Implementation of Project Based Learning: Research Overview

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Abstract: This paper is the result of a review article on project-based learning model (Project Based Learning), starting with the idea that the project-based learning is a method in which students learn, apply and research (practice their skills related to communication and the sharing and management of information). This review examines research related to teaching and learning models popularly referred to as "Project Based Learning" (PBL). This review found that project-based learning to develop students' creativity and interest in learning on the basis of their projects, because PBL is filled with activity of students in learning, it inspires students to acquire a deeper knowledge of the subjects they are studying. Several studies referenced in this review also shows that students are more likely to retain the knowledge acquired through the PBL is much easier than through learning Teacher Centered Learning. This case shows that PBL can be a bridge for the gap in educational attainment.

Keywords: project-based learning, implementation, education,

1. Introduction

Learning is essentially a process of interaction to all situations that exist around individual, learning activities carried out by two actors, namely teachers and students, and Learning Model is a system, which consists of the various components that are interconnected to one another. (Francese, Gravino, Risi, Scanniello, & Tortora, 2015). Lifelong learning is a very important issue that most of the government's emphasis on their educational programs. It is generally known that there are various requirements such as learning how to learn, improve their communication skills, teamwork and the ability to control the time-money etc. In order to be successful in professional life, in addition to theoretical knowledge. Most of the requirements mentioned even needed in everyday life we can learn efficiently, in the desired field. (Kapusuz & Can, 2014).

Application of PBL in teaching and learning are indispensable, if we understand, as a teacher, that to permanently have the opportunity adaptation, integration in the world they live or their students will live, our students must constantly develop and valorize learning competencies carabelajar. Specially for science education, we must eliminate the pedagogical practices centered on excessively formal presentation and public, and promoting the teaching and learning fired on the action, experimentation, investigation and problem solving. (Gorghiu, Drăghicescu, Cristea, & Gorghiu, 2015).

Project Based Learning method has advantages and disadvantages. Assuming that all students can not learn in the same way, it is important for educators to develop and implement alternative teaching methods (Muthukrisma et al., 1993). Thus, Project Based Learning is not limited in terms of knowledge and information, but with the help of their teachers, provides students with the opportunity to transform themselves during the learning process (Aggelakos, 2003). Furthermore, financial and technological challenges that teachers must be overcome, while evaluations can also be effective when students use technology. (Efstratia, 2014)
Based on the areas that need further examination, the purpose of this review study is to provide an updated review of studies on Project Based Learning. All research on Project Based Learning has occurred in recent years. Because there is no significant body of research PBL, the review is not selective inclusive topic, this review includes descriptions of the following things:

1. How Concept Project Based Learning?
2. What is the Role Students in Project Based Learning?
3. What are the results and effects are measurable in the implementation of project-based learning?
4. What Advantages and Disadvantages of Project Based Learning?

2. Method

2.1 Selection of Articles

To find articles on this review, the authors take on ScienceDirect Web, Database have been selected because they are known to include high quality and indexed in Science Citation Index and Social Citation Index. Search in a database searchable by keyword: project based learning, computer science, and education. The related term used to make the search more comprehensive. For example, the keyword alternative to project-based learning. This review was originally composed of 56 articles were left for further selection. Then in the selection again to 21 articles Titles and abstracts were reviewed for selecting paper that meets the following criteria: 1) peer-reviewed journal articles, 2) provided the full text, 3) empirical research, 4) related to the learning model, 5) including the computer science, and 6) targeted effectiveness and influence of project-based learning. Some exclusion criteria also apply: 1) is used for professional learning (eg, teacher education, technical, or professional workers), 2) emphasize the use of models of learning and development as opposed to student outcomes, 3) to be used exclusively in the outcome measures were not related with project-based learning (eg, computer science, manufacturing, vocational). After classifying the journal as illustrated above where the continued narrowing the criteria for the title of the article in order to be more focused, in order to study more in-depth later.

2.2 Analysis

Analysis articles that met the inclusion criteria were analyzed using qualitative content analysis method, which is a systematic process to analyze texts are grouped into categories for the purpose of interpreting the meaning (Hsieh& Shannon,2005). Information from the articles that are relevant to the research question then coded and then classified into a category. Then, the frequency for each category is calculated and reported in the table. Three strategies used to build trust and credibility analysis. First, the researchers had ongoing dialogue to verify the categories and classifications of information from the article (Graneheim & Lundman, 2004) .Second, a detailed description of the categories and themes that emerged as the findings for each of the research questions is provided in the Results section to provide transparency regarding how the categories were created (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005) Finally, the article / paper related to the discussion given to show how well the category representing the data (Graneheim & Lundman,2004).

3. Result`

The results of a review of research articles described in this section. First, an overview of research available followed by the results of three research questions focused on themes of learning, project based learning models and the effect / influence yahg posed to the effects of the application of learning project based learning.

