

PROCEEDING



*Building
Future
Leaders*

UNJ ICTVET 2015

2nd UNJ International Conference on Technical
and Vocational Education and Training

"TVET in The Changing World of Work"

October 27th, 2015

Universitas Negeri Jakarta, Indonesia

Organized by :
Faculty of Engineering
Universitas Negeri Jakarta
Indonesia

ISBN : 978-602-1619-01-8



Table of Contents

The Implementation of CLTSMK Method To Improve Learning Quality of SMK (<i>Galeh Nur Indriatno Putra Pratama, Moch. Bruri Triyono</i>)	1-8
Teacher Education Model On Care Environment Vocational (<i>Henita Rahmayanti, Rosmawita Saleh, Amos Neolaka</i>)	9-14
Design And Application Development Of Course Information System Monitoring And Web Based Students Presence (<i>Rima Irmayesni Rahmat, Bambang Prasetyes Adhi, Prasetyo Wibowo Yunanto</i>)	15-24
Improvement of Teachers Ability With Space Lightning Efficiency Technology In Eco Friendly Buildings (<i>Doddy Rochadi, Cynthia Riescanita Putri, Henita Rahmayanti</i>)	25-32
Application of Virtual Laboratory Course Through The Web For Food and Beverage Study In Culinary Art Program at Universitas Negeri Jakarta (<i>Nurlaila, Rusilanti, Sachriani, dan Kunto Imbar</i>)	33-40
Differences Status Regular / Non-Regular And Learning Styles Toward Ability Test Instruments Develop Student Learning Outcomes S1 PTB Faculty Of Engineering (<i>Riyan Arthur, Arris Maulana</i>)	41-44
Improved Ability To Control Engineering Students Basic Skills Vocational: Survey on Vocational Jakarta East (<i>Moch. Sukardjo</i>).....	45-55
Audio Visual Media About Nutritious Food Diet For Toddlers With Drill And Stad (Student Team Achievement Divisions) Methods For Learning Outcomes Posyandu Cadres (<i>Yeni Yulianti, Ruslianti dan Ari Istiany</i>)	56-65

THE IMPLEMENTATION OF CLTSMK METHOD TO IMPROVE LEARNING QUALITY OF SMK

Galeh Nur Indriatno Putra Pratama, Moch. Bruri Triyono

Faculty of Engineering, Yogyakarta State University
galehnurpp@gmail.com bruritriyono@yahoo.co.id

Abstract

This research aims to reveal: (1) the improvement of the learning attitude shown through motivation, creativity, and the managerial ability, and (2) the process to the improvement of basic competencies in identifying resources and create an engineering work design by using CLTSMK learning method in Craft and Entrepreneurship subject shown by motivation, creativity, and managerial ability in Chemical Industry of class X students of SMKN 2 Depok.

This research is classroom action research. The research design refers to the measures developed by Kemmis & Mc. Taggart. This research consisted of pre cycle, cycle I, cycle II, and cycle III. The stages of this classroom action research consist of planning, action, observation, and reflection. The subject of this research was 32 class X students of Chemical Industry in Craft and Entrepreneurship at SMKN 2 Depok in 2014/2015. The data were collected using observation and interview guides. The validity of the instrument was measured through the judgment of two experts. The data were analyzed using descriptive analysis techniques.

This research results showed that the mean percentage improvement of the condition of pre-cycle, first cycle, second cycle, third cycle subsequently are 41.611%, 36.053%, and 9.551% for the observation of students' motivation aspects; 29.239%, 40.458%, and 18.231% for the observation of students' creativity aspects; 30.774%, 32.311%, and 16.996% for the observation of students' managerial ability aspects. The process of improving the students' learning through motivation, creativity, and managerial ability consists of four phases. The first phase is conveying the goal and motivating students. The second phase is the presentation of information, observations, and questions. The third phase is to provide an opportunity to gather information, to discuss, to perform, and to present the results of the discussion. The last phase is the material reinforcement and inference.

Keywords: *craft and entrepreneurship learning, CLTSMK, student learning attitude*

1. Introduction

Craft and Entrepreneurship subject is a subject that combines skill and technology which is packaged in theory and practice learning [1]. According to [2], the combination of skills and technologies through entrepreneurial spirit in a certain person can be defined as Technopreneurship. Technopreneurship is a person's ability in entrepreneurship by using technology.

Refer to [3], explained that there is an increasing percentage of unemployment

vocational school students in 2014 in the amount of 5,578% from the number of unemployed vocational students in 2013 that is 1,258 million to 1,332 million students. The number of job vacancies that registered in BPS in 2013 only 612.699 pieces, this statement is corroborated by the Director of Vocational Mustaghfirin in Metro News, that the percentage of unemployment vocational student in August 2014 is the highest in the amount of 11.24%.

If the graduates student of vocational school do not absorbed in business and industry, and they don't have skills in entrepreneurship, they will be the burden of the state. Based on this phenomenon, there's should be a real effort to reduce the number of unemployable graduates student of vocational school, one of the solutions is the maximizing role of entrepreneurship education. Entrepreneurship education in vocational school can be the basic capital of graduates students of vocational school to be entrepreneur in accordance with their competence, so it will produces educated and skilled workers.

The problems that arise in entrepreneurial learning through Craft and Entrepreneurship subjects in SMK N 2 Depok is the lack of the results product of student that produced after following the Craft and Entrepreneurship subject. This problem is described by one of the teachers of Craft and Entrepreneurship subjects class X in SMK N 2 Depok, from 10 classes that they teach, not all classes are be able to produce a design/Craft and Entrepreneur subjects' products. Learning which has been used by teachers of Craft and Entrepreneurship subject at SMK N 2 Depok is not yet refered to the establishment of a skills through entrepreneurship, generally they still limited in the understanding of how to sell the goods, as well as maximizing the goods so they have commercial value.

The low quality of learning cause less motivated students in following Craft and Entrepreneur subject particularly in class X of Chemical Industry. This is demonstrated by the low activity of students when following the teaching and learning activities in the classroom. Rarely did the students give the active response through the questions when the teacher opens class discussion sessions on Craft and Entrepreneurship subject. In addition, the accuracy of the student in completing the tasks that assigned by the teacher often be one of the obstacles in the fulfillment of teaching materials in Craft and Entrepreneurship subject. Students often have difficulty in expressing ideas when they get the task of making an engineering design that

in accordance with the learning topics at that time.

One of the causes of the above problems is that the teacher of Craft and Entrepreneurship subject in SMKN 2 Depok is non-productive teacher. The teacher just explains about how to be entrepreneur to the students. Moreover, the teacher of Craft and Entrepreneurship in SMKN 2 Depok do not mastered the competency that in accordance with the entrepreneurship *strand* (specialisation) that is engineering.

The teacher of Craft and Entrepreneurship subject in SMK Negeri 2 Depok do not have the appropriate valuation techniques, in order to measure student learning result which consists of the ability to proceed, to produce products, and the ability to have a certain attitude. The alternative problem solving that can be implemented to solve some problems above is providing training for the teachers of Craft and Entrepreneurship in SMK Negeri 2 Depok in form of Engineering Entrepreneurship training.

The appropriate learning method is required to improve the quality of learning in Craft and Engineering subject in class X Chemical Industry in SMK Negeri 2 Depok, that is by applying cooperative learning method. Evaluating from some alternative problem solvings above, one selected action that aims to improve the quality of learning through students' learning attitude in participating Craft and Entrepreneurship subject class X Chemical Industry in SMK Negeri 2 Depok 2014/2015 is the use of cooperative learning method. Cooperative learning method will be combined with the use of technology in order to maximize learning process and it can be one of engineering strand implementation mediums in Craft and Entrepreneurship subject. The combination of cooperative learning and the use of technology in learning is called as Cooperative Learning by Technopreneur for SMK (CLTSMK).

CLTSMK is learning method which is based on project-based cooperative learning by utilizing technology for vocational students. CLTSMK applies the collaborative learning between students with learning majority in

performance to improve the quality of learning through students' learning attitudes through the use of technology. Philosophically, entrepreneurship means the creator or manager of the business. According to [4], the entrepreneurship is a characteristic, nature, and character of someone who has the will to achieve something. Refer to [5], the entrepreneurship is part of the economic and social mobility, the entrepreneur is a creator, innovator, leader and inspirator for the others.

Technopreneurship is an amalgamation of two words *technology* and *entrepreneur*. According to [2], the *technopreneurship* is part of *entrepreneurship* that emphasizes the ability to use technology. According to [6], *technopreneur* can be beneficial for the development of small and medium enterprises sector, *technopreneur* is someone who is able to make, create, and innovate products that will be sold into market with the utilizing of technology. Furthermore refer to [7], there are three main components in forming technopreneur characteristics, they are: intrapersonal, interpersonal, and extrapersonal where *technopreneurship* generally refers to the utilizing of technology for the development of entrepreneurship field.

Motivation comes from the word 'motive', it can be interpreted as the power contained within the individual and it can leads that individual to acts. Motivation can not be observed directly, but it can be interpreted in behavior in the form of stimulation, encouragement, or a power plant of the appearance of a certain behavior [8]. Without motivation, a person will not have the passion in trying up to attainment, otherwise with high motivation, someone will be interested and actively involved even took the initiative in the process to reach an understanding.

Creativity is identical with something new, as well as part of an innovation [9]. According to [10], termed creativity as the application of knowledge and skills in new ways to achieve the goal. Creativity can also be defined as the latest and original creations, because creativity is a mental process that is unique to produce something new, and different. According to

[11], creative thinking is the ability of someone to think about something in new and unusual ways and produce a unique solution. It can be said that creativity will emerge because of the urge of themselves to solve the existing problems, besides it is the result of ideas / new ideas. Creativity from the standpoint of *technopreneur*, is someone ability to express an idea, method, or a new product that can encourage to entrepreneurship activities by utilizing appropriate technology that based on expertise competency through learning activities. Indicators creative thinking, consist of: innovative attitude, oriented to the team / group, openness, and confidence.

According to [12], the management is an ability that must be owned by someone in order to manage all the processes within it to reach the goal. Managerial capability is formed from the result of social constructive that is used to solve a problem through a process [13]. Furthermore according to [14], the management is one of the important components in managing / running a business, which will always evolve over time and will adjust to the skills and the needs of each. Someone who has the management ability, should be responsible for all the processes that carried out, ranging from the planning to the evaluation [15]. Managerial capability in this research is the ability of a person in terms of managing the kind of work that can support entrepreneurship capability by utilizing technology in accordance with the skills competency through learning activities. When it is observed from the managerial skills of the students, it consists of: the students' ability in groups and students' ability to manage time in learning. Indicators managerial capabilities of students are: the ability to coordinate a group, the ability to work in groups, the ability to complete each others, and the ability to manage time that consisted of work on time, work in appropriate time, and the ability to use the time wisely.

Cooperative learning is one of learning types that is based on the understanding of constructivism. Cooperative learning is one of teaching methods that is effective to solve

problems in class such as making an effective classroom learning between theory and practice understanding indirectly in groups [17].

Cooperative learning method by Technopreneur for SMK (CLTSMK) applies collaborative learning between the students through majority of learning on performance. Technopreneurship competency that is used in this learning method is the ability of students in holding the learning process to produce a design / product according to students' competence by utilizing digital technology in their school. The improvement of learning quality in Craft and Entrepreneurship subject is observed by paying attention at student's learning attitudes which consists of student's motivation, creativity, and managerial abilities.

2. Research Method

This type of research is classroom action research. The model of research that is used in this classroom action research is a model that developed by Kemmis & Mc. Taggart which consists of planning, action, observation, and reflection. This study consists of pre-cycle, the first cycle, second cycle and third cycle. This research was conducted in SMK N 2 Depok, Sleman. The research was conducted in the second semester of academic year 2014/2015, in October-December 2014. The subjects of this research are students of class X Chemical Industry who following Craft and Entrepreneurship subject at SMK Negeri 2 Depok in the academic year of 2014/2015.

This classroom action research was conducted collaboratively by two people or two parties, they are a teacher and the researcher. The researcher makes a collaboration with the teacher who teaches Craft and Entrepreneurship subject in doing a class action. In addition, this study involves collaborators to observe the changes of the learning attitude in the classroom. Benchmark of the success of this research is can be reviewed through the achievement of at least 75% from the total number of students in terms of the improvement of student's learning attitude

which is showed by motivation, creativity, and students managerial ability. This design study can be described as follows:

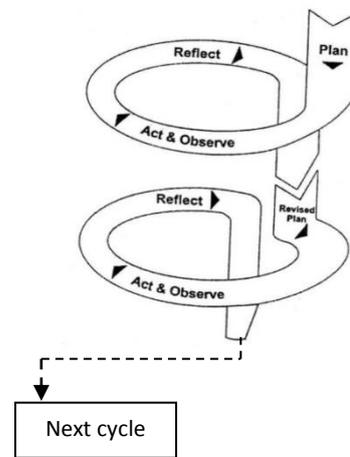


Figure 1. Model CAR of Kemmis & Mc Taggart [18]

To Collect the data, the researcher used observation sheet and interview guidelines. Before being used, the instrument had pass the validation test through expert judgment and reliability by using inter-rater test through the Cohens Kappa. Alternative answers which are available on the observation sheet of student learning attitude that shown by motivation, creativity, and managerial capabilities of students use a Likert scale. The data in this study were analyzed by using descriptive analysis techniques.

3. Result and Discussion

Student learning attitudes that are shown by student's motivation, creativity, and managerial ability in the production of design and products at Craft and Entrepreneurship subjects in class X Chemical industry are relatively low. It can be seen from the attitude of the students who seem less eager in doing the task, students who are reluctant to ask the teacher if they get any difficulties, minimal discussion in the learning process, and the submission of assignments over the due date causing the delivering materials are not in accordance with the schedule. The action that is given in the first cycle is the result of problems diagnosis that occurred at pre-cycle

condition. In general, the first cycle consists of several phases including planning, action, observation and reflection.

The problems that arise at pre-cycle condition toward student motivation observation are the passive students who are participate in learning activities, students who are less confidence with the subject materials, and the students who are less paying attention at the learning materials that delivered by the teacher; while in the aspect of students' creativity, the problems are the students who find difficulty in bringing up the ideas that related to the subject materials and the students who are only guided by the example from the teacher. In addition, the problems that arise in pre cycles on the aspects of students' managerial ability are students who collect the tasks over the due date and students who often depend on other students in completing the task group.

The actions in the second cycle aim to improve students' learning attitudes through students' motivation, creativity, and managerial capabilities that generally consists of: increasing the number of groups in the class which each group consists of four students, Providing an assistance for students who have difficulty to understand learning materials, requiring each group to present the results of the discussion in front of the class, giving different tasks in each group, providing an opportunity for all groups to find the source of ideas through utilizing laptops and mentoring group that has less performance, dividing student's tasks and responsibilities in each group, and making an agreement together to require the students presenting their results of the discussion in the classroom.

The actions in the third cycle is done to solve the problems that arise in the second cycle of learning activity and to improve students' learning attitude, generally, it consists of: providing the opportunity for students who have difficulty to express their opinions in group discussions and to get an assistance from the teacher, giving an emphasis in each group so that the results of the discussion that will be presented in the class different from the

other groups and the teacher should supervises them in advance, giving the students understanding toward their *jobdesk* in the group, so that they know their duties and responsibilities. The description categories for each observation aspects from pre-cycle, the first cycle, the second cycle and the third cycle can be described as follows

Table 1. The Description of the Student's Motivation

Category	Frek Pre-C	Frek C-I	Frek C-II	Frek C-III
Very High	0	0	8	30
High	0	0	24	2
Medium	0	7	0	0
Low	5	25	0	0
Very Low	27	0	0	0
Total	32	32	32	32

Table 2. The Description of the Student's Creativity of Thinking

Category	Frek Pre-C	Frek C-I	Frek C-II	Frek C-III
Very High	0	0	0	29
High	0	0	30	3
Medium	0	0	2	0
Low	7	32	0	0
Very Low	25	0	0	0
Total	32	32	32	32

Table 3. The Description of the Student's Managerial Ability

Category	Frek Pre-C	Frek C-I	Frek C-II	Frek C-III
Very High	0	0	1	5
High	0	0	13	27
Medium	2	3	18	0
Low	4	29	0	0
Very Low	26	0	0	0
Total	32	32	32	32

The average of the increasing of learning quality that was done in the action implementation ranging from pre-cycle condition, first cycle, second cycle and third cycle on motivation aspect in a row amounted to 23.375; 39.875; 62.344; and 69. The average scores acquisition chart per cycle toward aspects of students' motivation, creativity, and managerial ability in Craft and Entrepreneurship subject can be explained as follows:

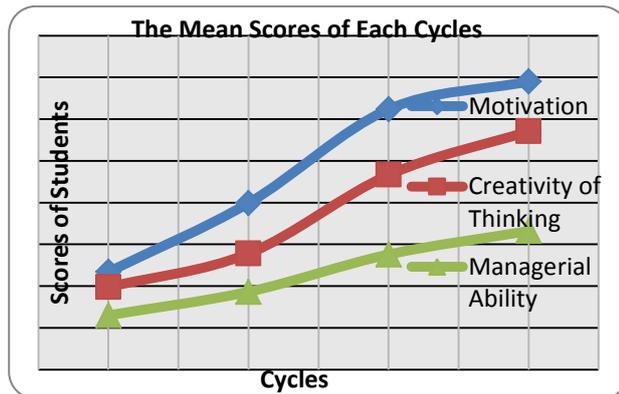


Figure 2. The Mean Scores Pre Cycle - Cycle III

The highest improvement of students' learning attitude towards students' motivation, creativity and managerial ability occurred in the second cycle. On the implementation of the action in cycle-II, students were divided into eight groups where each group consists of four students, the students have been accustomed to make plans for completing work that has been adapted to the *job desk*. Based on the result of observation in the second cycle, students are more enthusiastic in participating in the lesson. Students are more active in their group discussions with a small number of members; they also work dependently in completing the task. Students feel more comfortable with the number of the group members that just consist of four people, and almost all of the students can express their ideas in the discussion. The improvement of cycle-III is not as great as the cycle II; it is because the implementation of the actions has already in optimal conditions. Cycle-III can be held as one of efforts to determine whether there is a significant improvement of students' learning attitude or not.

The process of improving the quality of learning in Craft and Entrepreneurship subject class X Chemical Industry in SMK N 2 Depok through learning attitude that observed by aspects of students' motivation, creativity, and managerial abilities in general from the first cycle, second cycle and third cycle are formed by four phases. They consist of: 1) delivering learning objectives and performing apersepsi to the students by motivate them in early learning; 2) presenting information, observing, and asking; 3) gathering information, discussing, performing, and presenting the results of discussions; and 4) the strengthening the material and the conclusion of learning. Those four phases are used in an effort to improve the quality of learning in Craft and Entrepreneurship subject through students' learning attitudes. The used of those four phases in the action implementation at first cycle, second cycle and third cycle has been adapted to the basic competencies that must be mastered by the students that are identifying the resources needed to support the production process of engineering creation, simple communication tool and make design / engineering works of simple communication tool. The second and the third phase that are used in the implementation of the first cycle action, second cycle and third cycle have been adjusted with the characteristics of learning implementation plan in curriculum 2013 that consists of 5 M (observe, ask, gather information, associates, and communicating).

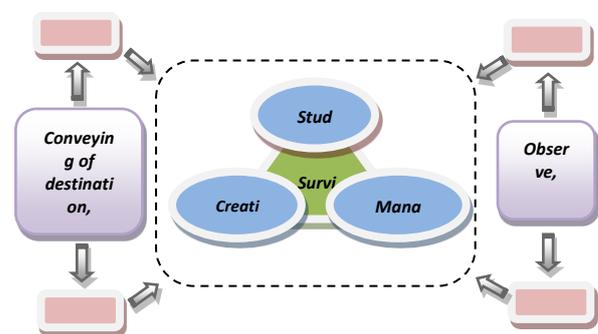


Figure 3. The Conceptual Research Findings

4. Conclusion

The conclusions of this study are: there is an improvement in students' learning attitudes through motivation, creativity, and managerial abilities of students in Craft and Entrepreneurship subject class X Chemical Industry in SMKN 2 Depok through the use of CLTSMK learning method. The mean of the increasing of students' learning attitude through motivation, creativity, and managerial abilities of students in a row starting from the first cycle, second cycle, third cycle are 41.611%, 36.053% and 9.551%; 29.239%, 40.458% and 18.231%; and 30.774%, 32.311% and 16.996%.

The process of improving the students' learning attitudes that demonstrated through motivation, creativity, and managerial ability of class X Chemical Industry in SMKN 2 Depok on the basic competencies of identifying resources and creating an engineering work design through the use of CLTSMK learning method in Craft and Entrepreneurship subject that consists of four phases, the first phase are the delivering the objectives and motivating the students; the second phase are the presentation of information, observations, and questions and answers; the third phase are giving the opportunity to gather information, discussion, performance, and presenting the results of the discussions; and the last phase are the materials reinforcement and making inferences.

