Introducing Undergraduates to Instructional Design in a Graduate Studio: An Experiential, Model-Centered Approach

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This case study describes a combined graduate and undergraduate instructional design studio that introduced undergraduate students to instructional design in a multifaceted, holistic, and applied way. Reviewing the experience of the undergraduates in the course, this design case describes four learning interventions used to create this applied experience: (1) instructional design team projects—one non-profit and the other in higher education, (2) weekly seminars and biweekly training sessions from field experts, (3) an experiential out-of-state trip, and (4) weekly reflection journals. These studio-based learning interventions are presented within the context of the Experiential Learning Theory and Model-Centered Instruction. Overall, the course introduced the undergraduate students to the field of instructional design in an applied and experiential format.

Introduction

This case study describes a learning experience at Brigham Young University (BYU) offered in a course, "Interdisciplinary Product Design for Education," and describes how undergraduate students were introduced to instructional design using a multifaceted, holistic, and applied approach. This course provided undergraduate students with an opportunity to work closely with graduate students in the Instructional Psychology and Technology (IP&T) program as part of an advanced instructional design studio described in an earlier issue of this journal (McDonald et al., 2022). During fall semester, the graduate students in the advanced course selected two clientele from six interested parties, conducted user analyses and background research, and formed plans to prototype real-life instructional design projects. In the following spring semester, the undergraduates joined the graduates to complete the designated projects. These authentic design team projects acted as one of four learning interventions used in the course. The other interventions included training sessions and seminars from experts in the field of instructional design, an experiential grant trip to San Francisco, and reflection journals completed throughout the semester.

While the goal of the course was to introduce undergraduates to instructional design, students enrolled in the course for a variety of reasons and personal goals. Some students hoped to expand their connections, resume, and knowledge while experiencing the actual work of instructional designers. Others wanted to learn instructional principles to apply to their professional pursuits in entrepreneurship or engineering. Some students used the course as a starting point in pursuing graduate school in instructional design. Finally, the course acted as a capstone for the undergraduate students who were completing the Design Thinking minor at BYU.

Three professors facilitated the four learning interventions for these students: One professor oversaw the graduate students in the course, while another focused on the undergraduate students and experience. The third instructor prepared and led the experiential grant trip to San Francisco. With the guidance of these three professors, this course provided a holistic, multifaceted, and applied learning experience for the undergraduate students. This design case describes the four interventions of the course within the framework of two learning models. It also reviews the undergraduates' experience with each intervention.

Pedagogical Approaches

The learning interventions used in this instructional design course were contextualized by aspects of two pedagogical frameworks: Experiential Learning Theory (ELT) and Model-Centered Instruction (MCI). The ELT was introduced in 1984 by David Kolb and is widely used by scholars and educators today (Morris, 2020). Kolb (1984) defined experiential learning as a four-part cycle, which consists of (1) concrete experience, (2) reflective observation, (3) abstract conceptualization, and (4) active experimentation (see Figure 1).

In this case study, concrete experience refers to learners' active participation in situated, novel, and real-world experiences (Morris, 2020). Reflective observation is the opportunity for learners to critically review the experience and find or create meaning from it (Burns & Danyluk, 2017; Davitadze et al., 2022; Schön, 1987). Abstract conceptualization refers to the learners' attempts at drawing conclusions from the experience; they form new or modified ideas about the information at hand (Burns & Danyluk, 2017; Davitadze et al., 2022; Kolb, 1984). Finally, active experimentation is the learners' chance to apply their new understanding to further experiences (Burns & Danyluk, 2017; Kolb, 1984). Aspects of Kolb's four-part ELT cycle were observed in each of the four interventions.

Figure 1

The four stages of the Experiential Learning Cycle as described by Kolb (1984)

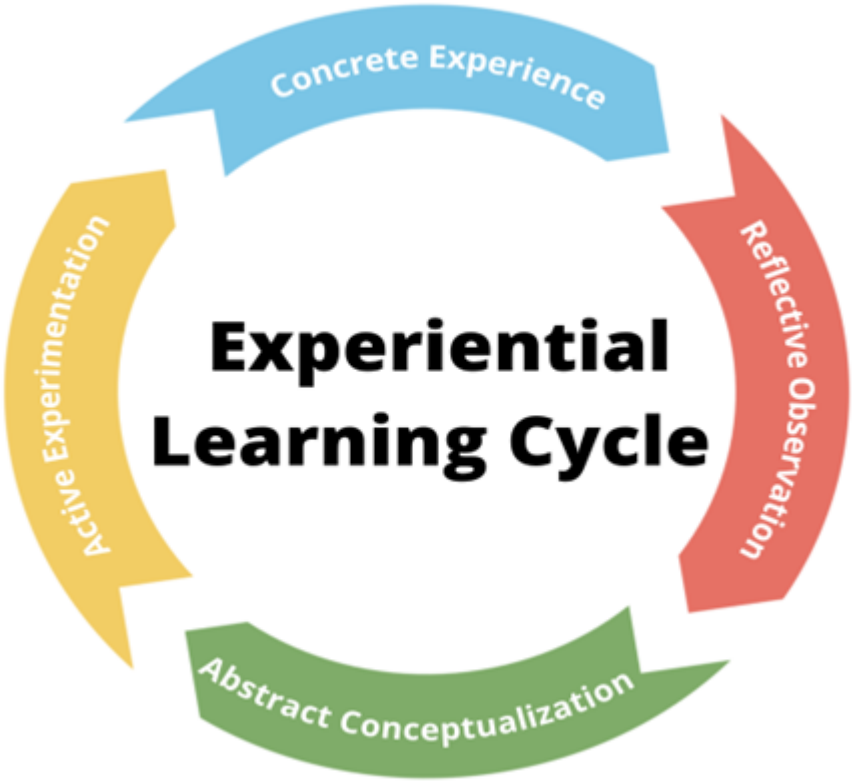

Figure 1. Experiential Learning Cycle: concrete experience, reflective observation, abstract conceptualization, active experimentation

