

## Project Based Learning Model Development on Buffer Solution Materials with Soft Skill Entrepreneur Oriented

<sup>1</sup>Sri Susilogati Sumarti, <sup>2</sup>Wuryandini, <sup>3</sup>Sudarmin

<sup>1</sup>Department of Chemistry, Semarang State University

<sup>2</sup>Department of Chemistry, Semarang State University

<sup>3</sup>Department of Chemistry, Semarang State University

### ABSTRACT

*The purpose of this study was to determine the validity of the project based learning model development on buffer solution materials with soft skill entrepreneur oriented, examine the effectiveness of the model, its influence on the soft skills of the entrepreneur, and study the response of students to the model. This study is the kind of R & D with project based learning model, scientific approach, method of discussion and experimentation. The results of the research in the category of very valid with a mean 94.77. Effective learning model with average learning outcomes 83.78 (> 80), N-Gain results of the Pre-test post-test of 0.74 (high category), t test of 4.11 (significant) and classical completeness 91.67% (higher than 85%). There is an effect of the project model on soft skills entrepreneur demonstrated by significance level calculation 0.00 (responsibility), 0.00 (confidence), 0.00 (cooperation), 0.01 (leadership), 0.03 (communication), and 0.00 (problem solving) respectively <0.05. Learners provide an excellent response with a mean gain of 87.5%. From the results it can be concluded that the model and the device is valid, effective, has influence on the soft skills entrepreneur who developed, gets a positive response from students.*

**KEYWORDS** - About five key words in alphabetical order, separated by commas.

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### I. INTRODUCTION

Faced with ever-changing challenges of the times it is necessary to human resources who have the competence and skills through education (Permendikbud, 2013a). In the 2013/2014 school year at some designated schools have been enacted in curriculum 2013 that develops learning directly generate knowledge (KI-3), and psychomotor skills (KI-4) as well as indirect learning is the development of attitudes and values (KI-1 and KI -2). The results of the data on the chemistry teacher observation at SMA 1 Pekalongan shows that the chemistry learning is not maximized to develop high-level thinking skills of learners. chemistry Learning is still a lot of teacher-centered and material oriented (subject matter oriented). Learners tend to learn just to get a good grade by solving the problems without increasing skills to solve the problems that exist in everyday life. The inability of students to solve everyday problems cannot be separated from learning by teachers that have giving more lectures and quickly work on the problems exercises without understanding the concepts in depth. Teachers provide practicum only one or two times in a semester. This cause learners less skilled to develop the power of reason to apply the concepts learned in solving problems encountered in everyday life.

This research will develop a project based learning (PBL) model with a scientific approach to the stages observe, ask, gather information, associate or analyze, and communicate. Project-based learning is learning managed by teacher to produce a product or project work of students (Wena, 2013). Project-based learning and its application in education is to enhance the creative abilities of learners, collaboration capabilities, and self-direction (Xu and Wenqi, 2010). In this study will also develop soft skills entrepreneurs through the buffer solution material PBL in the learning process. Soft skills are the skills of a person in dealing with others (interpersonal skills) and skills in organizing themselves (intrapersonal skills) that is able to develop to the maximum performance (Pazhani and Shanmuga, 2012). In general, soft skills are a group of personality traits, or abilities needed for someone to be able to work effectively in the workplace, and improve themselves.

Soft skills are generally developed through active involvement of learners, which requires training and feedback for improvement of skills (Blaszczynski and Diana, 2012). Research on project based learning model development on buffer solution materials with soft skill entrepreneur oriented, is expected to improve human resources, especially the attitude of the younger generation who are responsible, confident, able to work together, have leadership skills, problem solving, and communication. Formulation of the problem in this study were (1) How valid the PBL models and the buffer solution material soft skills entrepreneur oriented is developed? (2) How effective is the PBL model and the buffer solution material soft skills entrepreneur oriented is developed? (3) What is the effect of the PBL model and the buffer solution material on soft skills entrepreneur? (4) How is the response of learners to the PBL model and buffer solution material soft skills entrepreneur oriented? The purpose of this study was to determine (1) the validity of the model, (2) the effectiveness of the model, (3) the effect on the soft skills entrepreneur, (4) the response of learners (students) to the PBL model of soft skill entrepreneur oriented.

