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4th International Conference on Vocational Education and Training

PROCEEDINGS

4th International Conference on Vocational Education and Training 2016

"Strengthening TVET in ASEAN Economic Community"

Yogyakarta State University, Indonesia
September 15, 2016

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4th International Conference
on Vocational Education and Training 2016

Yogyakarta State University, Indonesia
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PROCEEDINGS

4th INTERNATIONAL CONFERENCE ON VOCATIONAL EDUCATION AND TRAINING (ICVET)

GRADUATE PROGRAM COLABORATION WITH
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September 15, 2016

STRENGTHENING TVET IN ASEAN ECONOMIC COMUNITY

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PREFACE

Strengthening Technical Vocational Education and Training (TVET)
in ASEAN Economic Community (AEC)

Welcome to the 4th annual INTERNATIONAL CONFERENCE ON VOCATIONAL EDUCATION AND TRAINING (ICVET 2016)

This proceeding compiles all abstracts and fullpapers from the invited speakers and partcipants presenter in the 4th International Conference on Vocational Education and Training (ICVET) held by the Graduate School and Faculty of Engineering Yogyakarta State University on 15 September 2016 at Sheraton Mustika Hotel Yogyakarta.

ASEAN Economic Community (AEC) has prevailed at the end of 2015. Regarding this issue, it has some consequences. One of them is the open flow of products, services, and human resources across ASEAN countries. In addition, ASEAN members can freely sell their industrial products. In other words, this policy can increase the degree of products competition among those countries. The main theme of this conference is "Strengthening Technical Vocational Education and Training (TVET) in ASEAN Economic Community (AEC)". Four sub themes are covered in this conference: 1) Establishing the policy of Quality Assurance in TVET to prepare Regional Qualification Framework, 2) The Role of TVET to Fulfill National Economic Growth and Workforce in AEC Era 3) Contribution of Informal Sectors and Skills Village in AEC, 4) Empowering Vocational Teacher Education Institution in AEC.

This conference provides the opportunity for teachers/lecturers, educational practitioners, industrial practitioners, and the others stakeholders as well to share knowledge, experiences, and research findings relevant in contributing ideas and considerations for the implementation of VET policy-making in order to strengthen Technical Vocational Education and Training (TVET) in ASEAN Economic Community.

The committee would like to thank to those who have provided assistance without which it is impossible to finish this proceeding. Further comments and suggestions on the improvement of this proceeding would be highly appreciated.

CHAIRPERSON SPEECH

Rector of Yogyakarta State University,
Prof. Dr. Pascal Marquet, University of Strasbourg, France
Tony Borkett, Theiss, Australia
Dr. Michael Grosch, Karlsruhe Institute of Technology, Germany
Prof. Soenarto, Ph.D., Yogyakarta State University, Indonesia

Distinguished guests, Participants, Ladies and Gentlements,

It gives me great pleasure to extend to you all a very warm welcome to the 4th International Conference on Vocational Education and Training (ICVET) with the theme "Strengthening Technical Vocational Education and Training (TVET) in ASEAN Economic Community (AEC)" held in Sheraton Mustika Hotel today.

Consequences of the implementation of ASEAN Economic Community which came into force in late 2015 are the open flow of products, services, and human resources across the ASEAN countries. Another consequence is there are many employment opportunities among ASEAN countries, however, when one side can enlarge employment opportunities, it can threaten less skilled human resources' position in a particular country.

The successful fulfillment of skilled human resources is highly dependent on vocational education. Reputable vocational education certainly is supported by professional teachers. Based on this fact, the strengthening of vocational teacher education institutions is considered urgent since at this time vocational teacher education institutions have not set up teachers according to expertise program in vocational education. This conference offers an opportunity for participants to share best practices, concepts, and experiences in Strengthening TVET in AEC.

Our technical program is rich and varied with 1 keynote speaker and 4 invited speakers. 170 participants in this conference that involving 4 groups: Graduate School Students, College/University Teachers, Secondary School Teachers, Vocational High School Teachers. A total of thirty papers will be presented during the parallel session.

As a conference chair of the 4th ICVET 2016, I know that the success of the conference ultimately depends on the many people who have worked with us in planning and organizing both the technical program and supporting social arrangements. Recognition should go to the organizing committee members who have all worked extremely hard for the conference programs.