MCI was developed by Andrew Gibbons (Gibbons, 2008) in 2001 as a way of carrying out dynamic model content. Dynamic simply refers to the constantly changing nature of the content that then necessitates adaptation (Gibbons, 2008). The purpose of MCI is to take these complex and dynamic situations and simplify them into consumable interactions that allow the learner to investigate, experiment, and practice skills (McDonald, 2018). Gibbons defined the process of MCI through seven principles (Gibbons, 2001). The seven principles of MCI are (1) experience with models, (2) problem solving, (3) denaturing, (4) sequence, (5) goal orientation, (6) resourcing, and (7) instructional augmentation (see Figure 2).

In this case study, experience with models refers to the modeling of a real-world design studio with clients, products, and feedback from instructors and graduate students (McDonald, 2018). Problem solving refers to being presented with a problem or observing a problem that requires solving. Denaturing is the modification of a model or scenario to facilitate learning. Sequence refers to the ordering of problems by task, size, or another hierarchy to facilitate learning (McDonald, 2018). Goal orientation is achieved by selecting problems that support specific learning goals or outcomes. Resourcing is providing the appropriate resources to support the achievement of the goals for instruction (McDonald, 2018). Instructional augmentation is the implementation of additional learning activities and materials that help the learner through the learning process. These are sometimes referred to as learning companions (McDonald, 2018). Portions of each of these seven principles are used throughout the interventions.

Figure 2

The seven principles of Model-Centered Instruction as described by Gibbons (2001, 2008)

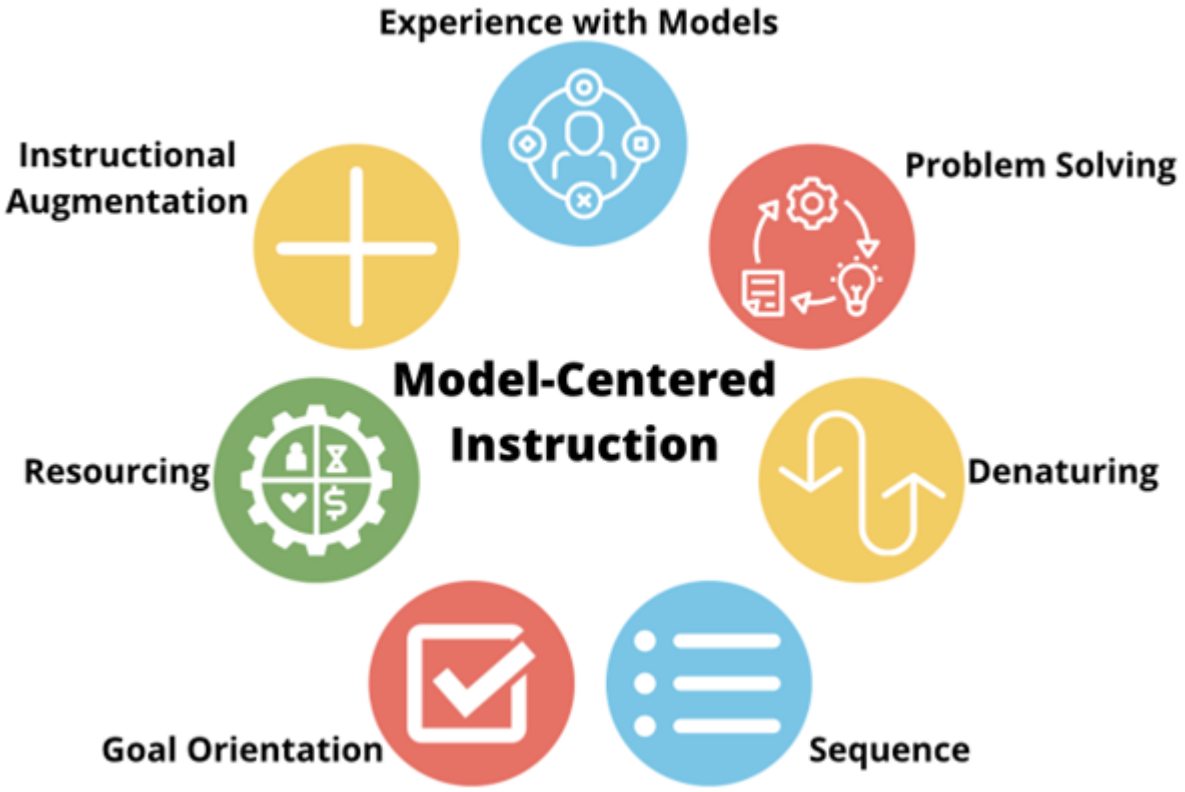

Figure 2. Model-Centered Instruction: models, problem solving, denaturing, sequence, goals, resourcing, augmentation

Interventions

The course, Interdisciplinary Product Design for Education, included four main instructional interventions, contextualized with the ELT cycle and MCI approach. These interventions include (1) the two design teams, (2) training sessions and seminars from field experts, (3) an experiential grant trip to San Francisco, and (4) the students' reflection journals. This section will detail how the four interventions fit in the ELT and MCI approaches, describe what the students did, and highlight learning outcomes for the students.