3.1. Overview Review

Of the 25 articles that reviewed journal publishing with a span of years 2009 to 2015, most of the studies (15 articles) published over 2010. The participants are mostly elementary students in general
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Other studies have focused on secondary school students (one article), primary school students (1) of the article), and it also involves the study participants between students and teachers (2 articles). An overview of these studies is presented in Table 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Researcher</th>
<th>Rankings Education</th>
<th>Domain Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Ríos et al., 2015)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
<tr>
<td>2</td>
<td>(Kaya, Şenyuva, İşık, &amp; Bodur, 2014)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
<tr>
<td>3</td>
<td>(Pucher &amp; Lehner, 2011)</td>
<td>Pendidikan/S1</td>
<td>Student/Teacher</td>
</tr>
<tr>
<td>4</td>
<td>(Ríos et al., 2010)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
<tr>
<td>5</td>
<td>(Koçak &amp; Bayir, 2009)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
<tr>
<td>6</td>
<td>(Voet &amp; De Wever, 2016)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
<tr>
<td>7</td>
<td>(Tuncay &amp; EkizoGlu, 2010)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
<tr>
<td>8</td>
<td>(Sart, 2014)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
<tr>
<td>9</td>
<td>(Gorghiu et al., 2015)</td>
<td>Pendidikan/S1</td>
<td>Student</td>
</tr>
</tbody>
</table>

3.2 The concept of Project-Based Learning

Project-based learning is an instructional models that has been developed in developed countries like the United States. If translated into Indonesian, project based learning meaningful as project-based learning. Project-based learning is a model of learning or innovative approach, the which emphasizes learning through activities Contextually complex. Project-based learning focused on the concepts and principles of the main (central) of a discipline, engage students in problem-solving activities and tasks of significant others, provide opportunities students work autonomously construct Reviews their own learning, and Ultimately produce the works the students valuable and realistic (Okudan, Gul E. dan Sarah E. Rzasa, 2004).

Project-based learning (PBL) is a model that organizes learning around the project. According to the definition found in the handbook for teachers PBL, the project is a complex task, based on challenging questions or problems, which involve students in the design, problem solving, decision making, or investigative activities; gives students the opportunity to work relatively independently over a long time; and led to a product or presentation (Thomas, 2000). Teachers play the role of facilitator, working with students to develop a worthwhile questions, structuring meaningful tasks, fostering both the development of knowledge and social skills, and carefully assess what students have learned from experience. PBL can occur either inside or outside the classroom (Efstratia, 2014).

The core of the methodology of project-based learning is the student, who, with a small group, plan, design and evaluate projects that respond to the real needs. For this learning process, students are required to use a variety of resources and investigate the knowledge of various disciplines to solve concrete problems (Ríos et al., 2015)

3.3 Role of Students in Project Based Learning

There are a number of ways that research on the characteristics of the students in the Project Based Learning can be done. Researchers may be interested in differential appropriateness or effectiveness of PBL for different types of students. Alternatively, researchers can try to change the design or features PBL to adapt to the variable characteristics (accommodate, restore) students. There are a number of variables characteristic of students who may be investigated in the context of Project Based Learning. For example, although no study was found to support this hypothesis, some practitioners have suggested that PBL PBL, has a variety of features, is a more effective way of adapting to different learning styles of students or "multiple intelligences" (Gardner, 1991).

Horan, Lavaroni, and Beldon (1996) observe classrooms Project Based Learning at two time periods for a year, once in the fall and once in the spring semester. On both occasions, they compared the
behavior of high capacity to low capacity PBL students in group problem-solving activities. Observers saw five behaviors critical thinking (synthesis, forecasting, producing, evaluating, and reflecting) and five behavioral social participation (working together, start, manage, awareness inter-group and inter-group initiator). The results of this study are provocative, but it is difficult to assess. Overall, students of high ability who are involved in social participation criteria behaviors of more than two and one half times as often as the low ability students in four classes observed and engage in critical thinking behavior is almost 50% more often. Another interesting finding, however, is that the ability of poor students showed the biggest gain in the behavior of critical thinking and social participation, increased by 446% between the observations fall and spring, compared with the increase of 76% for high-ability students.

3.5. Effect method Project Based Learning to Students Investment and Soft Skills for graduates

It is possible to consider as part of the characteristics important for individuals to be aware of the problems they encounter and may find a rational and appropriate solutions and develop projects each to get efficient results. This characteristic requires educators to design instruction including the real-life experiences and guide students in their problem solving and learning. This study claims that the project-based learning approach is an effective way to achieve these goals and impact should be checked thoroughly with the help of student reflection. (Tuncer, 2009).

The experience of success include the ability to resolve conflict through a creative approach to problem solving and achievement of a project that makes them more aware of real-life problems and issues. Therefore, the PPA played an important role in exposing students to meaningful learning process when they are engaged in completing their projects(Peng, Xu, Wang, Geng, & Zhu, 2015).