I hope that this conference will give benefit to the students, academic staffs and vocational teachers.

Thank you for your attention. I wish you a very fruitful conference.

Dr. Widarto
Chairperson of 4th ICVET 2016
Dean of Engineering Faculty
Yogyakarta State University

RECTOR YOGYAKARTA STATE UNIVERSITY WELCOME SPEECH

Prof. Dr. Intan Achmad, Directorate General of Learning and Student Affairs, Minister of Research. Technology and Higher Education, Indonesia
Prof. Dr. Pascal Marquet, University of Strasbourg, France
Tony Borkett, Theiss, Australia
Dr. Michael Grosch, Karlsruhe Institute of Technology, Germany
Prof. Soenarto, Ph.D., Yogyakarta State University, Indonesia

Distinguished guests, Participants, Ladies and Gentlemen's,

I would like to say welcome you warmly to the 4th International Conference on Vocational Education and Training (ICVET) with the theme of "Strengthening Technical Vocational Education and Training (TVET) in ASEAN Economic Community (AEC)" held in Sheraton Mustika Hotel today.

ASEAN Economic Community (AEC) has prevailed at the end of 2015. Regarding this issue, it has some consequences. One of them is the open flow of products, services, and human resources across ASEAN countries. In addition, ASEAN members can freely sell their industrial products. In other words, this policy can increase the degree of products competition among those countries. Service industry will take part in all ASEAN countries without boundaries. Others consequences are several employment opportunities among ASEAN countries. However, when one side can enlarge employment, opportunities, it can threaten less skilled human resources position in a particular country.

To confront the invasion of foreign labor from several countries, it is necessary to put up candidates who have qualified manpower that can be accepted in other countries. In that case, it is necessary for educational institutions at national, regional, and international level to have assured quality. Also, based on the demands of the regional labor qualification, it is expected that vocational education graduates can implement quality assurance in accordance with the framework of regional labor qualification.

Vocational education aims to produce skilled human resources to meet the demands. One of the criteria of successful fulfillment of skilled human resources is depended on vocational education. Vocational education certainly is supported by professional teachers. Based on this fact, the strengthening of vocational teacher education institutions is considered urgent since at this time vocational teacher education institutions have not set up teachers according to expertise program in vocational education.

We know that the success of the conference ultimately depends on the people who have worked with us in planning and organizing both the technical program and supporting social arrangements. Recognition should go to the organizing committee members who have all worked extremely hard for the conference programs. I hope that this conference will give benefits to the students, academic staffs, industrial practices and vocational teachers.

Thank you for your attention. I wish you a very fruitful conference.

Prof. Dr. Rochmat Wahab, M.A
Rector of Yogyakarta State University

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DEVELOPMENT OF CONTEXTUAL LEARNING TO INCREASE THE STUDENT KNOWLEDGE OF PILES IN FOUNDATION ENGINEERING

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ABSTRACT

One competency to be achieved by the students in the engineering foundation course is the knowledge about the mechanism of mounting piles. In contextual, these mechanisms is very difficult due to the complexity of the equipment, stage work and complex technical requirements The objectives of this research are to develop a Contextual Model Learning to increase the knowledge student about working of pile as foundation engineering and to measure the effectiveness of model. The development model refers to Dick and Carey model learning. The trial of model was conducted on 30 students who were taking courses foundation engineering. The effectiveness of the model is calculated by N Gain analysis based on data from the pre-test and post test. The result shows that : 1) The learning model used prototype of working method of pile. The prototype evaluation includes equipment, stages of processing and the technical requirements of the pile. 2) Effectiveness learning model was evaluated on improving students' knowledge of the working methods of pile foundation. The learning method is considered effective based on the N- Gage reached by the majority of students in the high category.

Keywords: contextual learning, piles method, learning model

I. INTRODUCTION

Competence of graduates in TVET institution must be in accordance with the development of industry. It is a requirement of the policy of the ASEAN Economic Community. Building Engineering Education is one of the courses that require technical abilities of graduates in the field of Civil Engineering. Therefore, the progress of the construction industry should be well understood by every graduate to be able to compete with human resources from other country.

