PROJECT-BASED LEARNING IN HIGHER EDUCATION: ENHANCING STUDENT ENGAGEMENT AND OUTCOMES

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Abstract

This research aims to develop a greater understanding of the unique interaction between student engagement in PBL higher education curricula (i.e. the extent and depth of their involvement in a learning experience) and the wider parameters that determine enhanced academic and personal development outcomes. We intend to identify the key determinants and how these experiences are affected by student demographics, module attributes, and perceptions of individual academic strategies adopted. This will enable the construction, subsequently testing, of an integrative model of student engagement and performance in the PBL setting. This research will contribute to new theoretical and pedagogic insights on the impact of PBL within higher education.

Keywords: Project-based Learning (PBL), Higher Education, Student-Centered Learning, Project Management

1. Introduction

I always feel like I'm trying to chase my tail. You can never truly prepare for every aspect of teaching, and new things will always arrive. Whatever needs doing, walking up to the front door or easing someone's anxiety, you have to face it head-on, like your mum flooding her broken car and wanting someone else to sort out the mess. It was an important and integral part of my teacher training. The vast majority of my year as a school direct trainee was spent in schools alongside my mentor, learning by doing as well as through experience and examples, observations, and strategic mentoring. Over the year, I went from watching in the classroom to teaching classes as part of my role working and learning in the institution best suited to me along with excellent mentorship and program management. (Guo et al.2020)(Zen & Ariani, 2022)

This paper describes the findings of an analysis conducted to determine the impact of the use of Project-based Learning (PBL) in higher education. It provides a summary of research conducted to determine whether the use of six dimensions of PBL had a positive and significant impact on student engagement, critical thinking, scientific argumentation, self-efficacy, science identity, and/or personal development. It then describes how the project addressed the

need by ensuring its objectives and outcomes explicitly focused on these six dimensions. We present the evaluation and research methodologies used and our findings. Finally, we discuss how the impact of PBL could be further enhanced if implemented at scale across the higher education sector. Our findings suggest that the use of PBL pedagogy has a positive and significant impact in all six dimensions of the student. PBL is not without challenges, which need to be addressed within a whole institutional approach. Many higher education institutions are incorporating project-based learning (PBL) into their curriculum. Due to numerous definitions and perceptions of PBL, it is essential to first define it.

2. Literature Review

Project-based learning (PBL) has emerged as a promising pedagogical approach in higher education, offering a dynamic and engaging way for students to apply their knowledge and develop critical thinking skills. This approach encourages students to tackle real-world problems, work collaboratively, and present their findings, fostering a deeper understanding of course concepts. (Krajcik & Shin, 2014)

The potential benefits of project-based learning in higher education are well-documented. By engaging students in authentic activities that mirror professional practices, project-based learning can increase student motivation and investment in their learning. (Blumenfeld et al., 1991) Moreover, the collaborative nature of project-based learning allows students to develop essential teamwork and communication skills, preparing them for the demands of the modern workforce. (Blumenfeld et al., 1991)

However, implementing project-based learning effectively in higher education settings presents unique challenges for both students and instructors. Designing meaningful projects that align with course objectives, managing the increased time and resource demands, and assessing student learning can be complex tasks. (Köse & Douglas, 2018) Nonetheless, the potential rewards of project-based learning, such as enhanced critical thinking, problem-solving, and self-directed learning, make it a valuable addition to the higher education curriculum. As Krajcik and Blumenfeld (Köse & Douglas, 2018) note, “Project-based learning offers one way to achieve this goal, as it encourages students to solve interdisciplinary problems that arise outside of the traditional classroom.”

The main idea in PBL is that students are engaged in meaningful projects through which they learn at a deeper level and develop critical thinking and creativity skills. PBL is a student-driven, teacher-facilitated approach to learning, knowledge, and skill acquisition. It requires students to collaborate with peers, construct usable knowledge by linking new and old ideas, relate new science content to student lives, and self-regulate across the weeks or months that the project might unfold (Blumenfeld et al.,1991; Krajcik et al., 1998).

