

# The Use of Learning Methods According to Students' Characteristics to Improve Learning Outcomes in Science Subject on Fifth Grade Elementary School in Jakarta

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**Abstract** This study aims to determine improvement in student learning outcomes by using learning methods or approach to suit students' characteristics in order to improve learning outcomes in science learning (Ilmu Pengetahuan Alam / IPA) on fifth grade elementary school students. The period of this study was eight months, from April to November 2014 at five elementary schools located in Jakarta. The study used Kemmis Taggart model, a class action research method which was developed by Suharsimi Arikunto. The implementation consisted of two cycles in which each cycle involved planning, implementation, observation, and reflection stage. Results showed that the science learning (Ilmu Pengetahuan Alam / IPA) was improved after learning process suited the students' characteristic for fifth grade elementary school using the methods of Problem Based Learning, Discovery Learning, Project base Learning, Inquiry and Scientific Approach.

**Keywords:** *learning methods, learning approach, science, learning outcome*

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## 1. Introduction

### 1.1. Background

Learning is a process to achieve a wide range of competencies, skills, and attitudes throughout the entire human life. A person who continuously learns will provide benefits to his quality of life. As for the community, learning has an important role in developing their culture and knowledge to be inherited for their next generation.

In order to support a learning process, Indonesia government had prepared a curriculum that can be used as a technical reference in learning implementation. However in recent years, the curriculum has undergone several changes. Previous curriculum, which was Competency Based Curriculum (*Kurikulum Berbasis Kompetensi / KBK*), was changed to Education Unit Level Curriculum (*Kurikulum Tingkat Satuan Pendidikan / KTSP*). *KTSP* was then changed again to Curriculum 2013 [9].

Curriculum 2013 for Elementary School was based on thematic integrated learning. In this process, the approach used scientific approach as well as the authentic assessment. The implementation of that thematic integrated learning together with scientific approach has brought an implication to change on the Elementary School learning.

The scientific approach is a learning approach that encourages students to conduct scientific skills such as observing, asking questions, gathering information, associating, and communicating ([9]; 18). Those skills could generate students who are active, able to find facts and to process it, and able to communicate information they obtained.

In its practice, there were several learning method that can be used on scientific approach. Among these were Project Based Learning, Problem Based Learning, Discovery Learning, and Inquiry (2013; 10). With Project Based Learning or PBL, students learn from doing projects. It is therefore important that if PBL is to be used, a pre-prepared project must be initially available. The other method, Problem Based Learning, is a learning method emphasizing the efforts to solve problems. Lastly the Discovery Learning is using discovery method where students were asked to find something.

Learning success can be seen from the students' learning outcomes. Learning outcomes are defined as the level of students' mastery on the subject matters as a result of behavioral changes after participating in the learning process in accordance to the learning objectives. This level is stated in the form of scores. Scores are obtained from the tests which are conducted as the series of learning activities in one semester, in this case it is therefore meaning to increase students' learning outcomes.

However, current learning outcomes in science subject (*Ilmu Pengetahuan Alam / IPA*) in elementary school had

not yet been as per expected. There were still large number of students with scores below the minimum completeness criteria (*Kriteria Ketuntasan Minimal or KKM*). This had also occurred in elementary schools in Jakarta, particularly on fifth grade students. In addition to low scores, the students' abilities to process and communicate information were still lacking.

There were several factors that contributed to the low scored on IPA learning outcomes. One of them was the approach and method used by teachers were not maximized. The method of approach for elementary schools students were supposed to be based on scientific approach, in which its process should involve activities such as observing, questioning, gathering, processing, and communicating the information.

Circumstances as described above encouraged the author to conduct a research titled "The use of learning methods according to students' characteristics to improve learning outcomes in science subject on fifth grade elementary school students in Jakarta". Those methods are Problem Based Learning method, Discovery Learning, Project Base Learning, Inquiry, and Scientific Approach.

## 1.2. Problem Formulation

Based on the research background and problem identification, this research has therefore formulated problems as follows; Can a learning method or approach that suits students' characteristics improve the learning outcomes in science learning (*Ilmu Pengetahuan Alam / IPA*) on fifth grade elementary school students?

## 2. Theoretical Review

### 2.1. Nature of Science Learning Outcomes for Fifth Grade Elementary Student

#### 2.1.1. Definition of Learning Outcome

According to Oemar Hamalik ([6]; 10), learning outcome is someone's change behavior process from not-knowing to knowing. This change behavior in learning outcomes should include such aspects as knowledge, emotional, understanding, social relationships, habits, physical, skills, ethical or moral, appreciation and attitude.

