Issues In Interdisciplinary Studies,
Vol. 41 (2), Fall 2023, pp. 47–76

TEXAS TECH
UNIVERSITY PRESS

Design Thinking: Chasing the What If

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Abstract: This article presents a research project that set out to better understand the transformational learning of students working with a real-world client in the design thinking process. The article presents a case study involving a partnership between Grand Valley State University and Founders Brewery to design, develop, market, and distribute a "Born and Brewed in Michigan" beer. The project involved a multi-level, qualitative research approach collecting data from Grand Valley State University students in INT-323: Design Thinking to Meet Real-World Needs and employees of Founders who were actively engaged in designing a beer and strategic marketing plan from January 2020 through April 2021. It is argued that students who engage in the design thinking process with a client in a real-world application develop a deeper understanding of theories associated with a course while refining skills that will transfer into their professional and personal lives. This article will provide insight into why design thinking ought to be adapted into interdisciplinary curriculum development.

Keywords: design thinking, experiential learning, real-world experience, interdisciplinary curriculum, community partner

Introduction

The questioning of what and how courses ought to be taught in state colleges and universities by politicians and the general public is not new to higher education in the United States (Lucas, 1994; Shor, 1987; Tagg, 2003). In the past decade, the cost of college has greatly risen and with this an even greater skepticism regarding the purpose of a college degree and pragmatic worth of general education courses (Crow & Dabars, 2015; Fischman & Gardner, 2022). The COVID pandemic that began in 2020 further pushed colleges and universities to rethink how to effectively engage in the process of education. Thus, the scholarship of interdisciplinary and transdisciplinary teaching and learning is important to the landscape of higher education when evidence can demonstrate methods of learning that connect real-world knowledge and skills to personal and professional applications (Everett, 2016; Newell, 2013; Wrigley & Straker, 2015).

ISSN: 1081-4760

Design thinking in the past two decades has moved from a niche process associated with industrial production into mainstream business, social innovation, and academic fields (Brown, 2009; Kimbell, 2011). Design thinking has expanded into a variety of disciplines premised on the idea that deeper engagement into real-world situations will provide college students with the skills necessary for 21st century professions (Dreamson & Khine, 2022; Koh et al., 2015; Ramaley, 2015/2016). This relatively new adaptation of design thinking into academic courses, when considered in light of the debate over the relevance of higher education, reinforces the need for scholarship into the best practices for interdisciplinary and transdisciplinary teaching and learning involving design thinking courses in academic fields (Beligatamulla et al., 2019; Everett, 2016; Schaab, 2020).

Design Thinking to Meet Real-World Needs (INT-323) offered through Brooks College of Interdisciplinary Studies at Grand Valley State University (GVSU) provides students with an opportunity to work with a client on an actual project. GVSU is a public liberal arts university in West Michigan providing undergraduate and graduate degrees. INT-323 involves a design thinking problem-solving process in which students are strategically placed in interdisciplinary teams to collaborate with stakeholders (Brown, 2009; Kroper et al., 2010). Students engage in transdisciplinary applied research, consult with stakeholders and experts, and work closely with a client to solve a need of an organization, institution, or company (Dreamson & Khine, 2022; Keestra, 2019). The intent of the course is to merge theory into practice by engaging students in creativity and innovative problem solving (Kelly, 2016). Students in the course implement human-centered design incorporating empathy and creativity to seed the process of ideation and implementation of a pilot program and/or prototype that are reviewed and refined by the client (Brown, 2009).

The researcher, having taught INT-323 for multiple years with a variety of clients, recognized the real-world application of design thinking in a college course related to a system of best practices in interdisciplinary and transdisciplinary teaching and learning. This insight was based on previous experience in such research projects that showed a transformation in how students understood sustainability education through active learning (Ripple, 2013), and work with community engagement and experiential learning in an urban setting (Ripple, 2016).

This article will present and analyze a case study focusing on a partnership between GVSU and Founders to design, develop, market, and distribute a beer. Founders opened in Grand Rapids, Michigan in 1997 as a brew pub and has grown into national and international markets. The GVSU/Founders Design Thinking project began in January 2020 and ran through April 2021. The learning partnership involved over a dozen Founders employees working with 46 students. Students learned from brewers, coordinators, managers, vice-presidents, and the co-founder and president, who encouraged them to

"chase the what if." The main objective of this IRB approved research (Protocol Number 20-191-H) was to assess the ways students learn when engaged with a real-world client in the design thinking process. The goals and questions associated with the scholarship of teaching and learning are as follows:

> *Goal 1*: To better understand the learning process of students engaged in design thinking in relation to a real-world application.
>
> Question—How do students who engage in the design thinking with a client in a real-world application develop a deeper understanding of theories associated with a course while refining skills that will transfer into their professional and personal lives?
>
> *Goal 2*: Promote design thinking in curriculum development.
>
> Question—Should the process of design thinking be extended into the teaching and learning pedagogy of other disciplines?