There are five components to elicit student responses for project-based learning and soft skills that are relevant based on the following; Teamwork, project management, communication skills, interpersonal skills, problem solving. Project-based learning contributes to the development of soft skills with application to the workplace which would seem to meet the needs of the labor market in the future medatang.(Musa et al., 2012)

3.6. Improving the Effectiveness of Student Learning Project Based Learning method

Using the Project Based Learning Method can develop effective content delivery for teachers and students. With the PBL where students are free to choose their own projects they become intrinsically more motivated and confident. In this study, two groups (control group and the experimental group) students used and two tests developed to evaluate student achievement. A remarkable difference in favor of the experimental group was found. The results provide great changes have happened in our lives along with technological developments. Obviously, the internet plays an important role in this regard. At this point the program web-design becomes more important. Starting with HTML program, students get scared alone. This may be a problem with vocational school students who are good practical skills and not very successful in other issues. Therefore, new strategies in the education necessary to draw their attention to students.(Tuncay & EkizoGlu, 2010).

At the end of the lesson the students are evaluated on the basis of their projects, rather than just on their theory rubric relatively narrowly defined by PBL exam is often more meaningful to them. This is a successful approach to instruction for a variety of reasons, his supporters say. For it can be concluded that the project-based learning helps students retain the information they learned. Lecture approach does not lead to long-term retention. However, the PBL students are encouraged to explore their own interests and to make connections to the world outside the school.(Sart, 2014).

3.7. Advantages and Disadvantages Implementation Project Base Learning

Project Based Learning is a learning model that uses matter as a first step in collecting and integrating new knowledge based on their experiences in real activity. Project Based Learning is designed for use on complex issues that required learners in doing investigasi and understand it (Ergül & Kargın, 2014). Through PBL, the process begins with the inquiry raises questions guide (a guiding
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question) and guiding learners in a collaborative project that integrates a wide range of subject (matter) in the curriculum. At the time a question is answered, direct learners can see the various major elements as various principles in a discipline that is being studies. PBL is depth investigation of a topic the real world, it would be valuable for the attention and effort of learners (Sart, 2014).

Table 2. Effect of Application of Project-Based Learning

<table>
<thead>
<tr>
<th>No</th>
<th>Researcher</th>
<th>Title Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Ergül &amp; Kargin, 2014)</td>
<td>The Effect of Project based Learning on Students’ Science Success</td>
</tr>
<tr>
<td>2</td>
<td>(Sart, 2014)</td>
<td>The Effects of the Development of Metacognition on Project-based Learning</td>
</tr>
<tr>
<td>3</td>
<td>(Makbule Basbay, 2009)</td>
<td>The reflections of student teachers on project based learning and investigating self evaluation versus teacher evaluation</td>
</tr>
<tr>
<td>4</td>
<td>(Lin &amp; Tsai, 2016)</td>
<td>The impact of an online project-based learning environment with group awareness support on students with different self-regulation levels: An extended-period experiment</td>
</tr>
</tbody>
</table>

Project Based Learning provides the opportunity for students to explore the content (material) using a variety of ways that are meaningful to him, and conduct collaborative experiments (Makbule Basbay, 2009). Learning "production based" introduces learners in vocational education with the atmosphere and the true meaning of work in the world of work. Thus the learning models that are suitable for vocational education is project-based learning (Lin & Tsai, 2016).

1. Advantages of Project Based Learning
   • Increase the motivation of learners to learn, encourage their ability to do important work, and they need to be appreciated.
   • Improve problem solving abilities.
   • Make learners become more active and managed to solve complex problems.
   • Increase collaboration.
   • Encourage students to develop and practice communication skills.
   • Improving the skills of learners
   • Providing learning experiences that engage learners are complex and designed to develop according to the real world.
   • Involve the learners to learn to take the information and demonstrate knowledge, then implemented with the real world.
   • Creating a learning atmosphere to be fun, so that students and teachers enjoy the learning process.

2. Disadvantages of Project Based Learning
   • It takes a lot of time to solve the problem.
   • Requires considerable costs.
   • Many instructors who are comfortable with traditional classroom, where the instructor plays a central role in the classroom.
   • The amount of equipment to be procured.
   • Learners who have a weakness in the experiment and collection of information will have trouble.
   • There are learners that less active in the working groups.
   • When the topic is given to each group is different, it is feared learners can not understand the topic as a whole.

4. Limitation

This review is limited to checking articles indexed in the database ScienceDirect. Articles in this database is considered to have a high impact on the pitch; However, with the limited number of paper
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covered may not reflect the latest research in keseluruhan. The results and recommendations of this review
do not yet reflect a strong reputation. Although the amount of paper in a limited review in this review, the
process of reading and understanding has been done carefully and is deep, with a systematic process to
avoid refraction. Going forward akann authors multiply the number of articles reviewed by using
additional databases and includes conference proceedings and journals open access to get more paper
trends and more updates.

5. Conclusion

Although this review is not meant to be comprehensive, provide important findings that can be useful
for instructional designers and researchers. From the results of the review some of this paper can be
concluded that the Project-based learning as a learning strategy that seeks to provide student
independence in working together, formed a project team to formulate new ideas and in groups and report
project idea through a percentage of the group is a synergy that will menghipotetikkan that aspects related
to soft skills such as problem solving skills, teamwork, leadership, ability to plan and team
responsibilities can be realized. The key is to understand the meaning and scenarios constructed by the
project-based learning strategy both by teachers, lecturers and other teaching staff as well as by learners
(pupils and students).

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