Design Teams

The No More a Stranger (NOMAS) design team and the Business design team were the primary setting for the students' learning experience (see Figure 3). In terms of the ELT cycle, the design teams acted as both concrete experiences and active experimentation. Students were actively engaged in a novel, real-world experience, and the design teams acted as an opportunity for the students to apply instructional design concepts. Similarly, the principles of problem solving, denaturing, sequencing, goal orientation, and experience with models from MCI were implemented. The teams set goals and deadlines while prioritizing tasks and deliverables. The teams also modeled real design teams working under the direction of project managers with constant communication between the clients and the teams. Denaturing was achieved through the unrealistic, semester-long length of each project (both projects would have been accomplished much faster in a real-world setting), giving students opportunities to experiment and learn new skills.

Figure 3

The two design teams, NOMAS (left) and Business Team (right), meet to work on their projects

Figure 3. Pictures of the NOMAS and Business Team, both at tables working on laptops

No More a Stranger (NOMAS)

The first team designed and prototyped a micro-learning instructional product for a non-profit foundation called No More A Stranger (NOMAS). NOMAS is an organization that assists individuals seeking entry into the United States and provides guidance through the various methods of entry that individuals can pursue. NOMAS' mission is to "advocate on behalf of and together with individuals from immigrant, migrant, and refugee backgrounds to strengthen our communities" (NOMAS, n.d.). NOMAS fulfills this mission through the work of volunteers and a team of legal representatives.

NOMAS's Challenge: ELT Concrete Experience. In realizing this mission, NOMAS faces the challenge of training new volunteers in immigration legal practices, so, in turn, they may train those interested in their services. In the past, NOMAS held an eight-week training course (both in-person and using video conferencing software) in which a member of the full-time staff trained new volunteers on skills and knowledge. With increased demands on the full-time staff, it became difficult to balance teaching with other responsibilities. Members of the NOMAS staff approached BYU's IP&T department seeking help in designing asynchronous instructional materials to facilitate the training of new volunteers while also alleviating pressure from full-time staff.

Addressing the Challenge: MCI Problem Solving, Sequencing, and Resourcing. The first design team addressed the NOMAS challenge by developing an asynchronous eight-week course. Prior to the inclusion of the undergraduate students, graduate students developed learning and performance outcomes for each lesson built on an analysis of the previous course content and in collaboration with NOMAS staff. All pre-development analysis and development work was created by the graduate students and stored in a Google Drive folder. Workflow was managed using the workflow software application Trello (Trello, n.d.) and a Gantt chart created using Trello (see Figure 4).

