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## Construction Case Studies: A Partnership with Engineering News Record (ENR) and the Associated Schools of Construction

**Lantz Holtzower, Ph.D.**  
Kennesaw State University  
Marietta, Georgia

**Brad Benhart and James L. Jenkins**  
Purdue University  
West Lafayette, Indiana

**R. Casey Cline, Ph.D.**  
Boise State University  
Boise, Idaho

**C. Ben Farrow, Ph.D.**  
Auburn University  
Auburn, Alabama

In 2020, the Associated Schools of Construction (ASC) established a relationship with ENR to provide free subscriptions to students and faculty. This collaboration grew to include the development of the ASC ENR Student Edition published four times a year highlighting case studies. This introductory, pilot study sought to explore student perceptions of experience, engagement, and learning from the case studies. Seventy-six senior construction management students at three universities were assigned case studies specifically related to ongoing learning. Students completed an 18-question Qualtrics survey regarding their experiences. Results indicated strong perceived value by students. 76% of students reported satisfaction with the case studies as part of their learning experience. Additionally, 86% reported strong connection to classroom material. However, the survey highlighted areas for improvement. For example, students cited amplified value of the case study when active discussion was included after students considered the questions. The data pointed toward a need for faculty to be better trained on how best to use case studies in the classroom, as well as the need to include discussion and additional related sources. Overall, the results of this pilot study suggested that the ENR case studies are a valuable tool for students in construction management courses.

**Key Words:** Case Studies, Engaged Learning, Real-World Problems, Collaborative Learning

### Introduction

Case studies in higher education provide students with a variety of highly valued educational practices (Herreid, 2005, 2007, p. 200; Nohria, 2021). First, case studies require students to apply knowledge gained in the classroom to real-world problems. This approach aids in critical thinking and problem-solving skills students can use in their future careers. Second, case studies require students to develop research and analytical skills. While the actual cases may provide some information, students

sometimes must conduct additional research and analyze information to solve problems. Third, case studies provide students an opportunity to engage in collaborative learning. This helps students develop teamwork and communication skills – both critical for today’s workplace. Finally, case studies allow students to reflect on their own learning building critical thinking and self-awareness skills.

From a student perspective, case studies can also motivate students, encourage creativity, and promote diversity of thought (Herreid, 2005, 2007; Nohria, 2021). Students struggle to connect items in the classroom with the real world. When case studies are used to bridge this gap, students realize an enhanced motivation to learn. Further, the larger context of case studies often encourages students to think beyond a typical “canned” answer to a professor’s question. Case study questions can also be tailored for students to generate different perspectives on a given issue that can enhance the student’s understanding of how to approach complex problems in practice.

As an applied discipline, construction management is uniquely suited to take advantage of case studies from professional practice. Real-world examples of construction issues, both successful and unsuccessful, allow students to learn from the mistakes and successes of others. And it challenges them to avoid making similar mistakes in their own work. Case studies also offer an opportunity to cover a wide range of topics including project planning, scheduling, budgeting, safety, procurement, and quality control. This allows students to gain a broad understanding of the field and identify areas of interest where they may wish to focus their careers.

At the start of the Covid-19 pandemic in the Spring of 2020, several authors approached ENR publishers about providing E-subscriptions to allow students to receive current construction information remotely. Subscriptions were free and thought to be temporary. The response was overwhelming, and ENR chose to continue following the pandemic. This grew into a partnership that has expanded to include all ASC member schools with thousands of free subscriptions for students.

In early 2021, the team of ENR editors and ASC faculty mapped a plan to develop a regularly published ENR – Student Edition. After discussion, the ASC representatives suggested that the Student Edition also include a regularly published set of case study questions that relate to the articles in the Student Edition. These questions would provide faculty with a prepared way to approach article discussions and provide ready-made assignments for students to prepare for that discussion. Further, the articles could be grouped into categories that better aligned with the classes taught in construction management programs allowing a faculty member to quickly find relevant case studies grounded in current practice. A group of nine construction management faculty (known as ASC Fellows) were assembled and given the task of working with ENR to create the case studies associated with current ENR articles. The fellows target 6-8 articles per edition and develop custom case study questions in addition to standard questions provided with each case study. The ENR Student Edition was first published in late 2021 and has continued through 2023. There are two editions published in the fall semester and two in the spring. Faculty and staff are provided an option to sign up for the student edition after they complete the free subscription enrollment. See Figure 1 for the ENR Student Subscription link on the ASC website and Figure 2 for the ENR Enrollment Page.