A multi-level qualitative research approach (Creswell, 2003; Maxwell, 2005) collected data from four different sources: 1) fourteen team presentations to the client, 2) asynchronous e-mail interviews in 2020 with six employees working on the project (Appendix A), 3) individual student discussion forum posts and assessment papers, and 4) practitioner observations of teamwork and presentations.

Design Thinking and Transformational Learning

The following literature review establishes the pedagogy associated with teaching and learning practices of the project while formulating plausible theories regarding the practice of design thinking in relation to transformational learning. The interdisciplinary foundations central to courses in Brooks College allow students to go beyond the acquisition of information in isolated subjects so as to engage in a more holistic learning experience from various subjects (Block et al., 2019; Scheer et al., 2012). The mission of Brooks College is to model interdisciplinary education in action by applying a liberal education to cultivate global citizens and lifelong learners (Appendix B). General Education courses (Appendix C) at the GVSU (such as this course) focus on the transformation aspect of a university experience (Buchanan, 1992; Fischman & Gardner, 2022; Kimbell, 2011).

INT-323 is an upper-division general education course (prerequisite: junior standing) that is in a 16-week format enrolling up to 30 students in a semester. As a general education course, INT-323 is designed to have students from various majors engage in design thinking by investigating perspectives about information and innovation, while promoting critical thinking, collaboration and communication skills (Burns, 2011; Ingalls Vanada, 2013; Koh et al., 2015). The course draws from the interdisciplinary approach of holistic

thinking which enhances the ability of students "to understand how ideas and information from relevant disciplines relate to each other" (Repko & Szostak, 2021, p. 18) to solve a real-world need. INT-323 is designed as a collaborative experiential learning model that encourages students to integrate course material into everyday applications, going beyond the abstract conceptualization to an active experimentation (Ash, 2009; Jamal et al., 2021; Kolb, 1984). The structure of the course includes formal classroom settings with traditional lectures involving theory and nonformal hands-on learning focusing on a client's real-world project. This allows students in teams to navigate through disruptive and transformative learning spaces, while taking ownership of decisions associated with the project (Trechsel et al., 2023).

For students who are more accustomed to passive learning associated with traditional lectures, quizzes, and assignments this type of course can seem chaotic and create anxiety. The pedagogy of the course seeks to establish a collaborative culture that provides a space that is safe, secure, and supportive, thus allowing learners the opportunity to contribute to the process and have their voices heard, recognized, and valued. A collaborative culture promotes richer ideas that can be applied in more complex initiatives thereby increasing the creative capacity of the project (Kelly, 2016). The combination of disruptive open-ended learning embedded into a collaborative culture provides students with the ability to transform in their ideas and skills (Newell, 1999).

INT-323 is different from other traditional problem-solving courses associated with a discipline that analyze a particular idea or input converging on a particular answer. The course instead focuses on systems thinking (Capra, 2002; Capra & Luisi, 2015; Meadows, 2008; Stroh, 2015) relying on the ability to understand interconnections in such a way as to achieve the needs of the client (Tan, 2017). INT-323 begins with the premise that there is no one right answer to a problem, but multiple ways of arriving at a solution. This allows students to take ownership of the project, accessing diverse ideas from multiple perspectives and solution paths (Kroper et al., 2010; Schaab, 2020; Trechsel et al., 2023).

Design thinking involves transdisciplinary collaborative research which is a mixture of divergent thinking (open-ended to generate choices) and convergent thinking (sorting through possible alternatives) intertwined in the problem-solving process and thus geared towards finding solutions. Transdisciplinary collaborative research as a process of divergent and convergent thinking "fosters creative development of products or practices that are both novel and tailored to context" (Klein, 2017, p. 62). Design thinking provides a variety of insights and alternative visions, allowing for a greater understanding of a problem (Brown, 2009; Dreamson & Khine, 2022; Kelly, 2016). Design thinking also involves analysis and synthesis to complement divergent and convergent thinking. Analysis is used to break down complex issues and synthesis provides context in an application of ideas in a meaningful way (Figure 1).

