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Project-based Learning as the Atmoshphere for Promoting Students' Communication Skills

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Abstract. The aim of the research is to determine the impact of Project-based Learning towards students' communication skills. This research is an experimental study that using Pre-Experimental Design with One-Shot Case Study. The subject of the research are students of Science Education Program, Universitas Negeri Makassar) who were attending Motion and Change course. The research instrument was a non-test instrument that can be divided into two types: rubric and questionnaire. Data analysis was using descriptive and inferential statistic. The result of descriptive statistic exhibits that there is an enhancement of students' communication abilities after implementation of Project-based Learning. Eleven out of twenty-nine students are above level 1 category. The inferential statistic reveals that Project Based Learning has an effect toward students' communication skills.

1. Introduction
The success of a learning process depends on how well the teacher organizes the classroom. It is starts from the planning, action and evaluation. The quality of learning should be fulfilled by a meaningful study. The twenty-first century challenge demands the students to actively contribute to society. Therefore a teacher should be more adaptive to prepare the students towards the challenge.

A teacher who came from an educational decides the quality of education where the role of educational institution itself is creating qualified teachers. One of educational institution in faculty of Mathematics and Science, Universitas Negeri Makassar is science education department. This institution needs a comprehensive and systematic strategy to have certain quality of educators who can improve a rigorous method of meaningful study.

Project-based learning (PjBL) is one of integrated learning model in science education classroom. This model has an opportunity to create a meaningful lesson. The skills gained from this approach are communication and collaboration [1][2]. [3] reported that the work environment must need a people who have interpersonal skill and project management towards a comprehensive teamwork. *National Science Teacher Association* (NSTA) revealed that the essential skill of the interpersonal skill is communication skill which can initiate the others skills such as collaboration skill [4].

In this study, PjBL chosen as the learning model to improve the students communication skill. The PjBL model oriented to constructivist approach. This model can facilitate the students to find the

concept through their own experiences to create a meaningful study to face the challenge of twenty-first century.

2. Project Based Learning Concept

Dopplet defined PjBL as one of learning model which developed based on constructivist learning. The project activities are the media for students to explore, interpret, synthesize and research the information to discover the concepts [5].

PjBL designed to solve the complex problem which is needed to understand knowledge. Through project based learning, the inquiry process started by a guiding question that will be directed students in collaborative project which is integrated to any subjects in curriculum. The answered question is a discovery concept in line with the subject. The duration of project based learning is diverse, there is a project conducted for a few days, weeks, even for one semester [6].

3. Project Based Learning Steps

According to Rosenfeld the steps of Project Based Learning consist of (1) making the project questions, (2) selecting the main questions or determining the project, (3) reading and searching for resources relevant to the problem (4) esign the appropriate method of solving the problem (5) write the proposal project (6) implementation and create the task document (7) data analysis and make the conclusion (8) make the final report (9) present the final project [5]. Student reflection and self-assessment, as well as teacher evaluation are important components of each project. Students' performances are individually assessed and from the resulting product quality, the deepening of content understanding is demonstrated during product presentations and student contributions in product making. Therefore, [7] includes the evaluation and reflection stage after the presentation with the stages of the model of PjBL as follows:

Stage 1   - Introduction: Teachers announce projects that students will do and make videos or design activities such as talk shows, field trips, discussions or scenarios of performances and so on.

Stage 2   - Essential Question: The teacher gives a fundamental question that will focus the students on
             the project.

Stage 3   - Research and Write: Students investigate and conduct research related to previous essential questions, find answers, draw conclusions and produce solutions.

Step 4   - Product Creation: Students create multimedia products to present their project information, such as media kits, public service announcements, blogs, websites or posters.

Stage 5   - Presentation: Students present their projects to the other students in the class.

Stage 6   - Evaluation and Reflection: Teachers and Students both assess learning and appearance with rubrics, feedback or feedback from teachers, and self-evaluation or self-reflection and reflection of students.

4. Communication skills

Communication is known as a verbal and nonverbal activity. Communication define based on the rapid development of information today involves interactions that take place in different areas, this shifts the traditional communication paradigm that requires direct encounter. Such areas include face to face interactions involving IT, digital literacy, email, text messaging, social media and virtual environments [8].

According to [3], communication involves a large number of 21st-century skills such as analysis, evaluation, problem-solving, metacognition, collaboration, and technology. Some of the content standards built as the foundation of CCSS (Common Core State Standards) target communication skills on the ability to write, talk and listen as follows:

1) Write informative text to test and convey complex ideas and information.

2) Produce clear and sustainable writing in the development of appropriate context, organization and

style of writing for tasks, objectives and audience.

3) Present information and findings that can be understood by the listener with the right method.
4) Adapt the style of speech to various contexts and communicative tasks
5) Actively participate in conversations involving different partners or partners
6) Integrate and evaluate the information presented in different media formats.