Figure 1. ASC/ENR Subscription Link on the ASC website [www.ascweb.org](http://www.ascweb.org)

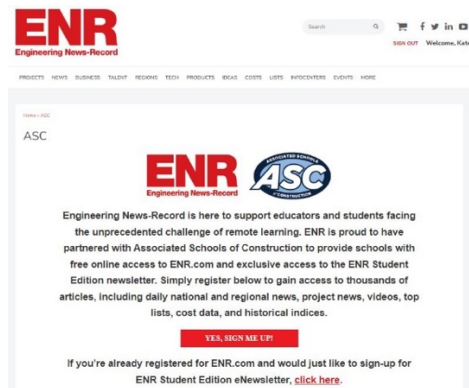


Figure 2. ENR Enrollment Page [www.enr.com/asc](http://www.enr.com/asc)

This introductory research article seeks to explore student experience, engagement, and learning of the ENR Student Edition case studies in the construction management classroom as measured by students who have incorporated their use. Specific questions explored include:

- Q1: To what degree is the student experience enhanced?
- Q2: To what degree is student engagement enhanced?
- Q3: To what degree is learning enhanced?
- Q4: What are the benefits and challenges of these case studies?
- Q5: In what way could the case studies be enhanced?

## Literature Review

### *Case Study Teaching*

In the early 1920s, Harvard Business School began teaching using the case study method (Herreid, 2011). Modeled after what was being done on law cases, the Business faculty started using actual stories of business practices to educate students. A Socratic dialogue emerged where students analyzed specific details of the case study problem. While the method has evolved over time, the

approach is now used in a variety of disciplines where case studies are “stories with an educational message” (Herreid, 2007, p. xiv.). Over time, case studies have been delivered using multiple approaches including large-group discussion, lecture, small-group discussion, and individual case instruction (Herreid, 2011). Multiple variations of each of these approaches exist.

Advantages of case studies include the ability to place the student as an active participant in the story where they are challenged to solve a problem. A meta-analysis of over 1200 studies that explored cooperative learning strategies – including case studies – yielded the following (Herreid, 2005):

- Greater learning and retention are promoted in verbal, mathematical, and physical skills
- Students reported the experience as more enjoyable. They noted better attitudes toward the subject, stronger social skills developed, articulation skills developed, and enhanced tolerance of differing viewpoints as compared to lecture environments.

In sum, there is a positive influence on skill development, and knowledge retention is enhanced as compared to standard lectures.

The disadvantages of case studies can be specific to the way in which classes are delivered (Herreid, 2011). In the lecture approach, students are passive observers. In discussion settings, some students may be reluctant to speak out, and a few individuals can dominate the discussion. Faculty often are not trained in delivering case studies and are left to rely on the limited experience they may have with the process.

#### *Case Studies in Construction Education*

As early as 1991, research shows that case studies were used in the undergraduate construction classroom (Adams, 1991). An instructor at the University of Washington developed a case study segment with the Project Management course that combined the teaching of management and planning skills with the teaching of problem-solving and decision-making skills. Banik (2003) explored a larger case study on how instructors could develop appropriate construction case studies for classrooms for teaching higher-order reasoning skills. Readability and student interest were noted as motivating factors for active student engagement. Depth of topic, time, and subject matter were key elements for instructors to consider.

After seeing the plethora of cases available in disciplines other than construction, the AGC Education and Research Foundation partnered with ASC and began commissioning the development of construction case studies for educational purposes in 2011 (*Implementing AGC Foundation Case Studies into Construction Education*, 2021). This effort has continued since that time and resulted in a series of extensive case studies in a variety of topic areas from site logistics to prefabrication to ethics. Faculty across construction management education may use these case studies to supplement primary educational material.

Erbas (2016) continued exploration of the case study approach in the area of project management education concluding that students not only improved human skills through group interactions but also technical and conceptual skills during all phases of the process.

#### *Gap in Existing Research*

No research was found exploring student engagement, student experience, or student learning related to construction case studies in the undergraduate construction classroom. This is surprising, given the

potential of case studies to engage students and assist them in learning about real-world challenges and solutions in the industry. Case studies on current ongoing news stories could be particularly engaging, as they would promote active discussion and debate on ongoing issues relevant to future careers. If additional information could be better understood, the teaching of construction management could be improved, and students have the potential to be better prepared for success in the workplace.

## Method

The main objective of this study is to investigate the student experience of using an ENR Case Study as part of the academic experience in a class. Specifically, the student experience, engagement, and learning are explored through a survey created for Construction Management students. Institutional Review Board (IRB) approval was obtained to conduct the voluntary survey.

The research methodology consisted of the following steps:

1. Creation of the survey questions.
2. Obtaining IRB approval.
3. Creating a Qualtrics survey to collect student response data.
4. Conducting the survey responses via Qualtrics.
5. Analysis of the survey results.