Project-based learning (PBL) is an instructional methodology that enables students to learn by engaging in projects that are complex, meaningful, and grounded in real-world challenges. This approach has been gaining traction in higher education due to its potential to enhance student engagement and improve learning outcomes. Here are several key aspects and benefits of PBL in higher education:

Key Aspects of Project-Based Learning

- Real-World Relevance: Projects are often based on real-world problems or scenarios, which helps students see the relevance of their academic work to their future careers.
- Student-Centered Learning: Students take an active role in their learning process, making decisions about the direction and scope of the project.
- Collaboration: PBL typically involves teamwork, which helps students develop collaboration and communication skills.
- Interdisciplinary Approach: Projects often require knowledge from multiple disciplines, promoting a more integrated understanding of concepts.
- Iterative Process: PBL involves cycles of feedback and revision, helping students learn from their mistakes and improve their work.

Here are several problems of PBL in higher education:

Challenges and Considerations

- Resource Intensive: PBL can require more resources, including time, materials, and faculty support.
- Assessment: Assessing student performance in PBL can be challenging due to the complexity and variability of projects.
- Scalability: Implementing PBL in large classes can be difficult.
- Faculty Training: Instructors may need training to effectively facilitate PBL.

3. Methodology

According to Mergendoller (2018), there are six important criteria elements of PBL high-quality projects. The High-Quality Project Based Learning (HQPBL) Framework was developed by the educators that describe six criteria that must be at least minimally present for a project to be judged “high quality,” and those are (Mergendoller, 2018):

1. Intellectual Challenge and the Accomplishment that enables students to learn deeply, think critically, and strive for excellence.
2. Authenticity is achieved through student projects relevant to their culture, lives, and future.
3. Public Product. Students' work is showcased, discussed, and critiqued publicly.

4. Collaboration. Students can collaborate with peers in person or online and seek guidance from adult mentors and experts.
5. Project Management. Students utilize a project management process to effectively progress from project initiation to completion.
6. Reflection. Throughout the project, students take time to reflect on their work and their learning.

During the assessment process, we utilize a variety of strategies and methods. At the start of the course, students are introduced to the main course objectives and key assessment components. This includes rubrics for project deliverables, reflections, a project management diary, time management, seeking feedback during the course and project development, a final presentation for the public, a self-evaluation questionnaire, and an evaluation of the teacher's guidance and incentives.

To successfully implement PBL, teachers must adhere to key elements of project design: commencing with a complex problem or question formulated by the student or group of students, providing ample time for thorough investigation where students can inquire, explore, research, and interact with materials in a meaningful manner, promoting real-world relevance, allowing students to have a say and make choices in crafting their project, fostering reflection throughout and at the conclusion of the PBL process, offering feedback for project enhancements through critique and revision, and ultimately sharing the product of PBL with the public.

4. Results

The research has demonstrated the negative impact of undergraduate student approaches to learning are diminished while in such student cooperative learning environments. However, there is limited empirical evidence examining the relative effectiveness of different forms of cooperative learning with the student evaluation of their learning courses in higher education. In addition to the deep versus surface approach to learning preferences of students, it has been recognized that academic success is also positively influenced by engaged time and effort. Alternatively, there is an increasing call for a focus on active learning tasks when a student is calling the absence of a high association with a range of student outcome measures collectively under the term of student engagement.

Enhancing Student Engagement

✓ Increased Motivation: When students work on projects that interest them and have real-world applications, they are more likely to be motivated and engaged.

✓ Active Learning: PBL shifts the focus from passive learning (listening to lectures) to active learning (doing and creating), which can be more engaging for students.

✓ Sense of Ownership: Students often feel a greater sense of ownership over their work, which can increase their investment in the learning process.

✓ Relevance to Future Careers: By working on real-world problems, students can see the direct application of their studies to their future careers, which can enhance their engagement.

In this study, we tested the following research objectives and produced some qualitative findings:

- Explored the perceptions and expectations of students regarding the impact of PBL pedagogies within a higher education setting
- Studied the impact of these pedagogies within the higher education curriculum setting
- Identified the key determinants (including student demographics, module attributes, and perceptions of individual academic strategies) of their increased (or decreased) experience capability within the context.