Another definition according to Sudjana ([15]; 2), learning outcome is the abilities owned by students after they receive learning experiences. A good learning outcome owned by a student is when he/she is able to show specific capabilities as a result of his/her learning experiences.

William Burton in Hamalik ([6]; 10) suggested that learning outcome is a pattern of actions, values, notions, attitudes, and skills that are received by students which gives a satisfaction and meaningful to their needs. Parmono ([13]; 42) further added that, "The learning outcome is students' success rate in learning school subjects which is expressed as score obtained from test results of each subjects". Furthermore Gagne in Sudjana ([15]; 22) classified the learning outcome into five categories, namely a) verbal information, b) intellectual skills, c) cognitive strategies, d) attitude, and e) motoric skills. Cognitive domain with respect to the learning outcome.

Based on several definition above, it can be concluded that learning outcome is a change behavior of students which includes cognitive, affective, and psychomotoric that occurred after learning process and after showing certain ability as the result of learning experience. This was measured in scores that is obtained from test or examination in certain period of time.

#### 2.1.2. Definition of the Science Subject (*Ilmu Pengetahuan Alam* or IPA)

Science is a subject aims to systematically discover about nature in order to master the knowledge, facts, concepts, principals, discovery process, and scientific attitude to be beneficial for students for their self-learning or for the natural surrounding (Curriculum SD/MI IPA, 2004;2). According to Malichah (2006; 9), IPA is seen as a process, a product and a procedure. A process means that in its learning it requires a process to discover a concept, a product means the observed objects, and in order to observe there are systematic procedures or steps to be done. In addition, Nokes (*Hakikat Matematika dan Ilmu Pengetahuan Alam, 2014*) stated that IPA is theoretical subject that is based on observation and experiments on the natural phenomena.

Therefore, science or IPA is a subject that studies human efforts to understand various natural phenomena through the interpretation of human experience with particular procedure which are analytical, accurate, complete, and connect natural phenomena with each other. This will create a whole new perspective on the object being observed and form a new perspective in which students can understand the subject and scientifically resolve different kind of problems that have been stated in the curriculum.

#### 2.1.3. Characteristic of Fifth Grade Elementary Students

Piaget in Muhibbin ([12]; 66) classified children cognitive development into four stages which are sensor motoric at the age of 0-2 years old, pre-operational at the age of 2-7 years old, concrete operational at the age 7-11 years old, and formal operational at the age of 11-15 years old. Elementary school students in Indonesia are generally between 6-12 years of age. According Syamsu ([19]; 178) children's cognitive at this rage of age have already developed into concrete and rational thinking.

Particularly for children at fifth grade, according to Muhibbin in Desmita ([4]; 35), their cognitive have involved: (1) mastering physical skills needed for games and activity, (2) Fostering a healthy life, (3) Learning to get along and work in a group, (4) Learning to establish a social role according to gender, (5) learning to read, write, and count in order to participate in society, (6) Receiving concepts to think deductively, (7) Developing conscious, moral, and values, (8) Achieving personal independence.

From the discussion above, learning activities for fifth grade students require teachers to acknowledge and consider learning approaches that need to be used to suit students' maturity as well as their developmental level. In accordance, a teacher should be responsive to different characteristic between each students. It is important that the approach involves reliable sources, media, and method to enhance students understanding the concept and information given so that the learning objective could be achieved.

## 2.2. Learning Methods or Approaches that Suit Fifth Grade Students

Learning methods or approaches that are suitable with the characteristic of fifth grade elementary school students are:

### 2.2.1. Problem Based Learning

Problem Based Learning is a learning method that uses authentic problem which is ill-structured and open as a context for students to develop problem-solving skills and critical thinking as well as to build new knowledge (Astan and Rahmita, [5]; 55). It is an approach where students are trying to solve an authentic problem in order to construct self-knowledge, develop inquiry and thinking skill, develop independency and confidence (Arends in Fahrurazi, 2011; 80).

It can be further stated that Problem Based Learning (PBL) is a learning that is obtained from attempts to solve practical issues in real life. Therefore PBL in teaching is directing students to solve these issues throughout series of systematic learning. And in order to find the solution, students should be guided to find required data and information for the source.

### 2.2.2. Discovery Learning

According to Hamalik Illahi (2002; 129), Discovery Learning method is a learning process that focuses on students' mental intellectual in solving various issues in order to find a concept or generalization that can be applied in the field. In line with above definition, Sund in Roestiyah (2008; 20), Discovery Learning is a mental process in which students are able to assimilate a concept or principle. By using this strategy there are various activities that students can do such as observing, digesting, understanding, measuring, and explaining.