Survey questions were prepared after an extensive review of similar case study questions and were customized to solicit responses from the use of Engineering News Record (ENR) case studies. The list of eighteen (18) survey questions was finalized after three revisions and a conference call with the authors. A series of initial questions related to demographics and experience with ENR were asked:

1. What is your academic grade? (Freshman, Sophomore, Junior, Senior)
2. Did you know of Engineering News Record (ENR) prior to this case study? (yes or no)
3. Have you read other articles in ENR prior to this case study? (yes, not, unsure)
4. Would you be more inclined to read ENR after participating in this case study? (yes, no, unsure)

Nine (9) questions then followed with responses focused on “rate this question on a scale of 1 to 5”:

1. How easy to understand was the case study presented by the ENR article? (very easy to very difficult) (Q1)
2. How well did the case study engage your interest? (very well to very poorly) (Q2)
3. How relevant was the case study in relation to course topics? (very relevant to very irrelevant) (Q3)
4. How well did the case study help you apply the course material to real-world situations? (very well to very poorly) (Q2)
5. How well did this case study help you work collaboratively with others? (very well to very poorly) (Q2)
6. Rate how the case study compares to a lecture environment. (much better to not better at all) (Q1)
7. Rate how the case study compares to an online learning environment. (much better to not better at all) (Q1)

8. Overall, how satisfied were you with the case study? (very satisfied to very dissatisfied) (Q1)
9. Overall, how effective was the case study in helping you learn the material? (very effective to not effective at all) (Q3)

Five (5) open-ended questions completed the survey:

1. What was the most challenging aspect of the case study? (Q4)
2. What did you like best about this case study? (Q4)
3. What did you like least about this case study? (Q4)
4. How could the case study be improved? (Q5)
5. What action did your instructor take in the case study discussion that added to your learning or understanding of the case? (Q3)

The target population for this research was undergraduate construction management students at three universities based in the different ASC regions. Engagement, experience, and learning were measured through the perceived experience of the student.

The link to the Qualtrics online survey platform was sent to the faculty at each of the three schools utilizing the ENR case studies. Faculty then emailed the survey to the participating population to collect the research responses. Within the Qualtrics survey instrument, the participant's responses to the questions were compiled. No identifying information was collected that could connect the participant to the results. The data was exported into an Excel spreadsheet for descriptive statistical analysis.

The qualitative comments were downloaded into an Excel® file and analysed using qualitative coding. This qualitative data expanded some of the information gleaned by the quantitative components of the work yielding more breadth and depth than either the quantitative or qualitative would have provided alone (O'Cathain et al., 2010). Specifically, thematic analysis was used to better understand student behaviours and needs and to identify opportunities to improve and enhance the case studies. The thematic analysis followed an approach outlined by Braun and Clarke (2006) using the following steps: 1) Become familiar with the data; 2) Generate initial codes; 3) Search for themes; 4) Review themes; 5) Define themes; 6) Write up. In several steps, the authors moved forward and back between steps to better understand the data.

## Results

The survey was completed by 76 senior-level construction management students at three Universities. 59 (78%) had knowledge of ENR prior to the case study, and similarly, 54 (70%) indicated they had read other ENR articles prior to the assignment of the case study. 35 (48%) indicated they would be more inclined to read ENR articles after participating in this study.

### *To what degree is the student experience enhanced?*

47 (64%) of students found the case studies easy to understand while only 9 (12%) found the case studies to be difficult or very difficult to understand. When students were asked to compare the case study approach to other methods of learning, the results indicated a preference for the case studies over lectures and online learning. Case studies were considered better or much better by 36% of students when compared to lecture and 65% of students when compared to online opportunities (Table 1).

Table 1

*Case study experiences of students versus other common learning approaches*

	Compared to Lecture	Compared to Online
Much Better	10 (13%)	17 (22%)
Better	18 (23%)	33 (43%)
Somewhat Better	31 (40%)	16 (21%)
Not Much Better	14 (18%)	7 (9%)
Not Better at All	4 (5%)	4 (5%)

Students were also asked how satisfied they were with the case study. 52 students (77%) reported being very satisfied or satisfied with the case study as presented. 6 students (8%) reported being dissatisfied or very dissatisfied with the case study.

*To what degree is student engagement enhanced?*

When students were asked how well the case study engaged their interests, 48 students (64%) reported that the case study did so well or very well. 7 students (9%) reported the case study did poorly or very poorly at engaging interest. Further students reported strong connection of the material in the case study to real-world situations with 69 students (77%) reporting the work connected the course material either well or very well with real-world situations.

