



A CONSIDERATION OF PROJECT-BASED LEARNING: EXPLORING ITS POTENTIAL, EFFECTS, CHALLENGES, AND BEST PRACTICES

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Abstract:

Recently, Project based Learning has garnered significant attention as a pedagogical approach. This paper aims to scrutinize and examine the advantages and impediments of Project based Learning from diverse standpoints. It intends to investigate and analyze the benefits and challenges of this educational method, while also considering related concepts such as Problem solving Based Learning.

Keywords: project based learning, problem solving based learning, educational method

1. Introduction

1.1 What is Project Based Learning?

The field of education has seen a significant increase in research on effective pedagogical methods in recent years, and "Project based Learning" has emerged as one of the most promising approaches [1, 2, 3, 4]. This technique involves interactive and active learning, where teams work together to solve problems and acquire skills [5]. Unlike traditional learning, which can be passive, project based learning enables students to actively engage in the learning process, thus fostering a deep understanding of the subject matter. Project based learning is also referred to as "problem solving learning" or "problem-based learning," and the research surrounding this approach has resulted in numerous academic papers [6, 7, 8, 9, 10, 11, 20]. In fact, the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) has even commissioned several universities to incorporate project based learning into their curricula [14].

The connection between project based learning and project management is significant, as demonstrated by the growing body of research. For example, Reference [6] discusses effective methods for developing project management skills through project based learning, while Reference [7] notes that project based learning can enhance project management competencies, such as communication and management skills. Moreover, Reference [8] quantitatively validates students' acquisition of project management and software engineering knowledge using a pedagogical method called Software

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Development Project based Learning. Reference [20] explores the optimal use of the Work Breakdown Structure (WBS) in project based learning. Many other references have also examined the relationship between project based learning and project management [23, 24]. Therefore, we believe that the advancement of project based learning will have a significant impact on the development of the project management domain, and we urge educators to consider this approach when designing their curricula.

1.2 Purpose and Outline of This Paper

As delineated in Section 1.1, there has been considerable research on "Project based Learning." However, it is challenging to assert that learning methodologies have been systematically established.

This paper assesses the benefits and drawbacks of project based learning from diverse viewpoints. The objective of this paper is to consolidate the pros and cons of project based learning and to facilitate the establishment of an effective learning methodology.

1.3 Structure of This Paper

Section 2 outlines the organization of this paper. Specifically, Section 2 provides a case study of project based learning, Section 3 discusses the advantages of project based learning, Section 4 outlines the obstacles of project based learning, Section 5 presents a summary of the key points of this paper, and finally, Section 6 offers a concluding summary.

2. Case Studies of Project Based Learning

Project based learning is a recognized pedagogical approach that has been proven to promote active learning and problem solving skills. However, determining the optimal practices for implementing project based learning in the classroom can be a challenge. To address this issue, numerous case studies have been conducted to investigate the effectiveness of different project based learning methods.

So, this chapter provides examples of the application of project based learning. For instance, Reference [15] elaborates on experiential learning through project based learning. It describes how a group of students formed a team and participated in a business competition, aiming to solve a problem at a company they visited. Following the project's completion, the author contends that the students provided positive feedback, such as "I was able to comprehend the challenges faced by the companies."

Reference [19] utilizes project based learning in the context of programming education. The approach involves providing students with a robot, tasking them with developing programs for the robot, and hosting a competition. The authors found that through this method, students were able to acquire programming skills and theoretical knowledge in an enjoyable and engaging manner.

Additional literature [21] explores the correlation between English language learning and project based learning, while reference [22] delineates the relationship between project based learning and Japanese language education in business. As previously mentioned, project based learning has been implemented in numerous contexts. It is expected that project based learning will continue to gain popularity as a valuable educational approach in the future.

3. Advantages of Project Based Learning

This chapter delves into the manifold benefits of project based learning, which offers a dynamic and student-centered approach that differs from the passive learning experience of traditional lectures or classes [9]. By encouraging independence and active engagement, project based learning fosters practical skills and competencies such as project management, communication, facilitation, and team-building, which are highly transferable and applicable across diverse educational domains.

