

Turnitin Artikel Prosiding Internasional Needs Analysis Project Based Learning in Programming..._

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**NEEDS ANALYSIS PROJECT BASED LEARNING IN PROGRAMMING
WEBCOURSES AT INFORMATICS AND COMPUTER
ENGINEERING EDUCATION UNM**

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ABSTRACT

Web programming courses at UNM PTIK Studies Program, a core courses. Course web programming has different characteristics compared with other subjects. This paper discusses the needs analysis, project-based learning in web programming courses at Informatics and Computer Engineering Education (PTIK) UNM. The method used in this research is descriptive research. The descriptive research used to reveal the learning needs of web programming in PTIK UNM. This study describes a phenomenon that occurs in the web learning associated with PBL method. Research on the analysis of the needs of PBL in the course of web programming is done by conducting a survey of student responses related about the learning models, the level of satisfaction, prior knowledge about project-based learning. Results of the study revealed that the attractiveness of the course web programming excellent response by 43%. The coursework have responded heavy duty load as much as 37%, practicum responded difficult as much as 32%. While the level of satisfaction learning web programming middle responded with a value of 38% while the number of students who know about project-based learning on average had known but the indicators of project-based learning in the course of web programming is still very low.

Keyword: *Need Analysis, Web Programming, Project Based.*

A. Background

In the global era, all nations strive to improve the quality of education because of the quality of education will produce quality human resources as well. Indonesia has made various efforts to improve the quality of education. The effort is evidenced by the efforts of the constitution through law (UUSPN No 2 Tahun 2003) that mandated the government to ensure the implementation of quality education for every citizen.

Various attempts were made by the Government of Indonesia to improve the quality of national education. These efforts, among others, through the development and improvement of curriculum, improvement of the evaluation

system, improvement of infrastructure and the development of educational materials and learning models, including learning web programming.

IT development in the world today is supported by the major role the internet where websites including the most popular internet applications today. Therefore learning web programming is an important thing to be studied and developed. This web programming learning model should be through real-life examples. Real examples mentioned in this web programming learning is a web product. One model of learning that emphasizes a final product is a project-based learning or PBL. Project-based learning (PBL) focuses on the role of students in the learning

process as well as an end product of learning.

Implementation of project based learning (PBL) in the teaching and learning can stimulate motivation, processes, and improve student achievement by using problems in real situations. This is based on the premise that knowledge and skills are solid and meaningful use can be constructed through the tasks and work that is authentic (Cord, 2001:30). Implementation of learning web programming courses necessary to apply the principles of: (1) focus on the mastery of competencies; (2) have procedures in conformity with the real world of work; (3) oriented learning have not been workplace oriented. The results of Prasurvey conducted at PTIK UNM has not fully using the principles.

The problem faced by web programming lecturer in courses Informatics and Computer Engineering Education, State University of Makassar is no learning model that draws students with programming procedures in the real working environment, students still learn on the instructions of lecturers not realwork.

Research on project based learning (PBL) has been widely applied to other fields, but has not been subject of research for web programming in Informatics and Computer Engineering Education

Department of Electrical Engineering Faculty of Engineering UNM has never been done. While web programming course is a core course at PTIK UNM. In addition to being a core course web programming has different characteristics compared with other subjects.

Studies on the development of project-based learning in web programming courses in the Information Engineering and Computer Education is very important to do in order to improve student achievement and competence, apply learning-oriented real working world so as to improve the quality of learning in the field of technology and informatics. Associated with the development of project-based learning model, we need a study on the analysis of development needs within the learning model of PBL web programming. This article will explain the results of the study on the analysis of the development needs of project-based learning model in web programming courses at PTIK UNM.

B. Basic Theory

1. Learning Approach

The Law on National Education System No. 2 of 2003 states that education is a conscious and deliberate effort to create an atmosphere of learning and the learning process so that learners are actively developing the potential for him to



get the spiritual power of religion, self-control, personality, intelligence, noble character and the necessary skills. Therefore, education can be interpreted as an attempt to change the behavior of students in order to become a man who can live independently as members of the community in the surrounding natural environment.