5. References

- [1] Directorate General of Vocational School. *Rencana strategis direktorat jenderal pendidikan menengah tahun 2010-2014*. Jakarta: Kemendikbud, 2013, p.41.
- [2] Nasution, A. H., Arifin, D., & Suf, M. *Entrepreneurship: membangun spirit teknopreneurship*. Yogyakarta: Andi, 2007, p.28.
- [3] BPS. *Pengangguran terbuka menurut pendidikan tertinggi yang ditamatkan Tahun 2004-2014*. Jakarta, 2004.
- [4] Lastariwati, B. Pentingnya kelas kewirausahaan pada SMK pariwisata. *Jurnal Pendidikan Vokasi*, 1, 2012, p.73.
- [5] Timmons, J. A., & Spinelli, S. *New venture creation entrepreneurship for the 21st century*. Yogyakarta: Andi, 2008, pp.21-22.
- [6] Jusoh, S. Incubators as Catalysts in developing high technology businesses: Malaysia's experience. *Journal ATDF*, 3, 2011, pp.25-29.
- [7] Dikti. *Technopreneurship*. Jakarta: Kemendikbud. 2008, p.7.
- [8] Sardiman, A. M. *Interaksi & motivasi belajar mengajar*. Depok: Rajagrafindo Persada, 2012, p.75.
- [9] Piirto, J. *Creativity for 21st century skills: how to embed creativity into the curriculum*. New York: Ashland University, 2011, p.1.
- [10] Pope, R. *Creativity: theory, history, practice*. New York: Routledge, 2005, p.27.
- [11] Lau, J. Y. F. *An introduction to critical thinking and creativity: think more, think better*. Jersey City: Wiley, 2011, p.216.
- [12] Kelly, J. *Value management of construction projects*. Victoria: Blackwell Science, 2011, p.1.
- [13] Kearins, K., & Springett, D. Educating for sustainability: developing critical skills. *Journal of Management Education*, 27, 2003, p.192.
- [14] Andler, N. *Tools for project management workshop and Consulting: a must have compendium of essential tools*

and techniques. Zweigniederlassung:
Erlangen, 2011, p.42.

- [15] Ben-Daya, M., et. all. *Handbook of maintenance management and engineering*. London: Springer Dordrecht, 2009, p.592.
- [16] Slavin, R. E. *Cooperative learning: teori, riset, dan praktik*. Bandung: Nusa Media, 2005, pp.4-5.
- [17] Yusuf. Penerapan pembelajaran kooperatif untuk meningkatkan hasil belajar Siswa pada mata diklat kewirausahaan di SMK Ardjuna 2 Malang. *Jurnal Fakultas Ekonomi dan Bisnis UNESA*, 3, 2012, p.2.
- [18] Rochiati, W. *Metode penelitian tindakan Kelas untuk meningkatkan kinerja guru dan dosen*. Bandung: Remaja Rosdakarya, 2006,p.66.

TEACHER EDUCATION MODEL ON CARE ENVIRONMENT VOCATIONAL

Henita Rahmayanti¹⁾, Rosmawita Saleh²⁾, Amos Neolaka³⁾

^{1,2,3)}Departement of civil engineering Faculty of engineering Universitas Negeri Jakarta
henita.rahmayanti@unj.ac.id

Abstract

Information technology is growth very rapidly at this time, so any moment that happen if it is good or bad, can be known by all learners. This gives a meaning to all moments that occur, such as: corruption, free sex, pornography, drugs, and behavior life who does not love or care about the environment, is the consumption of our learners every day. It is well known, that our current educational model is not enough to encourage learners, especially for generation on productive year to care about environment. Why? Because, many actor in educational, such as parents, lecturers, leaders, and people do not give the example about sustainable environment, which can be emulated for learners. There is no collaboration between parents and lecturers, but in the other hand information and technology make an impact on the behavior of learners. Then, a vocational lecturer is a must who became an example of caring the environment. This educational model will work if there is a will to implement it. The objective is to built a vocational lecturers who pay attention about environment. We all want all generation get a proper education to love the environment so that sustainability can be realized. So, which is the best educational model to help the next generation.

Keyword: Educational model, vocational lecturers, sustainability

1. Introduction

The progress of science and technology in many countries is because the strong support of the information technology itself. At this time, so any moment that happen if it is good or bad, can be known by all learners. This gives a meaning to all moments that occur, such as: corruption, free sex, pornography, drugs, and behavior life who does not love or care about the environment, is the consumption of our learners every day. Responsibility of lecturers and parents it a must in this era to prepare all learners to face all the challenges. On the activities of vocational education or education in general, Soemardjan states, the influence of teachers is important. The concept of human qualities is the nature and spirit, analytical thinking and attitude, relation, social environment, and connection with God. Likewise, Semiwan states, human relation make a society and this is a very decisive factor, start with an introduction,

so people need to know about manners in the society. Manner and communication in the society are the two things that cannot be separated. Law of education in Indonesia: UU No. 20 of 2003 based on UU No. 20 of 2003, education held in a democratic and fair and non-discriminatory, to uphold human rights, religion, culture, and diversity of the nation. In clause 15, which is type of education such as general education, vocation, academic, professional, religion, and executive. Clause 18, (1) secondary education is a continuation of basic education, (2) secondary education consist of general education and vocational education, (3) secondary education such as high school, madrasah aliyah, vocational school, and madrasah aliyah vocational or any other equivalent form. In normative, between liberal education and vocation education at each level do not need dichotomy. Mostly, liberal education and vocation education has been regulated by law, that education must held in a

democratic and fair and non-discriminatory. Educational path consist of formal and informal can be collaborate each other. Secondary education is consists of general secondary education and vocational secondary education. Perhaps the problem is about proportion, authority, conflict of interest, politic, supporting facilities, competencies and many more. Education budget is increase by 20% to provide a solution for education issues in Indonesia. Policy minister of education is to increase the proportion between vocational education and general education in 2014. Since 2010 until 2035 Indonesia get demographic bonus, like most productive generation in the history of Indonesia. It is estimated that in 2045, population of Indonesia will rise until half of billion and hundred million belong as productive generation. This generation still learning in kindergarten and elementary this day, and everyday they will consume many negative things, such as corruption, drugs, free sex, pornography, terrorism, and many more. Then we need vocation lecturers as an example for this generation. Vocation lecturer becomes an integral asset to build this nation. Related to vocational lecturer model who care about environment, then of course they need a competency, knowledge, skill, attitude and many more. If we look inside, a lecturer while studying in college and graduated, they get knowledge, and skill will look after they work in education industry. They can still learn more knowledge and skill to improve what they have. However, if the lecturer do not have a good attitude, it is hard to fix that problem. So, the main objective is to build a good attitude lecturer.

2. Methods

The method used is literature, like reading and make a summary related to education. Reading about the competence of teachers who care about the environment, and children age which is the golden

generation which is expected to care for the environment.

3. Results

Vocational according Kerschensteiner in quotation by Soejono is “Sekolah Kerja”. For him to educate is to prepare children to become good citizens. A good citizen is a person who works for public area, such as lecturer or teacher. Sekolah kerja is to train, like student to have a skill in real life, such as a soft skill, in order to serve this country. Sekolah kerja needs a working space for student, so they can learn and be productive. Meanwhile, a study by Brophy & Good, obtained that we have to be selective to choose the right lecturers, because good lecturer can make a great impact into the learners. And then the study suggested that we have to identify the competencies of the lecturers. According to Ambarjaya, there are several types of learning model, such as learning with inductive or deductive approaches, a model with expository approach and a model with process approach. According to Supaman, interactive learning models are divided into three major parts, such as information sharing, like seminars, panels, forum, and many more. Learning by doing or based on an experience. And last learning by problem solving. According to Nurfuadi in his book, he states that, professionalism is a principle which that every job should be done by a professional person. A professional person is a person who has a profession, such as an expertise, and an expertise must be expert on his area. Like a lecturer, lecturer is a professional job, which means this job can only be done by those who are prepare for it and go for it. As professional educators, lecturers have to perform the duties in a professional manner and must have knowledge and skill. According to Nolker and Schoenfeldt, student who studied in vocational education should handle tasks in their field area. If we look from learner point of view, we can make three conclusions. First, practice, in form of systematic courses in order to acquire and

train skills. Second, knowledge of the theory, obtain through systematic teaching, experiments, observations, discussions, and many more. Third, experience, obtain through celebrations, identification, and many more. In preparation for the golden era, Bafadal, said that the task for educator is to strive a child to know their potential and provide a facilities to enable them to develop into their potential, either academic or non-academic. According to Sugestiyadi, said that vocational education is an education for the mastery of knowledge and skill that have a value. The implications for vocational education divided by five, internship, on the job training, general training, specific training, and updating the training itself. According to Wikipedia, model is a plan, a representation or description that describe an object, system, or concept. And according to Haryanto, learning model is defined as a systematic procedure in organizing learning experience to achieve the target. Actually, learning model has the same meaning with an approach, strategy or method of learning. There are several characteristics of learning model, such as rational theoretical by developers, rationale about what learners learn, behavior of teaching, and learning the environment. As a lecturer, we should be able to choose which is the best method for learner. Because, when lecturers choose the method, they must pay attention to the condition of learners, material of learning and resource. A competent lecturer is a lecturer who is able to manage teaching and learning program, such as basic skill, opening and closing the lesson, explaining and many more.

4. DISCUSSION

Indicators characteristic learning model

Based on the description of the data the study of theory, found some traits learning model used for development, namely: (1) Rational theoretical logical compiled by the creators or developers. (2) The rationale about what and how students learn. (3) The behavior of teaching required so that the model can be

implemented successfully. (4) The learning environment necessary for learning objectives can be achieved. Indicators characteristic of the learning model is as shown in the box below:

Box 1: Indicators characteristic learning model

- The role of teachers in improving the quality of students'
- Character education, character, attitude, behavior, manners, so that harmony with the environment
- enhance the knowledge and skills of students
- prepare students for middle-level manpower as skilled, educated, and professional
- develop themselves in line with the development of science, technology and art
- In general, education for life, and to make a living
- Education for a change of mindset

Box 2: Indicator rationale about how students learn

- Human dimension, including human relations, creativity, commitment or responsibility, communication, manners socially flexibility, and orientation far ahead.
- Education family, religion, Pancasila, harmonious relationship with yourself *
- Education manners
- Development of potential

Box 3: Indicators of teaching behavior necessary for successful modem

- The dimensions of the task (task) include: planning, development, management, and assessment, control of IT,
- Have competence (professional, pedagogical, personality, social), focus on personality and social

competence (harmony with oneself) *

- Practice work / school work
- Teachers who have passed a rigorous selection

Box 4: Environmental Indicators study are required in order to achieve objectives

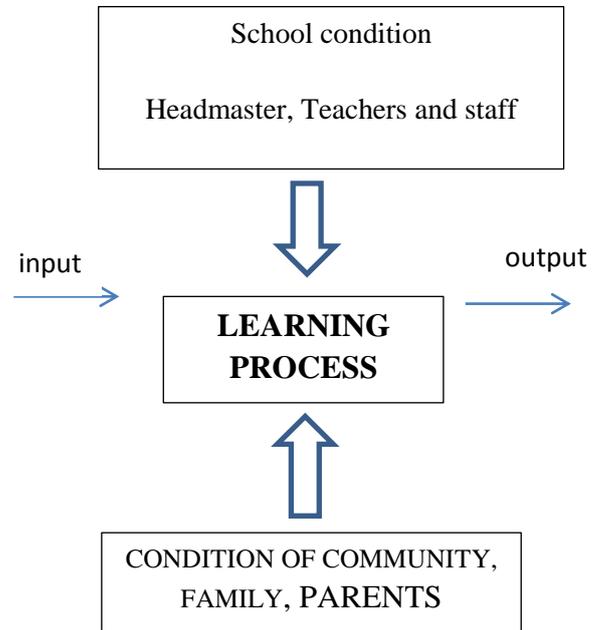
- The dimensions of the environment (environment) includes school and community
- Provision of manpower.
- Leisure environment
- Harmonization (self, family, environment, and the Creator) *
- Workshop, laboratory, studio
- Library

* Less attention by the government, schools, communities and families

Learning model developed

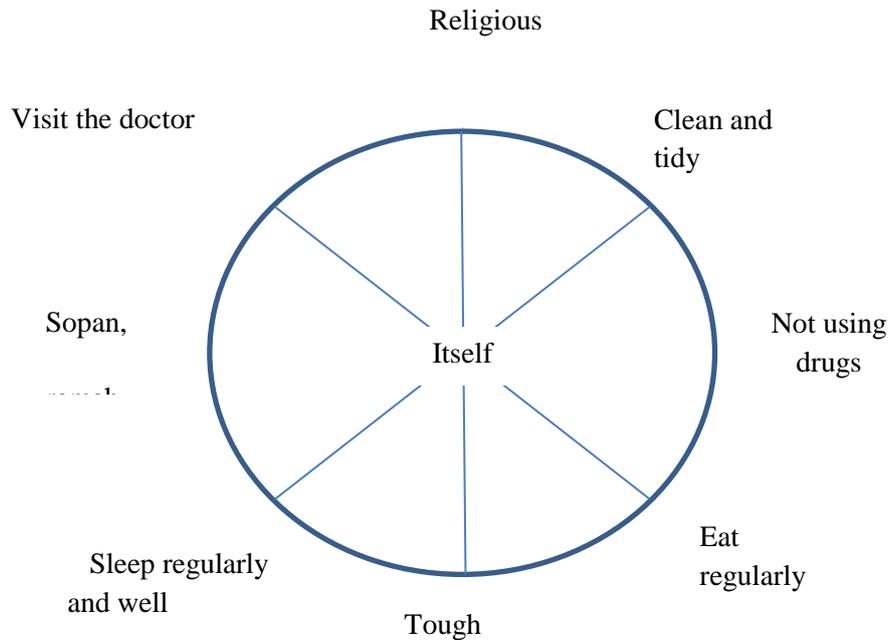
The development of this model will answer the question is how the writing problems of vocational teacher education model that care about the environment? After considering the indicators above findings writing about some characteristic model of learning, then it turns out there is a very poor indicator of the emphasis in learning interactions at school. The indicator is related to harmonization with oneself or the environment in particular exemplary ,, especially teachers / schools, parents, and government / society. The generation of productive age is the golden generation towards the year 2045 will fail, if the indicator relating to the harmonization of the environment less attention. So in order to

succeed, teachers / schools, parents, officials / government, and society, must be in harmony with themselves, for they exemplify / living example to the student or students and children, in the classroom by the teacher, at home by their parents, in in social life by



Gambar 1: +H Learning Model

corrupt officials, drug abuse, and so forth. Interactive learning models that have so far been good, only added to the teacher's actions harmonize with yourself (+ H), because they can not teach the material in harmony with themselves to students, if teachers themselves are not harmonious. Thus, the suggested model of learning that can be seen in the following image;



Gambar 2: harmony with itself

5. Conclusion

Model of vocational lecturer must concern about environment, it can use by interactive model which already exist and added with harmonize. It is impossible to teach about harmonization to the learner, if the lecturer is not a harmony with the environment. We have to do our best towards 2045, we have to fulfill all the indicator above, in order to be success.

6. References

- [1] Soemardjan, Selo. *Peran Guru Dalam Proses Pertumbuhan Kualitas Manusia*. Jakarta: Penerbit: PIJ-IKIP Jakarta, 1986, p.5.
- [2] Semiawan, Conny. *Tata karma Pergaulan*. Jakarta: Depatemen Pendidikan dan Kebudayaan, 1984,p.16.
- [3] Undang-Undang Republik Indonesia No.20 Tahun 2003
- [4] Soejono. Ag, mengutip Kerschensteiner. *Aliran Baru dalam Pendidikan*. Bandung: Penerbit CV. ILMU, pp.4-10.
- [5] Wittrock. Merlin C, in Brophy, Jere & Good, L Thomas. *Teacher Behavior and Student*
- [6] Tilaar. *Windu, Pendidikan Nasional: Arah ke Mana?* Jakarta: Kompas, 2012, p. 80.
- [7] Magnis, Frans Suseno. *Pedagogi Reflektif Ignasian, sebuah Kurikulum Hidup*. Jakarta: Penerbit Obor, 2013, p.16.
- [8] Ambarjaya, Beni S. *Psikologi Pendidikan dan Pengajaran, Teori dan Praktik*. Yogyakarta: Penerbit: CAPS, 2012, p. 96.
- [9] Suparman, Atwi. *Model-model Pembelajaran Interaktif*. Jakarta: STIA-LAN Press, 1997, pp.1-151.
- [10] Suwito. Ns. *Profesionalisme Guru*. Purwokerto: STAIN Press, 2012, pp.1-9.
- [11] Nolker, Helmut & Schoenfeldt, Eberhard. *Pendidikan Kejuruan, pengajaran, Kurikulum dan Perencanaan*. Jakarta: PT. Gramedia, 1988, p.27.
- [12] Bafadal, Ibrahim. <http://edukasi.kompas.com/read/2013/10/18>
- [13] Muhandi, <http://umk.ac.id/index.php/4/8/2014>

[14] Sugestiyadi, Bambang. *Pendidikan Vokasional sebagai Investasi*. [http://www.scribd.com/doc/202756712/Pend Vokasional/](http://www.scribd.com/doc/202756712/Pend-Vokasional/)

[15] Wikipedia, <http://id.wikipedia.org/wiki/model>

[16] Haryanto, <http://belajarpsikologi.com/pengertian-model-pembelajaran/>

DESIGN AND APPLICATION DEVELOPMENT OF COURSE INFORMATION SYSTEM MONITORING AND WEB BASED STUDENTS ATTENDANCE

Rima Irmayesni Rahmat¹⁾, Bambang Prasetyes Adhi²⁾, Prasetyo Wibowo Yunanto³⁾
^{1,2,3)}Department of Computer and Informatics Engineering Education
Faculty of Engineering Universitas Negeri Jakarta
rimairmayesnirahmat@gmail.com

Abstract

This study aims to create a web-based application that can monitor the course, the student assessment in detail, and the presence of students, so that they can help the academic administration, and faculty head of Major of in addressing student attendance and assessment is often difficult to record some students who attended the being subject of teaching and other information, since most information is incomplete, input assessment and attendance is still manual and difficult to access via the web. The study was conducted at the Department of Electrical Engineering, Faculty of Engineering, State University of Jakarta from March 2015 to June 2015. The method used in this study is a research and development (Research and Development or R & D) with a prototype model of software development. Overall there are three stages in the process of research and development that initial research, product development and testing as well as product revision. Initial research conducted in order to identify problems and seek solutions in solving these problems. Product development process includes the step of the analysis, design, implementation and functional testing. The trial results showed that after going through the stages, web-based applications can be implemented in information systems and is suitable to produce a web application that can perform inputting attendance and student assessment Major of Informatics and Computer Engineering Department of Electrical Engineering, Faculty of Engineering, State University of Jakarta based courses are taught by lecturers. The final shape of the prototype is a web-based monitoring system lecture that can be used by academic administration, the chairman of the Major of, lecturers and the person in charge of the class in the assessment and evaluation of students.

Keywords: systems information, monitoring presence, web

1. INTRODUCTION

With the expected education so that students can live independently as individuals and social beings. The learning process itself emphasizes the interaction between the students, faculty, methods, curriculum, facilities, and environmental aspects related to achieving learning competency. Competence will be achieved on maximum when all components are met in with their respective functions.

Based handbook Jakarta State University's academic school year 2011/2012^[1] lectures at the State University of Jakarta using semester credit units (SKS), by 1 (one) credits with details of the time courses per week of scheduled activities such as face-to-face, structured academic activities and

scheduled, planned by faculty and performed by students as homework, observation, etc. and independent academic activities undertaken on their own initiative. The total number of weekly lecture time is 170 minutes and 220 minutes of practical theory.

According to the National Education Minister Regulation No. 61 Year 2009 about Delegation of Authority and Authority Delegation To the Personnel Administration Implementation Activities Specific Officials in the Ministry of National Education^[2]. Absence is an activity or routine performed by the employee to prove that he is present or not present at work in agency said that absenteeism is a data collection activities in order to determine the amount of attendance at an event.

A large number of students in the Information Engineering and Computer

Department of Electrical Engineering, Faculty of Engineering, State University of Jakarta brings serious consequences for the control, processing and operation of the monitoring service lectures, especially in the Education Studies Information Engineering and Computer Department of Electrical Engineering, Faculty of Engineering, State University of Jakarta, Plus a number of existing studies program at the State University of Jakarta, so the specifics of these conditions will greatly affect the quality of student information service and transparency of the students' scores in detail the less obvious such as services for online presence, inputting value assignments, midterms and final exams of students, a lack of control on student attendance, grades daily assignments, midterms and final exams that must be made by each faculty and others. To ensure the quality of service in this lecture attendance information, either on the content, form and accuracy of the data, the necessary handling academic administration properly. However, given the large number of transactions of data must be addressed each semester, as well as the magnitude of the responsibility carried by the unit of this section, it is necessary to reform the current system is tailored to the upcoming needs. Future design and construction of the current system is not an easy business, not only because a large amount of data but also demands for improved quality better service and ensure the validity of the data. The web application can be referred to the web-based software has grown rapidly both in terms of use, size, language used and the complexity (Adhi Prasetyo, 2014: 1) [3]. The web application was originally just a static website and navigated oriented, as well as more widely used as a product brochure or company profile online. At this time web applications have a lot of dynamic, interactive and task-oriented for use in information systems, telecommunications. Based on the above issues, it takes a number of applications that can store student data in the database and display it. With a system of information that comes to attendance and grades, the student is expected to help faculty, academic administration and chairman of the study in the utilization of academic, expected to provide an ease in data processing and prevent the occurrence of data loss or data invalidity and provide a bridge new among the students with the provider of teaching and learning activities. With this, the authors propose the idea with the title "Model and Application Development Class Monitoring and

Information System Web-Based Student Attendance".

2. METHOD

Methods of research and development used to produce a particular product, and test the effectiveness of these products (Sugiyono, 2013: 207) [7]. The method used in this study is a research and development (Research and Development or R & D) method used to produce a monitoring system for lecture-based web in an effort to improve the quality of lectures and evaluation of students in the learning process in Education Program Information Engineering and Computer Engineering Department Faculty of Electrical Engineering, State University of Jakarta.

In designing the system to be developed can use the prototype method [8]. This method is suitable for developing a device that will be redeveloped. This method starts with the needs of users, in which case the user of the device developed is part of academic administration, faculty, chairman of the Major of and the person in charge of the class (students). Then create a design that is subsequently re-evaluated before it is produced correctly.

Product trials is a very important part in development research. This phase is done after the design of the finished product. Product trials aim to determine whether the products are made unfit for use or not be seen from the conformity with the user to resolve attendance problems and lectures. The test is done to see the extent which the products are developed to reach its goals and objectives.