One of the subjects at the Department of Technical Engineering Building Education is a foundation that provides an understanding of the foundation work. One type of foundation that is difficult to understand by the students is the process of implementation of the work piling. This is caused by the use of complex equipment, stage work and the complex technical requirements. Therefore, it is necessary to develop an effective learning model can improve student knowledge about the work piling

One model of learning which is assessed according to these difficulties is to provide students with experience in the real world. With this experience, students can better understand the stages of implementation of the work piling.

Contextual teaching and learning is a conception of teaching and learning that helps teachers relate subject matter content to real world situations; and motivates students to make connections between knowledge and its applications to their lives as family members, citizens, and workers and engage in the hard work that learning requires (Berns and Erickson, 2001).

Experience workmanship piles can be provided by using a prototype media depicting a model set of tools and a job step stake in the field. In addition, students also have to understand the concept of load transfer of the stake to the ground. There are two function of pile foundations are to transmit a foundation load to a solid ground and to resist vertical, lateral and uplift load. These piles transfer their load on to a firm stratum located at a considerable depth below the base of the structure and they derive most of their carrying capacity from the penetration resistance of the soil at the toe of the pile.

The pile behaves as an ordinary column and should be designed as such. Even in weak soil a pile will not fail by buckling and this effect need only be considered if part of the pile is unsupported, i.e. if it is in either air or water.Load is transmitted to the soil through friction or cohesion. But sometimes, the soil surrounding the pile may adhere to the surface of the pile and causes (Abebe and Smith, 2003).

Specifically, Kelley (2001) stated that the prototype is one of problem solving to introduce a product or service. Prototype method makes it easy for others to understand a series of complex projects. Prototype is good to give the development of thought for others that foster innovation and motivation.

Pile foundation works to support the load of the building and transmit loads to the ground towards the base. The bearing capacity of pile foundation should be greater than the large expenses incurred so that it can withstand the building safely. (Tambunan, 2012). Installation of precast pile is commonly done in the field is to do with a hammer pulverization.

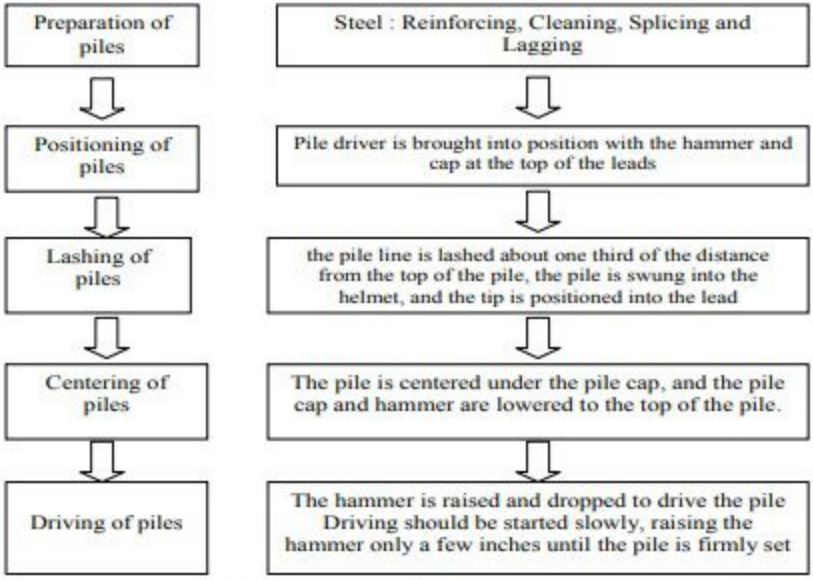

Fig 1. Installation of Pile (Abebe and Smith, 2003)

Piles stake system can be done with hydraulic drop hammer system and jacked piling system. Method Drop Hammer System has the following technical specifications: type of pole used is triangular (28 cm; 32 cm) or rectangular (20 cm; 25 cm), Heigh fall of hammer is 1 meter, weight of hammer is 1500 kg. The advantage of this method is the cost of mobilization and demobilization of equipment cost as well as setting the equipment quickly. Methods hydraulic jacked piling system with technical specifications: type of pole used is rectangular (20 cm; 25 cm), rectangular press capacity of 20 cm is 70 tons, rectangular press capacity of 25 cm is 100 tons, and the system of press jaw system. The advantage of this method is very little vibration when lining and no noise from a blow hammer because it uses a hydraulic system. (Nurdiani, 2013)

In the prototype, the necessary stages of processing the stake. In detail the stages are shown in the Figure 1.