Education is not only about the intellectual environment alone but also personality development of the students as a whole. Therefore, a theory of education is needed in order to build the world of education. Saiful Sagala (2010:4) wrote in his book that education is the key assumptions: (1) education stems from the actual conditions of individual learning and learning environment; (2) education is normative means of education focused on the things that are good; (3) education is a process of achieving goals and a series of activities that begins with the actual condition of individuals who learn to achieve the expected goals.

Education is the actual activity of a group of people who carry out educational activities. It means that education is the direction in the future development of learners. An understanding of education contains many aspects and its very complex. There is no denying that education has a very close relationship

with learning because learning is part of education.

Therefore, please note the link between education and learning. Teaching is essentially a process which is the process of arranging, organizing neighborhood, which raised the interest of learners to learn. Teaching can also be interpreted as an attempt to help someone to learn something. Thus teaching and learning is something that can not be separated from one another. Learning is an act that is so complex that the process to get the science can be done in various ways, among others, through experience, training, and learning. The same thing back revealed by Gagne (1992; 45) which states that the study is an attempt changes that occur in human beings constantly in the presence of stimuli that affect learners.

Furthermore, by Sukarjo and Ukim (2009: 61) argues that education practice focused on the learning aspect. The reasons put forward due to several factors, namely: (1) to be human means having the power to learn, students do not have to learn that there is no meaning, (2) students will learn things that are meaningful to him, (3) organizing learning materials and ideas new as part of a very meaningful for students, (4) learning will be optimal if the students participate in the learning process, (5) the study itself, there will be

experiential learning, (6) learning requires the involvement of students in full. Experiential related to learning and involvement of students in full then One model suitable adalah project-based learning model. Project-based learning is considered most relevant to fully engage students in a learning experience that is memorable.

2. Project Based Learning

Project-based learning (PBL) is one model of learning that comes from a constructivist approach directed to problem-solving (Doppelt, 2003). Constructivism underlying project-based learning is a learning theory that received broad support that rests on the idea that the students build their own knowledge in the context of his own experience. Project Based approach can be seen as one approach to creating a learning environment that can encourage students to construct knowledge and personal skills.

Project-based learning is a model or innovative learning approach, which emphasizes learning through activities contextually complex. Project-based learning is a learning model that focuses on the concepts and main principles of a discipline, involving students in problem-solving activities and other meaningful tasks, giving students the opportunity to work independently construct their own learning, and ultimately produce Student

work valued, and realistic (Okudan, et. al, 2004). Implementation of project based learning (PBL) in the teaching and learning can stimulate motivation, processes, and improve student achievement by using problems in real situations. This is based on the premise that knowledge and skills are solid and meaningful use can be constructed through the tasks and jobs are authentic.

Research on project based learning (PBL) has been widely applied to other fields as did Rais, et al (2009) on PBL for students of mechanical engineering, but has not been subject of research for web programming in education courses of Informatics and Computer Engineering Education, Department Electrical Engineering Faculty of Engineering has not been done. In addition to being a core course web programming has different characteristics compared with other subjects.

C. Method

The method used in this research is descriptive research methods. Where descriptive research method is one of the research methods used to express the learning needs of web programming in PTIK UNM. This study describes a situation or phenomenon that occurs in the web learning associated with PBL method. In general descriptive research method in this study is used to (1) describe the needs

of the web from the aspect of student learning, (2) interpret the results of the analysis of the needs of students.

The object of this research is the students of Informatics And Computer Engineering Education Department Of Electrical Engineering of Engineering Faculty UNM. This research was conducted in Makassar and the research conducted over six months, namely, in February 2015 until the month of July 2015.

D. Result

Research on the needs analysis of PBL in the course of web programming is done

by conducting a survey of the responses of students. The survey of students responses is described in the following section. Based on the results of a survey related to student responses to web programming course review of aspects of the theory, practice, coursework and appeal it can be seen in the following graphic display .