There are 7 steps involved in Discovery Learning method implementation (Ibid, 2012; 83): (1) Availability of the unresolved problems; (2) Suitable with students' cognitive ability; (3) Concepts or principle must be well written; (4) Availability of tools; (5) Appropriate classroom atmosphere; (6) Opportunity for students to collect data; (7) Ability of teachers to give answer according to data required by students.

It can be concluded that Discovery Learning method is a learning process according to students' mental process in solving various problems in order to find a concept, meaning or relationship that can be implemented in daily life by using pre-determined steps.

### 2.2.3. Project Based Learning

According to Thomas, Mergendoller, and Michaelson in Thomas ([18]; 1) projects are complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations. Project Based Learning has big potential to give learning experience in more interesting and meaningful for students (Gaer in Isjoni ([7]; 128).

Project Based Learning focuses on process, team work, discussion, and creating model. Students with this methods will acquire higher learning experience within exciting and multiple ways atmosphere.

### 2.2.4. Inquiry Method

Naturally a person has a desire to know everything through all senses since he/she was in childhood (Wina, 2009; 194). This is what trigger the inquiry process. Inquiry strategy can be defined as a series of learning activities that involve overall students ability to search and investigate in systematic, critical, logically, analytically, so that they could formulate their own discoveries with confidence (Gulo, 2008; 84).

Joyce in Gulo (2008; 85) suggests that there are general conditions as a prerequisite for the emerge of inquiry activities for students: (1) social aspects and openness in the classroom in which students do not feel any pressure or obstacles that may hinder the students in delivering its opinion, (2) inquiry focuses on the hypothesis. Students need to be aware that there is no absolute truth due to various conclusions derived from different students provided correct arguments were given, and (3) the use of the facts as a result of hypothesis testing.

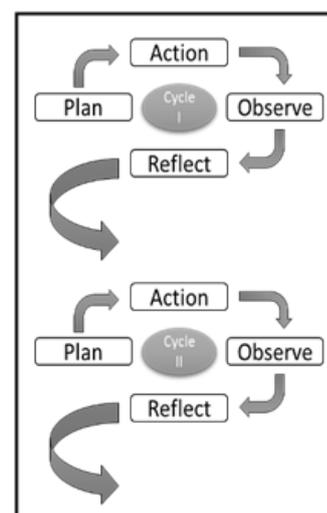
The teachers' roles in Inquiry learning methods is no longer as the central source of information. Their main roles will be as motivator, facilitator, intervene with questions when students do incorrectly, administrator, directing students activities, manager, and reward giver. Teachers' role is as important as before, if not more critical. Teachers must be able to create exciting learning atmosphere so that students would not feel inferior nor embarrassed to argue, even if the argument is irrelevant. Teachers should also be able to know well each of the students characteristics in order to give proper direction to those students who have difficulties.

## 3. Research Methodology

### 3.1. Location and Time of Research

The research was conducted at SDN Sukabumi Selatan 06 Pagi Kecamatan Kebon Jeruk West Jakarta, SDN Kebon Baru 02 Pagi, South Jakarta, SDN Kalisari 04 Pagi East Jakarta, SDS Ar-Rahman Motik South Jakarta, SDS Laboratorium PGSD FIP UNJ South Jakarta. The research was done from April to November 2014.

### 3.2. Method and Design of Research



Picture 1. Kemmis and Taggart Action Research Cycle

The method used in the research was Action Research (AR). The design which was practiced during the research was Kemmis and Mc Taggart model, which was further advanced by Suharsimi (2010;16). It consisted of 2 cycle in which each cycle includes planning, action, observing, and reflecting. The above picture depicts the Kemmis and Mc. Taggart model.

### 3.3. Researcher Role in the Research

The researcher was the planner leader in this research. She was actively participated in controlling the member in implementing the learning.

### 3.4. Subject of Research

The subject of the research was fifth grade Elementary School students at SDN Sukabumi Selatan 06 Pagi Kecamatan Kebon Jeruk West Jakarta, SDN Kebon Baru 02 Pagi, South Jakarta, SDN Kalisari 04 Pagi East Jakarta, SDS Ar-Rahman Motik South Jakarta, SDS Laboratorium PGSD FIP UNJ South Jakarta.

### 3.5. Expected Intervention Result

The success of this research was determined by whether or not students achieved at least 80% of minimum completeness criteria (Kriteria Ketuntasan Minimal or KKM) at the end of research cycle. And based on the result of the result, after the implementation of the methods and approaches in this research, the achievement of students have reached more than 80%.