Figure 4

NOMAS Gantt chart for organizing lessons and workflow

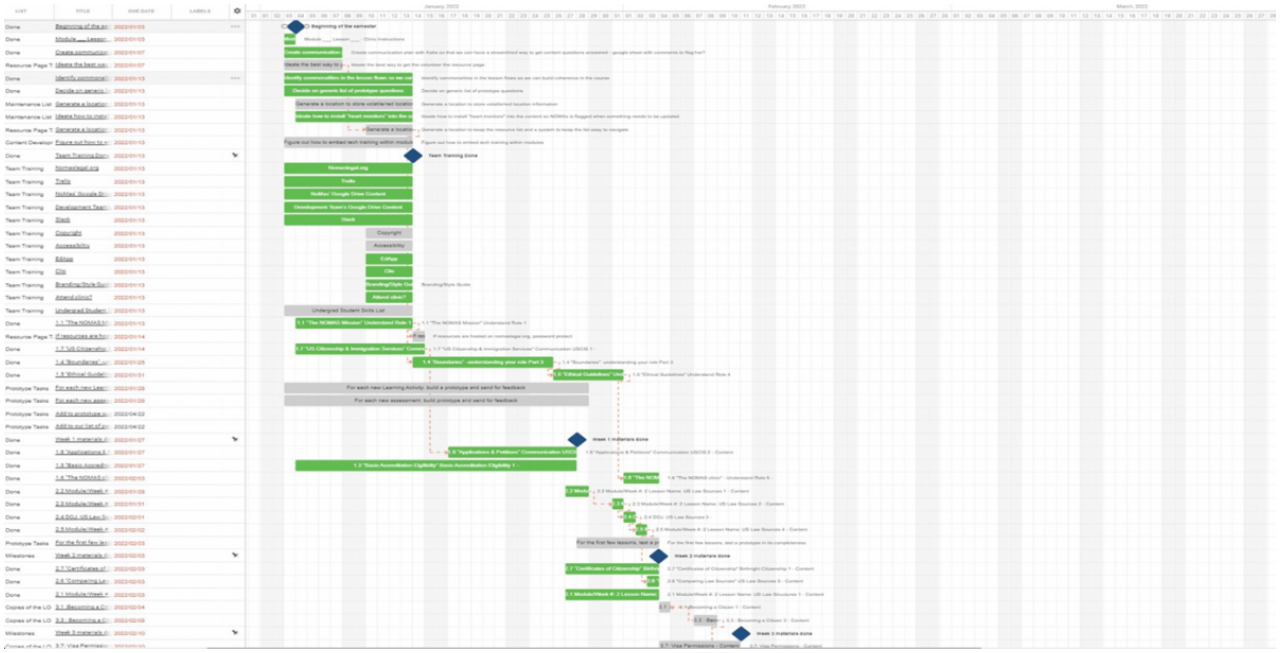

Figure 4. A Gantt chart with the organization and workflow of the NOMAS group

Through Trello, all team members (undergraduates included) were able to monitor the development of lessons and select which lessons to develop themselves (see Figure 5). Initially, undergraduates were assigned lessons based on the simplicity of the lesson's content because they did not have the background knowledge of the graduate students. All development work utilized rapid prototyping (Dong, 2021) and peer review—two team members reviewed every lesson to ensure the quality of each lesson. A content development checklist was used to standardize the approach each team member had when developing their assigned lessons. After various learning management software (LMS) was researched, EdApp (EdApp, n.d.) was selected as the ideal learning platform to deliver the instructional material.

Figure 5

NOMAS Trello sheet for organizing and assigning work between different team members

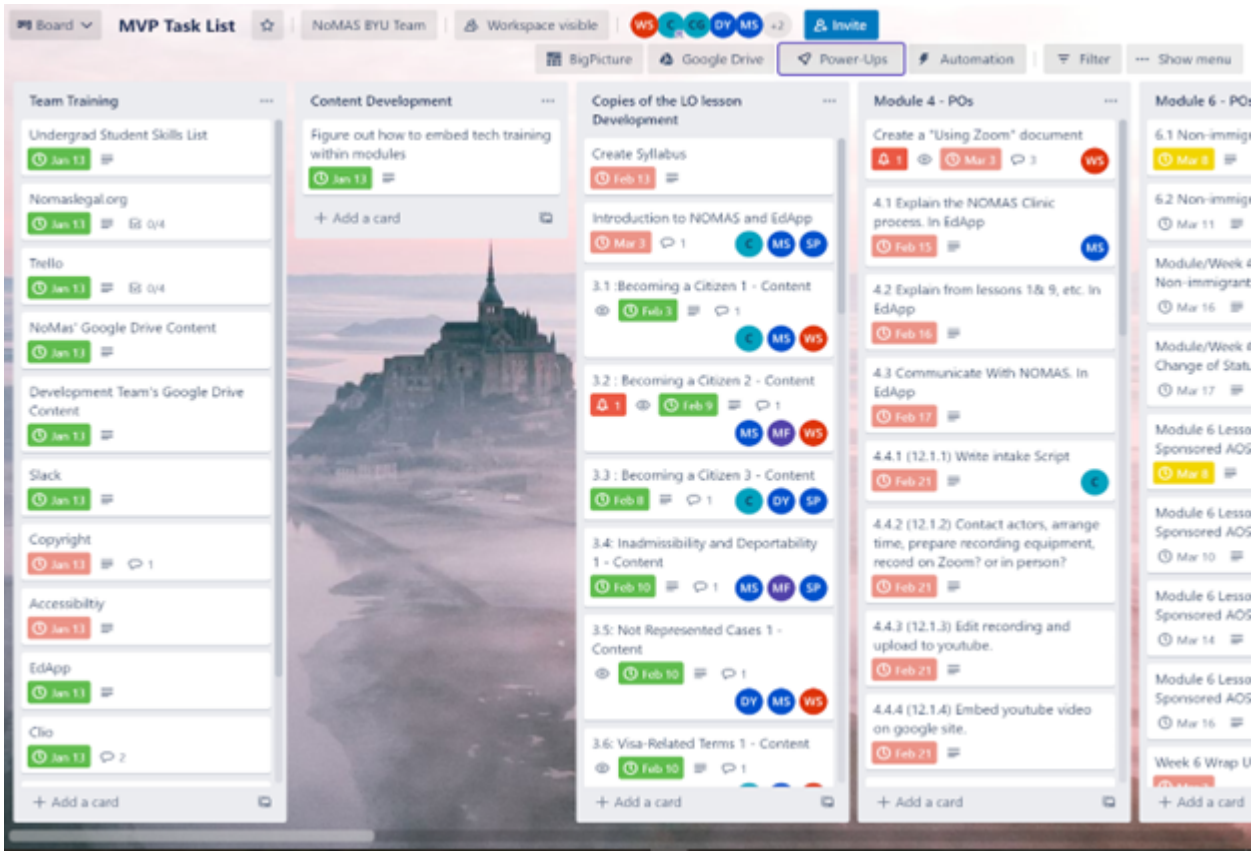

Figure 5. A Trello sheet with tasks assigned to different NOMAS group members

Undergraduate Participation: ELT Active Experimentation. As the semester progressed, the undergraduate students engaged in more skill-specific tasks. One student's background in film, as well as her access to filming equipment and locations, enabled her to work with a graduate student to film mock interviews and clinic sessions. This student was the primary editor for the final versions of the videos used in three weeks' worth of lessons. Another undergraduate with considerable experience in video conferencing developed a training sheet for volunteers using Zoom, a video conferencing software (Zoom, n.d.). This sheet used videos to teach NOMAS volunteers how to navigate Zoom in a professional setting. This was necessary as the personas developed by the aforementioned design team represented some who struggle using technology. This sheet also met accessibility standards and was included in the resources portion of the final online class. These undergraduates worked as equal partners with the graduate students and each developed multiple lessons for the eight-week course. The graduate students mentored the undergraduates to provide guidance and support while still allowing them to work independently.