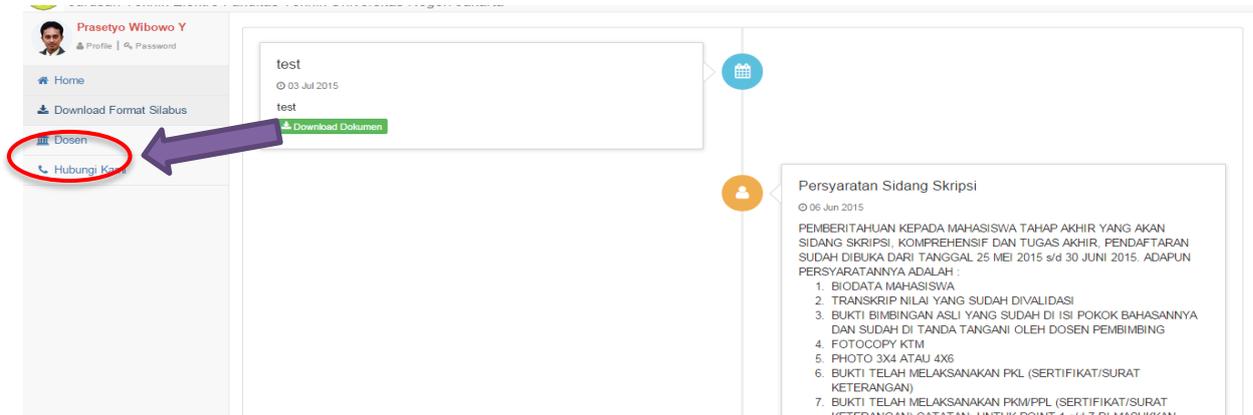
Testing techniques in the application used to verify whether all the desired functional requirements worked well and ascertain whether or not there is still an error on the application. In addition, this test is intended to ensure the quality of the application is to review the specification, design, and coding applications made.

User Acceptance Test (UAT) is a testing process by the user intended to produce documents that serve as proof that software which has been developed accepted by users, if the results of the testing (testing) can be considered to meet the needs of the user.

UAT process is based on a mutually agreed document requirement. Requirement document is a document that contains software scope of work that must be developed, and this document should be reference for testing.

Input Form 05 Presences Lecture List

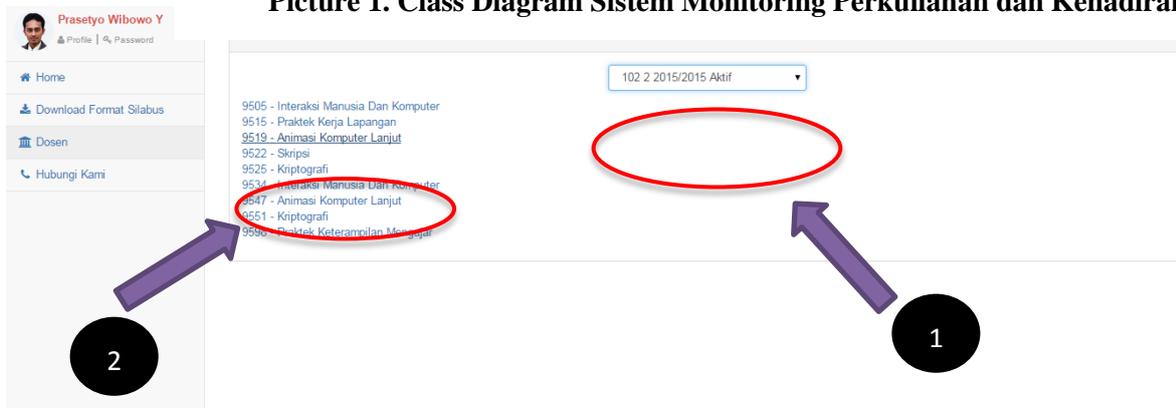
On the right-hand menu, click on the menu **DOSEN**.



Picture 2. Dosen Menu

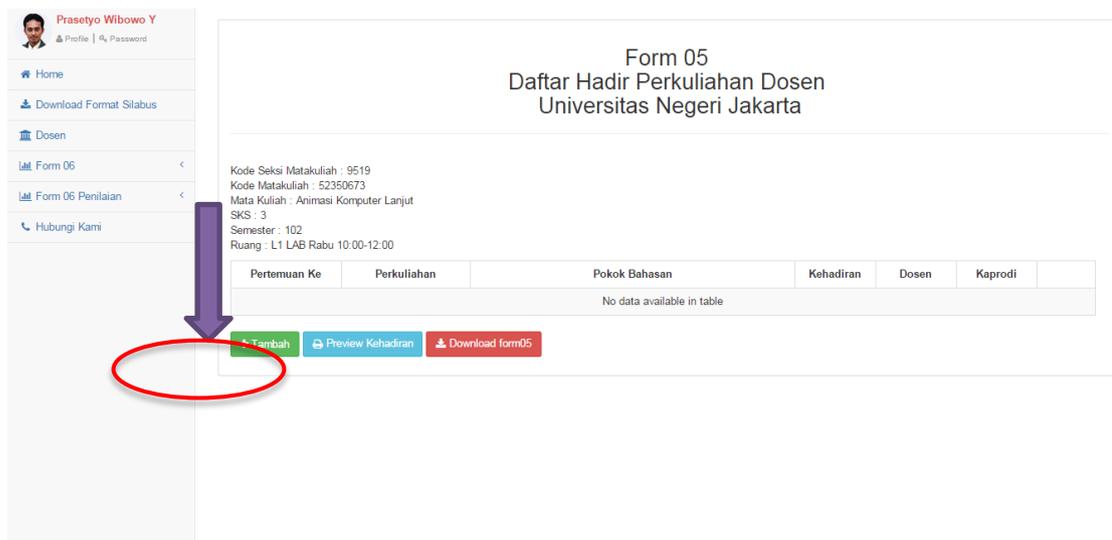
- Lecture list semester appears, select and click the active semester of the subjects that will be taught.

Picture 1. Class Diagram Sistem Monitoring Perkuliahan dan Kehadiran



Picture 3. Semester Lecture List Menu

- Click "Tambah".



Picture 4. Tambah Menu

3. Enter data that you needed, than click “Simpan”.

Picture 5. Menu Simpan

Input Form 06 Presences List

On the right-hand menu, click **Form 06 > Form Kehadiran**.

Picture 6. Form Kehadiran

1. Choose “pertemuan ke”, click button “perkuliahan” with choosing one of options of H=Hadir, I=Izin, S=Sakit, dan A=Alfa. Then click “Simpan Data”.

Picture 7. Menu Pertemuan Ke

No Registrasi	Nama Mahasiswa	Perkuliahan
5235110259	Nufi Eri Kusumawati	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235111815	Rizki Akbar Prayogi	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235120383	Ruby Eka Prawira	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235120387	Galuh Kusuma Aristy	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235120388	Hugo Fahpryan L	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235120389	Indah Pradini	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235122693	TONNY RESDIANTORO	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235122694	AIMEE RIANA DEVI	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235122695	ACHMAD SIDIK	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235122713	SYAHIDAH Humairoh	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5235122716	ANTONIUS SETYO U A	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa

Picture 8. Button Perkuliahan

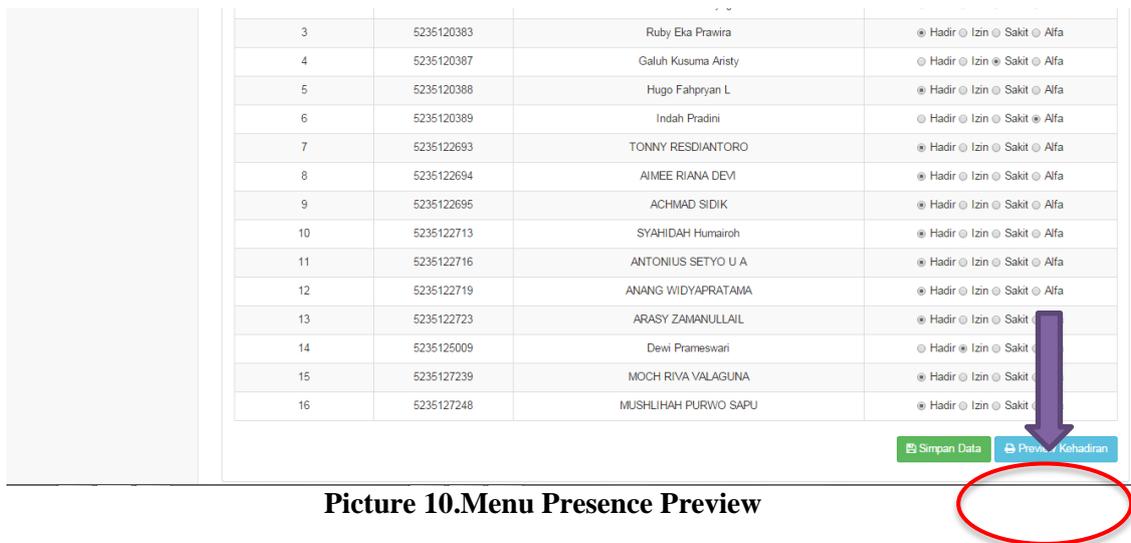
PERTEMUAN KE 1 21-07-2015

No Urut	No Registrasi	Nama Mahasiswa	Perkuliahan
1	5235110259	Nufi Eri Kusumawati	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
2	5235111815	Rizki Akbar Prayogi	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
3	5235120383	Ruby Eka Prawira	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
4	5235120387	Galuh Kusuma Aristy	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
5	5235120388	Hugo Fahpryan L	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
6	5235120389	Indah Pradini	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
7	5235122693	TONNY RESDIANTORO	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
8	5235122694	AIMEE RIANA DEVI	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
9	5235122695	ACHMAD SIDIK	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
10	5235122713	SYAHIDAH Humairoh	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
11	5235122716	ANTONIUS SETYO U A	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
12	5235122719	ANANG WIDYAPRATAMA	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
13	5235122723	ARASY ZAMANULLAIL	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
14	5235125009	Dewi Prameswari	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
15	5235127239	MOCH RIVA VALAGUNA	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa
16	5235127248	MUSHLIHAH PURWO SAPU	<input type="radio"/> Hadir <input type="radio"/> Izin <input type="radio"/> Sakit <input type="radio"/> Alfa

Picture 9. Menu Simpan Data



2. After click “Simpan Data”, then click ‘oke’.
3. Lecturers can see the presence preview of the lecture by clicking “Preview Kehadiran”.



Picture 10.Menu Presence Preview

Results of Presences Preview

Table 2. Functional Testing Results Input Form 05 Presences Lecture List

No	Scenario Prosess	System work or not (Yes/No)*	Anotation
1	Hyperlink to form page 05 : attended the lecture list is functionate.	Yes	-
2	Page 05 list showing the form present lecture correctly in accordance with the code of the course section, course code, course, semester, credits and location.	Yes	-

No	Scenario Prosess	System work or not (Yes/No)*	Anotation
3	Table list consists of lectures attended how much meeting, the date of the lecture, the subject, the number of students, faculty confirmation and confirmation of the head of the major.	Yes	-
4	Button Tambah to fill out the form A05 attend the lecturer list is functionate.	Yes	-
5	Pop up appears when added form 05 list lecturer present.	Yes	-
6	Textfield for input subject is functionate.	Yes	-

No	Scenario Proses	System work or not (Yes/No)*	Anotation
7	No lectures calendar function can be updated in addition to the system	Yes	-
8	The number of students automatically counted on form 06 student attendance	Yes	-
9	Select Box confirmation lecturers is functionate.	Yes	-
10	How much meeting can be change by <i>user</i> .	Yes	-
11	Button updates in the form of 05 lecturers present list function correctly.	Yes	-
12	Button Edit and hapus appears after <i>user</i> click button simpan.	Yes	-
13	Button edit on form 05 list lecture present list function correctly.	Yes	-
14	Pop up appears when added form 05 list lecture present.	Yes	-
15	Button update when doing editing form 05 lecture present list is functionate.	Yes	-
16	Button hapus on form 05 lecture presence function correctly.	Yes	-
17	Notification appears when <i>user</i> click button hapus.	Yes	-
18	Button Edit and hapus disappear when <i>user</i> click button hapus.	Yes	-
19	Button download on form 05 is functionate.	Yes	-
20	Download form 05 lecture presence list format in pdf.	Yes	-
21	User move to form 05 lecture presence list if click button Simpan.	Yes	-
22	User back to form 05 lecture presence list if click button Batal.	Yes	-

4. RESULTS AND DISCUSSION UNIVARIABLE ANALYSIS

User Interface Appearance

View website lecture monitoring and information system created by the dominant presence of gray, yellow and white. Gray color is taken because the gray color combination of two colors black and white that symbolizes the unity between students, as well as students with faculty, and staff. The yellow color is also taken from the color logo Jakarta State University. The white color is chosen as a neutral color which can facilitate the user in monitoring lectures and student attendance.

In making display dynamic and responsive to any tool, researchers used programming language HTML, CSS, jQuery v1.3.0 Javascript, jQuery-ui, and use CSS templates from Bootstrap. For this type of writing, researchers used a type of writing with the font-family: Sans Serif which give the impression of a straightforward, clear, informative and formal. In addition, the navigation pages kept to the minimum to allow a user to monitor the course and attendance without any technical faults.

Functional Test Result

Based on Table shown that the information system monitoring student attendance at lectures and Major of Information and Computer Engineering Department of Electrical Engineering, Faculty of Engineering, State University of Jakarta tested using black box testing.

There are four types of user who involved in the information system monitoring. The first user is the admin academic of Department of Electrical Engineering where users can access, view and print the form 05 list the lecture presence, the form 06 attendance of lectures, form 06 tasks, form 06 formulation score, form 06 scores tasks, form 06 scores practices, form 06 scores midterms, form 06 scores final exams, the form 06, the final score, the admin can access the database monitoring system for lectures and attendance, updating (view, add, delete, and edit)

agenda input, input the course evaluation instruments, mailing account, input the semester, faculty input, student input, input course schedules, student input.

The second user is a lecturer where users can update (view, add, delete, and edit) input formulation score, input form 05 list present the lecturer, input form 06 electronic book, an input form 06 attendance of lectures, form 06 tasks, form 06 formulation score, score assignment form 06, form 06 scores practices, form 06 scores midterms, form scores 06 final exams, 06 form the final score, re-upload the syllabus, suitability information input SAP.

The third user is chairman of the Major of where the user can confirm the form 05 is present lecture list, view/print the form list 05 faculty present lectures, lecture attendance form 06, form 06 formulation score, and the results of the course evaluation instruments.

The fourth is the responsible user class that the user can confirm the form 05 is present lecture list, view/print the electronic book form 06 and form 06 assignments, lecture evaluation instrument input.

So, based on what have been evaluated and tested by the user, the results of the test in accordance with the design of the functional needs of the system and display system. It can be ascertained that the functional testing system is already working in expected the Department of Electrical Engineering has edigible user used in accordance with the results of the testing have been carried.

5. CONCLUSION

Based on the results of preliminary studies, product development, testing and revision of the test results as well as the products have been presented before. It can be concluded as follows:

- The process of monitoring information system application and web-based student attendance is done by using research methods Research and Development which combined with software development method prototype.
- The method of software development using

the prototype stages of requirements definition, analysis or system design, implementation, and testing system, in which the definition requirements tailored to the needs analysis in Major of Information and Computer Engineering Department of Electrical Engineering, Faculty of Engineering, State University of Jakarta.

- Based on testing with a black box indicates that the site lectures and attendance monitoring system has been running well, where the system can provide information on the monitoring list of lecturers attend lectures, lecture attendance, assignments, formulation scores in detail.
- The monitoring system of lectures and web-based student attendance which developed has been tested and based on test results declared edigible to be published in order to assist the administrators of academic Department of Electrical Engineering, professor, head of the Major and the person in charge of monitoring the classes in lecture.

6. REFERENCE

- [1] Universitas Negeri Jakarta. 2011. Pedoman Akademik 2011/2012 Universitas Negeri Jakarta. Jakarta: Universitas Negeri Jakarta.
- [2] Kementerian Pendidikan Nasional. 2009. Peraturan Menteri Pendidikan Nasional Nomor 61 Tahun 2009 tentang Pemberian Kuasa dan Delegasi Wewenang Pelaksanaan Kegiatan Administrasi Kepegawaian Kepada Pejabat Tertentu di Lingkungan Kementerian Pendidikan Nasional. Jakarta: Kementerian Pendidikan Nasional.
- [3] Adhi Prasetyo, *Buku Sakti WEBMASTER Php & MySQL, HTML & CSS, HTML5 & CSS3, Java Script*, (Jakarta : mediakita, 2014), hlm 1.
- [4] Merriam-Webster (2014). Pengertian Monitoring. Dari <http://www.merriam-webster.com/dictionary/monitoring>, diakses pada 18 Desember 2014 Pukul 11:14.
- [5] Firdaus, Afrian. 2011. *Solusi Pengembangan Sistem Monitoring Perkuliahan Berbasis Web Untuk Optimalisasi Proses Monitoring Perkuliahan di Fakultas Ilmu Komputer Universitas Sriwijayes*. Palembang:Universitas Sriwijayes. C110-115.
- [6] Ikwanti. 2009. *Pengembangan Aplikasi Monitoring Perkuliahan di*

- ITS, (Surabeyes: Institut Teknologi
Surabeyes.
- [7] Sugiyono. 2013. *Metode Penelitian
Kuantitatif, Kualitatif dan R&D*. Bandung:
Alfabeta.
- [8] Pressman, Roger. 2012. *Software
Engineering 7th Edition*. New York:
McGraw-Hill.

IMPROVEMENT OF TEACHERS ABILITY WITH SPACE LIGHTNING EFFICIENCY TECHNOLOGY IN AN ECO FRIENDLY BULDINGS

Doddy Rochadi, Cynthia Riescanita Putri, Henita Rahmayanti

Department of building engineering
Engineering major Sipil Faculty of engineering Universitas Negeri Jakarta
doddroch@yahoo.co.id

Abstract

The development of large cities has led to a rapid bermunculnya high-rise buildings. Energy efficiency is a general term that refers to the use of less energy to produce the amount of service or output. In view of the general public is also interpreted as the energy efficiency energy savings.

The lighting in the Office building primarily processed in general use of artificial lighting, the utilization of natural lighting are still less processed. Therefore the processing of openings or holes of light as a medium natural lighting with high absorption brings the possibility of utilization of natural lighting in the building. In this case the aspects examined is the use of simulation of DIALux EVO to analyze the magnitude of energy consumption on building and identify ways to penghematannya. This design first by making the building design using autoCAD and then designing a lighting system using the software DIALux EVO. It might be the problem, could be a model openings, natural lighting systems, and the use of lights against the building is observed.

The results of the analysis showed that the artificial lighting conditions observed on the building almost meet the standards, but to the natural lighting conditions on the building based on simulated results obtained a value large enough illumination so that needs to be done a few ways to optimize the level of natural lighting into the space, including: the addition or replacement of material and color of the walls and floor with a slightly darker color , do a blackout lights in areas exposed to sun light so as to reduce operational costs.

Efforts efficiency that done is to do a simulation on software, and through case studies, obtained the real picture regarding the knowledge of energy saving analysis. Using simulation technology for teachers who teach building much needed areas of planning, to give input in producing environmentally friendly buildings, through the efficiency of lighting spaces.

Key Words: energy efficiency, simulation of DIALux EVO, lighting.

1. Introduction

The demands of the current office building was a modern building but has a value of energy efficiency so that the electricity can be more efficient and profitable. Space requirements the lighting in a room can be obtained through the system of artificial lighting and natural lighting systems or a combination of both. Natural light for space depending on the layout of the room or the building against the rotation of the Earth that moves from West to East. Office buildings in the cities currently have a value of as much as possible in accordance with the energy

efficiency issue is ' energy efficient ' buildings that developed at this time. But unfortunately, understanding, concern and willingness to organise efficient building concepts menerap, is only still a ' slogan '. On the other hand Indonesia is a country located in the tropics, an area that has the rays of the Sun are abundant, and the sun shines all year round. This natural condition of course is the potential that can be utilized in the building perencanaan to reach the value of efficiency in terms of lighting.

The size of the light and the light needed by someone to have activity depending on the type of work a person performed in the room. On the work space in particular offices, the

minimum recommended lighting levels based on SNI 03-6575-2001 was 1200 lux, meeting room of 300 lux, living about 120~250 lux. Every room needs a size in a different light.

The space could use a good natural lighting system according to the standard, so it can save on artificial lighting (lights) in the room so that the electrical energy use more efficiently. Research analysis of the lighting is expected to achieve energy-efficient buildings with lights on rotation solutions showcase in working areas adjacent to the aperture, the light can be turned off and vertical blind can be used according to the standard angle of the eye to avoid glare, so sunlight can enter into the interior of the room but did not result in excessive heat glare, so sunlight can enter into the interior of the room but did not result in excessive heat and glare. In this study using the assistance software is done to find out the amount of light in a rungan through natural lighting and artificial lighting. The building was chosen as the object of research because it has openings openings and materials that can perform energy savings through natural lighting control and optimization of the use of artificial light that will be done with the Energy Modeling Software namely software DIALux Evo, the software used to calculate energy consumption in building movie based on limitations of the use of the intensity of the room listed in the SNI 03-6197-200 about energy conservation in lighting system.

2.METHODS

Research methods used in this research is a survey research methods with the descriptive approach. The problem examined is the issue that needs to be discussed in depth or conducted an in- depth understanding. The

research about the implementation of the energy efficiency through the optimization of lighting on buildings with the software. This research focuses on the process of simulation of conditions in the field.