### 3.6. Data and Data Source

**Table 1. KKM Achievement Cycle 1 and 2**

No	Approach/Methods	Cycle 1		Cycle 2	
		Learning outcomes (Achievement KKM)	Monitoring Actions	Learning outcomes (Achievement KKM)	Monitoring Actions
1	Problem Based Learning	66.67%	77.60%	87.20%	88.89%
2	Discovery Learning	65.38%	76.30%	93.30%	88.46%
3	Project Based Learning	72.90%	60.00%	86.67%	91.89%
4	Inquiry	63.33%	75.12%	100.00%	95.12%
5	Scientific Approach	77.78%	75.16%	95.66%	92.67%

Each approach /method was implemented independently to each pre-determined elementary school. Two cycles were conducted to see the learning outcomes improvement for each approach in regards to the level of the approach being implemented. This level is defined in percentage as Monitoring Actions. Learning outcomes improvement was measured based on the overall students' achievement to accomplish a good minimum completeness criteria (Kriteria Ketuntasan Minimal or KKM). As mentioned before in expected intervention result, the success of this research was determined by whether or not students achieved at least 80% of KKM at the end of research cycle.

When the comparison is made between cycle 1 and cycle 2, there is a consistent trend that when the level of monitoring actions is higher, the learning outcomes is better. For Problem Based Learning method, when the monitoring action was 77.60%, the KKM achievement was 66.67%; however when the monitoring action was elevated to 88.89% the KKM achievement jumped to

The data source in this research was the learning outcomes of fifth grade students from the determined Elementary School in Jakarta in science subject (IPA). These students have been taught by using the aforementioned methods of Problem Based Learning, Discovery Learning, Project Base Learning, Inquiry, and Scientific Approach.

### 3.7. Data Collection Method

Data collection methods used in the research were test, non-test, documentation, observation, and field note.

## 4. Result Discussion and Research Limitation

### 4.1. Result Discussion

From the preliminary analysis, there were various circumstances that cause the low KKM achievement on science subject of fifth grade students such as students' who did poorly in receiving information, infrastructure that did not support the teaching environment, or teachers who did not conduct appropriate teaching and learning activities. This research focused on how teachers select the approach and methods in science subject learning.

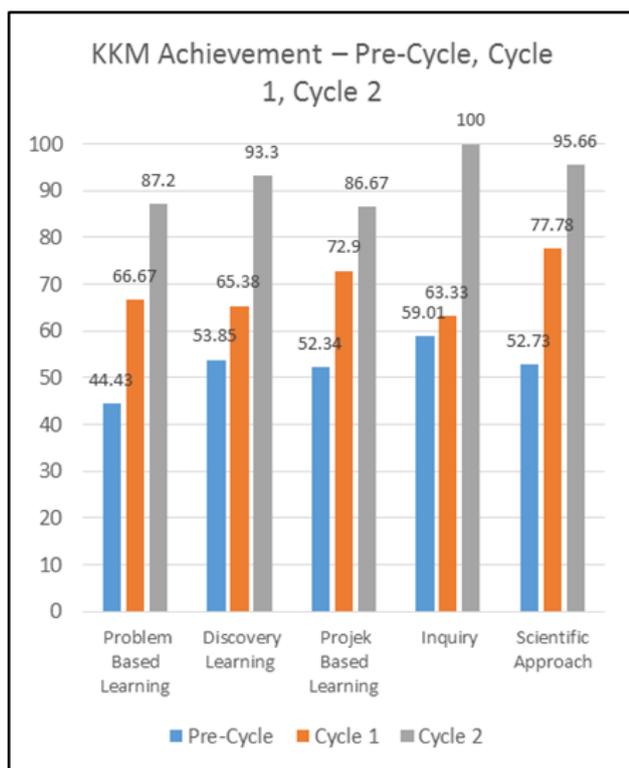
The use of scientific approach, Problem Base Learning method, Project Base Learning method, Discovery Learning and Inquiry in five selected elementary school were implemented for 2 cycles to see improvement in students' KKM. The result can be seen as follows:

87.20%. As for Discovery Learning, when the monitoring action was 65.38%, the KKM achievement was 76.30%; and after monitoring action was increased to 88.89% the KKM achievement was up to 93.30%. In Project Based Learning, when the monitoring action was 60.00%, the KKM achievement was 72.90%; and after monitoring action was increased to 91.89% the KKM achievement was better at 86.67%. For Inquiry approach when the monitoring action was 75.12%, the KKM achievement was 63.33%; and after monitoring action was perfected to 95.12% the KKM achievement was at perfect score at 100%. Lastly for Scientific Approach, when the monitoring action was 75.16%, the KKM achievement was 77.78%; and after monitoring action was increased to 92.67% the KKM achievement was up to 95.66%.