Business Course

The second team formed an instructional product for BYU's Marriott School of Business (MSB). The MSB sponsors a nationally ranked education to thousands of students each year (BYU Marriott School of Business, n.d.) and offers a variety of undergraduate and graduate business-related degrees in fields like accounting, information systems, human resources, and more. The MSB also offers a minor in business.

The Business School's Challenge: ELT Concrete Experience. However, the MSB lacks an integrative, introductory business course that could address two issues faced by some students at BYU. First, certain non-business major students are interested in learning business principles and skills to apply to their professional interests and widen their career options. Second, some business students begin their education in a business discipline major with little to no background experience in the field. These students may feel stuck and regret their decision. In both cases, an integrative, introductory survey course would expose these students to the disciplines of business and help them

develop business skills to use in their professional lives. The MSB approached BYU's IP&T program hoping for assistance in completing the design and construction of this introductory, survey course for non-majors.

Addressing the Challenge: MCI Problem Solving, Goal Orienting, and Resourcing. Addressing the needs of their clientele, the second design team created a semester-long, asynchronous course that will introduce business minor or non-business major students to the principles and skills of business. The course is presented using the Canvas LMS (Canvas, n.d.) and follows the basis of three learning outcomes identified by the clients' requests and a learner analysis conducted by the graduate students in the previous semester. The learning outcomes are to (1) understand key business principles in a variety of settings, (2) apply business skills to improve real organizations, products, or services, and (3) demonstrate integrative thinking of business topics to address real problem-solving experiences. Throughout the semester, this design team worked with subject-matter experts (SME) from the MSB to form content, assignments, and projects that would assist the students in meeting these learning outcomes. This process was guided by a project manager—one of the graduate students—and the assistance of Trello boards, a Gantt chart, and two team meetings each week during the semester.

Undergraduate Participation: ELT Active Experimentation. The undergraduate students on this team participated in the design process in two main ways. First, each team member designed content and created assignments for their discipline with the help of a subject-matter expert (SME), who was typically a faculty member in the MSB. As an example, one undergraduate formed the content for human resource management and organizational behavior (HR/OB). To do so, this student worked closely with an HR/OB professor, as SME, to create content and assignments that would meet the needs of the clientele and help future students meet the course learning outcomes (see Figure 6). The second way in which the undergraduates participated in the design process was by addressing different needs of the course as a whole. For example, the undergraduate students on this team worked together to create a Canvas structure that would accommodate the unique needs of the different business topics while maintaining uniformity and integration throughout the course. Overall, the undergraduates in this group were given opportunities to experience instructional design in a real-world setting.