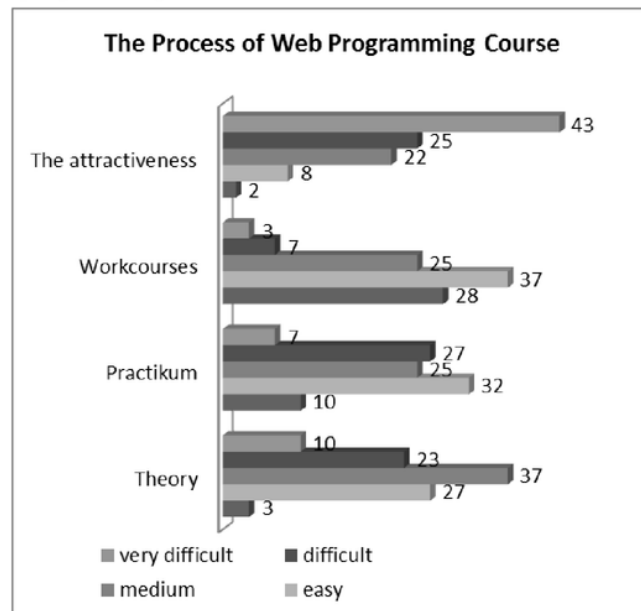


Figure 1. The Process of Web Programming Course

In figure 1 shown that students who assess that learning web programming was

very interesting with the amount of 43%, was to assess the burden of student tasks

difficult and weigh as much as 37% while the level of difficulty of the theory of the student assess the degree of difficulty moderate/modest 37%, but for the practice of assessing student hard/heavy as much as 32%. Thus it can be said that it takes a

practical innovation to make the process simpler.

Relating to the implementation of the course web programming that has been carried out , based on the survey can be displayed in the following chart:

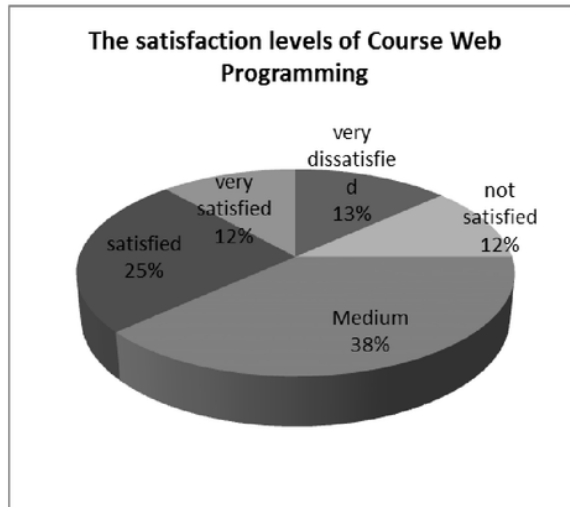


Figure 2. The satisfaction levels of Course Web Programming

Based on the data in Figure 2, it can be described as follows that most respondents answered the level of satisfaction the implementation of the normal course of web programming as much as 38% , while the answer satisfied as much as 25% , but also recorded the respondents who answered less satisfied as much as 12%

The number of students who are familiar with or listen to on project-based learning carried out in web programming ,

most students answered have heard as much as 67% and that has never been as much as 33% . The graph of the results of the survey can be seen in Figure 3 below.



Figure 3. The Number Of Students Who Already Know PBL

The characteristics of the projects surveyed several indicators, among others, the instructions given by the lecturer (guidance of lecturer), web develop techniques, the steps to create a web, web skills, language programming, collaboration with classmates, expressing

ideas, it can be shown the results of the survey as follows.

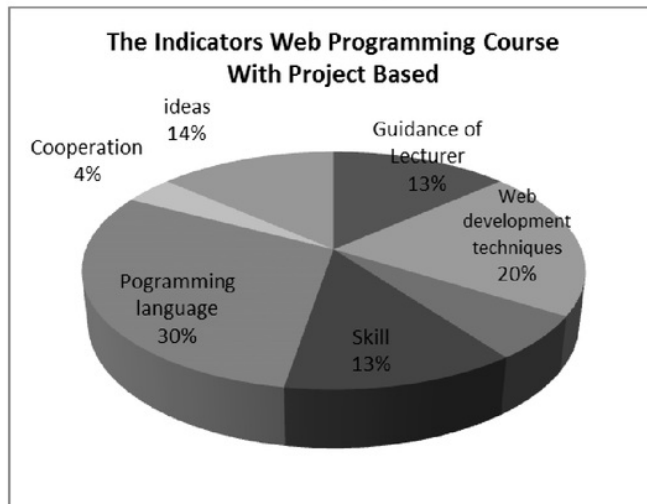


Figure 4. The Indicators of Project Based Learning in Web Courses

From the above chart shows that only 13% of respondents who understand the instructions given by the lecturers, only