3.RESEARCH RESULTS

Office building that has a whole floor of 17 x 24 m² and a height of ceilings as high as 3.4 m. this room using a white wall paint as a base colour that dominates the entire room. Floor tile using the size 60 x 60 cm white and ceiling using the ceiling panels are white. Furniture (chairs, tables, storage cabinets, and others) used the average colored dark gray/grey, oak wood.

There are some problems appeared in this Chamber, namely:

- a. sunlight a lot goes into a room especially the room in the front and the side, due to the layout of the openings of the entire area lies in the eastern part. This causes the room gets light rays of the Sun in large amounts.
- b. Room feels hot and impressed glare, since keseluruhan majority of spaces using white color without color on the walls, floor, or ceiling.

Before doing the prores simulations, must first make a modeling the space with material with a EVO DIALux libary as possible with the conditions in the field. As for the material used in the modeling space are as follows:

Table 1. The material used in the modelling space

Interior Element	In Fields	DIALux EVO
Wall	White Painted	Concrete 2
Floor	Wall	Standard wall
Plafond	<i>pearl white</i>	90%
Furniture	Ceramics 60x60 cm	Tiles white 76%
	White Painted Ceiling panel	<i>Grey white</i>
	Table: Finishing Paint	<i>Light oak</i>
		<i>Lemon wood dark</i>
		<i>Macassar</i>
		<i>Ash light grey</i>
		7001 (<i>silver grey</i>)
Lamp	Light Painted Cabinet container	Light oak
		7011 (<i>iron grey</i>)
	Chair	5024 (<i>pastel blue 31%</i>)
Extra Interior	Sofa	
	• TL 2 x 36 W	
	• TL 2 x 18 W	Philips TBS160
	• Downlight 18 W corridor	2xTL-D36W
	• Downlight toilet 10 W	Philips TBS318 C
	<i>Vertical blind</i>	2xTL-D18W
		Philips FBS291
		1xPL-C/4P18W
		Philips FBH058
		1xPL-C/2P10W
		5024 (<i>pastel blue</i>) 31%

Software DIALux EVO Optimization Simulation Results

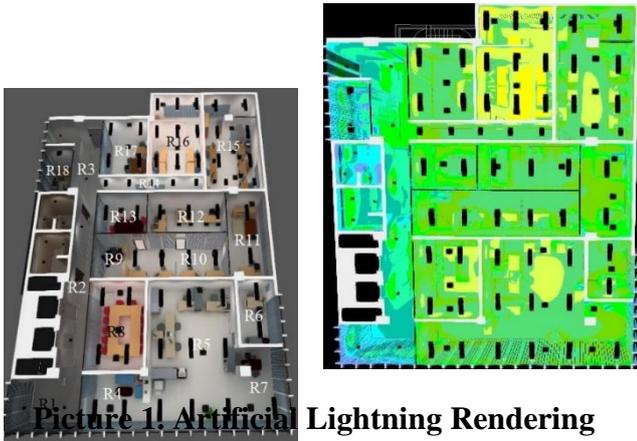
Simulation Optimization of lighting design done by first determining the plan modeling conditions or a replica of the space, the variable materials and interior elements indoors at the DIALux program EVO. As for the simulated strategy is as follows:

1. Simulation of natural lighting/daylight, obtained from the openings with the sky conditions existing in the simulation program, namely: clear sky, sky and overcast average sky. As for the parameters to be used are: clear sky, on 23/11/2015 at 10:00. To represent the simulation on the morning and afternoon, can choose the time at 10 am and 2 pm.
2. The making of modelling/replica space, form and size of the room, along with a material of walls, ceilings, floors, furniture, as well as the type of lighting that is adapted to the field.
3. Variable assignment experiment, determine the sample interior materials which will be personalised way in the process of design alternatives.
4. Optimization of lighting design, changes.
5. Floor material colour, walls, ceiling.
6. Used texture (*finishing*).

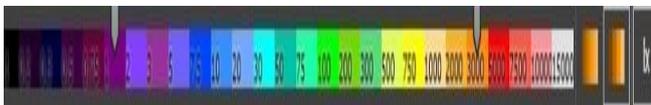
Artificial Lightning Simulation

On the simulation of artificial lighting, this will be done through a two-stage i.e. modeling or replica that correspond to the conditions in the field and modeling after the change of material/material and color. It also required data parameters software for simulation program such as the value of the maintenance factor (MF) recommended by SNI 03-6575-2001 in an area that is 0.80. Detailed technical data inputted on the report as it is in a field that is already present on the parameters of the

software. The results of the simulation of artificial lighting with the software DIALux EVO, displayed in the form of figures and tables.



Picture 1. Artificial Lightning Rendering Results

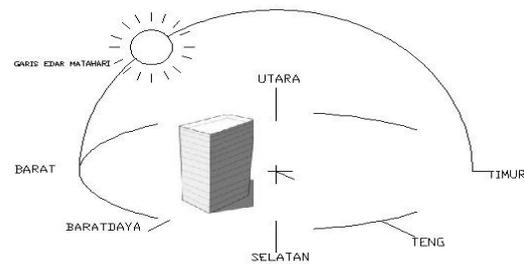


Picture 2. False Colour Rendering Results

From the results of the simulations obtained a result that is the level of artificial lighting in the building based on a standardized SNI for workspace lighting level has 350 lux, and based on the results of the simulations of the lighting level owned quite evenly i.e. pencahayaan rata-rata have a level 300-350 lux, and based on the results of the simulations of the lighting level owned quite evenly i.e. have an average lighting level 300-350 lux. The resulting simulation results and the amount of energy consumed is about 10500-6700 kWh/a. However there are a few spaces that have a level of lighting is approximately 500 lux, a work area and two leases that has about 750 lighting levels lux. Simulation result against artificial lighting can be seen in the following table:

Natural Lightning Simulation

After knowing the results of the analysis of the simulation of lighting in the simulation of artificial lighting, in order to do a comparison of the intensity in the room and the improvement in energy consumption electricity at the space close to the openings (window glass), namely by not turning on the lights at 09.00 – 15.00 GMT+7, except on a rainy or cloudy weather. The following is an example of data that was taken for simulated against the natural lighting in a building in Jakarta.

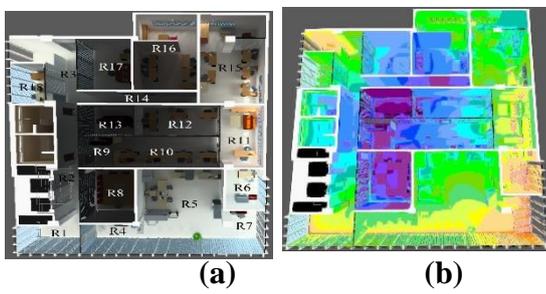


Picture 3. Sun Position against Building

In this simulation, we will take the example of a daylight scene selected on September 23, 2015 at 10:00 pm and at 14.00 GMT to represent simulation on the morning and afternoon.



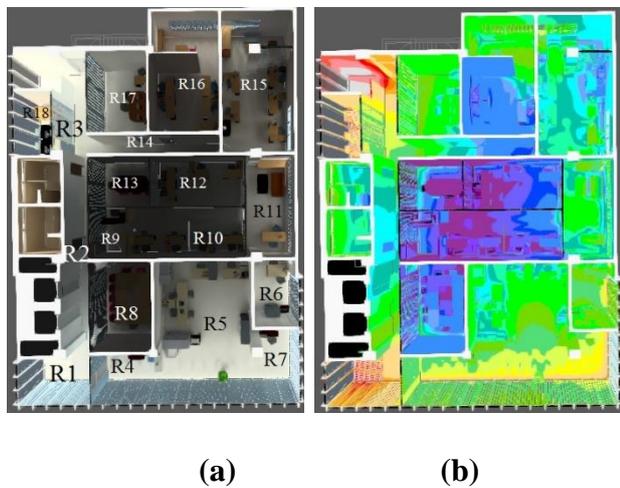
Picture 4. Modelin and/or Replica of Space before simulation



Picture 5.

(a) Natural Lighting Simulation Rendering Results at 10.00 GMT+7
(b) False Colour Results

The results of the simulation of natural lighting is done at 10:00 a.m has optimum results with the intensity of 3000 lux and 100 lux sets. Optimum results are obtained from simulations of natural lighting is the room that is close to the openings, which receive a lot of sun light. After performing a simulation of natural lighting on at 10.00 GMT+7 representing simulation early in the day, on the next simulation conducted simulated natural lighting back on at 14.00 GMT+7 representing simulation in the afternoon.



Picture 6. (a) Natural Rendering Results at 14.00 GMT+7 (b) False Colour

Natural lighting simulation results performed on at 14.00 GMT+7 have the same optimum results with simulated results at 10:00 GMT+7. The average quantity of illumination is the area close to the openings that receive a lot of sun light.

Natural lighting on the simulation Results can be seen in the following table:

Table 3. Natural Lightning Average Value

No.	Room Type	Natural Lightning Value at 10.00 GMT+7 (lux)	Natural Lightning Value at 14.00 GMT+7 (lux)
1.	Front Corridor	700 – 1000	10000
2.	Middle Corridor	20 – 100	30 – 100
3.	Back Corridor	100 – 200	500 – 1000
PT. Pembangunan Sarana			
4.	Living Room	300 – 750	200 – 500
5.	Room for Work	200 – 750	100 – 500
6.	Room of Head Office	1000	200 – 300
7.	Secretary Room	1000	500 - 750
8.	Meeting Room	3 – 5	10 - 20
PT. Vorla Water Indonesia			
9.	Room of receptionist	3 – 5	3 – 5
10.	Room of Staff 1	7,5 – 20	7,5 – 20
11.	Room of Head Officei	500 – 750	100 – 300
12.	Room of staff 2	7,5 – 20	7,5 – 20
13.	Meeting Room	3 – 5	3 – 5
14.	Corridor lease space	10 – 20	20 – 100

15.	PT. Lease Space 1	100 – 300	50 – 100
16.	PT. Lease Space 2	20 – 100	20 – 100
17.	PT. Lease Space 3	20 – 30	100 – 200
18.	PT. Lease Space 4	100 – 300	1000

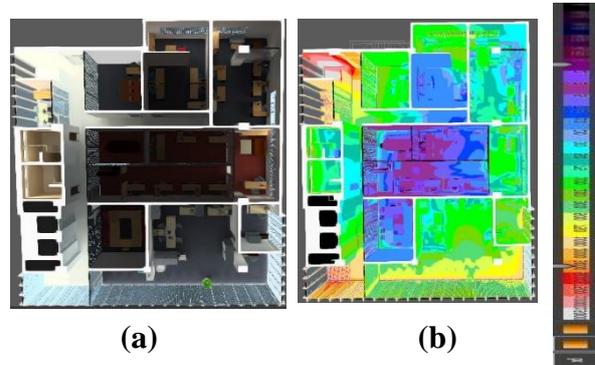
From the table above, note that the average level of natural lighting from the results of simulations using the DIALux EVO has a greater level of lighting especially on the part of the space close to the openings. On the space that has a distance of approximately 2 – 3 m from the openings have a large lighting level is about 750 – 2000 m respectively based on the size of the space. From the results of the simulation of natural lighting above, because the resulting illumination magnitudes larger than the amount of illumination artificial lighting, then on the area more exposed to light of a need for sunlight lamp so that it can reduce the operating handle.

Lightning Simulation Optimization

Optimization simulation results indicate that natural lighting design has optimum results with Eav (lx) of 1500 lux. From the results of simulations for the optimization of lighting, building Means Jaya 3 already doing savings with lighting system that has a more efficient lighting power 40% of the entire power lighting, namely at the beginning of the simulation retrieved amount of energy used 6700 – 10500 kWh into 4100 – 6550 kWh. As for the simulation of the color change is as follows:

- a. White Colour of Wall and Ceiling.

- b. Floor *retains* the ceramic pear white 60 x 60 cm, for a change using the carpet as a floor covering meter. The carpet is a carpet type crown with two colors namely grey and red.
- c. Furniture finishing using soft colors: cream, beige, and soft gray.



Picture 6. (a) Rendering Results and (b) False Colour

This can be seen in the image above the room where it will be ignited and extinguished. After performing the optimization of lighting engineering simulation can be seen by the average of the room already meet energy efficiency criteria, namely the existence of a light on areas that are exposed to the rays of light from the Sun.

Table 4. Light Value after Lighting Optimization

No.	Room Type	Light Value (lux)	Description
1.	Front Corridor	700 – 1000	Light off
2.	Middle Corridor	100	Light off
3.	Back Corridor	100 – 200	Light off
	PT. PS		

4.	Living Room	750 – 1000	Light off
5.	Room for Work	750 – 200	Light off
6.	Room of <i>Head Office</i>	1000 – 2000	Light off
7.	Secretary Room	2000	Light off
8.	Meeting Room	300 – 500	Light on (if used)
PT. VWI			
9.	Room of receptionist		Light on
10.	Room of Staff 1	200 – 500	Light on
11.	Room of <i>Head Officer</i>	750 – 1000	Light off
12.	Room of staff 2	100 – 200	Light on
13.	Room of rapat	100 – 200	Light on (jika digunakan)
14.	Corridor lease space	100 – 200	Light off
15.	PT. Lease Space 1	750 – 1000	Light off
16.	PT. Lease Space 2	500 – 750	Light on
17.	PT. Lease Space 3	250	Light on
18.	PT. Lease Space 4	100 – 250	Light off
19.	Room of sholat	700 - 1000	Light off

DISCUSSION

From the results of simulation on artificial lighting and natural lighting lighting level that the results obtained on the artificial lighting is considered enough, and based on the results of the simulation of natural lighting are taken at 10.00 am and from 14.00 PM which represents the time the morning and during the day, the sunlight coming into the room to have a sizable amount of strong, because if natural lighting in the work area of 350 lux , then lights off. Whereas if natural lighting in the work area of less than 350 lux, then lights on. Hence the need for a blackout lights on the area exposed to the rays of light from the Sun so that it can reduce operational costs in space.

Because the walls and the ceiling in the room that almost the entirety of the use of white lead to the atmosphere in the room into the glare, heat, and high penghawaan level, to help the State then used the interior of additional vertical blind to reduce entry of sunlight. However, because the area on more use of white color that has reflected greater power causing the atmosphere in the area was impressed and dazzled the less comfortable. So the optimal lighting design which is able to solve the entire problem surrounding the room lighting is the use of paint a wall that can be replaced, on the floor using ceramic pearl white can be added by using a carpet can absorb the sun light mask so as to reduce pantula light indoors, on carpet using a metered building type crown with two colors namely grey/grey and red. While finishing the furniture still use soft colors, such as light green color, crem, beige, grey and soft.

RESULTS

In principle the building overlooking the West and to the South have different problems when viewed from the aspect of the trajectory of the Sun. In general they saw openings/window should pay attention to the path of the Sun, the North and the South is where they saw the potential for a window, in order to get natural light. While East and West positions on certain hours needed protection against direct solar radiation.

Based on the results of the simulation using software DIALux EVO against conditions in the field showed that the magnitude of luminasi artificial lighting in a room on the second floor is almost standard. As for the results of the simulation in natural lighting, illumination of the quantity produced is very large, this is caused by the opening (window glass) and the influence of the materials and colors that the majority of the light colored so that it causes the light rays that enter have the power of reflection and the atmosphere in the room into the glare and heat, resulting in an area of high techniques required.

Optimal lighting design which is able to solve the entire problem surrounding the pencahayan room on the building is the use of a white wall paint, ceiling panels, white is white, thus leading to a brighter and cleaner atmosphere. Window coverings using vertical blind is blue. Carpet coloured dark gray/grey and Red are added as a floor covering. While finishing the furniture using soft colors, such as light oak, beige, cream, soft gray.

Energy efficiency do a top priority in the design, the design fault resulted in wasteful energy which will affect operating costs throughout the building in operation. Harnessing sunlight for lighting spaces provide the efficiency of energy consumption electricity for lights and reduce the cost of electricity consumption Simulation Based.

Conducted in this study then expected the teacher to develop his knowledge and apply lighting efficiency technology in learning, with lighting efficiency technology spaces then the effort of creating an eco-friendly building can be upgraded.

LIST OF REFERENCES:

- Adiyanda BW. 1999. *Pengendalian Cahaya Alami sebagai Upaya Penghematan Energi pada Bangunan Gedung*. Universitas Diponegoro: Semarang. <http://eprints.undip.ac.id/12098/>
- Bean, Robert. 2004. *Lighting Interior and Exterior*. Massachusetts: Architectural Press.
- Ching, Francis DK. 1995. *A Visual Dictionary of Architecture*. New York: Van National Reinbold.
- Darmastiawan, Christian, Lestari Puspakesuma. 1991. *Teknik Pencahayaan dan Tata Letak Lampu, Jilid: Pengetahuan Dasar*. Jakarta: Grasindo.
- Gunawan, Ryani. 2012. *Simulasi Rancangan Bukaannya Pencahayaan Cahaya Matahari Langsung*. Faculty of engineering Jurusan Arsitektur: Universitas Katolik Parahyangan.
- Honggowidjaja, Stephanus P. 2003. *Pengaruh Signifikan Tata Cahaya Pada Desain Interior*. Dimensi Interior. 1 (1). 1-15:
- Indonesia. Kementrian Energi dan Sumber Daya Alam (2009). *Indonesia Energy Outlook 2009*. Jakarta: Author.
- Mangunwijaya, Y.B. 1981. *Pasal-Pasal Pengantar Fisika Bangunan*. Jakarta: PT. Gramedia.
- Manurung, Parmonangan. 2012. *Pencahayaan Alami dalam Arsitektur*. Yogyakarta: Penerbit ANDI.
- PT. Asdi Swasatya. *Daylight Simulatin – DIALux EVO GBC Indonesia*. Jakarta.
- Syam, Syahriana, Syarif Beddu dkk. 2013. *Pengaruh Bukaannya Terhadap Pencahayaan Alami Bangunan Alami Bangunan Tropis Indonesia*. Universitas Hasanuddin: Makasar.
- Warsito, Ir. Agung. 2012. *Optimasi Pencahayaan Buatan untuk Efisiensi Pemakaian Energi Listrik pada Room ofan Dengan Metode Algoritma Genetika*. Universitas Diponegoro: Semarang.

APPLICATION OF VIRTUAL LABORATORY COURSE THROUGH THE WEB FOR *FOOD AND BEVERAGE* *SERVICE* STUDY IN CULINARY ART PROGRAM AT UNIVERSITAS NEGERI JAKARTA

Nurlaila¹, Rusilanti², Sachriani³ dan Kunto Imbar⁴

^{1,2,3}Facultas Teknik, Universitas Negeri Jakarta

e-mail: laila.mashabi@yahoo.com

Abstract: This research has to develop instructional media Virtual Laboratory through web for teaching at Food and Beverage Service students of the State University of Jakarta. This research was conducted in Food Culinary Education Program Faculty of Technology State University of Jakarta. The study was conducted over 6 months, starting from May to November 2014. To analyze the virtual laboratory through Web, the research uses qualitative descriptive analysis techniques. Media virtual learning laboratory food service with various services i.e. American Service, English Service, Russian Service, and French Service. While the average value of the total results individual test (one to one) achieved are good, with score 4.31 and a limited trial (small group evaluation). The test was tested to forty students who are taking the Restaurant Service Course in semester101. Total mean in American service is very good the score 99.4. Test on English media service with average total scores are good, the score 100. Test on French media service with average total scores are good the score 86.37. Tests on Russian service with average total scores are good, the score 82.54. Thus the total results of four services have a very good quality.

Keywords: *Virtual Laboratory Implementation of Food and Beverage Service through WEB, on Food Culinary Program*

1. INTRODUCTION

Advance technology developments have positive impacts in many areas of life, one is education. The ideal education is supported by infrastructure including the completeness and sophistication of learning model. With using the appropriate learning models expected can be achieved educational goals effectively and efficiently.

These goals can be achieved if the students are able to master the science, so they can think and act in accordance to society demands. In order to the targets can be achieved effectively, these goals need to be developed learning model oriented towards personal trigger efforts learners who have the cultural characteristics of critical thinking, creative, innovative and rational reasoning and have pattern of attitudes and independent acts.

The Implementation of teaching and learning are an effort to influence learning process. Learning success was stated of any behavior

changes. Of course, to produce behavior change is not easy, but a teacher should prepare the material will be given to the students well.

Students often have learning difficulties. Therefore, the students need teaching and learning strategies that can solve the problems. To achieve the learning goals that produce students who have a good understanding and mastery so it is needed conducive learning approach to teaching and learning process.

One of the learning methods that lecturers used as the main source in delivering science and knowledge to the students is a Virtual Laboratory where students can learn at home or anywhere, anytime without performing in the classroom / laboratory, so the students can improve their skill, increase learning flexibility, time and place, especially learning the type of restaurant service (service). In addition, through the development of a virtual laboratory media accessible to the e-learning

system that can be accessed through the Internet.

State University of Jakarta (UNJ) as an institution that produces human professional resources required to further improve the quality of learning that involves various aspects such as infrastructure, professional lecturers and conducive environments, methods and media that are able to produce competitive graduates. One of the studies is Culinary Education where the students graduate of this study have a vocational and educational competence. Vocational competence is a competence in the arrangement of dishes which included the competence of restaurant service.

Food Layout study is a subject that must be taken by the students of Culinary Education. Where in the description of this study are able to practice the various types of service in restaurants i.e. English service, Russian service, American service and French service. In Culinary Education especially on Food and Beverage Service study, the learning process is still done by several simple methods and media but still relevant as varied lectures, discussions, demonstrations, and so forth. Because of using media can better facilitate the students to absorb the information which can make positive response results from the students, active and healthy interaction and the student's comprehension of the material are fast enough.

With the existence of this grant competition, the authors are interested in doing research on the development of teaching materials Virtual laboratory as an effort to help the students, to get a model of learning that can improve the effectiveness, efficiency and creativity of the students in learning competencies kind of service in restaurants.