Figure 6

One part of the business team's final product on as viewed on mobile

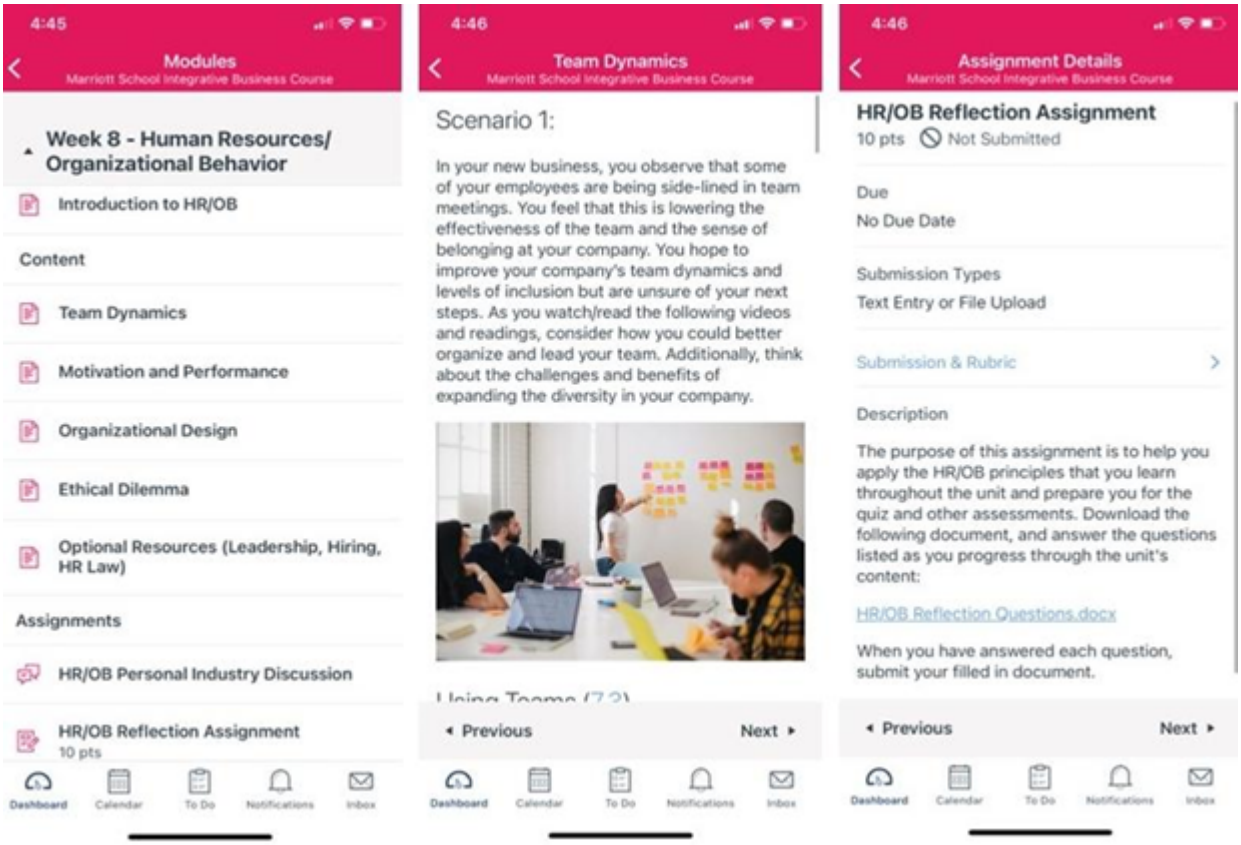

Figure 6. Mobile screenshots of a Canvas module and pages

Outcomes

As the undergraduate students participated in these instructional design projects, at least five outcomes were realized as reported in the undergraduate students' reflection journals and researchers' observation notes. First, the students experienced the kind of work that many instructional designers do in non-profit, corporate, and university settings. It helped them to see the outcomes and challenges of working in teams and with clients and SMEs. Second, designing courseware helped the undergraduates apply a variety of learning and instructional theories beyond learning these concepts abstractly. Third, the students created an actual instructional product that can be added to their design portfolios and resumes. Fourth, building the course encouraged the students to use design-thinking processes. In doing so, they came to better understand the need for continual empathy, rapid prototyping, testing for feedback, and other parts of the instructional design process (Doorley et al., 2018). Finally, working in this concrete experience introduced the students to learning management systems as well as a variety of project management techniques and tools they will use later in their careers.

The undergraduates' learning experience was positive overall, but they felt that it took some time for the graduate students to fully embrace and integrate the undergraduate students into their teams. In retrospect, this should have been better anticipated—the graduate students had already spent the previous semester working together on their respective design projects. While one group successfully integrated the undergraduate students into the team's workflow, the other group struggled to find a place for the undergraduate students, especially early on in the project. This left these undergraduates with little work and limited learning opportunities until later in the semester. In future iterations of the course, the undergraduates could be offered the opportunity to join the graduate students for their capstone experience the first semester, rather than the second, or change the capstone experience for the undergraduate students to a two-semester class, as it is for the graduate students. Conversely, faculty could help the graduate students better prepare to welcome and integrate the undergraduate students into their teams and add a measure of accountability to the expectation.

Seminars and Training Sessions

A second intervention used in the course included biweekly training sessions and weekly seminars from experts in the field. These opportunities acted as a second concrete experience in the ELT cycle; the undergraduate students were invited to participate in discussion and lecture-based experiences covering a variety of topics. This then led to reflection, contextualization, and experimentation of those topics in their design team projects. These trainings served to support instructional augmentation when analyzed using MCI principles as additional instruction was given to the students outside of the project workspace. These skills, while pertinent to instructional design, were not always directly related to the work that they were engaged in within their respective design teams but served to expose students to a broader understanding of instructional design.

The weekly seminars are part of a half-credit hour class offered by the IP&T department for faculty and graduate students, which the four undergraduate students were encouraged to attend each week. A sample of some of the presentations given by other professors and experts included the following: “Chigen-iku: A universal performance improvement method,” “Learning Engineering . . . ,” “Conversational Instruction and Message Layer Design,” “Learning Experience Design: Why Content Alone Isn't Enough,” and “Improving STEM Teaching and Learning.”

For the four undergraduate students enrolled, the professors also provided 30-minute, biweekly training sessions offered by experts in the field on topics relevant to their instructional design work for the design team projects (see Figure 7). The titles of training sessions included “User Interface Design,” “Methods of Design,” “Microlearning,” “Blended Learning,” “Graphic Design for Learning,” and “Adaptive Comparative Judgment.”

Figure 7

Undergraduate students participating in one of the bi-weekly trainings offered by a field expert