5. Discussion

The emergence of Project-Based Learning (PBL) is considered a methodology that effectively combines content and critical thinking development. Today's successful instructors are intellectual leaders who support their students' ability to learn independently. Autonomous learning is an ongoing process, and starting from kindergarten, students need to become more skilled at evaluating material and managing their knowledge. To meet these expectations within the class period, meaningful projects need to be integrated with standards-based teaching. This approach focuses on project-based learning rather than simply "doing a project". The Buck Institute for Learning (BIE)[1], defines PBL as "a standards-focused systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks." The depth and complexity of the inquiry will depend on the student's age and grade level. Project-based learning aims to create an equal focus on the process and the product while accommodating each student's learning style and emphasizing the student-led learning journey. PBL can take on different formats and definitions, but the BIE model prioritizes standards, content, accountability, and performance, bridging the gap between educational system expectations and educational theory ideals. The term "standards-focused systematic teaching method" implies a well-planned, well-organized process and the essential elements of that process are represented in the graphic below:

[1] https://www.shsu.edu/centers/project-based-learning/k-12.html K-12 Project Based Learning Resources

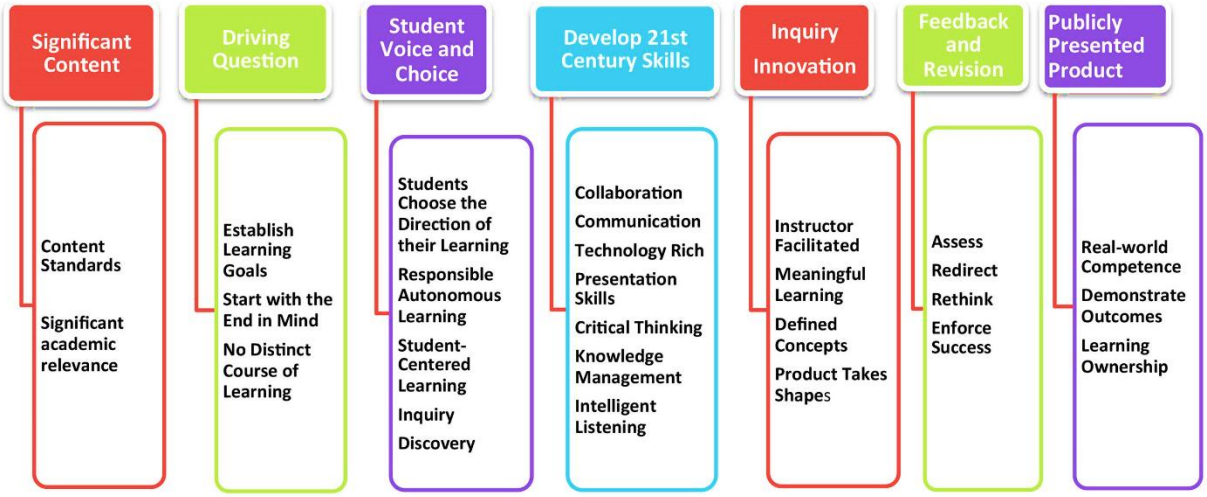

Figure-1. Essential Elements of Project-Based Learning. (Lorin Mayo, 2013)

Table-1. Recommendations for improving efficiency

Improving Learning Outcomes	Implementation Strategies
Deep Learning: PBL encourages deep learning as students must apply, analyze, and synthesize information rather than merely memorizing facts.	Start Small: Begin with smaller projects or integrate PBL elements into existing courses.
Skill Development: Students develop a wide range of skills, including critical thinking, problem-solving, collaboration, and self-management.	Collaborate with Industry: Partner with businesses or organizations to provide real-world problems and contexts for projects.
Enhanced Retention: Engaging with material in a meaningful way can enhance retention and understanding of the subject matter.	Provide Support: Ensure that students have the necessary support and resources to succeed in their projects.
Preparation for the Workforce: PBL helps students develop skills and experiences that are directly applicable to their future careers, making them better prepared for the workforce.	Use Technology: Leverage technology to manage projects, facilitate collaboration, and provide feedback.

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6. Conclusion

Project-based learning can significantly enhance student engagement and learning outcomes in higher education. By focusing on real-world problems and promoting active, student-centered learning, PBL prepares students for future challenges and careers. While there are challenges to implementation, the benefits of PBL make it a worthwhile endeavor for institutions aiming to improve educational outcomes.

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