20% of respondents who master the technique of making the web, only 14% of respondents are capable of expressing

ideas in the form of a web, and only 4% are able to work with classmates in the process of making web.

E. Conclusion

Web Programming Course Class processes related to aspects of theory , practice , workload and attractiveness , gets mixed response . Responded very well appeal as much as 43 % , have responded workload heavy duty load as much as 37 % , practicum responded difficult as much as 32 % were for simple response theory by 37 % .

Learning satisfaction level Web Programming mediocre responded with a value of 38 % while the number of students who know about project -based learning on average had known but the indicators of project-based learning in the course of web programming is still very low.

F. Recommendation

Studies on the development of project-based learning course on web programming in Education courses Information Engineering and Computer UNM should be done well.

Web programming learning process should focus on the role of students in the learning process is not just focused on the lecturer .

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ANALYSIS OF VOCATIONAL COMPETENCY IN EASTERN PART OF INDONESIA

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ABSTRACT

This study was conducted to analyze the graduates of vocational competence mapping in order to resolve the problems, especially in the learning process. This research was carried out with a mixture of quantitative and qualitative approaches. Qualitative data is used as the supporting quantitative data. Population of this study are all either state and private vocational school in Indonesia. The sample number is set 25 schools with the selected sampling is done by using *purposive sampling technique*. As for the processing and analysis of data on *qualitative research* conducted through the stages of categorization of data, data reduction (*data reduction*), presentation of data (*data display*), and conclusion and verification (*conclusion drawing*). The results showed that: (1) mapping the distribution of 25 vocational teachers in the sample with the number of teachers as many as 683 people who become the bottleneck is still the large number of non-civil servant teachers that there are 303 (40.5%), (2) as much as 255 (40.3%) teachers were certified and 408 (59.7%) others have not been certified both civil servants and non-civil servants, (3) the number of teachers with civil servant status of teachers as many as 380 683 people, or 59.5%, while the status of Non PNS as many as 303 people or 40.5%. Meanwhile, the number of teachers who have a diploma of education classification by 32 (4.7%) people, 609 (89.2%) of S1, and 42 (6.1%) of people with education above classification S1. Data analysis was based on school mapping the obtained ratio between the number of teachers and groups namely 460 the number of teachers as much as 683 people. Based on these data, it can be drawn a comparison between the number of teachers and the number of existing groups is 1: 1.5, which means that every groups already potent by 1 teacher. Furthermore, to the category of high interest, there are 5 areas of expertise most demanding base on existing data. Areas of expertise Computer Engineering and Networks is a field of expertise that most interest is 16 (16.2%), Light Vehicle Engineering 12 (12.1%), TGB, TITL, and TSM 5 (5.1%).

Keywords: Teacher, SMK, Competency Mapping

A. Introduction

Development of national education, directed at three pillars, namely the expansion of access and equity of education, enhancement and improved quality management, relevance and education. The gap between the quality of graduates of secondary education, especially secondary vocational education with the needs of the industry and the business world is an urgent issue that must be addressed in order to boost economic growth, reduce

unemployment and poverty. BPS survey results (Sakernas, 2009) showed that the majority of educated unemployed are graduates of secondary education.

Until February 2010, unemployment and high school graduates is still high (SMA = 11.9%) and SMK = 13.81% (based on BPS in www.bps.go.id). In addition to the limitations caused by the employment, unemployment vocational graduates tend to be due to competence gaps graduates with the competencies required workforce. World

of the 21st century as an open world requires competitive human resources (Tilaar, 2009).