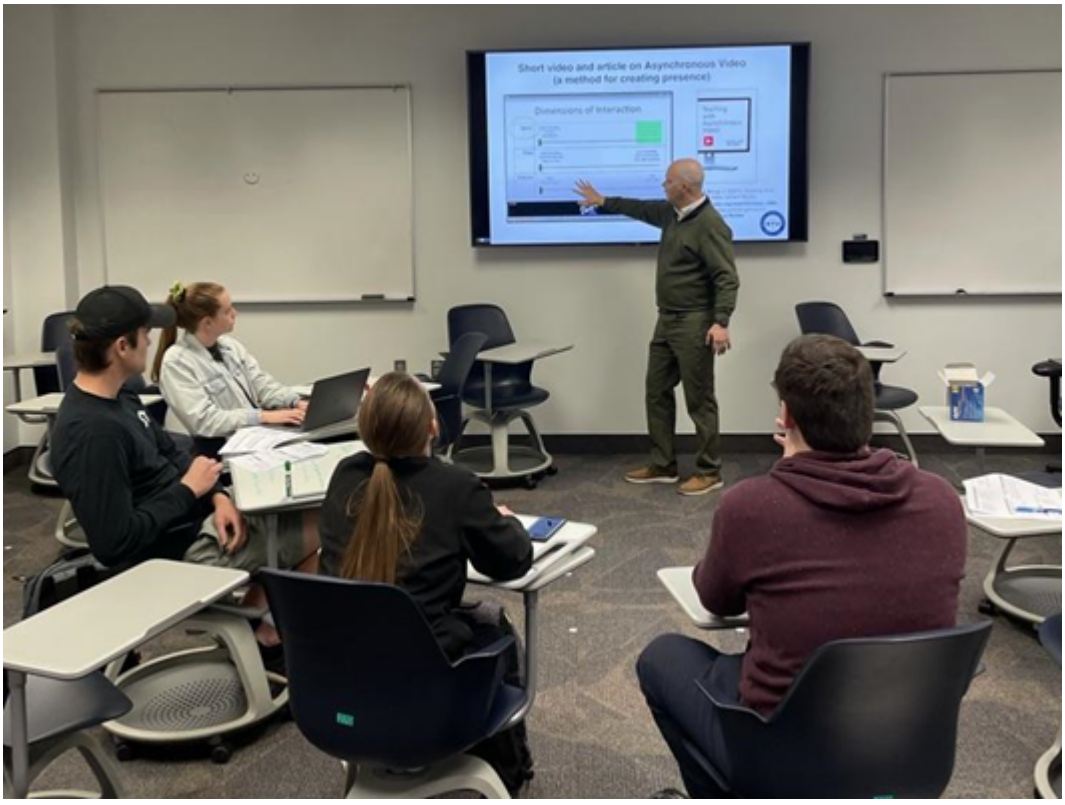

Figure 7. Guest instructor presenting to four students

Based on the undergraduate students’ reflection journals and researchers’ observation notes, the weekly seminars and biweekly training sessions led to three main outcomes for the undergraduate students in the course. First, the students

were able to interact with faculty and students currently in the IP&T graduate program. As some of the undergraduates are interested in the program, this helped form relationships and connections to assist their educational futures. A second outcome from training sessions and seminars was students were able to gain further knowledge about the processes, theories, and research surrounding instructional design. This helped students better apply instructional design topics to their own design projects. Finally, the training sessions and seminars acted as an opportunity to network with and learn from professional experts in the field of instructional design. These connections will help the students in their professional pursuits and give the students insights into the many ways that an IP&T education can be employed.

However, one challenge came with the timing of the biweekly training sessions. Each training was given during class time, which is when the design teams worked on their projects. Only the undergraduate students attended these training sessions, so the graduate students on the design teams would oftentimes continue their planning and work while the undergraduates attended the training. This sometimes left the undergraduates behind on the decisions and progress made on the team projects. This challenge might be easily resolved by including the graduate students in the training; they, too, would benefit from these training sessions, if for no other reason than to further network with other professionals in the field.

Experiential Grant Trip

The third intervention for student learning was an experiential grant trip to California. Thanks to generous donors, some students—including the four undergraduate students—were given the opportunity to participate in a field trip to San Francisco, California, where they observed design processes in action in the unique instructional design elements of Alcatraz Island (Boling, 2014) and the Exploratorium (King et al., 2018). They also participated in instructor-led, reflective discussions about their experiences. In this way, the field trip facilitated reflective observation and abstract conceptualization in Kolb's (1984) ELT cycle. Within MCI, field trips act as a way for students to experience models outside of those in the studio. Students can also see various instructional models in action and consider ways of implementing them within their own designs. This was an example of instructional augmentation as students participated in an activity outside of the original scope of their project that provided them with additional learning opportunities.

Alcatraz Tour

Alcatraz has been transformed from the United States' first high-security prison to an innovative museum experience that takes patrons through the lives of many of the prisoners that stayed behind its walls (Boling, 2014). Students were given an afternoon to explore and interact not only with the cellhouse tour, but with the many other exhibits and locations found on the island (see Figure 8). Students were then brought back together, in larger group settings, and discussed what they learned from Alcatraz; specifically, how what they learned could relate to the projects they were currently engaged in. Students found that the Alcatraz experience, while initially not having much to do with their projects (NOMAS and the business course), had more in common with them than they thought. The Alcatraz designers had the same basic goal as the two groups: to help learners relate to the information presented and understand how it could apply to them. Some pointed out that this gave them new ideas and expanded their view of what learning could look like in different settings.

Figure 8

Members of the design teams (both undergraduate and graduate) and faculty at Alcatraz Island

Figure 8. Members of the design teams (both undergraduate and graduate) and faculty at Alcatraz Island

The Exploratorium

The Exploratorium is an innovative collection of interactive science exhibits ranging from physics to life sciences to psychology (King et al., 2018). The students were given the morning to explore and interact with the exhibits in small groups of two to four (see Figure 9). Within their small groups, and later with the instructors, the students were encouraged to discuss how different design experiences in the Exploratorium could relate to their design team projects (NOMAS or the business course), work problems, or projects for other classes. For example, some students discussed how they could prototype more interactive content into their design projects. Others mentioned how they wanted to add more authenticity to their project. In short, the students' time at the Exploratorium allowed them to observe how the design process resulted in real-life products and experiences like what they were doing to create instructional products and experiences for their clients in their design studio.