## II. RESEARCH METHODS

The study was conducted at SMA Negeri 1 Pekalongan on Buffer Solution material. The subjects were students of SMA 1 Pekalongan school year 2013/2014 class XI IPA 3 and 4 of 60 learners. The research design used was the control group pretest-posttest design. This study is the kind of research and development (R & D) that has been modified (Hamdani, 2011). Modifications in this study is a product developed that is PBL model with the orientation of soft skills entrepreneurs. Step consisted of: (1) define phase, i.e. field studies, literature on learning models, and curriculum 2013 studies in high school chemistry subjects; (2) the stage of design, aim to design a learning device (draft 1); and (3) develop phase, is an expert validation and testing the product. After that, a small-scale test expert validation, revision, large-scale test, revised again and analytical instruments that include validity, reliability, power difference test, and level of difficulty of the questions. The results of the validation and final revision produced the final product that ready for use in the implementation phase. In the implementation phase, pre-test, learning activities, post-test is done. Assessment conducted during the learning process are the assessment of soft skills entrepreneurs and discussion, practices assessment, product assessment using observation sheets, and ended up by giving a questionnaire to determine the response of students to learning implementation. Data analysis included the N-Gain test, normality test and t test. It also tested the effect among variables using SPSS version 16.0 using a regression formula (Ghozali, 2009).

## III. RESULTS

### 1. Validity of the PBL Model Soft Skill Entrepreneur Oriented

The tests were conducted by experts showed that learning model is valid with a mean validity is 94,77. Then it can be used for chemistry learning after some revisions on the advice and input of experts to perfection of learning program.

### 2. Effectiveness of PBL Model Soft Skill Entrepreneur Oriented

The result of pre-test post-test buffer solution implementation phase PBL model soft skills entrepreneur oriented are in Table 1.

Table 1. Results of Pre-Test and Post-Test Buffer Solution Competencies

No	Data	Average Value	Max Value	Min Value	Completeness (%)	N-Gain	N-Gain Criteria
1	Pre Test	37,51	44	25	0%	0,74	High
2	Post Test	83,78	97	62	91,67%		

The results showed that PBL learning model oriented on soft skills entrepreneurs have been able to improve the control of the buffer solution competence from the average pre-test score 37.51 to the average value of the post-test 83.78 with the value of N-Gain 0.740 which is the high category.

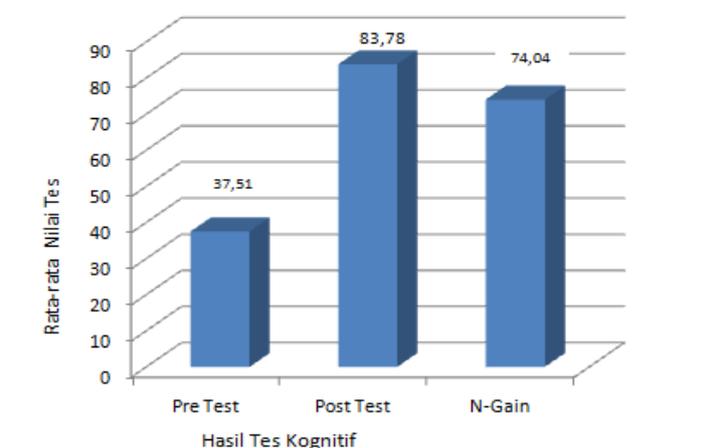


Figure 1. Results of Pre test-Post Test Cognitive Assessment

In Fig. 1 is presented visualization of Table 3 the average value of the pre-test, post-test, and the value of the N-Gain for buffer solution competence.

Prior to the t-test, normality test is conducted to determine parametric or non-parametric statistical. The results of the pretest and posttest normality test can be seen in Table 2.

Table 2. Normality Test Pre-Test Post-Test Results

Test type	Chi2 count	Chi2 table	Conclusion
Pre-Test	11,402	12,592	normal
Post-Test	10,919	12,592	normal

Therefore, the data of pre-test post-test are normal distributed, with  $\chi^2$  count <  $\chi^2$  table, then performed the t-test. T-test results can be seen in Table 3.