When asked about how the case study supported collaboration with others, 49 students (63%) indicated that the study supported collaboration well or very well with only 5 students (7%) indicating that collaboration was not facilitated.

*To what degree is learning enhanced?*

Students were asked to connect how relevant the case study was to the course topics. 66 students (86%) indicated that the case study was either relevant or very relevant to the concepts studied in the class. When students were asked about how effective the case study was at helping them learn the material, the results were generally positive. 45 students (58%) reported that the case study was very effective or effective at helping them learn the material. When the category of somewhat effective was also included, the percentage of students increased to 90% essentially matching the percentage that indicated the study was relevant to their learning.

When students were asked what actions their instructor took to enhance learning around the case study, several themes emerged. Students appeared to benefit most from open discussion in the class. One student said, the professor “would question everyone’s response to help us see the other side.” Others noted key areas of misunderstanding where the instructor provided clarity. “He explained the situation very well and gave us his knowledge from his experience...but explained how there could be alternative actions taken.”

*What are the benefits and challenges of these case studies?*

Students with limited or no construction experience seemed to struggle with the case studies as identified by this quote: “The most challenging aspect was using my small amount of real-world construction skills to answer the case study questions.” Other students seemed to have similar responses citing challenges in understanding terms, content, and specifics.

Some students pointed to missing key information that would give them the ability to make better answers. Others talked about the challenge associated with having to assume different roles in the case studies from owner to upper management to immediate supervisor. A few students saw a disconnect between some of the content of the article and the case study questions. “It was quite lengthy” or “Too long and hard to understand” were comments made by students.

Students seemed to relish the somewhat ambiguous nature of real-world problems. One student said, “There are no right answers. That is the part I enjoyed—especially the conversation that followed.” Students also appreciated the opportunity to work in groups and have a break from the typical monotony of class. “The discussion. The case studies are...decent but without the communication of the class and the brainstorming of my group, the case studies wouldn’t stick with me nearly as well.” “It’s a cool and effective way of learning and thinking.”

#### *In what way could the case studies be enhanced?*

Student responses seemed to recognize that articles and case study questions were developed separately. One student said, “Add more of an introduction and conclusion”.

Several wanted the case studies to be easier to read and comprehend. “Dumb it down.” “Explain more thoroughly.” “More concise.”

Finally, some students reported that the case study was simply given as an assignment to be submitted in a written format. The professor “made us write a paper about it, and I didn’t get a lot out of it.” “He just made us read it and take the quiz.”

## **Discussion and Conclusions**

All the quantitative data received indicated students perceive positive experiences regarding engagement, experience, and learning about the ENR case studies. Students found the strongest connections with application of class material (86%), the connection of course material to real-world situations (77%), and general satisfaction with the assignment (76%). These comments suggest the ENR case studies are effective ways to engage students in the class material and perhaps suggest the importance of a broad and diverse set of case studies that correspond to needed student learning outcomes.

Previous work by Banik (2003) cited readability and student interest as motivating factors for active student engagement with encouragement for instructors to consider the depth of topic, time, and subject matter as key elements. This research matched Banik’s findings with a key emphasis on the real-world application of the case studies. Instructors in this pilot study appeared to connect well the selected case study with the subject matter in the class.

Students recognized deep value in the class discussion following the case studies. Students who did not have such discussions did not seem to gain the value experienced by others. Interestingly, the case studies have been created without any real instructions to professors on how to use case studies in the classroom. Training to faculty should be provided to show them how to maximize the engagement and learning associated with case study opportunities.

Several students mentioned a lack of understanding of the terms or conditions within the case. None mentioned using outside sources or seeking unknown information in some other fashion. Perhaps the



training of faculty could also include encouragement to faculty to set expectations for students that they may have to do research beyond the document provided to fully understand the situation.

This study only explored the experiences of 76 senior students in three university programs and is not intended to represent the experiences of all students who have used the case studies. In addition, the study did not control how the instructor used the case studies. Additional research is needed to more deeply explore the learning and experience of students who use the case studies. For example, what is the impact of case studies on-specific student learning outcomes? Also, this study did not explore how case studies were perceived to impact critical thinking and problem-solving skills.

In addition to identifying future studies and resources, this data has identified best practices that can be incorporated today:

1. Introduce the case study in class and identify unknown terms.
2. Review the questions with the class prior to the assignment.
3. Identify additional resources for students to refer to in their problem-solving phase of the case study.
4. Provide opportunities for small group problem solving followed by large class discussion.
5. Debrief with the students on how to improve the next case study.

In summary, the partnership with ASC and ENR has been valuable for the faculty and students. The data collected will help guide and refine future student editions including best practices for instruction.

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