Communication skills can be integrated further in various subject lessons at all levels of education that include reading, listening, and observing activities. The process of information transfer and problem solving conveyed through language is a key capability [3]. Common Core State Standards (CCSS) adds the communication skills that adjust with the 21st-century skills as follows:

1) Identify and use various kinds of verbal communication such as conversation, debate and invitation.
2) Involve constructivist dialogue with each other
3) Demonstrate acceptable communication skills such as paying attention to the topic delivered, listening reflectively and understanding.
4) Read, view or observe and listen to varied media for different purposes.
5) Produce more effective communication through various media: oral, visual written, nonverbal and technology
6) Using persuasive communication for example, presenting the findings expressively.

4.1. Types of communication skill

According to [8] the things which need to be understood in communication specifically can be adapted to the type of oral communication, written communication and interpersonal communication detailed as follows:

4.1.1. Oral communication

Oral or spoken communication can be presentations, discussions, debates, interviews, meetings and so on. This type of communication can be the task most often faced by students. The pressure on presentation will be inevitable.

4.1.2. Written communication

Written communication is very diverse. It can be writing applications, proposals, promotions, letters, memos, emails, publications, reports, press releases.

4.1.3. Interpersonal communication

Interpersonal communication or communication conducted between individuals, contains several aspects that need to be considered namely. Emotional intelligence, body language, posture, sensitivity to an audience demonstrated through appropriate behavior, and active listening.

5. Method

This research is pre-experimental study with only one subject of research and no control class. The research design using one shoot case study, where the subject was given a treatment and be observed toward the subject's communication skills.

The population of this study is all of the students in science education department in faculty of mathematics and science, Universitas Negeri Makassar odd semester year 2016/2017. This research conducted during one year. The sample of this research is the students of science education in regular class second year. This study use non instrument test comprise of rubric and questionnaire. The data are collected by self-assessment (a questionnaire which is filled by students) and rubric (filled by observer). The data analyzed by descriptive statistic.

6. Discussion

6.1. Rubric

The average of Students Communication skills rubric towards Pre-PjBL and Post-PjBL can be shown on the Table 1.

Table 1. Average rubric communication students ability towards pra-PjBL and post-PjBL

Communication skills marks	*Pre-PjBL*	*Post-PjBL*
Maximum marks	1.50	4.00
Minimum marks	0.25	1.25
Average	0.75	2.53
Category	**Level 1**	**Level 2**

Average of communication skills rubric on Table 1 demonstrates the increasing ability of student communication skill when taught using *Project Based Learning (Post-PjBL),* which is 1.78 high.

6.2. Questionnaire

Percentage average acquisition questionnaire marks which categorized for each aspect on students communication ability could be seen on Table 2.

Table 2. Average percentage questionnaire marks for each communication skills

NO.	Communication Aspect	Percentage (%)	Category
1	Delivering message clearly with certain meaning or purposes	70.1	Very high
2	Receptive process (receiving the message: listening, reading, and observing)	69.5	Very high
3	Using varieties of sources to state the ideas	74.7	Very high
4	Presentation skill		Very high
	Average	**70.7**	**Very high**

Based on the average questionnaire marks for each communication skills aspects in Table 2 illustrates that "Using varieties of sources to state the ideas" aspect is obtaining the highest percentage, while the lowest percentage is "Presentation Skills" aspect.

6.3. The Effect of PjBL model towards Students Communication Skill

Rubric descriptive analysis results have shown the increasing students communication skill when taught using PjBL model. The increasing that occurs is significant enough to gain the average rubric score of communication skills that is increasing into the second level after given the manners of the PjBL learning model. The increasing which occurs, could be proven by the distribution rubric communications marks diagram, which some of the students have succeed to reach the score above the first level. This matters, also supported by the acquisition of questionnaire marks which the students communication ability placed on the very high category.

Students communication skill can be interpreted further by seeing the score per aspect. Based on the percentage of communication skill score the lowest rate shown by presentation skill aspect. This aspect has a low rate due to the students still has a difficulty on mastering the complex concept that is support for the uncomprehensive information. The initial observation showed that the learning process was lack of contextual learning activity that made the student passive and became an information receiver. Meanwhile PjBl involved the students to real-world connection which can make the student easier to understand the concept through the project stages [9].

The average of the highest questionnaire score shown by "using variety of sources to state the ideas". [10] approved that research study is the skill that need to conduct the project due to the activity of PjBL involve literature activity such as reading by skimming and scanning, collecting information, and identifying the relevant project. Musa's finding shown the relevant theory from this study. The aspect of using variety of sources to state the ideas' is predominate on *Research and Write* stage. The student is given a chance to collect the information from any literature through online and offline sources. Thus, the students can find the answer of guiding question "is the light bend into a current color of light?".

Research and write stage supports the student to deliver the idea in focus group discussion stage. This finding is supported by observer finding on rubric score of communication skill at the aspect of "state the ideas clearly" toward the standard criteria of Greenstein achieved the highest score.

7. Conclusion
The study revealed that there was a significant effect of project based learning toward science education students' communication skill. PjBL can increase the abilty of students to skim and scan the literatur clearly. The students also are able to use varieties of source of learning and deliver it. However, the students still have to improve their skill to present their project in the classroom.

Acknowledgments

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