II. METHOD

The development model refers to Dick and Carey model learning. The steps of learning described in the Fig. 2.

The trial of model was conducted on 30 students who were taking courses foundation engineering. The effectiveness of the model is calculated by N Gain analysis based on data from the pre-test and post test. Samples were students of Building Engineering Education that measuring the effectiveness of the learning model was calculated using the Gain test using the Hake formula (Meltzer, 2002)

$$N - Gain = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}}$$

N-Gain = effectiveness of methods
Spost = Posttest Score
Spre = Pretest score
Smaks = High score

Interpretation of the results of N gain made based on table 1.

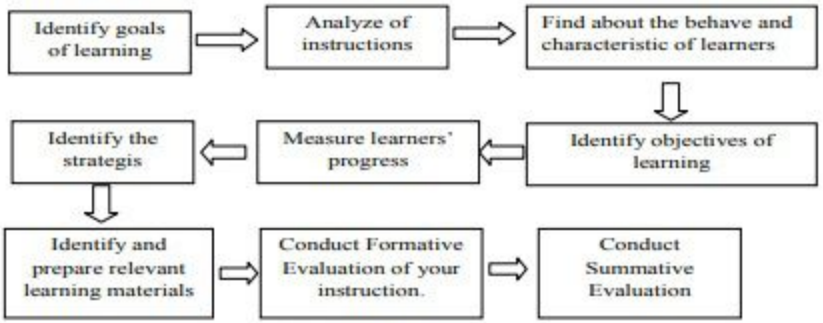

Figure 2. Steps of learning

Table 1. N-gain Category

Value	Category
G > 0,7	High
0,3 < G ≤0,7	Moderate
G ≤ 0,3	Low

Source: Meltzer, 2002

III. RESULT AND DISCUSSION

3.1. *Learning Development Model*

Stages of learning model development is done in stages as follows:

Goals of learning

The learning objectives are achieved knowledge of foundation engineering students about the concept of load transfer from the foundation to the ground as well as the knowledge of students about the stages of processing the pile foundation with hydraulic jack system. This concept is the basis for students of Building Engineering Education in the development of the knowledge of the concept of other types of pile foundation.

Instructions

In theory Bowless, Foundation is a part of engineering systems that transmit the load supported by the foundation and its own weight to and into the soil and rock that lies underneath. Pile foundation is part of the structure that is used to receive and transfer (distribute) the load of the upper structure to support land located at certain depths. Piles are long and slender that distribute the load to the ground. The main materials of the pole is wood, steel, and concrete. Piles made of this material are beaten, drilled or

in the jack into the ground and connected to the pile cap (poer).

Additionally, depending on soil type, material characteristics and load distribution poles are classified differently. In Indonesia kind of piling on the market is spun pile, square pile, triangle pile, sheet pile, and others. Pile foundation by the use of materials and structural characteristics. Piles can be divided into several categories (Bowles, 1991) include: wood piles, concrete piles, Cast in Place Pile, steel piles, piles composite. Planning stake of piles supported by the data carrying capacity of the land. This is calculated based on the characteristics of soil.

Furthermore, the determination of the minimum depth of eligible security on the carrying capacity of land has been calculated. The size and depth of the foundation is determined by the carrying capacity permitted to be weighed against the decline of tolerance. If it turns out the results of the count are divided ultimate bearing capacity factors resulted in a decrease of excessive, foundation dimensions changed to a large decrease in eligible.

Implementation of the stake of the foundation carried with phase:

Piling Site preparation; Preparation tools and access piling are mobilization tool. Site preparation should also consider soils to be able to support the weight of the tool. When the elevation of the head end of the stake was below the original ground surface, the excavation must be carried out before piling.

Preparation of the piling in the ground; Preparation of the pile stored in the field should consider lifting point and the fulcrum for the storage of material, according to the technical instructions of the manufacturer of the piling.

