | | Students |
| 1. | Feel actively involved in learning | 100% |
| 2. | Be pleased to learning | 100% |
| 3. | Experience difficulty understanding the material | 25% |
| 4. | Previous knowledge to help in understanding the material | 87,5% |
| 5. | Explanation and examples easy to understand | 87,5% |

Proposals to improve student learning is the following: (1) students need to do a presentation in front of the class using a computer media, (2) need to see goods lo / practice module in the workshop, (3) need to have the task of observation, (4) needs to be done demonstration, (5) media enhanced learning. To improve the process and learning outcomes is still needed so the cycle or the next round, especially on aspects of the proposed student as mentioned above.

b. Cycle II

In accordance with the results of the monitoring, evaluation, and reflection of the action that has been done in the cycle so I need some more intensive action which was done. This is done in the workshop of electricity there are many of the modules or the equipment of various kinds of engine cooling. This is meant to be; (1) students can view a variety of engine cooling, (2) shows the bias as a lecturer or demonstrate how working, engine cooling, and (3) students do a presentation. With this activity is expected to facilitate students in understanding the material in accordance with the competencies that are required. Results monitoring, evaluation and reflection of the implementation of the action on the cycle II were presented as follows.

From the results of the monitoring by the Observer show that the implementation of the learning process has involved all the components for effective learning, namely: constructivism, find, ask, community learning, modeling, reflection, and authentic assessment.

Evaluation of the results shows that students learn the students' learning is significantly increased. Acquisition value of the distribution is as follows: score A- (6

students), B + (2 students), and B- (1 student). Score is the average score of the score of individual tasks, group work, and quizzes.

Result of student reflection on the learning cycle II is done through a simple questionnaire is as follows in Table 3.

Table3. Student Results Reflecting on Cycle I

| No. | Description | Percentage |
|-----|---|------------|
| | | Students |
| 1. | Satisfied of the learning | 87,5% |
| 2. | Benefit in learning | 75% |
| 3. | Feeling happy in learning | 100% |
| 4. | Increased motivation | 87,5% |
| 5. | Feeling tearful | 100% |
| 6. | Increased understanding | 100% |
| 7. | Contextually appropriate learning applied | 87,5% |
| 8. | Feel actively involved | 100% |

Based on the watch list, evaluation and reflection on the learning cycle II indicator means that the success of both the indicator and the learning out comes have been achieved. This shows that learning technical subjects of Air conditioner and use the contextual model of learning is a competency-based effective. Thus the need to continue learning more followed the application of the contextual model of learning that is competency-based course on the technical procedure and Air conditioner.

Based on the above description to be clear that the implementation of contextual learning is competency-based learning by doing activities in accordance with a seventh on the component can produce a positive impact, the learning becomes more interesting and fun, students more active, students will understand the material in accordance with the competency claim becomes easier. This is in accordance with the results of the reflection made by the students.

On the other hand, when seen from the results of students have shown that indicators of success from the results that have been achieved. This can be seen from the acquisition score of the students. On the cycle I, all students who have reached the minimum score is declared passed (score C) and many of the students exceeded the minimum score. Even in cycle II, acquisition score has increased. No more students who get the score of C, students obtain a minimum score (B-). In addition, it was increasing the number of students who get the score (A-).

CONCLUSION AND RECOMMENDATION

Implementation of contextual teaching learning based competencies at Subject Refrigeration and Air Conditioning appears to have been made that this strategy had a positive impact on either the quality or the process of the lectures and on the results of students to study this subject. From process side, the implementation has successfully increases student motivation, active involvement of student. In addition, it increases situation of learning to be conducive, interesting and making happy. Besides, it makes student easier in comprehending and mastering the competencies that stated on lecture plan. So that teaching learning processes become more has a meaning

From side of result of study, the implementation of contextual teaching learning has successfully go beyond minimum criterion of success. All of student get score above minimum criterion (C). This is shown by acquirement of score as follows. In cycle I: A(4 students); B (3 students), C+ (3 students), C (3 students), medium of cycle II: Score A(6 students), B+ (2 students), B (4 students), and B(1 student). It also showed that there was significantly improvement between cycles II and I.

Based on results of implementation that described above, showed that strategy of contextual teaching learning based competencies is effective, hence it is suggested that in execution of other theoretical lecturing can apply this model. As for practical lecturing that available its equipments has applied this model. The core of contextual teaching learning based competencies is in the lecturing attempting connected subject matter with real life and pushing student for always making relation between knowledge with their surroundings. Moreover, teaching learning processes must refer to attainment of competencies matching with public demand

Based on the explanation above, it needs for applying of the same lecturing model, that is contextual teaching learning based competencies, for other lectures, either different characteristic of subject matter or different characteristic of student, and in other condition or setting.

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