2. METHODS

This research was conducted in the Laboratory of food and beverage service faculty of technology State University of Jakarta was held 4 months, starting from May to November 2014. Respondent's virtual laboratory applied through Web is 40 culinary

education students who are taking Food layout Restaurant service courses (Food and Beverage Service 2).

This research aims to implement a virtual media laboratory learning on Food and Beverage Service through WEB is a distance learning system through an information technology-based web pages. The specific objectives of this research is to apply the product of education learning objectives, methods, evaluation of learning, so that the learning process becomes more effective,

In implementation of virtual laboratory research there are some steps being taken by respondent's stages evaluation i.e.: Planning, Analysis, Design and Implementation

In applying virtual learning media laboratory study of Food and Beverage through WEB conducted several stages of evaluation by the respondents 1) Test experts (expert review) : involves two respondents, which is the IT multimedia experts and the material experts are lecturer who have expertise in governance; 2) The test individual (One to one Evaluation) : involves 2 students ; 3) The limited test (Small Group Evaluation) : involves 5 the students ; 4) The test field (field test) : involves 40 Culinary Education students .

The Instruments that are forms used in instructional media development of questionnaires were given to respondents that are material experts, media experts and To analyze the on-line virtual laboratory using WEB, media learning is used qualitative descriptive analysis techniques. While to produce a good evaluation of data and in accordance with the fact it should refer to validity. Validity used is the logical validity which means the logical validity of reasoning (Arikunto, 2005)

In the instructional media tests through this virtual laboratory using a questionnaire instrument with grading scale 1-5 i.e., the score 1 is not very good, and the score 5 is very good. The purpose of grading scale is used to identify the weaknesses and strengths of products made and can also be a material consideration to revise the components in the virtual media laboratory.

The results obtained from questionnaires after media experts and the students after seeing the virtual media laboratory for on-line using WEB media summed and the average taken. The Average or the score then are the basis for assessing the quality of virtual learning laboratory media. The results of trials that have been done then will be processed with qualitative descriptive analysis using a 1 to 5 scale

3. RESULTS AND DISCUSSION

The location for the research was held in Family Welfare Department majoring; State University of Jakarta which is located in Rawamangun Muka, East Jakarta. Culinary Education Program – Faculty of Technology State University of Jakarta which has graduated educators, competent experts in their field and has a good record has a very strategic location, comfortable classrooms, and laboratory facilities for practicing as Food and beverage service laboratory. Media Test Expert including 1 respondent who has IT expert.

Table 1. Assessment Test Expert Media

Aspect	Category	Score
View		
1	Selection of the font and font size	4
2	Selection of color and composition	4
3	Graphics serving, images, photos and graphics	5
4	Videos servings	4
5	Animated serving	4
6	Voice servings, music and effects	5
7	Narrative serving pronunciation and sound color	4
8	Use of the	5

	screen	
9	Selection of word	5
10	The use of the phrase	5
Program		
1	Selection flowchart	4
2	Consistency dish with flowchart	4
3	The clarity of the instructions for use	5
4	Ease of use	5
5	Efficiency programs	5
6	Security programs	4
7	Anticipating the possibility of student responses	4
8	Reciprocity responses students	5
9	Clarity procedures	4
10	Speed	4
Instructional		
1	The accuracy of the selection of topics for multimedia	5
2	Clarity formulations of instructional objectives	5
3	Clarity of objectives	5
4	Consistency with the contents of Instructional Objectives / ICT	4
5	The clarity of description / explanation of material	4
6	Clarity examples given	5
7	Provision of exercise	5

8	Provision of feedback	4
9	The use of logic	4
10	The quality of the learning interaction	4
11	Personalization and individualization	5
12	sequence	4
13	Consistency test with Instructional Objectives / ICT	4
14	Feedback on student test results	4
15	Provision of motivation	5
The total score of media quality		156
Average score of		4.45

On Table 1, the results of total average score achieved are very good that score 4.45 is on a good criteria. This showed that the media's virtual learning laboratory can be said have a good quality from the aspects of view, program and instructional so it could be used by students, teachers, professors or people who are interested in obtaining a variety of learning resources to support the learning process in college, either face-to-face classroom learning, at home individually or the internet service place.

Test Expert Matter (Subject Matter Expert): Involves 1 respondents are lecturer who has expertise in food and beverages service

Table 2. Assessment Test Expert Content

Aspect	Aspect of category	Score
View		
1	Selection of the font and font size	4
2	Selection of color and composition	4
3	Graphics serving , images, photographs and	4

	graphics	
4	Videos Servings	4
5	Animations Servings	4
6	Voice, music and effects Servings	5
7	Narration Servings	4
8	Use of the screen	4
9	Selection of word	5
10	The use of the phrase	4
Program		
1	Selection flowchart	4
2	Dish Consistency with flowchart	4
3	The clarity of the instructions using	4
4	Ease of use	4
5	Programs Efficiency	4
6	Security programs	4
7	Anticipating the possibility of	4
8	Reciprocity responses students	4
9	Procedures Clarity	4
10	Speed	4
Instructional		
1	The accuracy of the selection of topics for multimedia	5
2	formulations of instructional objectives Clarity	5
3	objectives Clarity	5
4	Consistency with the contents of Instructional Objectives / ICT	4
5	The clarity of description / explanation of material	4
6	examples given Clarity	5
7	Provision of training	5
8	Provision of feedback	4
9	The use of logic	4
10	The quality of the learning interaction	4
11	Personalization and individualization	4
12	sequence	4
13	Consistency test with Instructional Objectives / ICT	4
14	Feedback on student test results	4
15	Providing motivation	4
The total score of media quality		142
Average score		4.1

On Table 2 above, the results of the total average score achieved is very good that the scores score of 4.1.

Individual Trial (One to One Evaluation), virtual learning laboratory media through Web of service (service) tested on 2 students of culinary education

Table 3. Results of Individual Trial

Aspect	Aspect Description	Score
Display Quality	Program operating instructions Clarity	9
	Readability of text / article	9
	The quality of image display	9
	Animation Serving	9
	Colors composition	8
Presentation Material quality learning objectiv	Instructional learning Clarity	9

es		
	Learning objectives Clarity	8
	Understanding the sentence in the text/ article	8
	understanding the material / content of the lesson easiness	9
	The order of presentation accurate	8
	Training Adequacy	9
	Clarity feedback / response	8
	Learning with virtual laboratory program	9
	Total Score	112
	Average scores	4.31

On Table 3, the media quality test results, total average score achieved is good, the score 4.31. This indicates that virtual learning laboratory media services (Service) through WEB have a good quality.

Limited Test (Small Group Evaluation) involves 5 students.

Table 4. Limited Testing Results

Aspect	Description Aspect	Score
Clarity display	Quality operating	67
	Readability of text / article	68
	The quality of the image display	69
	Animation Serving	73
	Colors composition	70
Materials Quality Display	Presentation of learning objectives	66
	Clarity	
	Instructional learning Clarity	67
	Understanding the sentence in the text / article	71
	Understanding the material / content of lessons	67
	The accuracy of the presentation order	66
	Training Adequacy	64
	Respondent's feedback Clarity	64
	Learning with virtual laboratory program	67
	Total score	
Average score		4,51

On Table 4 above, the average total score results achieved are very good, the score 4.51. This shows that media virtual learning laboratory in food layout and food serving course through web has very good quality.

On field test phases, the media virtual learning laboratory on four services i.e. American Service, English Service, French Service, and Russian Service on State University of Jakarta were tested to forty students who were taking Restaurant Services course (Tata Hidang 2) on semester 101 simultaneously. Based on the test results, the quality of the virtual media lab "American service" on students, the average total score of the results achieved is good, with the score 4.27. This indicates that the virtual learning laboratory media services through WEB has a good quality. Learning outcomes of virtual learning media laboratory at the American

service, average total scores achieved were very good, with the score 99.4. This indicates that the application of virtual learning media laboratory at the American service through Web improved the student learning outcomes in both categories.

Based on the test results of the quality of the virtual media lab "English service" to the students, then the results of the total average score on the quality of the virtual media lab "Home Service" achieved was good, the score 4.23. This indicates that the virtual learning laboratory media services (Service) through WEB have a good quality. Learning outcomes of virtual learning laboratory media in English service, average scores total results achieved were very good, with score 100. This shows that the implementation of virtual learning media laboratory on the English service through Web

to the students earning outcomes have good quality.

Quality test results virtual media lab "French service" on students, the average total score of the results achieved is good, that is the score 4.22. This indicates that the virtual learning laboratory media services (Service) through the WEB have a good quality. Total average score of students learning outcomes were very good, with score 86.37. This indicates that the results of media application on virtual learning laboratory French service on student are good.

Quality test results virtual media laboratory "Russian service" on students, the total average score of the results achieved are good, that is the score 4.3. This indicates that the media virtual learning laboratory on services through WEB have good quality. Learning outcomes of media virtual learning laboratory in Russian service, the total average score of the results achieved are very good, with score 82.54. This indicates that the application of media virtual learning laboratory in Russian service to the outcomes students learning is good.

Thus the total results of four services on food layout 2 courses (Planning and Service Restaurant) have good quality. Results of media quality test assessment through Web get a very good assessment after seen from the aspects of view, programs and instructional. And also to improve student learning outcomes, which is obtained from the average total score of the implementation of the virtual media laboratory shows good results.

2. CONCLUSION

Media virtual learning laboratory food service with various services: American Service, English Service, Russian Service, and French Service, are good. Tests performed at Media Experts, the results of the average total score achieved are very good with score 4.45. Expert tests on the material results of the average total score achieved are very good with score 4.1. While individual

test (one to one) the average total score results achieved are good, with score 4.31 and small group evaluation. on field test phases, the media virtual learning laboratory on four services i.e. American Service, English Service, French Service, and Russian Service for Culinary education students at State University of Jakarta are tested to forty students who were taking the food arrangement and Restaurant Services (Tata Hidang 2) on semester 101 simultaneously. Total average score on American Service achieved was very good, with score 99.4. Test on English media service average total scores results achieved are very good, with score 100. Test on French media service the average total scores results achieved are good with score 86.37. Field tests on Russian Service the average total scores results achieved are good, with score 82.54. Thus the total results of the four services in the course food layout and Restaurant Services have very good quality. The results of media experts assessment through Web get excellent ratings as seen from the aspect of view, programs and instructional.

4. REFERENSI

Ardjuno Wiwoho, *Pengetahuan Tata Hidang*, Jakarta :Penerbit Erlangga, 2008

Arif Sadiman dkk, *Media Pendidikan: Pengertian, Pengembangan dan Pemanfaatannya*, Jakarta: PT Raja Grafindo Persada, 2008

Arikunto Suharsimi, *Dasar Dasar Evaluasi Pendidikan*, Jakarta: Bumi Aksara, 2008

Ayat & Nurlaila, *Tata Hidang*, Jakarta, 2012

Prihastuti Ekawatiningsih, Kokom Komariah, Sutriyati Purwanti, *Restoran untuk SMK Jilid II*, Jakarta: Direktorat Pembinaan Sekolah Menengah Kejuruan ,Direktorat Jenderal Manajemen

Pendidikan Dasar dan Menengah
Departemen Pendidikan Nasional, 2008

Pustekkom, *Instrumen Evaluasi Media Video
dan Audio Pembelajaran*, Jakarta, 2009.

Yudhi *Munadi*, *Media Pembelajaran*. Jakarta:
Gaung Persada Press, 2010.

DIFFERENCES STATUS ON REGULAR / NON-REGULAR STUDENTS AND LEARNING STYLES TOWARD ABILITY TEST INSTRUMENTS DEVELOP STUDENT LEARNING OUTCOMES S1 PTB. FACULTY OF ENGINEERING

Riyan Arthur¹, Arris Maulana

Faculty Of Engineering, State University Of Jakarta
arthur@unj.ac.id

ABSTRAK

The objective of research is to study the differences in the status of regular and non-regular Against Developing Ability Test Instrument of Student Learning Outcomes S1 PTB, Faculty of Engineering UNJ. To obtain the data used Develop proficiency test instruments Test Instrument Learning Outcomes and learning style instruments in the form of Likert attitude scale models. The method used is the ex post facto by using factorial design with a number of samples, 80 students were taken by simple random sampling. Analysis of the data used is T test analysis. The results showed that the ability Develop Test Instrument Learning Outcomes of regular and non-regular students are relatively the same, whereas the results of subsequent studies showed that both classes have a tendency to different learning styles. The results provide an indication that differences in learning styles did not much affect the ability of the students in preparing the achievement test. So even the difference in class regularization does not result in different abilities

Key Word: *Differences regularization, Learning Achievement, S1 PTB*

INTRODUCTION

Competency evaluation of education is an important thing, considering that the output of a study can be viewed directly when evaluation. The evaluation can not be separated from the measurement, assessment and decision-making of educators. Therefore, competence of the educator or teacher is a matter that can not be taken lightly. Evaluation of education or learning can be directly used as a picture of a person's ability by the evaluator.

One of the common competence for teacher or educator is the ability to arrange high quality of tests. The quality of test do have an important role in the evaluation of learning both courses and practical in the field. Good point will

determine the evaluation are credible and trustworthy. Moreover, the national standard of education pointed out that teachers are required to make the tests independently.

The opening of non-regular class is one college's policy to accommodate the wishes of the people who want to pursue higher education and the enthusiasm of people who have not been accommodated in the regular classroom. However, this policy certainly provide considerable impact, both in institutions and in individual students. Impact to the institute is about usage of classrooms, increase the intensity of lectures, and individual students would have an impact particularly on the time and expense. Academically, the students will through different psychological condition when they have study and coupled by the relatively higher costs for education institutions even it

still conduct additional activities.

Department of Civil Engineering, Faculty of Engineering, Universitas Negeri Jakarta as an institution that has a class of non-regular and regular study major of undergraduated Technical Education Building has to facing related issues. This is certainly an impact to the institutional and faculty at the department. Differences in the driveway, additional costs and all matters related to the provision of education at the level of the course may be implicated in a variety of things including the ability in the field of engineering education building located under department of civil engineering UNJ.

Some assumption tell the status of regular and non-regular would reduce the competence of the teacher candidates. However, competence basically is not only supported by regular or non-regular. Moreover, motivation, learning styles, and attitudes towards learning is important also noted.

Competence of teachers are basically influenced by various factors both internal and external. The internal factors may include intellectual abilities, interest in learning, learning styles, learning motivation, self-concept, and so on. While external factors that can affect learning achievement may be the method of learning, instructional media, support for the closest, and so forth. It is used as a reference to remind the professors and infrastructure facilities obtained pre means not distinguished by the departments.

Based on the description above, so excited in-depth study would be done through research that focuses on the quality of test in the course of evaluation of learning associated with regularization factors and internal factors in the form of student self learning styles.

METHODS

The method used is the ex post facto method factorial design (causal comparative), to collect data and the ability to draw up the instrument test the students' learning styles UNJ FT S1 PTB. The population is all students S1 PTB FT UNJ who have passed or who are following a course of learning evaluation of both regular and non-regular. The samples are mostly students who are taking courses in learning evaluation.

RESULTS

This research is ex post facto which using T-test design. So based on that, then the description of the data that will be presented here: (1) The ability to prepare the instrument of regular grade test (A1). (2) The ability to develop instruments of non regular grade test (A2). (3) Regular Student Learning Styles (B1). (4) Non-regular Learning Styles (B2).

Normality Test

Normality test in the groups using Liliefors test. Criterias is a score or distribution groups come from populations that are normally distributed when the value of L count <L table and the score came from population groups that are not normally distributed if the L count > L tables.

1.1.1 Table. 1 Result of Normality Test

N o	Group	n	L _{count}	L _{table}	Result
1	A ₁	40	0,051	0,137	Normal
2	A ₂	40	0,003	0,137	Normal
3	B ₁	40	0,079	0,137	Normal
4	B ₂	40	0,014	0,137	Normal

Table 1 shows that all groups (A1, A2, B1, and B2) have the L count <L group-table so the group derived from Normal distributed population.

Homogeneity Test

Difference in average scores between groups should qualify homogeneity of variance between groups, due to differences in the average value of the group can only be meaningful if the variance is homogeneous groups or the same can only be interpreted.

Because in this study is the research on students who tend to be homogeneous, it is not necessary homogeneity test empirically. Homogeneity has happened to the student population S1 Technical Education Building class of 2012.

The hypothesis in this study is to count the average difference (effect) between a given variable with treatment and no. T-test using two sides or two treatment. T-test were used in the real level of 0.05, the coefficient t otherwise meaningless, if $t > t$ table. With the test criteria is reject the null hypothesis that the coefficient of the population means nothing if the level of t is greater than t table. Calculation using SPSS version 11.5.

Impact of Regular and Non-Regular Students Towards the Ability to Arrange Student's Test Instrument.

Calculation of SPSS version 11.5 shows that t-count = 1.972 was greater than t-table = 2.021 ($1.972 < 2.021$). This means that H0 is accepted,

that there is no difference between the ability to arrange test students who are in regular and non regular classes.

Based on the hypothesis testing, the results of this study is there was no difference in the ability of arrange tests among students who are in regular and non regular classes. It means the ability possessed by the regular and non-regular students are relatively equal thus the research hypothesis is rejected.

Impact of Learning Styles Towards the Ability to Arrange Students' Test Instrument

Calculation of SPSS version 11.5 shows that t-count = 13.458 was greater than t-table = 2.021 ($13.458 > 2.021$). This means that H0 is rejected, that there are differences in learning styles between students who are in regular and non-regular classes.

Based on the above hypothesis testing, the results of this study are there was differences in learning styles between students who are in regular and non-regular classes. Learning styles of students held regular classes tend to field independent and learning styles that are owned by non-regular class students tend to be field dependent.**DISCUSSION**

Efforts to improve the ability of arrange learning tests should consider the exist elements within individual students, groups and classes. Learning styles is one of the factors that influence the success in learning. However, if it properly managed, learning styles are not the things that obstruct the students to get the same capabilities.

Therefore, dissemination of information about the importance of student input and description of the students quality when entering the school is needed. Both of regular and non-regular is

not a fundamental problem if managed properly. Input from the Seleksi Nasional Masuk Perguruan Tinggi Negeri (SNMPTN) or from local examinations through Penerimaan Mahasiswa Baru (PENMABA) and the Independent Examination provided maintainance of the quality managemen, then we will get results that the relatively not much different.

SUMMARY

Based on the results, not all of hypothesis proved significantly. Therefore, it can be concluded that in terms of ability to arrange achievement test, regular and non-regular students is relatively same despite having different styles of learning.

REFERENCES

- _____, Undang Undang No. 20 tahun 2003 tentang Sistem Pendidikan Nasional BAB II pasal 3.
- dePorter, Bobbi Mark Reardon, & Sarah Singer-Nourie. 1999. *Quantum Teaching Mempraktikkan Quantum Teaching di Ruang-ruang Kelas*. Penerjemah: Ary Nilandari. Bandung: Kaifa.
- Djaali dan Mulyono, 2004 *Pengukuran dalam bidang pendidikan*. UNJ Press : Jakarta.
- Gibson, James L., John M.Ivancevich, James H.Donnelly Jr., Robert Konopaske, 2009. *Organizational: Behavior, Structure, Processes*, McGraw-Hill, Irwin, New York.
- Gibson, James L., John M. Ivancerich dan Jarnes H. Donneily, 2000. *Organisasi*. Terjemahan: Djarkasih. Jakarta: Erlangga.
- Luthans, Fred 2006. *Perilaku Organisasi*. Terjemahan Vivin A. Y., et all. Yogyakarta : Penerbit Andi.
- Mulyasa, E. 2002. *Kurikulum Berbasis Kompetensi, Konsep, Karakteristik, dan Implementasi*. Bandung: Remaja Rosdakarya.
- Munandar, S.C.Utami 2002. *Mengembangkan Bakat dan Kreativitas Anak Sekolah*. Jakarta: Gramedia Widiasarana Indonesia.
- Nasution. S. 2003. *Berbagai Pendekatan dalam Proses Belajar & Mengajar*. Jakarta: Bumi Aksara.
- Opitz. Michael F., 1995. "Self assessment and learning centers: do they go together?" dalam *Journal of Teaching PreK-8*, Vol.25, January, hal. 104.
- Robbins. Stephen P. 2006. *Perilaku Organisasi*. Terjemahan Benyamin Molan. Jakarta : Penerbit Indek.
- Wijaya Cece & Tabrani Rusyan, 2004. *Kemampuan Dasar Guru dalam Proses Belajar Mengajar*. Bandung: Remaja Rosdakarya.
- Wijaya, Adi dan Jakim Wiyoto. 2010. *Penyusunan Tes Pilihan Ganda*. DIRJEN PMPTK: Jakarta.

IMPROVED ABILITY TO CONTROL ENGINEERING STUDENTS BASIC SKILLS VOCATIONAL

Moch. Sukardjo

Faculty Of Engineering, State University Of Jakarta

E-mail: asukardjo@yahoo.com

Abstract

Objective of this research is to determine the relationships between mechanical aptitude and inductive thinking toward technician's profession and technique basic skill capability. The research concludes that there is positive relationships between: (1) mechanical aptitude and technique basic skill capability with a $r_{Y1} = 0.279$ and $\hat{Y} = 11.935 + 0.258X_1$ (2) inductive thinking and technique basic skill capability a $r_{Y2} = 0.289$ and $\hat{Y} = 11.401 + 0.348X_2$, Furthermore, there is a positive relationship between the two independent variables simultaneous-ly and technique basic skill capability $R_{y,12} = 0.373$ and $\hat{Y} = 8,276 + 0,198X_1 + 0,315X_2$

The aim of this study was to determine: 1) the relationship between mechanical aptitude Vocational High School students with the capability of basic skills techniques, 2) the relationship between the ability to think inductively students with the ability of the basic skills of engineering 3) at the end of the study wanted to know the relationship between the mechanical aptitude of students, inductive thinking ability, together with the ability of basic technical skills.