Checkup the material piling; This is check performed to ensure that the material piling in accordance with the technical specifications of the job. Material piles must meet these requirements:

- No cracks, defects and broken
- Cross-sectional size and length should be in accordance with the specification and placement on construction drawings.
- Age of concrete must be sufficient for piling.

Preparation of piling tool; Piling tools with this kind of drop hammer should not be less than the amount of weight the pole along with a hat piling. As for the diesel hammer, weight hammer can not be less than half the weight the pole and its total piling cap plus 500 kg and a minimum of 2.2 tons.

Implementation of Piling; Piling ejected using a crane. Monitoring the implementation of the piling is by placing the pole at the point of the plan and examined the verticality of the two directions (X-Y cross section piles). During the execution of piling, high-fall hammer also monitored so as not to cause damage to the pole.

Connection of piling; After piling the first set, to connect the second pillar should be residue the piles on the ground as long as 30 cm for easy welding pole.

Piling pole connection; For piling pole connection, the activities carried out at the time of the previous piling. Final decision set to determine when termination piling based on decline of pole when hit. Decision of kalendering at the piling when nearing the top of pile required then implemented kalendering process.

Characteristic of learners

Characteristics of learners is mostly had low knowledge about the process of implementation of the work the piling. It is obtained from the pre test that shows the average value of 15.166.

Strategic

Learning strategy chosen was to create a prototype of piling activities. This model is designed to facilitate students to observe the stages of piling in the field. The tools used are:

- Aquarium as a soil media to illustrate clearly the working conditions on the work of piling actual field. Aquarium is made of fiber with a length of 40 cm, width 10 cm and high 30 cm.
- Leader crane to illustrate a steel beam as a reference a real hammer. This tool is a piece of metal pipe with a height of ± 20 cm and carried pieces lengthwise using a

hand gurinda which serves for anchoring the crane hammer stand and made a small hole in the tip of the iron pipe piles
- Hammer cranes are piling hammer beater serves to grind the piling used as the foundation of a construction field.
- Pole stake illustrated with a plain iron diameter 10 cm length scaled.

Prototype model is presented in the Figure 3.

Figure 3. Piling Process Prototype Model

The learning model is applied to the class by the number of students by 30 participants with stage:

- Provides an understanding of the concept the piling and load transfer.
- Provide a description of the type of equipment used in the piling
- Describe the piling stages of processing which is accompanied by a demonstration on the prototype.
- To evaluate the learning outcome

Learners Progres

The results obtained in the learning process is an increase in student knowledge about the process of piling. It is based on the value of post test results that showed an average of 71.3 or high category.

Objective of Learning

By using a prototype model, the objective of learning is achieved. It's indicated by the increasing of student knowledge. This condition is supported with increased student motivation with their prototype models.

Effectiveness of Learning Models

As the evaluation of the learning model, the measurement of the effectiveness of the methods of N-Gain. Results of this analysis are presented in the Table 2:

Table 2. The Achievements of Student Knowledge

N-Gain Category	Frequ-ency	Percen-tage
Low	0	0
Moderate	13	43.33
High	17	56.67

Based on the results in the Table 2 indicate that most of the students have increasing knowledge. Value of N-Gain in the high category. This shows that the prototype model that is effective in achieving the learning objectives.

Model-based contextual learning which are prepared using the prototype stage of Dick and Carey is shown to improve the learning process is the increased motivation of students to understand the learning content. With motivations, more conducive learning environment and support the achievement of learning objectives.

By knowing the real situation in the construction world as well as the problems faced in the process of piling poles, then the skills students will increase. This is supported by Berns and Erickson (2001) that the knowledge and skills relate to students lives either now or in the future. Real-world situations and problems rarely represent only one discipline. The intent for the level of learning to rise so the students can better understands life situations (e.g., those presented at the workplace), identify and effectively solve problems, make wise decisions, and think creatively).

IV. CONCLUSION

The learning model used prototype of working method of pile. The prototype evaluation includes equipment, stages of processing and the technical requirements of the pile. Effectiveness learning model was evaluated on improving students' knowledge of the working methods of pile foundation. The learning method is considered effective

based on the N- Gage reached by the majority of students in the high category

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