In Chapter 2, the versatility of project based learning is discussed in detail, spanning various fields such as Japanese and English language instruction, programming education, and project management education. This pedagogical approach provides a comprehensive learning experience that guides students through a structured process, including team formation, identification of central problems, development of problem solutions, implementation of the solutions, and critical reflection upon the results for future steps [10]. Moreover, project based learning not only offers practical skills that are difficult to acquire through traditional classroom instruction, but also provides valuable preparation for professional life [10]. When the project task involves abstract concepts, the educational benefits of project based learning are particularly high, as students must learn how to translate abstract issues into concrete problems that they can address through problem solving techniques [11]. Furthermore, the relevance of the task is crucial in determining the success of project based learning, as highlighted by a recent study [12].

Thus, project based learning provides numerous advantages and is a highly sensible approach to learning. Its student-centered and holistic approach encourages active engagement and fosters practical skills that are applicable across diverse educational domains, making it a valuable and transferable learning approach for the future.

4. Challenges of Project Based Learning

This chapter delves into the challenges of implementing project based learning, which despite its numerous advantages, also presents some obstacles. The specific issues are discussed below, with insights provided by the author.

In actual educational settings, the lack of active learning experiences for students, and the limited teaching experience for teachers utilizing project based learning, can prove to be a significant challenge. Moreover, if students lack strong communication

skills, there may be an insufficient dialogue among team members which can make problem solving difficult, even after the project has commenced. Studies, such as [13], have noted the shortcomings of students' communication skills.

One significant challenge is to effectively integrate desk-based learning and project based learning, and to establish a coherent and effective system of combining these two modes of learning.

When implementing a student-led learning approach, the absence of a manual or framework to promote critical thinking and reflection can result in students feeling uncertain and confused about the task at hand [16]. However, there are few environments in which such frameworks are fully developed. A potential solution is to utilize business frameworks, of which there are numerous resources available in book form [17, 18].

The learning system frequently requires activities that extend beyond the classroom, such as additional discussion outside of class time [15]. As a result, student motivation is directly linked to the team's progress.

There may be circumstances in which students lack the necessary skills to engage in project based learning. In such cases, students should be provided with a systematic learning opportunity before moving on to project based learning.

As discussed in Chapter 3, project based learning necessitates taking initiative. Consequently, project based learning may not be fruitful for students who lack motivation.

Furthermore, the investment of time and financial resources can be substantial, with the latter being a particular concern. In Europe and the United States, some schools offer student internships in collaboration with businesses [13]. In contrast, in Japan, it is often challenging for universities and companies to establish cooperation, potentially leaving students unable to find an industry-academia partner [15]. To mitigate this issue, alternative approaches, such as securing subsidies from national and local governments, could be explored.

For a considerable period of time, project based learning did not receive much attention and thus, there is a paucity of educational resources dedicated to it [15]. Nevertheless, some materials do exist (e.g., [16]). As highlighted earlier, project based learning is not without its difficulties. Nonetheless, as expounded in Chapter 3, it offers several benefits. It is our fervent wish that you do not just concentrate on the challenges but also take into account the merits, and consider adopting project based learning with optimism.

5. Conclusion

This paper presents an analysis of the merits and obstacles associated with project based learning, examined from diverse angles. In the domain of education, a plethora of learning methods beyond project based learning has been explored and suggested. The author holds the belief that it is crucial to thoroughly scrutinize the advantages and

challenges of distinct pedagogical approaches and to select the appropriate educational method depending on the specific context.

Acknowledgments

I humbly express my sincere gratitude to all those who have extended their invaluable support, enabling me to successfully accomplish this paper.

Conflict of Interest Statement

The author declares no conflicts of interest.

About the Author

Takaaki Fujita is usually involved in various system development as a system engineer/IT service manager. His research interests include discrete mathematics, combinatorics, algebra, graph theory, ICT education, and project management. He has a master's degree in computer science.

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