The method used was a survey with simple and multiple correlation analysis, simple and multiple regression and partial correlation. This research was conducted at the Vocational High School V East Jakarta. This study population across grade II Department of Electronics Vocational School in East Jakarta Capital City 2013-2014 school year. The samples were taken randomly (simple random sampling), which is 75 students.

This study used three (3) instruments, namely: first, the instruments for measuring mechanical aptitude using standard instruments borrowed from the Graduate Program (PPS), State University of Jakarta, both instruments are basic skills the ability to think inductively techniques and instruments developed by the researchers. Inductive Thinking Instruments to form an inductive thinking tests.

Results of this study stated that the entire hypothesis is accepted. The results of the study hypothesis testing are as follows: First, the mechanical Talent has a positive and significant relationship with the knowledge of basic engineering skills. The higher the mechanical aptitude of students, then the higher the knowledge of basic skills and techniques vice versa. Secondly, inductive thinking ability has a positive and significant relationship with the knowledge of basic engineering skills. The higher the inductive thinking skills of students, then the higher the knowledge of basic engineering skills. Third, mechanical and talent, ability to think inductively together have positive and significant correlation with the knowledge of basic engineering skills .

INTRODUCTION

In the information age of a worker is required to have high performance. It is necessary for Indonesian workers can compete with a workforce of mancanegara. According Slameto (1991: 1) to be able to compete internationally, required the excellence eminence either cooperatively or competitively. Manpower to be able to compete and compete well with other labor

required superior human resources, one of which is a high quality human.

To be able to produce graduates who have the knowledge and vocational skills as demanded by the industry are many factors that to influence. Such factors include facilities and infrastructure in schools, internship opportunities in the industrial world, the curriculum, the support of a society of including parents as well

as the mental attitude of the students of SMK itself.

In the national education law, that the main purpose of vocational education is to prepare learners to be able to work in a particular field. (UU- No. 20 of 2003 on National Education System 2003: 43). Accordingly Schhipers said the purpose of vocational education is to equip students to have competence in the field of vocational behavior of certain so concerned is able to work for the future and for the welfare of the nation. (Schhipers, Patratama, 1994: 19).

Issues arising from the joint venture foreign direct investment (FDI) of Japan, workers in Indonesia generate annual turnover of only 20% of German workers. (Schhipers, Patratama, 1994: 32) In addition raised the issue in various media performance of vocational school graduates are generally low. Vocational school graduates can not be removed immediately face a number of machines and production aids (Syafudi, 1996: 66).

To improve the quality and the quality of vocational education is to improve the learning resources are adequate, good source to learn to practice and theory. Along with that it is necessary to study the theoretical literature and in-depth research about the factors that affect the quality and ability of a vocational school graduates, especially with regard to study mechanical aptitude, empirical experience that is reflected by inductive thinking, and the ability of the basic engineering skills. Based on the above background, the formulation of the problem in this study as follows: (1) Is there a relationship between the mechanical aptitude of students with the basic skills of technical capability? (2) Is there a relationship between the ability to think inductively students with the basic skills of technical capability? (3) Is there a relationship between mechanical aptitude and ability to think inductively, together with the ability skill basic techniques?

THEORETICAL STUDY

Basic Skills Capability Engineering.

The term "capability" refers to the capability of learning and is the result of one's learning (Gagne, 1985: 46-69). Gagne, Briggs, and Wager (1992: 107) said that ability is organizing learning outcomes and experiences,

where learning and experience can be seen (real) on the appearance of someone who is affected by the quality of the influence of the wider structure. So the result of learning is the accumulation of all that is experienced, learned by someone who gained through experience in the field and in the classroom. Besides the capability is defined as the general capacity of a person who is connected with the appearance of motor skills. (Magil, 1990: 13)

Of the five types of learning capabilities expressed Gagne one motor skills. (Gagne, 1985: 47). In the motor skills of learners perform in a number of follow-motor movements are organized. Motor movement itself refers to the acquisition of skills that require body movements. (Oxendine, 1968: 12) Definition of basic skills are the skills that people need in order to succeed in life. (Kohl, 1984: 107). Of the six basic skills students need to learn is the ability to understand science and technology, and can use tools. (Kohl, 1984: 110).

Motor skill is an ability that is contained in a person in performing movements with smooth muscle in the right time, such as swimming. Gagne, said that if an organized motor skills, it will form a unity of action that is smooth, regular and timely. (Gagne, 1985: 62). Furthermore it is said there are three main meanings in learning skills, namely: (1) action, (2) accuracy, and (3) timing. (Gagne, 1985: 198). The third characteristic is generally contained in learning motor skills.

To learn motor skills necessary in accordance with the phasing levels. There are seven levels of classification psychomotor domain, namely: (1) Perception (interpreting), (2) Set (preparing), (3) Guided Response (learning), (4) Mechanism (habituating), (5) complex overt response (performing), (6) adaptation (modifying) and (7) origination (creating). (Harrow, 1972: 27).

Results of the analysis of the needs in the field for the field of electronics requires the mastery of knowledge and skills of basic electronic circuits and electronic equipment. (Tranggangan, 1998: 1). Results of research on the basic need for unskilled workers was needed aspects of basic knowledge and skills as well as techniques have much to learn about safety. Kulaeith, 1999, said they also want to know how to use measuring equipment and basic tests measure knowledge in technology and job skills.

All requirements needed in the field, especially for electronics technician on the mastery of knowledge and skills of basic electronic circuits and electronic equipment on the subjects taught basic skills in engineering Vocational High School in clumps electro mechanical subjects. According to Butler a person's ability to learn a very influential among them is the knowledge or skill that is mastered previously associated with a special material that has been studied. (Butler, 1979: 16).

Mechanical Talent

Talent is the inherent ability or "inherent" in a person (Semiawan, 1996: 5). Khatena (1992: 5) says giftedness is defined as a natural ability or aptitude; talent. Besides talent, or "aptitude" is defined as an innate ability which is the potential (potential ability) that still need to be developed or trained. (Semiawan and Munandar, 1987: 1). Children who are gifted in a certain field does not necessarily have a high IQ.

Gifted and talent give evidence on the ability of high performance in children in areas such as intellectual, creative, artistic, or leadership capacity of specific academic skills (Clark, 1983: 5). On the other hand Munandar say that talent and ability is one of the factors that determine one's achievement, where achievement is determined among other things by the intelligence (Munandar, 1992: 17.) Magill believed that the intelligence is the ability to learn and understand, often linked with the skill of someone on a new treatment or a material that is not known. (Magill, 1993: 1)

In the approach to the analysis of the factors stated there are two main factors that shape to construct-ability is a factor g (general) and the factor s (specific). (Khatena 1992: 5). The concept of factor analysis repaired by other experts, known as the usual factors (multiple factors). In the plural factor is said that intelligence operates on four levels, namely (1) try try (trial and error), (2) persepstual, (3) ideational and (4) conceptual. (Khatena 1992: 3). The main capabilities expressed in the usual factors consists of six capabilities: (1) Verbal comprehension (V) that is commonly measured verbal understanding through reading and understanding subtest per-bendaharaan said. (2) Number (N), which is measured through counting problems. (3) Spatial relations (S) measured through manipulation of the

symbol of geometer. (4) Word Fluency (W) measured by the quick response words. (5) Memory (M) measured by the memory of the words that are interconnected. (6) Reasoning (R) is measured through a series of tests of various analogies or complete sentences or patterns. (Khatena 1992: 73)

In the theory of multiple intelligence dikatakan that human intelligence has seven dimensions: (1) linguistics, which is sensitive to sound, rhythm, understand the meaning of words, and sensitive to distinguish the functions and language. (2) Music, which includes the ability to create and appreciate the sound of instruments and music, (3) mathematical logic, including the ability of logic, mathematics and scientefic. (4) visual spatial, namely the ability to form a spatial model includes the ability to maneuver and operate according to the model form. (5) physical kinesthetic, namely the ability to solve problems or problems with the model of partial limbs or whole limbs. (6) social interpersonal, namely the ability to sense and make a difference in various situations, stating the purpose, motivation and feelings of others. (7) intrapersonal the ability and the capacity to control the feelings correctly and effectively applied in their lives.

Of some aspects of intelligence such as that mentioned above, in accordance with the spatial aspects of mechanical ability. A measurement experts say is often used to measure special ability is to measure the ability of mechanics. (Aiken, 1997: 210).

According to Ernest Hilgard R workers mechanical, electrical and building must have a degree in mechanical reasoning above average. From one of the results of research Renzulli et al, states that one of the important points that determine a person's giftedness is liable or binding themselves to the task. It is also stated by other experts who say that the ability of children who have high performance includes the capability demonstration or potential ability within the scope of the following may unggal or a combination of: (1) General intellectual ability, ((2) Specific academic aptitude, (3) Creative or productive thinking, (4) Leadhersip ability, (5) Visual and performing arts and (6) psychomotor ability. (Dorothy, 1987: 8).

Abramson, Title, Cohen says there are 10 kinds of talent that can be identified include: (1) intelligence, (2) Verbal, (3) numerically, (4) Spatial. (5)

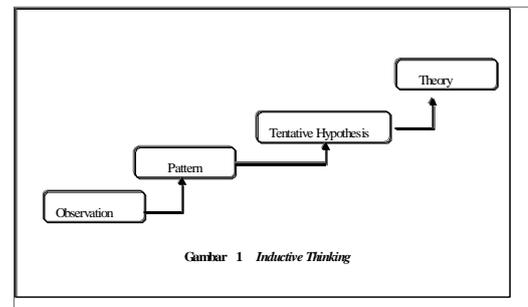
perception, (6) clerical perception, (7) motor coordination, (8) Skills hand, (9) manual skills, (10) koordiasi eyes, hands and feet, (11) the color discrimination. (Abramson, Title, Cohen, 1979: 257)

Inductive Thinking Ability

Thinking is a process of change information from the existing data is done by the brain as a tool. (De Bono, 1971: 43) In addition, it is said to be thinking skills where the application of intelligence to act based on the experience for a purpose. (De Bono, 1990: 3). Thinking stated that focuses on three elements, namely (1) the application of skills, (2) intelligence, and (3) experience. In general thinking is the development of the ideas, concepts and so forth. (Syria-sumantri, 1989: 52).

Logic process draws conclusions from facts or premises given. (Leahey, Hariss, 1997: 229). Inductive reasoning is closely connected with the empirical, where understood empiricism stated that the facts are revealed through human experience is the source of truth. (Suriasumantri, 1998: 45). Human experience that is the source of truth, is a science for the man himself.

Inductive thinking is a way of thinking draw general conclusions from individual cases. (Suriasumantri, 1998: 48). Other experts say that inductive reasoning illustrate the general conclusions from a data set. (Leahey, Hariss, 1997: 229). Work inductive reasoning is of a special observation leading to generalisasi and theory. In inductive reasoning, we start from the observation and measurement of specific, then start by detecting irregular patterns and properties, then the formulation of a tentative hypothesis that can be explored and eventually develop some general conclusions or theories. (Wiliam, 1999, 1). For more details can be seen in Figure 1. Inductive thinking can be described in three stages as deductive, namely: (1) the first stage to understand and appreciate the observations or state information, (2) a second stage to form a hypothesis that can describe the above information in conjunction with knowledge the common person, and (3) The third stage is to evaluate the validity of the conclusions that have been enriched. (Laird, Philip, 1993: 1)



Taken from Research Methods Knowledge Base. 2nd edition, 1999

Think of some component parts, one important component of thinking is thinking (reasoning). Thought is the conclusion of a description of the logic, facts or of the reasons given. Inductive reasoning includes an overview of general conclusions from the data. (Laird, Philip, 1993: 1).

To be able to conclude a general truth of various data or case there can be shaped inductive generalizations, analogies inductive and causal. From the above it can be concluded that empirical thinking ability is reflected by inductive thinking is the ability of students in the general conclusions of the cases were found, including in this case on the ground that is often experienced in the field of engineering.

FRAMEWORK OF THINKING

Relationship Between Student Talent Mechanics (X1) Basic Skills Engineering Capabilities (Y)

Of the many factors that contribute to the success of a person is talent. The talents of someone very different between one person with another person. The difference is due to an inborn talent.

In the field of engineering ability of a person are also very different in both the acquisition of skills and knowledge. To be able to master the engineering field well, which should be controlled or be a prerequisite is the acquisition of skills that are basic. Abilities that are basic in vocational subjects reflected in electro mechanical. In electrical engineering subjects that must be mastered the basic skills related to the ability of the technique. The ability of basic skills is a technique that requires organizing ability of the entire physical movement that can not be separated from knowledge.

Therefore we need a better understanding of knowledge concerning the safety and knowledge of the equipment. A skilled person to do a job not just a habit, but it requires the ability of each individual to be able to adapt to changes. So here it is necessary that the dynamic response of a person. From the description of the basic engineering skills and talents as above, then someone who has a talent in the field of engineering, if given adequate education can develop their potential, then the ability of basic technical skills will be good also. This suggests a positive relationship between the mechanical aptitude vocational students with the basic skills of technical ability.

Correlation Between Thinking Inductive Students (X2) Capabilities-Pilan Ketaram Basic Techniques (Y)

The ability to think empirically that the conclusion of inductive thinking is a process thought to take general conclusions from particular th Making general conclusions from particular data that can be shaped inductive generalizations, analogies, and causation things. People think empirically, then rationalism will be strong, because it is derived from the experiences of individuals. All abilities are obtained either from the school as well as the experience gained from the outside as practical experience of the industry or the practice in other places will make a valuable provision for students to be able to infer the general from what ever experienced. It is therefore expected with empirical thinking ability that is reflected by inductive thinking ability of students will have the mastery of basic skills good technique.

From the description it can be said the higher the person's ability to think inductively, then the higher the ability of basic technical skills, and vice versa

The Relationship Between The Mechanical And Inductive Thinking Ability, Together With The Ability Of Basic Technical Skills

From the description framework as described above which states that if a person has a mechanical aptitude is high, then the ability to basic technical-skills will also be high. Thus suspected mechanical aptitude of the students is positively related to the ability of basic technical skills.

Similarly, the ability to think inductively students. The higher the person's ability to think inductively, then the higher the ability of basic technical skills. Therefore, it is suspected there is a positive correlation between the ability to think inductively with the basic skills of technical ability. So of the three above explanation, it can be concluded that with good talent, especially talent with regard to mechanical ability inborn then supported or supported by the ability to think inductively is good, then all of this together in-expect will generate skilled capability good basic technique.

RESEARCH HYPOTHESIS

Research hypotheses were proposed as follows:

1. There is a positive relationship between the mechanical aptitude X1 students with the basic skills of technical capability Y
2. There is a positive relationship between students' ability to think inductively X2 with basic technical skills capability Y
3. There is a positive relationship between students of mechanical aptitude, the ability to think inductively, together with the ability of basic technical skills

RESEARCH METHODOLOGY

The method used was a survey with simple and multiple correlation analysis, simple and multiple regression and partial correlation. The aim of this study was to determine the relationship between mechanical aptitude students Vocational High School (VHS) with the capability of basic skills techniques. In addition, this study also wanted to know the relationship between the ability to think inductively students with the basic skills of technical ability. At the end of this study wanted to know the relationship between the student mechanical aptitude, the ability to think inductively, together with the ability of basic technical skills.

This research was conducted at the Vocational High School in East

Jakarta. This study population across grade II Department of Electronics Vocational School in East Jakarta 2013-2014 school year. The samples were taken by simple random sampling of 75 students.

Research instruments for measuring mechanical aptitude using standard instruments borrowed from the Graduate Program (PPS), State University of Jakarta. For other instruments created and developed by researcher. Inductive Thinking Instruments to form an inductive thinking tests.

Table 1.

Analysis of variance for the regression of Y on X1 with the equation:

$$\hat{Y} = 11,395 + X_1$$

Sumber Variasi	Dk	2. JK	KT	F _h	F _{tabel}	
					(5%)	(1%)
Total	75	21798	21798		(5%)	(1%)
Regresi (a)	1	20966,88	20966,88			
Regresi (b/a)	1	64,68	64,68	6,45*	3,37	6,69
residual	73	766,44	10,50			5
Tuna Cocok	14	120,37	8,6	0,79 ^{ns}	1,87	2,40
error	59	646,07	10,95			

Description :

* = Significant regression in $\alpha = 0.05$ ($F_b = 6.45 > F_t = 3.37$)

Regression is not significant on $\alpha = 0.01$ ($F_b = 6.45 < F_t = 6.695$)

ns = shaped linear regression ($F_b = 0.79 < F_t = 1.87$)

df = degrees of freedom

JK = sum of squares

KT = Squares middle

RESEARCH RESULT

In this study tested three hypotheses. Testing the hypothesis as follo:

First, the relationship between talent Mechanical X1 with Basic Skills Knowledge Engineering Y obtained form the relationship between the two variables to the equation: $\hat{Y} = 11.935 + 0,258X_1$. To determine the significance of

regression equation F test results can be seen in Table 1. From table 1 above in mind the price of the F count $> F$ table prices ($F_h = 6.45 > F_t = 3.37$), it can be concluded that the coefficient of the regression of Y on X1 direction "significant". To test linearitas as in Table 1 above were obtained $F_h = 0.79 < F_t = 1.87$ at the significance level of $\alpha^* = 0.05$, said linear regression. Thus the regression equation $\hat{Y} = 11.935 + 0,258X_1$ can be used to predict the dependent variable Y relationship with the independent variable X1. This means that each increase of one unit X1 will increase towards Y for konstasnta 0.258 at 11.935.

Ry1 correlation coefficient = 0.279 and the significance test of correlation coefficients obtained price $t = 2.11267$. Because $t = 2.11267 > t$ table = 1,66 can be concluded that there is a positive relationship between knowledge of the basic skills of engineering with mechanical aptitude.

Determination coefficient of 0.078. This means that 7.78% of variation that occurs in the knowledge-skills learning outcomes can be explained by the basic techniques of mechanical aptitude.

The second relationship between X2 with Inductive Thinking Skills Knowledge Basic Techniques Y obtained form the relationship between the two variables to the equation $\hat{Y} = 11.401 + 0,348X_2$

Tabel 2.

Analisis varian untuk regresi Y atas X₂ dengan persamaan:

$$\hat{Y} = 11,401 + 0,348X_2$$

Sumber Variasi	Dk	3. JK	KT	F _{hitung}	F _{tabel}	
					(5%)	(1%)
Total	75	21798	21798		(5%)	(1%)
Regresi (a)	1	20966,88	20966,88			
Regresi (b/a)	1	69,61	69,61	6,67*	3,37	6,695
Residu	73	761,51	10,432			
Tuna Cocok	10	116,242	11,624	1,135 ^{ns}	1,98	2,61
Error	63	646,07	10,242			

Description :

* = Significant regression in $\alpha = 0,05$ ($F_h = 6,67 > F_t = 3,37$)

Regression is not significant on $\alpha = 0,01$ ($F_h = 6,67 < F_t = 6,695$)

ns = shaped linear regression ($(F_h = 0,135 < F_t = 1,98)$)

df = degrees of freedom

JK = sum of squares

KT = Squares middle

From Table 2, it is known $F_h = 6,67 > F_t 3,37$, it can be concluded that the coefficient of the regression of Y on X_2 direction significantly. To test the linearity such as table 2 above the price obtained $F_b = 0.135 < F_t = 1.98$ at $\alpha = 0.05$, so it can be said to be the linear regression. Thus the regression equation $\hat{Y} = 11,401 + 0,348X_2$ can be used to predict the dependent variable Y with independent variable X_2 .

This equation implies that every one-unit increase in X_2 , then will increase to Y by 0,348 units to a constant 11.401. The strength of the relationship is indicated by r_{y2} correlation coefficient = 0.289 and significance test of correlation coefficient with the price obtained $ujit\ t\ th = 2.4711 > tt = 1.66$ can be concluded that there is a positive correlation between the knowledge of basic skills by thinking inductive techniques.

This equation implies that every one-unit increase in X_2 , then will increase to Y by 0,348 units to a constant 11.401. The strength of the relationship is indicated by r_{y2} correlation coefficient = 0.289 and significance test of correlation coefficient with the price obtained $ujit\ t\ th = 2.4711 > tt = 1.66$ can be concluded that there is a positive correlation between the knowledge of basic skills by thinking inductive techniques. The coefficient of determination between Y with X_2 is equal to 0.0835. This means that 8.35% of variation that occurs in basic skills learning outcomes technical

knowledge can be explained by the ability to think inductively with the regression equation $\hat{Y} = 11.401 + 0,348X_2$.

The third relationship between talent Mechanical and Inductive thinking, the Basic Skills Knowledge Engineering obtained regression equation $\hat{Y} = 8.276 + 0,198X_1 + 0,315X_2$.

The calculation results in Table 3 show that the price of the F count obtained at 5.817, while F table with 2 degrees of freedom numerator and denominator degrees of freedom 72 at $\alpha=0.05$ significance level of 2.74. From the calculation of the prices of F count > F table prices ($F_h = 5.817 > F_t = 2.74$), thus it can be concluded that the regression equation $\hat{Y} = 8,276 + 0,198X_1 + 0,315X_2$ can be used to predict the mechanical aptitude X_1 , inductive thinking and X_2 , with the knowledge of basic engineering skills Y.

Tabel 3
Analisis Variansi Regresi Linear jamak

$$\hat{Y} = 8,276 + 0,198X_1 + 0,315X_2$$

Sumber Variansi	Dk	JK	KT	F _{hitung}	F _{table}	
					($\alpha=0,05$)	($\alpha=0,01$)
Regresi	2	115.6206	57.810	5.817*	2,74	4,06
residu	72	715.500	9.937			
Total	74	831,120	-			

Description :

* = Significant regression in $\alpha = 0,05$ ($F_h = 5.817 > F_t = 2,74$)

df = degrees of freedom

JK = sum of squares

KT = Squares middle

α = significance level

Results of calculation of plural correlation between the variables X1, X2, Y generates a plural $R_{y.12}$ correlation coefficient of 0.37. Significance test F_h price correlation coefficient = $5.817 > F_t = 2.74$, then the correlation between Y with X1 and X2, together "means". It can be concluded there is a positive relationship between the mechanical talent and Thinking Inductive vocational students together with the Basic Skills Knowledge Engineering.