Table 3. Difference Test of Pre-Test Post-Test Value

Test Type	Chi2 count	Chi2 table	Conclusion
Pre-Test	4,11	1,296	Significant
Post-Test			

The calculations showed that the pre-test post-test data has significant differences, with the results of the  $t$ -count >  $t$ -table.

### 3. Effect of Learning Model to Soft Skill Entrepreneur

Effect of PBL model results on soft skills can be founded out with regression test using SPSS version 16. As the independent variable is the value of the project, while the dependent variable is the value of soft skills. Calculation results presented in Table 4.

Table 4 Effect of Project Based Learning Model Results on Soft Skills

No	Aspect of Soft Skill	Level of Significance	Description
1	Responsibility	0,00	Significant
2	Confident	0,00	Significant
3	Working together	0,00	Significant
4	Leadership	0,01	Significant
5	Communication	0,03	Significant
6	Problem solving	0,00	Significant

Soft skills observations obtained from any learning process competence on buffer solution using the PBL model. From the data in Table 4 show the effect of project activities with each soft skills entrepreneur that observed with the value level of significance <0.05.

#### 4. Response

Student response data to the PBL model of learning activities oriented in soft skills entrepreneur obtained by using student responses questionnaire and the results can be seen in Fig. 2.

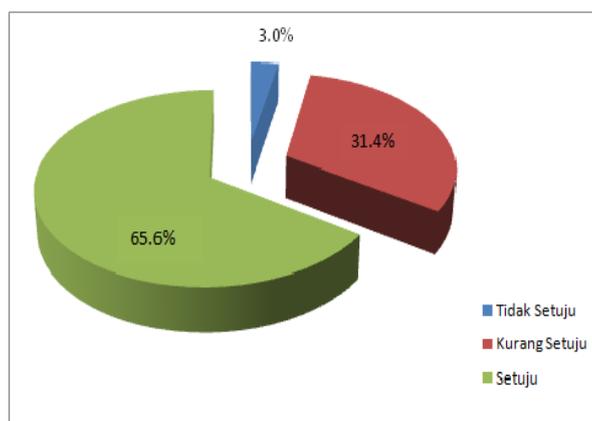


Figure 2. Percentage of Students Response Questionnaire

The result of acquisition of students response show that generally, students responded positively to the PBL model learning activities of soft skill entrepreneur oriented which has conducted, indicated by learners agreed on an item of 65.6%, less agree 31.4%, and disagree as much as 3.0%. Average yield values of students is 87.5, it was concluded that the students showed an excellent response or positive response to the PBL model learning activities of soft skill entrepreneur oriented.

## IV. DISCUSSION

### 1. Validity of the PBL Model Soft Skill Entrepreneur Oriented

Device before tested to students, validation to the expert / validator is conducted to determine the feasibility of development product in this study. Validation includes the content and the order in accordance with the model developed. From this validation results, obtained a mean 94.77 including a very valid category.

### 2. Effectiveness PBL Model Soft Skill Entrepreneur Oriented

Analysis of the effectiveness test is shown with a mean of learning outcomes of 83.78 ( $\geq 80$ ), and the classical completeness of 91.67% ( $\geq 85\%$ ). In accordance with the study (Movahedzadeh, 2012), PBL model can increase students motivation, mastery of the subject matter, and found the application to be applied in a variety of situations. Through project learning students acquire academic knowledge and skills to solve complex problems, trust, and critical thinking. Long-term results of project-based learning obtained on the main level is knowledge, processes, and changes in attitude (Mioduser and Nadav, 2007).

The stages of project learning requires students to think and be challenged to solve the problem through five learning experience of observing, ask, gather information, associating, and communicating (Permendikbud, 2013a). Through learning soft skills entrepreneur oriented may actually enhance the critical thinking skills that will challenge students to think a high level and increase collaborative (Colakoglu and Sally, 2013).