The result was clearly shown a trend that the more each approach was implemented at a better level, the better the KKM achievement will be. Even though the Cycle 1 has not given the expected result, when the approach was more implemented in Cycle 2 the KKM achievement is a

lot better. Having said that, Cycle 1 was still better than Pre-Cycle when none of the approach was implemented. This trend was the same for all approach and this can be depicted in Picture 2.

At the end of Cycle 2, all students who became the subject of this research has reached the expected target of KKM achievement at 80% for science subject and even more. The increase in Cycle 2 was either doubled or almost doubled from Pre-Cycle. This showed a promising trend that if the teaching method for science subject was changed to either one of the method, the students would have a better learning outcomes.



Picture 2. KKM Achievement Pre-Cycle, Cycle 1 and 2

## 4.2. Research Limitation

Despite of the successfulness of the research in achieving the expected result, this research has several limitation during the period of time. The identified limitation are:

- Distraction from other students from different class who were not the subject of research. Some schedule of science time table was collide with physical exercise time table resulting noises

which was suspected to distract the teaching process

- Time limitation of the researcher to create the expected teaching atmosphere in science subject learning process
- Poor infrastructure owned by the schools for science subject learning process

Number of students were more than ideal for one class. This caused teachers to divide bigger group than normal resulting less effective learning process.

## References

- Anderson and David. Taxonomy For Learning Teaching And Assessing. Jakarta: Delima Press. 2001.
- Anderson, Lorin W danKrathwohl, David R.A Taxonomy for learning, Teaching, and Assesing (A Revision of Bloom's Taxonomy of Educational Objectives) h. 77-80.
- Badan Standar Nasional Pendidikan. 2006. Standar Isi dan Standar Kompetensi untuk Satuan Pendidikan Dasar. Jakarta: BP Cipta Jaya.
- Desmita. Psikologi Perkembangan Peserta Didik. Jakarta: Remaja Rosdakarya.
- F. Atsnan M, dan Rahmita Yuliana Gazali. 2013. Penerapan Pendekatan Scientific dalam Pembelajaran Matematika SMP Kelas VII Materi Bilangan (Pecahan). Yogyakarta: FMIPA UNY.
- Hamalik, Oemar. 2003. Proses Belajar Mengajar. Jakarta:PT.Bumi Aksara.
- Isjoni. "Cooperative Learning" Efektivitas Belajar Kelompok. Bandung: Alfabera. 1999.
- Illahi, Mohammad Takdir. 2012. Pembelajaran Discovery Strategy dan Mental Vocational Skill. Yogyakarta: Diva Press.
- Kurikulum 2013. Panduan Teknis Tematik Terpadu Dengan Pendekatan Saintifik Di Sekolah Dasar. Jakarta: Kementerian Pendidikan Dan Kebudayaan.
- Kurikulum. 2004. Standar Kompetensi mata pelajaran IPA untuk SD & MI. Jakarta: Depdiknas.
- Kementerian Pendidikan dan Budaya. 2013. Panduan Teknis Pelaksanaan Kurikulum 2013. Jakarta: Kemendikbud.
- Muhibbin Syah. 1996. Psikologi Pendidikan Suatu Pendekatan baru. Bandung: Remaja Rosdakarya.
- Parmono. 2009. Strategi Belajar Mengajar. Jakarta: Diadit Media.
- Purwanto. 2009. Evaluasi Hasil Belajar. Yogyakarta: Pustaka Belajar.
- Sudjana, Nana. 2005. Penilaian Hasil Proses Belajar Mengajar. Bandung: Rosda Karya.
- Sumaji. 1998. Pendidikan Sains yang Humanistis. Yogyakarta: Kanisius Trianto. Hakikat IPA. <[http://eprints.uny.ac.id/8312/3/bab%20%2008312244\\_049.pdf](http://eprints.uny.ac.id/8312/3/bab%20%2008312244_049.pdf)> (accessed February 23, 2014).
- Taksonomi Bloom, <http://www.coe.uga.edu> (accessed February 26, 2014).
- Thomas, John W. A Review of Research Project-Based Learning. 2000. [http://www.bobpearlman.org/BestPractices/PBL\\_Research.pdf](http://www.bobpearlman.org/BestPractices/PBL_Research.pdf) (accessed August 31, 2015).
- Yusuf, Syamsu LN. 2009. Psikologi Perkembangan Anak dan Remaja. Bandung: PT Remaja Rosdakarya.