

Improving Student Learning in an Operations Management Course: An Integrated Group Project

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Abstract. This article describes a problem-based learning (PBL) approach to teaching core operations management concepts during an undergraduate course. The approach employs a semester-long, open-ended challenge in which each small student group creates a fictional company operating in an industry where there are real large-scale transnational companies, and develops a competitive profile for the company with respect to ten elements of a commonly-taught operations management framework. The results of the PBL-based project are compared to a baseline teaching method of lecture, practice problems, and examinations, and to a simplified case study in which students choose an existing large transnational company and research the company's existing profile throughout the term or semester concerning the ten operations-management decisioning concepts.

Keywords: problem-based learning, teaching brief, operations management, case study.

1. Introduction and Conceptual Foundations

The need for business schools to demonstrate their value proposition and relevancy has been growing for years and has been exacerbated by the economic turbulence and increasing public and private debt experienced during the COVID-19 pandemic. For example, Schlegelmilch (2020) pointed out that pressures from other colleges and non-traditional educational sources are forcing business schools to address popular, current issues. This paper describes an active learning approach to reinforcing learning in an operations

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management classroom that incorporates problem-based learning (PBL) in a semester-long project tied to key course learning topics. The project engages students with course materials in a just-in-time manner that improves course learning outcomes while exposing students to current “real-world” business affairs.

Active-learning pedagogy involves the engagement of students, course materials, and course instructors with teaching techniques such as interactive discussions, problem-solving and case studies. The benefits of active learning are well documented (Prince 2004; Smith, Sheppard, Johnson and Johnson 2005; McEwen 2010; Farashahi and Tajeddin 2018). Raymond, *et. al.* (1993) described how providing “real-world experience” to “help students learn to think and solve problems” is vital in preparing students for a business career following college.

As a common pedagogical technique for active learning, case studies have been successfully used to teach subject matter and critical thinking for decades in many fields including medicine (Crowe, Cresswell, Robertson, Huby, Avery and Sheikh 2011), engineering (Smith, Sheppard, Johnson and Johnson 2005), and business (Brooks, Harris, and Clayton 2010; Barratt, Choi, and Li 2011). Kooskora (2013) describes the value of case-study-based learning compared to a more traditional teaching method (i.e., lecture format with assignments and classroom testing), providing details on the positive experiences of using case studies in their business classes. Lyons and Bandura (2019) discuss how the case study is a way for the instructor to focus on small-group learning within the realm of adult learners and improve learners’ job performance. Structured case analysis, specifically assigning phases of a case study to topics throughout a course, has been used for marketing courses to develop critical thinking skills (Klebba and Hamilton 2007) and as the basis for a semester-long series of student-team activities (Harris-Walker 2000). And, Chulkov and Nizovtsev (2015) describes an integrated case study that employs PBL techniques and student teams, in which the authors covered 10 assignments related to the case study throughout the course, and demonstrated that this method improved students’ performance via the student learning outcomes.

PBL is a learning approach in which students receive a general framework and basic information for an assignment that has many potential solutions, and must conduct research and evaluate tools or techniques to arrive at a desired solution. The pedagogy promotes effective collaboration, problem-solving, and critical thinking skills (Hmelo-Silver 2004; Duch, Groh, and Allen 2001). Miller, Hill, and Miller (2016) apply a PBL approach to teaching Lean Six Sigma in a supply chain course, using a cookie-manufacturer-themed, integrated case study as the foundation for their semester-long project.

For the project described in this paper, we required students working in small groups to select a well-known multinational enterprise (MNE) as a

competitive benchmark and to create a new, fictional company that would compete with their real MNE. For their fictional company, each group was required to develop a mission statement, competitive strategy, Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis, and strategy incorporating ten strategic areas that are included in a typical operations management framework, and present their work products in an oral presentation. Student outcomes are assessed with a 15-question exam supplement (Appendix C) at the end of the course, and results are compared with student performance on the same 15-question assessment in 1) a more traditional lecture, homework, exam course, and 2) a course employing a simplified case study in which students select an MNE and identify characteristics of their company that correspond to each of the 10 operations management strategic areas. Student instructions are documented in Appendix A. A project information sheet (class handout) is included in Appendix B. This study was reviewed by the university's Institutional Review Board and determined to be an exempt pedagogical research project.

2. Create a Competitive Company – Operations Management Study

The Competitive Company project supports the subject matter topics for a typical undergraduate operations management course. We use *Operations Management: Sustainability and Supply Chain Management* by Heizer, Render, and Munson (2020), although the framework and ten strategic areas of operations management covered in this text are common to several major-publisher textbooks. The course topics include a focused study on ten specific strategic areas; students can consider these key elements (learning objectives) when constructing their integrated group project addressing the ten strategies, as shown below.

In addition, utilizing the opening chapters of the text, we focus on important business decisions, such as:

- Naming the company
- Designing a logo
- Developing a Mission Statement and/or Vision Statement
- Developing a SWOT analysis
- Determining the best competitive strategy

The figures below show representative illustrations based on some sample presentations.

Figure 1 - Example of Mission Statement/Competitive Strategy & Logo

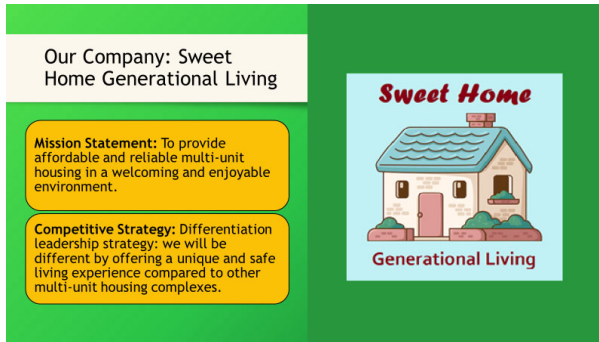
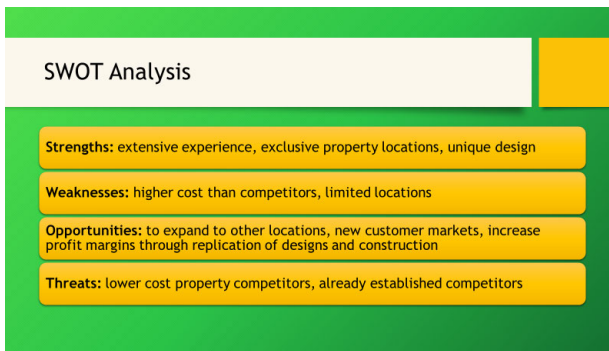


Figure 2 -Example SWOT Analysis



1. Design of Goods and Services – Product life cycle and strategy; Product development system; Create a house of quality; Define goods and services; Documents needed for production; Decision tree application to product design; etc.