Related Problems Processing Standards indicated by 5 the following, namely: (i) the amount groups and the number of students per groups higher than the standard; (ii) the implementation of the practice of arranged, so impressed SMK has been able to overcome the problem of limited facilities and infrastructure practices; (iii) the limited collection of books in the library skills program; (iv) there is still SMK conducting daily tests after more than 1 basic competence is completed; (v) without taking into account the workload of teachers in vocational school / other schools, the workload of teachers have not been complied with.

Standards related issues Teachers and Education Personnel qualification is not incompatibility with standard workshop. In addition the number of teachers has not been sufficient productive subjects, an average of one SMK still needs 9 people. Problems related to relevance is very few respondents who stated that all graduates obtain employment in accordance with the educational background.

Problems related to competitiveness is the low percentage of graduates who are booked when the industrial working

practices which tend to be caused partly by the difficulty of the school network with the world of work which is partly due to lack of confidence in the working world of the school. Other problems are yet to fulfill the demand of graduates by the world of work because of a mismatch of competence of graduates with the competencies required by the workforce.

Based on the formulation of the problem it is necessary to study how to mapping competence and any barriers that exist in improving the competence of vocational school graduates.

B. Literature Review

Vocational School

Facing the global market in the era of *APEC*, the Directorate of Secondary Vocational Education issued a policy to anticipate the vocational development up to the year 2020. This policy is leading to the establishment of educational institutions and vocational training national and international standard. At the end of 2020, the projected number of 500 SMK national standard, and 100 SMK the international standard (Dikmenjur, 2002). As an initial step has identified the ability of schools that are eligible to be developed into an international and national vocational standard. In the year 2003 has been 19 SMK international



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level and 53 vocational national shown in Table 1.
level. Vocational development plans are

Table 1.
Development of Vocational 2000 - 2020

No.	Program group	Projection Total SMK					The number of vocational developed		
		2000	2001	2010	2015	2020	International	National	Total
1.	Agriculture	105	1174	1614	2310	2973	7	-	7
2.	Technology Industry	1458	931	1280	1832	2358	20	-	20
3.	Tourism & Public Health	343	567	779	1115	1435	5	11	16
4.	Business & Management	2192	364	501	717	923	18	-	18
5.	Arts & Crafts	65	324	445	637	820	2	1	3
6.	Marine	81	405	556	796	1025	1	1	2
7.	Information technology	25	283	390	557	718	1	7	8
Total		4169	4048	5565	7964	10253	53	19	72

With a wide range of issues concerning the poor quality of teachers, inadequate educational facilities, the system of cooperation with the industry that has not settling, the learning process is not yet effective, and performance management are still low, to realize the plan of vocational development of National and International standards must fulfill six requirements: (1) education programs and vocational training to the *Competency Based Training approach*; (2) the teachers have experience working in the industry in a relevant field and have a certified competence of national / international; (3) the availability of adequate

educational facilities to support the achievement of its own competence both school and through *outsourcing*; (4) implementing integrated quality management consistently refers to the international standard *ISO 9000* and refers to the National Standardization Council for national standards; (5) has a partner institution the standard national / international; (6) carry out testing and certification profession using standard devices and procedures that national / international.

The main objective of vocational education is implemented to prepare

students to work in the community and to continue their education to higher education for those who qualify (Wardiman, 1995). Vocational education is directed to work and entrepreneurship as well as useful work in the community for the benefit of the nation and state (Kennedy, 2011; Afwan 2013; Zaib & Harun, 2014).

That is to educate men to have knowledge and adequate vocational skills and become productive human beings. To maximize learners in vocational learning process, required the involvement of all the senses are conditioned. Learners learn by listening, listening, seeing, imitate the things that are informed by the teacher or facilitator in front of the class. With this kind of learning, learners can have a behavior in accordance with the objectives that have been planned by the previous teacher.

A number of problems faced by vocational technology education today by Infallible, H (2004), among others: (1) the not yet optimal achievement of competence of graduates, (2) low quality of graduates, (3) the need for adjustment of the relevance between the graduates and the labor market, (4) industry awareness of the vocational technology education, (5) learning support facilities and infrastructure that have not yet optimal memadai.Ini an indication of

management education based on quality and competence.