Figure 9

Design team students interact with an educational exhibit in the Exploratorium

Figure 9. Students interacting with a musical exhibit at the Exploratorium

Outcomes

Research shows that field trips are uncommon in higher education, yet when they take place, they assist student learning in a variety of ways. These include a greater sense of connection between their peers and instructors, increased intrinsic motivation, and more opportunities for non-traditional learning (Fedesco et al., 2020). Students from the 2018, 2019, and 2022 experiential trips reported similar results along with a few other outcomes in a qualitative survey that they completed shortly after their trips. For example, some of the students who observed design processes firsthand mentioned how valuable it was to see their studies contextualized and applied in a real-world setting. It also helped inform the direction and plans of others concerning their future schooling, research, and career. While not surprising, one challenge was that the experiential grant trip exacted extensive planning and preparation. One of the professors did all the work—from application to arranging venues, transportation, and housing, and then leading the two-day trip. To address this challenge, future professors might employ students (even students in the course) to help with planning and logistics. This would be another concrete experience for the students.

Reflection Journals

The final intervention of the instructional design course included reflective journal entries that the four undergraduates completed each week. Journaling acted as another opportunity for reflective observation as part of the ELT cycle. Each student was encouraged to reflect on their experiences thoughtfully and critically throughout the week and construct meaning from their own experiences as part of (or participants in) the graduate-led design teams, expert training, and the experiential trip to San Francisco. While the MCI model lacks a specific principle of reflection and feedback, the case can be made that the principles of instructional augmentation and goal orientation include reflection and feedback.

In this course, the students were asked to write and submit a half- to one-page reflection each week. These reflection entries were to include a thoughtful reflection of the students' experiences and lessons learned in their team project and

related learning activities. For example, parts of one student's final reflection entry are shared below:

> *It's not often that you end a course feeling truly accomplished and proud . . . I felt like every class period was productive and useful and I learned like I would on a job. I think skills are best taught when students are trusted to figure things out while also providing them with support systems. By the end of this course, I was able to do as much as the graduate students in developing and creating content . . . We worked so well because we worked as a team rather than as a class. I think that classes work to achieve the low-hanging fruit or the bare minimum. A team has a clear understanding of what they want to do and sets standards to ensure that the final product is quality and even goes beyond what was asked . . . I feel like this class was the best way to recognize what skills I had and what skills I wanted to develop.*

This student was able to use reflective journaling to assess their progress in the course, evaluate progress, and construct meaning from their learning experience.

Such use of reflective journaling as an academic exercise to promote deeper learning and lifelong learning is an accepted teaching practice and assessment activity (Allan & Driscoll, 2014). An important outcome for the teacher is that the journaling activity provides insight on how the student is doing, how the class is going, and what things the teacher can do to improve the learning experience—if not with the current class, then in a future class. An important outcome for students who are encouraged to journal as part of the learning (and design) experience is that it helps them learn by improving their metacognitive skills and deepening their critical thinking as they write and reflect (Sternberg, 1998). Along with these outcomes, the undergraduates felt reflective journaling helped them assess their progress, fill or connect gaps in their knowledge, and set personal learning goals.

Conclusion

This design case described a graduate instructional design studio that was used to introduce undergraduate students to instructional design with a multifaceted, holistic, and applied approach. First, the course was analyzed through the lens of two pedagogical frameworks. The first was Kolb's ELT, which includes concrete experience, reflective observation, abstract conceptualization, and active experimentation (Burns & Danyluk, 2017; Cherrez & Nadolny, 2017; Davitadze et al., 2022; Kolb, 1984; Morris, 2020). The second was Gibbon's (2001, 2008) seven principles of the MCI, such as experience with models, problem solving, denaturing, sequence, goal orientation, resourcing, and instructional augmentation (McDonald, 2018).

Within the context of these theories, this article described four learning interventions used in the course to create a holistic experience: (1) authentic instructional design team projects for clients, (2) training from field experts, (3) an experiential out-of-state trip, and (4) reflection journals. These interventions, along with the opportunity for undergraduates to work with graduates, allowed this course to fulfill the expected outcome of introducing undergraduate students to instructional design in a multifaceted, holistic, and applied way.

Each of these interventions also led to their own specific outcomes. The design teams, for instance, introduced the students to the work of instructional designers, helped them apply learning theories to their own designs, and allowed them to create an authentic product for clients. The training sessions and seminars gave the students opportunities to network with and learn from experts in the field on a variety of topics. The experiential grant trip to San Francisco helped the students form relationships with their classmates and professors, find inspiration for their professional futures, and contextualize design theories. Finally, the reflective journaling helped the undergraduates assess their progress, construct meaning, and improve their writing and critical thinking skills.

Working with graduate students provided a rich learning experience for each of the undergraduate students, as well as two other opportunities—namely, the opportunity for graduate students to mentor undergraduate students and the opportunity for faculty to take feedback to improve future offerings of the course. This class, capstone experience, and learning studio experience not only introduced the undergraduate students to instructional design principles and practices, but also linked them to fellow students (undergraduate and graduate) and faculty, with whom they spent a

semester working on real-world instructional products. The student experiences described give motive to provide future students with similar applied and experiential learning opportunities that draw from multiple learning frameworks.

Acknowledgements

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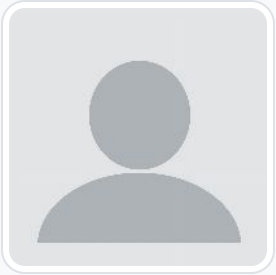

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Dr. McDonald's research focuses around advancing instructional design practice and education. In particular, he studies the field's tendency to flatten/redefine educational issues in terms of problems that can be solved through the design of technology products, and how alternative framings of the field's purpose and practices can resist these reductive tendencies.

At BYU, Dr. McDonald has taught courses in instructional design, using stories for learning purposes, project management, learning theory, and design theory. His work can be found at his website: http://jkmcdonald.com/