### 3. Effect of Learning Model Against Soft Skill Entrepreneur

The results showed effect of learning project with soft skills entrepreneur. PBL model learning soft skills entrepreneur oriented can develop creative abilities of learners, collaboration capabilities, and self-direction (Xu and Wenqi, 2010). Students through the PBL model learning of soft skills entrepreneur oriented, able to work together in groups to complete a project that has been given to them. Students gain increased accuracy, problem solving, collaboration with team members, and scientific communication (Robinson, 2013). First soft skill is the responsibility. Through the project activities can be used to develop the leader, responsible, and team building personality (Pitts, 2008). Second soft skill is working together. This behavior is based on an attempt to make the Students able to establish relationships with others in carrying out the action and work. Cooperation was done by Students starts when they are looking for a project that will be done, making the experimental design, conducting experiments, to make reports to be presented and collected. Development of soft skills required to increase job opportunities in the global economy of the 21st century (Massaro, 2013).

Third soft skill is confident. Confident is a good attitude to be developed as entrepreneurial spirit capital, so that students can do any work without the easily discouraged.

The fourth and fifth Soft skills are leadership and communication. Soft skills can increase individual interaction, achievement and career development through communication, leadership, and analytical skills (Pazhani and Shanmuga, 2012). In a discussion, students were asked to speak in front of the class and friends, and willing to accept the suggestion or criticism from them. To be a successful person does not have to have perfect knowledge value, but also must have leadership, innovation and a desire to progress that can be implanted through the entrepreneurial aspects of learning (Banes, 2013). The sixth soft skill is problem solving. Through project learning, students acquire academic knowledge and skills to solve problems, collaborate with team members, and scientific communication (Robinson, 2013). Through learning project oriented in soft skills entrepreneurs, there is an increase in knowledge, skills, confidence, cooperation, and resilience to face difficulties in students (Jean and Audet, 2012).

#### 4. Response

Students generally responded positively to the PBL learning model soft skills entrepreneur oriented demonstrated by the acquisition of an average value of 87.5. Students can also make a feasibility analysis that demonstrated the benefits of each group. Development of soft skills needed to improve employment opportunities in the global economy of the 21st century (Massaro, 2013).

Some aspects of this model can motivate students and think higher in the learning process which is when they get the data, communicate, seek their own ways of working, collaboration, and teamwork in making the decision to complete the project (Robinson, 2013). Learning projects encourage students to communicate both orally and in writing. Oral and written communication is an important soft skills when we relate to others (Wahl, 2012).

Soft skills are important for the development of entrepreneurial spirit, and a capital for early students in addition to hard skills so that they can plunge into the community to face the global competition.

#### V. CONCLUSION

Based on research that has been done on the development of PBL model soft skills entrepreneur oriented, concluded that; 1) the project based learning model development on buffer solution materials with soft skill entrepreneur oriented are valid with a mean validity 94.77; (2) the PBL model development on buffer solution materials with soft skill entrepreneur oriented are effective with a mean of 83.78 ( $\geq 80$ ), and the classical completeness 91.67% ( $\geq 85\%$ ); (3) There is an influence that PBL model development on buffer solution materials with soft skill entrepreneur oriented which developed to students soft skills entrepreneur with a significance level of 0.00 for the responsibility, confidence, and cooperation, 0.01 (leadership), 0.03 (communication), and 0.00 (problem solving); (4) The students responded positively to the implementation of the PBL model development on buffer solution materials with soft skill entrepreneur oriented which is equal to 87.5% with a very good category.

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### **Biographies and Photographs**



*Sri Susilogati Sumarti*, was born in Pati 12 Nopember 1957 from couple Sulaiman Dwidjosukarto and Sumirah. Finished elementary at SD Negeri Sidokerto I Pati year 1969, junior high school at SMP Negeri III Pati year 1972 and senior high school at SMA Negeri Pati year 1975. By 1976, continued college at IKIP Semarang in chemistry science, graduated young bachelor in 1979, and bachelor at 1982. Magister of Science achieved in 1999 at UKSW Salatiga on Developing Studies and then Doctor of Education Management at UNNES achieved at 2012. Working experience began at 1979 as teacher in SMA Institut Indonesia Semarang, SMA Masehi I Semarang, STM 1 Ungaran, and as a lecturer at Akademi Teknik Semarang. Year 1983 – now as lecturer at Chemistry FMIPA UNNES by teaching Anorganic Chemistry, Basic Chemistry, Chemistry Learning Practice, Micro Teaching and Chemical Entrepreneurship. Teaching post graduate at UNNES on Science Research and Entrepreneur.