Graduates of vocational competence

Graduates of vocational competence profiles consist of general competence and vocational competence, which each have loaded the key competencies. General competence refers to the goal of national education and generic life skills, whereas vocational competence refers to SKKNI (Curriculum Vocational, 2004).

1. General competence

- a. Demands UUSPN Article 3, among others: (1) faithful and devoted; (2) morality; (3) healthy; (4) competent; (5) creative; (6) independently; (7) democratic; and (8) of responsibility.
- b. The demands of the world of work: (1) disciplinary and (2) to be honest.

2. Competency Vocational

Vocational qualification level of competence in various skills programs in Vocational High School are described in each of trades leading competence in the form of manuscripts in the vocational curriculum.

C. Method

The activities carried out within a period of four months effective from September to



December 2014. The location for the implementation of this research in eastern Indonesia. The study was carried out with a mixture of quantitative and qualitative approaches. Qualitative data is used as the supporting quantitative data. Population of this study are all either state and private vocational school in which there is in Indonesia. The sample number is set 25 SMK. Furthermore, determination of selected samples is done by using *purposive sampling technique*. The implementation of data collection is done in various ways, including among them is the observation, interviews, *focus group discussion* (FGD), as well as data collection through questionnaire and spreadsheet. Processing and analysis of data on *qualitative research* conducted through the stages of

categorization of data, data reduction (*data reduction*), presentation of data (*data display*), and conclusion and verification (*conclusion drawing*).

D. Result

The number of secondary vocational schools sampled in this study were 25 Vocational High School located in eastern Indonesia region. The number of classes in all class based on samples taken as many as 460 groups the number of teachers 683 people consisting of 380 civil servants and 303 non-civil service classification Diploma as many as 32 people, S1 609 people, and above Bachelor 42 people with 275 of them already certified status and 408 others that have not been certified both civil and non civil servants. The foregoing is illustrated in the following table:

Table 1. Mapping Guru and Groups by Region

Region	Number of Teachers	Groups
Papua	64	75
Sulawesi	261	289
Kalimantan	57	96

The number of samples taken in the area of Papua as much as 3 SMK, Sulawesi region as much as 17 samples and Kalimantan as much as 5 samples. Based on the results of the mapping it can be seen comparing the number of teachers and groups that exist in the region.

Papua with the sample number 3 SMK shows that the ratio between the number of teachers and groups 64:75, based on these data it is still the need for additional teachers in the area of Papua evenly due to the three schools that were visited, the

number of teachers is always less when compared with groups number.

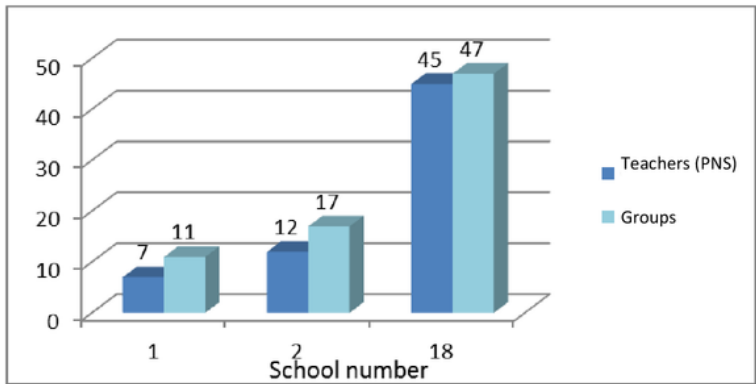


Figure 1. Comparison of the number of teachers and groups Papua region

Sulawesi with a total sample of 17 vocational indicate that the ratio between the number of teachers and overall groups is 259: 289. Based on these data it is still the need for additional teachers in the Sulawesi

region but not evenly because there are four schools that the number of teachers more if compared to the number groups. It can be considered that the distribution of teachers in Sulawesi can be done wisely.