The coefficient of determination $R^2 = 0.139$, shows that 13.9% of variation that occurs in the knowledge of the basic skills of vocational students techniques can be predicted by Talent mechanical and Thinking Inductive with Basic Skills Knowledge Engineering jointly by the regression equation $\hat{Y} = 8,276 + 0,198X_1 + 0,315X_2$. In other words a score of Talent Mechanical and Inductive Thinking together can predict the score of knowledge-Skills Basic Techniques by 13.9%, while the remaining 86.1% can not be explained, and derived from other variables not accounted for in this study.

Conclusion

From the results of the study hypothesis testing described above conclusion as follows:

First, the mechanical Talent has a positive and significant relationship with the knowledge of basic engineering skills. The higher the mechanical aptitude of students, then the higher the basic skills of technical knowledge and vice versa.

Secondly, inductive thinking ability has a positive and significant relationship with the knowledge of basic engineering skills. The higher the inductive thinking skills of students, then the higher the technical knowledge of basic skills.

Third, mechanical and talent, ability to think inductively together have positive and significant correlation

with the knowledge of basic engineering skills

IMPLICATIONS RESEARCH

Noting the conclusions of the research results as described above, it is to increase the knowledge of basic skills with the engineering students can improve mechanical aptitude and thinking inductively with the following steps:

Improving Talent Mechanics

Results of studies have provided a contribution of 7.78% of the increase in knowledge of basic engineering skills. Therefore, in order to improve a better result on the basis of technical skills knowledge, there are some efforts that need to be done include: (1) There should be an optimization capabilities of each individual in the schools. Optimization can be by taking into account each individual talents and optimize the talent. (2) talent someone, especially in this case the mechanical talent which is inborn can be optimally developed through experience and practice. Experience here can be created in the school situation, especially vocational schools by providing practical experience as much on students. The practical experience can be provided in industries or can also be assigned to the student, so that the assignment through these subjects students gain valuable experience. (3) The talent is inborn, therefore, the need for guidance on the younger generation, especially in schools to be able to pay attention to nutrition. With good nutrition, the brain will develop and grow well. (4) Because talent is innate abilities, the education system in schools should not be too restrain the child. Let the child in school activities that can support the talent, and the teacher only lived to provide direction and guidance. Likewise, in the home of the parents should not overly restrain the child, for the child to move and walk on the right track.

Efforts to Improve Thinking Inductive

From the research think inductively-ment has given sum 8,35% of the basic skills of technical knowledge. Therefore, in order to further enhance the technical knowledge of the basic skills of vocational students, the need for the following programs: (1) classroom learning system in both

theory and practice need to be created in such a way so as to train the student's cognitive. If cognitive students are trained regularly and continuously, will eventually become a habit, then by itself a way of thinking that students can quickly grasp science, and this in turn will be able to increase the knowledge of basic engineering skills. (2) It should provide sufficient experience which can train students how to think. The experience can be acquired in school, at home or also with peers. But of course it must be planned by the teacher in planning a coherent, logical, and continuous. (3) The next step needs to be done is an atmosphere of learning, especially learning atmosphere in schools. The learning environment both in laboratory and in the classroom needs to be created in such a way, so that the atmosphere of learning can be developed the ability to think inductively as optimally as possible. (4) Familiarize children discuss observe symptoms that occur both in the field nor Mr engineering in other fields. Next will be asked to make a conclusion. The material can be discussed in the classroom or at home assignments. Therefore, teachers should really make careful planning to provide learning that can develop students' thinking inductively.

SUGGESTIONS

Discussion of the results of the research, conclusions and implications as described above, it is proposed the following suggestions: First. Vocational schools should particularly in new admissions to consider holding the aptitude test, in addition to the selection tests through pure NATIONAL EXAM value. Second. By knowing the talent of the students, the school through teachers can give lessons to optimize the ability of their students.

Third. To train inductive thinking, in addition to be created in the classroom learning system that can train students' thinking skills, must be added the tool library or books related to the ability to think, especially books that can improve the ability to think empirically.

If the books are available given the opportunity for teachers to learn the books, so that future teachers can prepare lesson plans so as to be able to train to think inductively. Fourth. Because the key

to success in the classroom is the teacher, then the Regional Office of the National Education Service (RONE) should provide the means to increase teachers' activities in creating a learning atmosphere that can meciptakan inductive thinking ability of students. Means of these activities can be by way of a training workshop organized by RONE, seminars, research, and so on. Fifth. There should be further studies on the ability of the basic skills of vocational students techniques by observing the weaknesses that exist in the study.

References

- Abramson, Theodore, Title Carol Kehr, Cohen Lee. *Handbook of Vocatioanl Evaluation*. London: Sage Publication, 1979.
- AECT, *Educational Technology. A Glossary of Terms*. New York: Association for Educational and Technology, 1979.
- Barrett, Jim and Williams, Geoff. *Tes Bakat Anda*. Jakarta: Gaya Media Pratama, 1997.
- Briggs, Leeslie J., *Insructional Design: Principles and Applications*. New Jersey: Englewood Cliffs, 1977.
- Butler, F. Coit *Instructional System Developement for vocational training*. New Jersey: Englewood Cliffs, 1979.
- Caney, James D. and Scheer Richard K., *Fundamental of Logic*, New York: Macmillan Publishing Co., Inc. 1980.
- Clark, Barbara. *Growing-Up Gifted: Developing the potential of children at home and at school* (USA: Charles E. Merill Publ. Comp., 1983.
- Crown, Thomas K., Kaminsky Sally, Podel David M., *Educational Psychology: Windows on Teaching*. USA: Brown & Benchmark Publ., 1997.
- De Bono. *Pelajaran Berpikir ahli bahasa Martin Samosir*. Jakarta: Erlangga, 1990.
- Donald, Sellin F., and Jack, Birch W., *Psychoeducational Development of Gifted and Talented Leaners*. London: An Aspen Publication.

- Dorothy, Sisk. *Creative Teaching of The Gifted*. USA: McGraw-Hill Book Company, 19987.
- Gagne, Robert M., Leslie J. Briggs, Walter W. Wager. *Principles of Instructional Design* (New York: Harcourt Brace Joanovich College Pub., 1992.
- Gagne, Robert M., *The Conditions of Learning and Theory of Instruction*. New York: Holt, Rinehart and Wiston, 1985.
- Harrow, Anita J., *A Taxonomy of the Psychomotor Domain*. New York: Longman, 1972.
- Hilgart, Ernest R. *Introduction to Psychology*. USA: Harcourt, Brace & World Inc, 1962.
- Fazavieh. *Introduction to Research n Education*. USA: Holt, Rinehart and Wiston, Inc., 1982.
- Joni, Raka. *Pengukuran dan Penilaian Pendidikan*. (Surabaya: Karya Anda, 1986.
- Khatena, Joe. *Gifted: challenge and response for education*. Illinois: F.E Peacock Publishers, Inc, 1992
- Kohl, Herbert *Basic Skills*. Toronto: Bantam Books, 1984.
- Krech, D, Crutchfield R.S., Ballachey E.L., *Indiviudal in Society*. Tokyo: McGraw-Hill Kogaku-sha, Ltd., 1962.
- Kulaeith, Theera. *Research on basic needs of unskill workers required by th production industries and the assembly of auto parts*. Webnaster @1 ibrary.kmitnb.ac.th., 1999.
- Laird, Johnson, Philip N., *Human and Machin Thinking*, 1993. Internet: <http://penta.ufrgs.br/edu/telelab/3/inducti v.htm>.
- Larson, Milton E., *Teaching Related Subject in Trade and Industrial and Technical Education*. Ohio: Charles E. Merril Publishing Co., 1972.
- Leahey Thomas Hardy, and Hariss Richard Jackson. *Learning and Cognition*. New Jersey: Prentice Hall, Upper Saddle River, 1997.
- Magill, Frank N. *Survey of Soscial Science: Psychology Series Vol. 1*. New Jersey: Salem Press, 1993.
- Magil, Richard A. *Motor Learning : Concep and Application*. Iowa: Wm. C. Brown Company Pub, 1990.
- Muller, Daniel, J. *Measuring Soscial Attitudes: A Handbook Resear-cher and Practioners*. New York: Teacher College Press, 1996
- Munandar, Utami S.C., *Mengmbangkan Bakat dan Kreativitas Anak Sekolah*. Jakarta: Gramedia Widiasarana Indonesia, 1992.
- Oskamp, Stuart. *Attitudes and Opinion*. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1977.
- Oxendine, Joseph B., *Psychology of Motor Learning*. New Jersey: Engliwood Cliffs, 1968
- Parkison, G.H.R., *An Encyclopaedia of Philoshopy*. Great Britain: Routledge, 1966.
- Poepoprodjo, W., *Logika Scientifika*. Bandung:Remaja Karya, 1987.
- Schhipers, Uwe, Pratrata Dajang Madya. *Pendidikan Kejuruan id Indonesia*. Bandung: Angkasa, 1994.
- Semiawan, Conny R., I. Made Putrawan, Th. I. Setiawan. *Dimensi Kreatif Dalam Filsafat Ilmu*. Bandung: Remaja Karya, 1991.
- Semiawan, Conny, A.S Munandar, Munandar S.C. Utami, *Memupuk Bakat dan Kreativitas Siswa Sekolah Menengah: Petunjuk bagi teknisi dan orang tua*. Jakarta: Gramedia. 1987.
- Slamet, *Pendidikan dan Pelatihan Kejuruan Dalam Era Kompetensi Global*, Kumpulan Tulisan dan Makalah. Yogyakarta: PPs IKIP Yogyakarta, 1991.

Soekadijo, R.G., *Logika Dasar: tradisional, simbolik dan induktif*. Jakarta: Gramedia, 1985.

Suriasumantri, Jujun S., *Filsafat Ilmu; sebuah pengantar populer*. Jakarta: Pustaka Sinar Harapan, 1998.

-----*Ilmu Dalam Prespektif*. Jakarta: Yayasan Obor Indonesia, 1989.

Syafrudi, Haris A., *Upaya Memperkecil Kesenjangan Keterampilan Lulusan Sekolah Menengah Kejuruan dengan Permintaan di Dunia Industri/Usaha* Jakarta: Balitbang Dikbud Kajian Jurnal Ilmiah No. 003/th. I, Februari, 1996.

Undang-undang Republik Indonesia No. 2 Tahun 1989: tentang Sistem Pendidikan Nasional..Jakarta: Ekojaya, 1989.

Wiliam, MK. *Research Methods Knowledge Base*. 2nd edition, 1999. Internet:<http://trogin.human.cornel.edu/kb/Dedind.htm>.

[1]Tajik, J and S, Nazifi., 2011. A Study of Correlation of Serum Leptin with Trace Elements in Water Buffalo (*Bubalus bubalis*). Australian Journal of Basic and Applied Sciences, 31: 231-234.

[2]Tomovska, J., S, Presilski., N, Gjorgievski., N, Tomovska., M.S. Qureshi and N.P. Bozinovska., 2013. Development of a spectrophotometric method for monitoring angiotensin-converting enzyme in dairy products. Pak Vet J, 33(1): 14-18.

References should be cited in the text as **References:** Bibliographic references in the text appear like [1, 2 ...], using square brace. References should be numbered consecutively in the text.

Authors are responsible for ensuring that the information in each reference is complete and accurate. All references must be numbered consecutively and citations of references in text should be identified using numbers in square brackets (e.g., “as discussed by Smith [9]”; “as discussed elsewhere [9, 10]”). All references should be cited within the text; otherwise, these references will be automatically removed.

No information writes in the paper without reference for authorization the information.

The list of references at the end of manuscript must be arranged consecutively and each reference in the list should appear in the following form:

AN ANALYSIS OF THE EFFECTIVENESS OF FLASH PROGRAMS AUDIO VISUAL MEDIA ABOUT NUTRITIOUS FOOD DIET FOR TODDLERS WITH DRILL AND STAD (STUDENT TEAM ACHIEVEMENT DIVISIONS) METHODS FOR LEARNING OUTCOMES POSYANDU CADRES

Yeni Yulianti¹, Ruslianti² dan Ari Istiany³

S2 Pendidikan Teknologi dan Kejuruan, Fakultas Teknik, Pasca Sarjana, Universitas Negeri Jakarta¹

Program Studi Tata Boga, Fakultas Teknik, Universitas Negeri Jakarta²

Program Studi Tata Boga, Fakultas Teknik, Universitas Negeri Jakarta³

Phone number : 081319863836¹

e-mail : yenyulianti13@gmail.com¹

Abstrack

This research to analyse the effectiveness of flash programs audio visual media about nutritious food diet for toddlers with Drill and STAD methods for learning outcomes posyandu cadres. This research will be implemented in posyandu located in Rawamangun village, East Jakarta. Research carried out in February until in July 2015. This research using comparative quantitative with uses the quasi experiment method. Based on the result of calculation, then missed a hypothesis that is 1) the analysis variance two tails $F_h = 15,89 > F_t = 4,11$ at $\alpha = 0,05$. The value of this indicates that learning outcomes posyandu cadres with audio visual media is better than the handouts media. 2) Score of $F_h = 0,38 < F_t = 4,11$. Shows that learning outcomes posyandu cadres who applies the Drill and STAD methods do not have a significant difference. 3) Score of $F_h = 5,72 > F_t = 4,11$ shows that there is the influence of the interaction between the media and methods to learning outcomes cadres. 4) The test results from using tuckey $Q_h = 1,594 < Q_t = 3,79$ on the level of significance $\alpha = 0,05$ This value shows that learning outcomes posyandu cadres with audio visual media and handouts on Drill method not having a significant difference. 5) Score of $Q_h = 6,377 > Q_t = 3,79$ Shows that learning outcomes posyandu cadres who uses audio visual media with the STAD methods higher than who uses the handout. 6) Score of $Q_h = 3,91 > Q_t = 3,79$ shows that learning outcomes who uses audio visual media with the Drill and STAD methods having a significant difference. 7) $Q_h = 1,77 < Q_t = 3,79$ shows that learning outcomes who uses audio visual media with the Drill and STAD methods not having a significant difference.

Keywords : *The Effectiveness Of Flash Programs Audio Visual Media, Nutritious Food Diet For Toddlers, Drill and STAD Methods, Learning Outcomes Posyandu Cadres*

1. INTRODUCTION

Results Health Research (Riskesmas) of 2013 nationally an estimated prevalence of malnutrition Toddlers and less by 19.6 %.¹ The Government has sought the prevention of nutritional problems by developing a program of the Family Nutrition Improvement Effort

(UPGK).² The development and improvement of Posyandu service quality is strongly influenced by public participation including the cadres.

The implementation of the counseling nutrition in indonesia often with a method of talk accompanied media handouts, posters and leaflets is one approach learning by giving a set of knowledge and dexterity are required to the objective to be able to make

¹ Riset Kesehatan Dasar (Riskesmas). 2013. *Laporan Komunikasi Data jumlah Balita Gizi Buruk dan Kurang Setiap Provinsi di Indonesia*. Jakarta. Direktorat Jendral Gizi dan KIA.

² Kementerian Kesehatan RI. 2011. *Profil Kesehatan Indonesia 2010*. <http://www.depkes.go.id>

the choice conduct appropriate to raise the status of nutrition their babies.

This approach begins with the assumption that an increase in knowledge as intervention cadres the elucidation will be held followed by a change in attitude and action.³ But in fact still many posyandu cadres not skilled in doing counseling nutrition, and knowledge posyandu cadres had not been was increased only by intervention media and this method.

The knowledge cadres about posyandu are less, the main task of other knowledge is still very limited, research Sukiarko said that education cadres range between primary schools-senior high school, receive any education to senior high school down 85,7% in city and 68.5% in rural. Skill in counseling nutrition uses the media conventional and methods demonstration show category less of 60.8 % in urban and 54.7% in rural. The rate of knowledge posyandu cadres in city (46,2%) a category lacking and across the countryside (41,4%). The ability, greater accuracy the data collected cadres is still lo, and 90 % cadres made a mistake.⁴ Investigators Yuli, said the data process of kusioner sample before refreshment be seen that average level sample knowledge that is 49,16 % of 56 cadres most knowledge cadres less than good. While skill in use dacin and provide information from the weighing are still in the category of less namely 56,18%.⁵

During this cadres have found basic training and counseling about for services at the posyandu with that the conventional approach, which were training given in talk and question and answer by coach. One of the weakness of the conventional is only

increase of knowledge, but not improved the skills of participants trainer.⁶

Based on these conditions researchers interested to analyze the effectiveness of media audio program and visual flash handouts about food nourishing balanced toddler with the drill and stad of the results of the study posyandu cadres in nutritional information at the Rawamangun, in Pulo Gadung, east Jakarta. The study analyzed the difference of the results of knowledge posyandu cadres before and after treatment and skills in counseling nutrition well with the drill or STAD using media audio visual flash and handouts program.

With these problems researchers with the purpose of forming a educational model nutrition the media of media audio visual program flash about nutritious food balanced for toddlers applied with the methods learning drill and STAD, expected increase study results of knowledge and skill in counseling of nutrition in posyandu cadres and indirectly can help the government empower the community and endeavors to improve nutrition families through posyandu activities.

2. RESEARCH METHODS

This research can categorized into research quantitative comparative with the quantitative approach and uses the method quasi experiment. Methods used is the method his experiments with design design treatment factorials 2 x 2. This method can be used to scrutinize the whereabouts of the difference by granting treatment over the experiment.⁷ Learning outcomes instrument measured through a test of knowledge and skills tests. By the experiment instruments knowledge of tests use of construct validity and validity content to trial instrument to posyandu cadres not taken as samples for measuring validitas level. While the validity of instrument tests skill only use of construct. The reliability testing pre test instruments obtained reliability index 0,876

³ Angkowo, R., & Kosasih, A. *Optimalisasi Media Pembelajaran*. (Jakarta : PT. Grasindo. 2007) hal, 78.

⁴ Sukiarko, E. 2007. *Pengaruh Pelatihan Dengan Metode Belajar Berdasarkan Masalah Terhadap Pengetahuan Dan Keterampilan Kader Gizi Dalam Kegiatan Posyandu*. Tesis Fakultas Gizi Masyarakat Undip, Semarang.

⁵ Yuli Laraeni dan Afni Wiratni. 2012. *Pengaruh Penyegaran Kader Terhadap Pengetahuan Dan Keterampilan Kader Posyandu Menggunakan Dacin Di Wilayah Kerja Puskesmas Dasan Cermen Kecamatan Sandubaya Kota Mataram*. Artikel : Public health Faculty UNTB Mataram.

⁶ Sukriarko. E. *Op. Cit. hal, 8*.

⁷ Arikunto, Suharsimi. *Prosedur Penelitian*. Jakarta: Rienka Cipta. 1993. hal, 178.

with r_t of 0,339. Because $r_h > r_t$ so instrument pre test said it is reliable. Then on instrument post test knowledge nutriment balanced for toddlers show results 0,861 with r_t reliability of 0,339. Because $r_h > r_t$ so instrument pre test said it is reliable. The data in this study through two under assessment stage the judgment in reaching skill counseling nutrition and judgment in reaching knowledge of food nourishing balanced for toddlers.

In terms of respondents considered activities psychomotor test skill counseling nutrition, the assessment by using rating scale 3-1 in 10 about. While assessment cognitive considered through a test choice right-wrong 32 those on pre a test and post test .Data from the measurement result study results of knowledge and skill must meet the requirements data analysis with this normality and the homogeneity. Testing normality data was undertaken by using Liliefors, while homogeneity data was undertaken by test Barlett. Data analyzed consisting of descriptive analysis and analysis inferential. Data that has been tested when it comes from a population that is normally distributed and the fourth group of data (samples) that are not interconnected has a population variance is homogeneous then qualified to be analyzed by using a technical analysis of the data through analysis of variance (ANOVA) two- lane design with treatment 2 x 2. If the results of the analysis of variance showed differences of treatment group, the difference of the independent variable on the dependent variable and there is interaction between the independent variables with the dependent variable, then the analysis will be followed by Tukey's test in order to test the hypothesis further .

