

Teaching Project Management Through a Campus Sustainability Project

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Abstract. Understanding the intricacies of project management is essential for today's business students. This paper describes the design and execution of a sustainability project conducted by management students in collaboration with the Residence Halls and Facilities Center at a university. The project provided students with practical experience in planning and executing real-world projects, emphasizing the use of Microsoft Project for project management. The impacts of such projects are highlighted through student feedback and the successful completion of recycling awareness campaigns. The course design could be easily replicated by other instructors teaching project management.

Keywords: project management, sustainability, senior projects, service learning.

1. Introduction

1.1. Experiential Learning in Project Management Education

Teaching project management through experiential learning has been shown to be highly effective by providing the students with practical experience in project lifecycle management, team collaboration, and problem-solving, which are critical for their professional development (Abernethy *et al.* 2007). Experiential learning not only enhances student motivation and understanding of theoretical concepts but also develops essential skills needed to tackle real-world challenges (Car *et al.* 2007).

Various experiential learning approaches have been employed, such as service-learning projects, simulation-based games, and team-based client projects. For instance, Dixon (2011) discusses service learning projects that integrate collaborative project management, while Dantas *et al.* (2004) explore the use of simulation-based games for experiential learning in project management.

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Additionally, Cook and Olson (2006) introduced a hands-on activity called “The Sky’s the Limit”, where students construct structures with limited resources, simulating real-world project constraints and teaching core project management principles. Innovative approaches have extended the teaching of project management to younger audiences, as seen in Delle-Vergini *et al.* (2023), where project management principles are introduced to primary school children through gamification and real-life projects. These strategies provide students with real-world experience, enhance their understanding of project management concepts, and develop essential skills such as teamwork and client interaction (Hicks 1996; Hussein & Nyseth 2005).

1.2. Teaching Project Management Across Disciplines

Project management education varies across disciplines, with distinct approaches tailored to engineering, IT, and business students. Rojas, McGill, and Depickere (2006) examined the application of project management practices among IT students, finding that while students are generally aware of project management principles, they often struggle with applying these practices effectively throughout their projects. Munns (2001) describes how engineering students use project management to manage their own learning, focusing on technical and managerial skills within a structured framework. Car, Pripui, and Belani (2010) describe a comprehensive approach where electrical engineering and computing graduate students engage in client-oriented projects closely related to their field of study. This method allows students to apply theoretical knowledge in real-world contexts, fostering both technical and managerial skills. In IT, Venkatagiri (2011) highlights the integration of Agile methodologies, demonstrating how IT students apply these techniques to manage software development projects. Trautwein, Morais, and Kubota (2024) provide a case study of a Junior Enterprise operated by mechanical engineering students, illustrating how the shift to agile practices improved both project outcomes and student learning experiences.

1.3. Teaching Project Management to Different Students

The complexity of project management education often depends on the level of students. Carreiro, Maccari, and Scafuto (2023) highlight the importance of tailoring educational approaches to the specific needs of each group, noting that graduate students often require a more complex and dynamic learning environment that bridges the gap between theory and practice. They also emphasize the importance of experiential learning for both levels, but with a greater focus on developing advanced skills and knowledge for graduate students. Graduate programs typically involve more advanced tools and methodologies. For example, Reif and Mitri (2005) incorporated Microsoft Project in a course for graduate students of electrical engineering and computing, allowing them to gain practical experience in project scheduling,

resource allocation, and monitoring. Similarly, Hicks (1996) discusses experiential learning in a postgraduate program that balances traditional lectures with hands-on activities.

In contrast, undergraduate programs tend to focus on foundational skills and real-world applications without heavily relying on advanced project management software. Courses like those described by Schmitz *et al.* (2015) and Pollard (2012) emphasize team-based projects and client interactions, often without the integration of tools like Microsoft Project.

1.4. Format of the Project

Different formats of project management education offer varying levels of engagement and learning outcomes. Simulation-based projects, such as those discussed by Dantas *et al.* (2004), provide a controlled environment where students can learn and apply project management principles in a simulated setting. Weidman and Farnsworth (2017) describe the use of a small-scale design-bid-build project simulation to teach undergraduate construction management students about project complexities and stakeholder relationships.

Individual projects, like those in Chen (2008), allow students to independently manage small-scale projects, often focused on specific tasks like website design.

Team-client projects, whether on-campus or industry-based, offer more dynamic learning experiences. On-campus team-client projects, as described by Chen and Chuang (2009), involve working with campus departments or other internal clients, allowing students to practice project management in a relatively safe environment. Industry-based team-client projects, as seen in Vavreck (2002) describes how project management principles were applied to multidisciplinary student design projects in engineering technology programs.

1.5. Type of the Project

The type of project can significantly influence the skills and knowledge students gain. Service learning projects, such as those discussed by Dixon (2011), emphasize social responsibility and community engagement, allowing students to apply project management skills in meaningful, real-world contexts. Consulting and research projects, highlighted by Pollard (2012), provide students with opportunities to analyze and solve problems for actual clients, fostering critical thinking and problem-solving abilities.

Website design projects, like those described by Chen (2008), focus on the practical application of project management in IT and design contexts, allowing students to manage the complexities of creative projects. Product and app development projects, discussed by Reif and Mitri (2005), involve managing the lifecycle of software development, from planning to execution,

often incorporating Agile methodologies and other advanced project management techniques.

1.6. Project Management Software/Technology

The integration of project management software is a key differentiator in the educational approaches discussed. While some courses heavily rely on tools like Microsoft Project to enhance learning outcomes, others do not incorporate any software, focusing instead on conceptual understanding and practical application. For example, Reif and Mitri (2005) and Hicks (1996) highlight the use of Microsoft Project in graduate programs, where students gain hands-on experience with industry-standard tools.

Conversely, many undergraduate programs reviewed did not include Microsoft Project as part of their curriculum. Courses like those discussed by Dixon (2007) primarily focused on hands-on experience and teamwork without integrating specific project management software. The absence of Microsoft Project in these undergraduate courses suggests an opportunity for further enhancing the practical skills of management students.

A recent trend in project management education is the incorporation of sustainability principles. Project management textbooks now frequently include sustainability concepts, and the AACSB accreditation body has emphasized the importance of integrating sustainability and societal impact into business curricula (AACSB 2023). Sustainability-focused projects not only align with these educational standards but also resonate with students, who are motivated by the opportunity to contribute to real-world environmental challenges (Hansen & Lehmann 2006). Jääskä, Aaltonen, and Kujala (2021) discuss the implementation of the “Project Business Game” (PBG), a game-based learning tool designed to teach project sustainability management. This simulation allows students to engage with real-world scenarios in a controlled environment, improving their decision-making skills related to sustainability and project management.

Table 1 summarizes the experiential learning approaches in project management education across disciplines.

Table 1. Summary of Experiential Learning Approaches in Project Management Education Across Disciplines

Paper	Discipline	Level	Project Format	Type of Project	Use of Software/Technology
Munns (2001)	Engineering	Undergraduate	Individual	Learning Management	None
Reif & Mitri (2005)	Electrical Engineering/Computing	Graduate	Team-Client (Industry)	Product/App Development	Microsoft Project
Schmitz <i>et al.</i> (2015)	Management	Undergraduate	Team-Client (Campus)	Service Learning	None