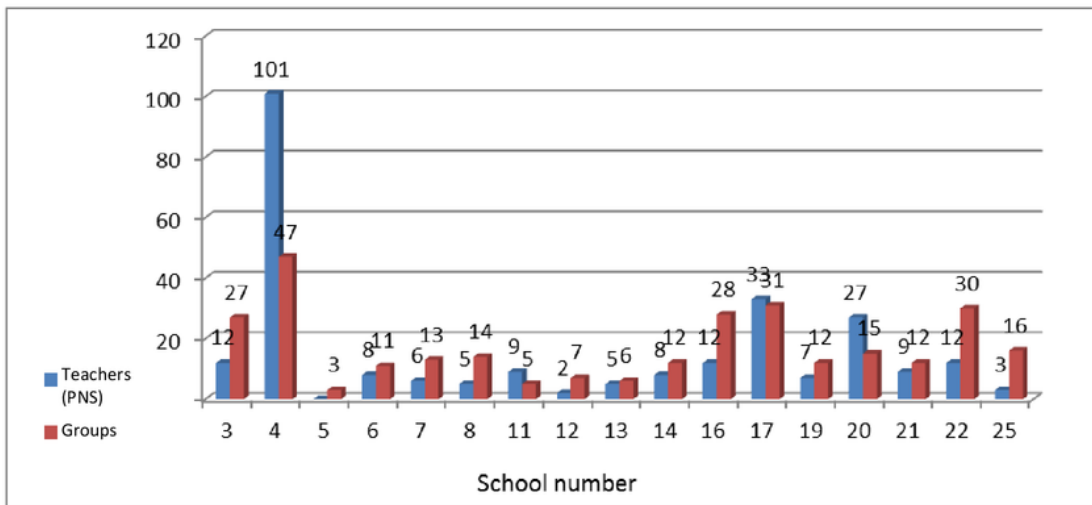


Figure 2. Comparison of the number of teachers and groups Sulawesi

Kalimantan with a total sample of 5 SMK shows that the ratio between the number of teachers and overall groups is

57:96. Based on these data it is still the need for additional teachers in Kalimantan but not evenly because there is one school that has



the same number of teachers with a number than the number groups.
groups and one school had more teachers

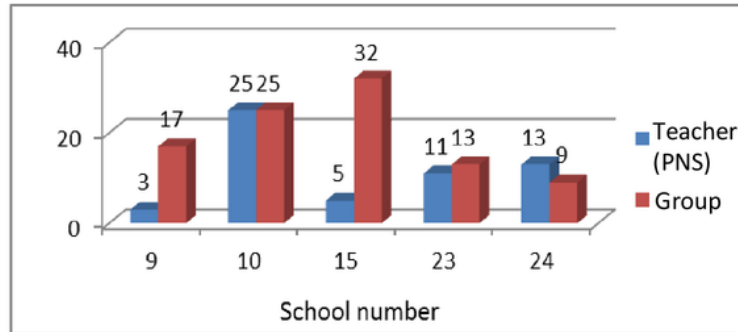


Figure 3. Comparison of the number of teachers and groups Kalimantan

E. Discussion

Graduates of vocational competency mapping is done by collecting field data is conducted to obtain data and information needed by using an instrument that has been tested. The data in question is supporting data as a comparison between the ratio of the number of areas of expertise, study groups, the classification of education, employment status, number of teachers and mapping fields of expertise.

The analysis results obtained from the sample as many as 25 Vocational Schools are scattered in various regions shows that the ratio between teachers and the number of classrooms are in accordance generally with the demands set out in the guidelines 5 ministerial regulation on mapping and equitable civil servant teachers. Especially those related to the regulation say at point 1

on Teacher Needs Vocational High School (SMK) that each groups in following certain subjects taught by one (1) person except groups teachers on the subjects of Basic Vocational and Vocational Competency is divided into 2 (two) groups, each taught by one teacher. Data show that of the 25 samples SMK groups as a whole has a number of 460 the number of teachers as much as 683 people. Based on these data, it can be drawn a comparison between the number of teachers and the number of existing groups is 1: 1.5, which means that every groups already potent by 1 teacher.