3. RESULTS AND DISCUSSION

3.1 Description of Research Data

3.1.1 Research Data

Learning outcomes in nutrition counseling cadre's nutritionally balanced meals for toddlers than would be described in the

following description .

a. Frequency Distribution Learning Outcomes Posyandu Cadres Using Learning To The Media Audio Visual Flash Program (A₁)

Results cadre's learning that uses learning with audio-visual media have a *flash* program on psychomotor theoretical range of 7-100, 3-100 cognitive and empirical range of 61-95, with the lowest score and 61 the highest score of 95. The results of this study have a cadre's scores an average of 78.55. Modus Score of 75, a median score of 78, standard deviation of 8.948 and the variance of 80.096. The frequency distribution of learning outcomes cadre's score is divided into 6 classes and long intervals of 6 classes.

b. Frequency Distribution Learning Outcomes Posyandu Cadres Who Uses The Media Handouts (A₂)

Learning outcomes that follow the cadre's learning with media *handout* has a theoretical range of 7-100 on the psychomotor, cognitive empirical range 3-100 and 59-88, with the lowest score and 59 the highest score of 88. The results of this study have a cadre's average score at 71.8. Score Mode 71.6; The median score of 72, standard deviation of 7.698 and the variance of 59.25. A frequency distribution score learning outcomes posyandu cadres divided into 6 class long interval and class as much as 5.

c. Frequency Distribution Posyandu Cadres With Learning Outcomes Methods Applying Drill (B₁)

Cadre's learning outcomes by applying *drill*, has a theoretical range of 7-100 on the psychomotor, cognitive empirical range 3-100 and 61-88, with the lowest score and 61 the highest score of 88. The results of this study cadres have an average score of 74,65. Score mode is 78.5, while the median score of 77.2, standard deviation and variance of 7.056 at 49.789. The frequency distribution of learning outcomes cadre's score is divided into 6 classes and interval length by 5 grade.

d. Frequency Distribution Posyandu Cadres With Learning

Outcomes Applying the STAD method (B₂)

Cadre's learning outcomes which apply the method STAD, has a theoretical range of 7-100 on the psychomotor, cognitive empirical range 3-100 and 59-95, with the lowest score and 59 the highest score of 95. The results of this study cadres have an average score of 75,7. Score mode at 79.2, while the median score of 76.5, standard deviation and variance of 8.912 at 79.718. The frequency distribution of learning outcomes cadre's score is divided into 6 classes and long intervals of 6 classes.

e. Frequency Distribution Learning Outcomes Acquire Media Audio Visual Learning Flash Program Drill Group (A₁ B₁)

Cadre's learning results by using audio-visual media program *flash* in the group *drill* method, has a theoretical range of 7-100 on the psychomotor, cognitive empirical range 3-100 and 61-87, with the lowest score and 61 the highest score of 87. The results of this study cadres have an average score of 76. Score Mode of 76.83 while the median score of 77.83, a standard deviation of 7.972 and the variance of 63.56. The frequency distribution of learning outcomes cadre's scores are divided into four classes interval and length of class 7.

f. Frequency Distribution Learning Outcomes Acquire Media Audio Visual Learning Flash Program STAD group (A₁ B₂)

Cadre's learning results by using audio-visual media program *flash* in the group STAD method, has a theoretical range of 7-100 on the psychomotor, cognitive empirical range 3-100 and 67-95, with the lowest score and 67 the highest score of 95. The results of this study cadres have an average score of 81.1. Modus Score of 84, while the median score of 84, standard deviation of 7.264 and the variance of 52.76. The frequency distribution of learning outcomes cadre's scores are divided into four classes interval and length of class 7.

g. Frequency Distribution Learning Outcomes The Learning Acquire Media Handout In Drill Group (A₂ B₁)

Cadre's learning outcomes by using media *handout* in the group *drill* method, has a theoretical range of 7-100 on the psychomotor, cognitive empirical range 3-100 and 61-88, with the lowest score and 61 the highest score of 88. The results of this study had a mean score of cadres -rata 73.3. Score Mode of 72.17 while the median score of 72.75, a standard deviation of 7.56 and variance of 57.12. The frequency distribution of learning outcomes cadre's scores are divided into four classes interval and length of class 7.

h. Frequency Distribution Learning Outcomes The Learning Acquire Media Handout In STAD Group (A₂ B₂)

Cadre's learning outcomes by using media *handout* group STAD method, has a theoretical range of 7-100 on the psychomotor, cognitive empirical range 3-100 and 59-81, with the lowest score and 59 the highest score of 81. The results of this study had a mean score of cadres -rata of 70.3. Scores for 73.5 mode while the median score of 76.5, standard deviation of 7.48 and variance of 56.01. The frequency distribution of learning outcomes cadre's scores are divided into four classes grade interval and length of 6.

3.2 Testing prerequisite Analysis

In this study, the test used is the analysis of two-track analysis of variance (ANOVA), if there is a test interksi then continued with a difference by using Tukey test. Some of the requirements to analyze data covering the randomness of the sample, the data are normally distributed population and population data from the homogeneous treatment groups. Testing normality of the data by using test Lilliefors and Barlett Test to test the homogeneity of the population across treatment groups.

3.2.1 Normality Test Distribution of Population

In a test of normality distribution of the population showed that eight groups were tested with Liliefors smaller than $L_t (L_o < L_t)$ with the highest value at $L_t = 0.206 < 0.258$. Thus concluded that all groups of data in this study come from the population of normal distribution.

3.3 Homogeneity testing

Homogeneity test is performed to determine that the data of the score comes from a population that has the same variance. Testing homogeneity of variance using Bartlett test due to the presence of two different treatment. Result of homogeneity test calculation can be seen in the table below:

Table 1. Recapitulation Test Results Bartlett Homogeneity of Variance Test

Group	Variance	X^2_{count}	X^2_{table}	Conclusion
A1	80.06			Homogeneous
A2	59.25	0.10	3.84	
B1	49.78			Homogeneous
B2	79.42	0.02	3.84	
A1B1	63.56			Homogeneous
A1B2	52.76	0.16	7.81	
A2B1	57.12			
A2B2	56.01			

The table above shows the results of all groups tested by Bartlett test result $X^2_{count} < X^2_{table}$. Thus concluded that all the data in this learn group is homogeneous population.

3.4 Research Hypothesis Testing

After the test requirements are met then the two lines of analysis of variance (ANOVA 2x2) can be performed to test the hypothesis of the study, if there is an interaction then tested further by using the Tuckey test. The use of ANOVA two lanes aims to look at the two main influences and the influence of

interaction. Its main influence is the difference in the use of instructional media to learn cadre's results and the influence of teaching methods on learning outcomes cadre's. While the influence of the interaction is the effect of the use of media with teaching methods to the learning outcomes cadre's. Calculation of data analysis are presented in the following table.

Table 2. Recapitulation ANOVA two Paths

Source Variance	db	JK	RJK	Fcount	Ftable (0.05)	Interpretation
Inter-group	3	630.67	210.22	7.33	3.24	Significant
In Group	36	2065.10	28.680			
Inter Column	1	455.63	455.63	15.89	4.11	Significant
Inter Line	1	(11.02)	(11.02)	(0.38)	4.11	Not significant
Interaction	1	164.02	164.02	5.72	4.11	Significant
Total	39	2695.77				

Based on the calculation above ANOVA two lines can explained that:

1. There are differences between the cadre's learning outcomes which uses audio visual media with the cadre's *flash* program that uses media *handout*. The average result of learning cadre's group $A_1 = 78$ is significantly larger than the average group $A_2 = 73$; Based on the calculation table $F_{count} > F_{table} (0.05)$; $15.89 > 4.11$, then reject H_0 so that there is a very significant difference in the instructional media A_1 (audio-visual media program *flash*) and A_2 (medium *handout*)

- There were no significant differences in learning outcomes between the cadre's *drill* method (B1) with STAD method (B2). The average cadre's learning outcomes from group B1 = 74.5 is not much different from group B2 = 75; as a result of $F_{\text{arithmetic}} < F_{\text{table}} (0.05)$; $0.38 < 4.11$ then $F_p < F_t$ then there are very significant differences in learning methods namely B₁ (*drill* method) and B₂ (method *STAD*).
- There is an interaction effect between use of media with teaching methods to the learning outcomes cadre's. Because $F_p > F_t (0,05)$; $5.72 > 4.11$ then there is interaction between A (Media Education) to B (Method of Learning).

From the results of the study hypothesis which states that there is an interaction effect between use of media with the learning method to learn cadre's results, the analysis followed by Tukey test. Tukey Test results are presented in the following table.

Table 3. Summary of Results Calculations Test Tuckey

Group	Q count	Q table	Descripti on
Learning outcomes cadre's group <i>drill</i> method by using audio-visual media and <i>handouts flash</i> program	1,594	3.79	Not significant
Learning outcomes cadre's group <i>STAD</i> method by using audio-visual media and <i>handouts flash</i> program	6.377	3.79	Significa nt
Learning Outcomes cadre's audio-visual media that use <i>flash</i> in the group <i>drill</i> program and <i>STAD</i>	3.91	3.79	Significa nt / receive

Learning Outcomes cadre others use media <i>handout</i> in the group <i>drill</i> and <i>STAD</i>	1.77	3.79	Not significant
---	------	------	-----------------

Based on the calculation in the table above, the hypothesis that missed are:

- First hypothesis: The results of the analysis of variance of two lines between columns obtained $F_{\text{count}} = 15.89$ price is greater than the $F_{\text{table}} = 4.11$ at significance level $\alpha = 0.05$. This value indicates that the learning outcomes cadre's learning with audio-visual media *flash* program better than the media *handout*.
- The second hypothesis: The result of the calculation of an analysis of variance two-lane tar line price obtained $F_{\text{count}} = 0.38$ is smaller than $F_{\text{table}} = 4.11$ at significance the level of $\alpha = 0.05$. This value indicates that the learning outcomes which apply the method cadre's *drill* and methods of *STAD* did not have significant differences.
- The third hypothesis: Calculation results of analysis of variance two-track interaction rates obtained $F_{\text{count}} = 5.72$ is greater than the $F_{\text{table}} = 4.11$ at significance level $\alpha = 0.05$. This value indicates that there are significant interactions between media p better teaching and learning methods of the cadre's learning outcomes.
- The fourth hypothesis: Results advanced calculations using Tuckey Test against the *drill* method that uses audio-visual media and *handouts flash* program. Values obtained $Q_{\text{count}} = 1,594$ smaller than the $Q_{\text{value table}} = 3.79$ at significance level $\alpha = 0.05$. This value indicates that the cadre's learning outcomes with audio-visual media and *handouts flash* program on *drill* method does not have a significant difference.
- Fifth hypothesis: Results advanced calculations using Tuckey Test against the cadre's on *STAD*

method by using audio-visual media and *handouts flash* program. Values obtained $Q_{count} = 6.377$ is greater than the value of $Q_{table} = 3.79$ at significance level $\alpha = 0.05$. This value indicates that the learning outcomes cadre's the use of audio-visual media program *flash* in the group with the method STAD (*Student Team Achievement Division*) higher than the cadre's learning outcomes using a media *handout* in the group with the method STAD (*Student Team Achievement Division*).

6. Sixth hypothesis: Results advanced calculations using Tuckey Test against the cadre's on and *drill* method and STAD using audio-visual media program *flash*. Values obtained $Q_{count} = 3.91$ is greater than the value of $Q_{table} = 3.79$ at significance level $\alpha = 0.05$. This value indicates that the learning outcomes cadre's the use of audio-visual media in *flash* program group with *drill* method and STAD (*Student Team Achievement Division*) there are significant differences.
7. The seventh hypothesis: Results advanced calculations using Tuckey Test against the *drill* method and STAD that uses media *handout*. Values obtained $Q_{count} = 1.77$ is smaller than the $Q_{table} = 3.79$ in significance level $\alpha = 0.05$. This value indicates that the learning outcomes cadre's media *handout* on *drill* method and STAD did not have significant differences.

3.5 Discussion of Results

Based on the description of the research that has been analyzed is above that audio-visual media program *flash* on a balanced nutritious diet for infants have better results than the media *handout* so that the audio-visual media *flash* programs can effectively improve learning outcomes cadre's better than using media *handout*. As well as *drill* method and STAD (*Student Team Achievement Divisions*) have no difference to the learning outcomes cadre's so that both methods can be effectively applied in the learning process of

cadres to improve learning outcomes. There is also the effect of the interaction between media with learning method for learning outcomes cadre's.

With these results we can establish a model of nutritional education is media in the form of audio-visual media program *flash* on nutritionally balanced meals for toddlers who applied learning methods *drill* and STAD, media and the method can improve learning outcomes in the form of knowledge and skills in nutrition counseling on cadres Posyandu thus indirectly help the government program in community empowerment and Family Nutrition Improvement Efforts (UPGK) through Posyandu activities.

In determining media effectiveness of learning and the learning methods dilhat from measurement the results of data and assess through observation. Measurement is an assessment in terms of the achievement of predetermined targets by using targets available. Obviously the goal or objective has been achieved as planned earlier is effective. So, if a purpose or goal that is not in accordance with a predetermined time, then it is not effective. The following scale interval in determining the effectiveness of:⁸

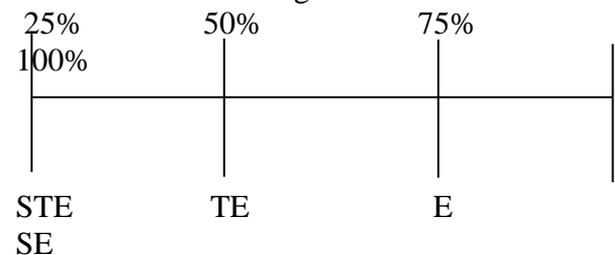


Figure 1. Interval Scale Effectiveness

Description:

- SE : Very Effective
- E : Effective
- TE : Ineffective
- STE : Highly Ineffective

Based on the results of the average value data obtained showed effectiveness description as follows:

⁸ Sugiyono. Understanding Qualitative Research. (Bandung: ALPHABET. 2005), p 15

1. Cadre's effectiveness learning outcomes between the application of audio-visual media and media *flash* program *handout*
The average percentage of the value of audio-visual media program *flash* 78.5% showed effective scale criteria. While the value of the average percentage of 71.8% media *handout* suggests the criteria are not effective. Based on these data the audio-visual media program *flash* more effective than media *handout*.
2. Cadre's effectiveness learning outcomes between the application of methods and media *Drill* STAD (*Student Team Achievement Division*)
The value of the average percentage of 74.65% *drill* method with rounding of 75% indicates criteria effective scale. While the value of the average percentage method STAD 75.7% showed effective criteria. Based on these data and STAD *drill* methods are equally effective for the learning process cadre's in nutrition *counseling*.
3. The effectiveness of learning outcomes between the application of audio-visual media and *handouts flash* program on cadre's group with the *drill* method
The average percentage of the value of the application of audio-visual media program cadre's *flash* in the group with *drill* method showed a 76% effective scale criteria. While the average percentage of the value of the application of media cadre's *handout* in the group with *drill* method by 73% indicate the criteria to be ineffective. Based on these data the application of audio-visual media program cadre's *flash* in the group with *drill* method is more effective than using a media *handout*.
4. The effectiveness of learning outcomes between the application of audio-visual media and *handouts flash* program on cadre's group with the method STAD (*Student Team Achievement Division*)
The average percentage of the value of the application of audio-visual media program cadre's *flash* in the group with 81.1% STAD
method demonstrated effective scale criteria. While the average percentage of the value of the application of media cadre's *handout* in the group with STAD method of 70.3% indicates the criteria to be ineffective. Based on these data the application of audio-visual media program cadre's *flash* in the group with STAD method more effective than using a media *handout*.
5. The effectiveness of learning outcomes between the application of audio-visual media program cadre's *flash* in the group with *drill* method STAD (*Student Team Achievement Division*)
The average percentage of the value of the application of audio-visual media program cadre's *flash* in the group with *drill* method showed a 76% effective scale criteria. While the average percentage of the value of the application of audio-visual media program cadre's *flash* in the group with 81.1% STAD method demonstrated effective criteria. Based on these data the application of audio-visual media program cadre's *flash* in the group with *drill* method and STAD equally effective in cadre's learning to improve learning *outcomes*.
6. The effectiveness of learning outcomes between the application media cadre's *handout* in the group with *drill* method STAD (*Student Team Achievement Division*)
The average percentage of the value of the application of media cadre's *handout* in the group with 73.3% *drill* method showed criteria do not scale effectively. Furthermore, the average value of the percentage of media application cadre's *handout* in the group with STAD method of 70.3% indicates the criteria to be ineffective. Based on these data the application media cadre's *handout* in the group with *drill* method and STAD ineffective in the cadre's learning *process*.
In addition, the effectiveness of media and learning methods to improve learning outcomes assessed from the cadre's observation in the

learning process takes place, among other things measurement of the level of effectiveness as follows:

1. Timely attendance
2. Posyandu cadres adhere to the spirit
3. All participating actively in the learning process
4. In general cadres who asked for 80% of total participants
5. In general cadre who give opinions or suggestions for 60% of total participants
6. Highly motivated in the achievement of TUK and ICT
7. Increased knowledge of the test results through the data *pre-test* and *post test*
8. Improved skills test results through the data *pre-test* and *post test*

4. CONCLUSION

Through research and testing, it can be concluded as follows:

1. In general, audio-visual media program *flash* on a balanced nutritious diet for children is better than the media *handout* in improving learning outcomes cadre's. That is, the learning outcomes in nutrition counseling cadre's on nutritionally balanced meals to children more effectively increased by using audio-visual media program *flash*.
2. There is no significant difference between the methods of learning *drill* and STAD (*Student Team Achievement Divisions*). It means learning outcomes p cadre posyandu in nutrition education about nutritious food for infants by applying the *drill* learning methods and STAD (*Student Team Achievement Divisions*) is the same or equally effective cadre's improve learning outcomes.
3. There is an interaction effect between instructional media and teaching methods. That is, posyandu cadres must determine instructional media and teaching methods are appropriate and precise in nutrition counseling to increase knowledge and skills.
4. No difference cadre's learning outcomes in the group that apply the method of learning *drill* with

- audio-visual media and media *flash* program *handout* on nutritionally balanced meals for toddlers. That is, the learning outcomes that apply cadre's *drill* method still has the knowledge and skills of good nutrition counseling using audio-visual media and *handouts flash* program.
5. There are differences in learning outcomes cadre's the group that apply the method STAD (*Student Team Achievement Divisions*) with audio-visual instructional media program and media *flash handout* on nutritionally balanced meals for toddlers. Thus improving learning outcomes cadre's group STAD method can be used *flash* media audio-visual learning.
 6. There are differences in learning outcomes cadre's group that applies *drill* method and STAD (*Student Team Achievement Divisions*) that uses audio-visual instructional media program *flash* on nutritionally balanced meals for toddlers. Thus improving learning outcomes cadre's group *drill* and STAD method can be used *flash* media audio-visual learning.
 7. No difference cadre's learning outcomes in the group that implement the methods *drill* and STAD with instructional media *handout* on nutritionally balanced meals for toddlers. That is, the cadre's learning outcomes which apply the method *drill* and STAD not recommended to use media *handout*.

Results from this study provide input to the health authority (IHC) in particular and education in general that the use of audio visual media program *flash* on nutritionally balanced meals for children can be more effectively performed in nutrition counseling to the public and the media are more able to improve their knowledge and skills. *Drill* and STAD method can be applied to both the learning process cadres but to improve results learn of media should be selected very appropriate that the knowledge and skills in nutrition counseling for the better and a maximum. Good interaction between the strategies used

instructional media and teaching methods applied will determine learning outcomes cadre's because with this interaction can find out media and appropriate and effective method of doing counseling about eating nutritionally balanced nutrition for toddlers.

Cadre's learning outcomes which apply the method *drill* equally well when using audio-visual media program *flash* and *handouts* here seen that the method of *drill* in principle is an exercise method repeatedly so it does not matter if the learning is done with the audio-visual media program *flash* and *handouts*. As for the cadre's who applied the method STAD better use of Audio visual media program *flash* so that the learning outcomes are maximized and competent result is good because it will hone creativity, interaction and knowledge about food nutritionally balanced toddler.

Audio-visual media program *flash* on a balanced nutritious diet for children is also not only be applied in nutrition counseling, but can be applied to the learning process more associated with infant nutritional, because creativity, cooperation, training, competence and independence should be improved through the learning process. The quality of cadre's knowledge and skills need to be improved, training cadres is an important tool in improving the knowledge and skills of cadres in Posyandu activities. Skilled cadres will greatly assist in the implementation of integrated health activities, so that the information and messages of nutrition can easily be conveyed to the public. The high value of the knowledge and skills of cadres influenced by formal education, participation in the course of cadres, the frequency follows the guidance, active cadre as well as nutritional counseling education model in the form of media and methods in Posyandu and duration cadre.

5. REFERENCES

Angkowo, R., & Kosasih, A. (2007). *Optimalisasi*

- Media Pembelajaran*. Jakarta : PT. Grasindo.
- Arikunto, S. 2004. *Dasar-Dasar Evaluasi Pendidikan*. Jakarta: Bumi Aksara.
- Arikunto, Suharsimi.1993. *Prosedur Penelitian Suatu Pendekatan Praktek*. Jakarta: Rineka Cipta
- Dahlia Mutiara., dkk. 2014, *Perancangan Model Pendidikan tentang Pembentukan Kesukaan Anak tentang Makanan Bergizi Seimbang pada Ibu sebagai Upaya Pemberdayaan Masyarakat*. Lemlit UNJ : Jakarta.
- Istiany Ari dan Rusilanti. 2013. *Gizi Terapan*. Jakarta : PT. Rosda Karya.
- Kementrian Kesehatan RI. 2011. *Profil Kesehatan Indonesia 2010*. <http://www.depkes.go.id> (diakses tanggal 10 Mei 2015).
- Mahdiyah. 2014. *Statistik Pendidikan*. Bandung : PT. Rosda Karya.
- Riset Kesehatan Dasar (Riskesdas). 2013. *Laporan Komunikasi Data jumlah Balita Gizi Buruk dan Kurang Setiap Provinsi di Indonesia*. Jakarta. Direktorat Jendral Gizi dan KIA.
- Sugiyono. 2005. *Memahami Penelitian Kualitatif*. Bandung: ALFABET.
- Sugiyono. 2007. *Statistika Untuk Penelitian*. Bandung: Alfabeta.
- Sukiarko, E. 2007. *Pengaruh Pelatihan Dengan Metode Belajar Berdasarkan Masalah Terhadap Pengetahuan Dan Keterampilan Kader Gizi Dalam Kegiatan Posyandu*. Tesis Fakultas Gizi Masyarakat Undip, Semarang.
- Yuli Laraeni dan Afni Wiratni.2012. *Pengaruh Penyegaran Kader Terhadap Pengetahuan Dan Keterampilan Kader Posyandu Menggunakan Dacin Di Wilayah Kerja Puskesmas Dasan Cermen Kecamatan Sandubaya Kota Mataram*. Artikel :Public health Faculty UNTB Mataram.
- Zulkifli, 2003, *Posyandu dan Kader Kesehatan*, Fakultas Kesehatan Masyarakat Universitas Sumatera Utara.