Although it is said equalization of teachers overall is considered to be good, but this is only true in general because if the teacher mapping between civil servants and non-civil servants is done it will produce a slightly different analysis. Based on the data

obtained by the number of teachers with civil servant status of teachers as many as 380 683 people, or 59.5%, while the status of non-civil servants as much as 303 people or 40.5%. Thus it can be said if the mapping is done by the teacher, the teacher status mapping vocational teachers still less because when averaged then 1 teacher should teach more than 1 groups there.

In improving competence in vocational graduates to compete in the industrial world is not only based on the teaching and learning process but also determined by the quality of existing teachers in the school. By him that the classification of education a teacher is something quite decisive. Based on data obtained from 683 the number of teachers that there were 32 (4.7%) of whom had a diploma of education classification, 609 (89.2%) of S1, and 42 (6.1%) of people with education classification above S2.

In addition to the fundamental things that need to be considered in improving the welfare of teachers are graduates of both the civil and non civil servants. One factor that influence performance improvements the welfare of teachers. By him that it must be a concern that the focus of the teacher is no longer divided, based on the well-being so as to increase the personal competence

possessed. Government in this case has made a breakthrough in improving the welfare of teachers by doing certifications that can improve the living standards of teachers. Based on data obtained as many as 255 (40.3%) teachers were certified and 408 (59.7%) others have not been certified both PNS and Non PNS. This may be a material consideration in improving the performance of teachers in improving the competence of graduates in vocational.

Based on the data obtained by mapping the distribution of teachers at SMK 25 is an advanced sample with the number of teachers as many as 683 people who become the bottleneck is still the large number of non-civil servant teachers that there are 303 (40.5%), it is able to be a bottleneck in improving the quality of vocational school graduation due to factors that have not been biased welfare is assured by the school. In addition to the certification of teachers became one of the most important factors in improving the quality of graduates as teachers welfare indirectly encourage morale and motivation in improving the professionalism of teachers.

In addition to teachers mapping was also conducted on areas of expertise. Based on existing data there are 99 amount of areas of expertise with 39 types of diverse areas of



expertise. There are 5 areas of expertise most demanding based on existing data. Areas of expertise Computer Engineering and Networks is a field of expertise that most interest is 16 (16.2%), Light Vehicle Engineering 12 (12.1%), TGB, TITL, and TSM 5 (5.1%).

Quantitatively, the number of teachers also followed the program number and kinds of expertise as well as the number of classrooms that exist. Overall for the existing 25 vocational teachers is 683 people, while the number of 25 schools, the number of skills program 99, and the number of classrooms 460. When viewed ratio, the ratio of teachers: School = 25: 1, teachers: program expertise = 7: 1, and teachers: groups = 1.5: 1. In other words, the school is occupied by 25 teachers, a membership program taught by seven teachers, and one study groups guided more than 1 teacher. This needs to be further studied with regard to the qualifications of teachers are supposed to exist.

F. Conclusion

Based on results of the discussion and analysis, it can be concluded that the number of secondary vocational schools sampled in this study were 25 vocational schools that are in the region of eastern

Indonesia. According to analysis conducted obtained the number of teachers were civil servants as many as 380 people or 59.5%, while the status of non-civil servants as much as 303 people or 40.5. Based on the data obtained by 32 (4.7%) of whom had a diploma of education classification, 609 (89.2%) of S1, and 42 (6.1%) of people with education classification above S2.

Based on data obtained as many as 255 (40.3%) teachers were certified and 408 (59.7%) others have not been certified both PNS and non PNS. This may be a material consideration in improving the performance of teachers in improving the competence of graduates in vocational.

There are 5 areas of expertise most demanding based on existing data. Areas of expertise Computer Engineering and Networks is a field of expertise that most interest is 16 (16.2%), Light Vehicle Engineering 12 (12.1%), TGB, TITL, and TSM 5 (5.1%).

Overall for the existing 25 vocational teachers is 683 people, while the number of 25 schools, 99the number of skills program, and 460the number of classrooms. When viewed ratio, the ratio of teachers: School = 25: 1, teachers: program expertise = 7: 1 , and teachers: groups = 1.5: 1.

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