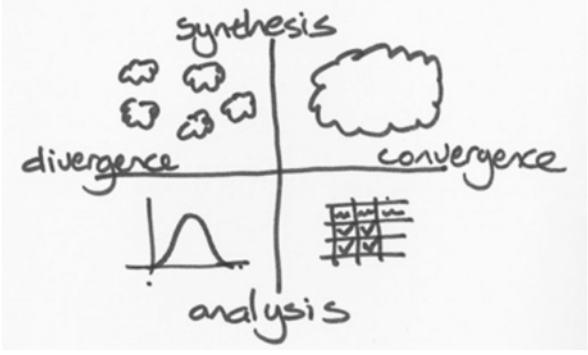

Figure 1. Visualization of the Design Thinking Process.
Note. From IDEO Design Thinking CEO Tim Brown (2008, September 7), "What does design thinking feel like?" (https://designthinking.ideo.com/blog/what-does-design-thinking-feel-like)

Design thinking students individually and in teams explore and reflect on ideas, information, and theories from the course, while incorporating knowledge and skills acquired in their various majors to engage in transdisciplinary hands-on learning by working with a client or community organization to solve a real-world need. For example, the course might involve creating a sustainable development action plan for a local company. Students will actively participate in the course and project by reading and learning about ecology from Aldo Leopold, historical perspectives from J. Donald Hughes, botany from Gary Nabhan, and sustainability from Lester Brown, while experientially observing ecosystems and carrying capacities, surveying stakeholders to determine best practices in sustainable development for the company.

The educational design allows students to conceptualize course material by putting theory into practice (Boud et al., 1985; Cowan, 1998). This applied interdisciplinary learning pedagogy provides students with opportunities to learn about their own learning processes while developing and practicing lifelong skills (Everett, 2016). Students are required to reflect on course materials in reference to how they are applying newfound knowledge to the actual project and how they participate with others in their teams. Reflection is essential to the learning process because it provides the student with context and meaning, while transforming their understanding of how course materials provide real-world applications. Design thinking tends to be a more pragmatic way of having students engage in the new challenges of 21st century life than more traditional mechanistic ways of problem solving by applying knowledge and skills to wicked problems such as climate change, artificial intelligence, globalization, and equity issues associated with rapidly changing landscapes (Brown, 2009; Dreamson & Khine, 2022; Hesser, 2013; Kimbell, 2011).

Finally, INT-323 emphasizes the close relation of human-centered design to empathy throughout the entire process of design thinking (Brown, 2009; Devecchi & Guerrini, 2017; Kimbell, 2011). Empathy is an attempt to make authentic connections with stakeholders and better understand the lifeworlds of those involved. Empathy further serves as a bridge from inspiration to ideation to implementation. Design thinkers learn how to draw useful inferences, making connections between what they are observing and synthesizing towards a solution, while grounding theoretical ideas through experience or what might be referred to as "learning by doing."

Designing the Course for a Client's Project

The design of INT-323 requires the teacher to solicit companies and organizations to have students resolve an actual real-world need, which means that theories and skills taught will vary from client to client. The transdisciplinarity of the course fosters "partnerships with stakeholders in public and private spheres for solving complex problems through co-production of knowledge and public engagement" (Klein, 2021, p. xix). The basic structure of the course, with respect to teaching and learning, remains consistent regardless of the client or organization. For example, in this case study, students met the needs of the client by learning about beer, sustainability, product development, marketing, and the client's history and philosophy. During a previous partnership to design a summer learning camp for the Boy Scouts of America, students learned about science, technology, engineering, and math (STEM), experiential learning, underrepresented populations, learning competencies, and the history and philosophy of a nonprofit organization. The subject matter that is being researched and applied will differ from project to project, although the structure of the course remains consistent regardless of the delivery format which will be further discussed in the case study.

Creating a culture of collaboration is a primary focus of the course which begins to be established on the first day. While reviewing the syllabus, students are clearly informed not to focus on grades (Kohn, 2013), but as in the professional world to work as a team concentrating on the client's needs. A World Café (Brown & Isaacs, 2005) style approach to collaboration is implemented in the early stages of the course as a way of encouraging students to share ideas and knowledge associated with discussion forums based on weekly readings. Individual discussion forum posts are worth five percent of the overall grade (eight in all) and are not evaluated for a grade, but only for providing students feedback (Tinto, 2012). To receive full credit for the assignment, students need to post three paragraphs by the due date providing evidence from the reading and respond to two other posts.

The World Café each week consists of 4–6 students randomly assigned to informal groups (Barkley et al., 2005) for 10 minutes and then reassigned to

another new set of learning partners for another 10 minutes. Students in the groupings discuss weekly readings which provide theories and information that are applied to the course and project. For example, in week three of the course a discussion forum analyzes *The Concept of Creative Development* by Robert Kelly (2016). In the first five minutes of the World Café, students are asked to discuss how creativity can mean different things to different people in many different contexts. This is followed by another five minutes of expanding on the relationship of the creative process to the development of a new beer. The same questions are repeated in the second pairing of students and after which the various groups report out. This activity provides a shared learning experience actively engaging all students and building a culture of collaboration.

Before transitioning into a 30-minute lecture on a weekly topic, the teacher follows up the World Cafe by highlighting important ideas associated with the reading(s) providing context and relevance to the course and project. The learning process in the first half of the semester involves sequence and reinforcement (Vella, 2002) where learning assignments build on previous learning skills and ideas, progressing toward more complex problem-solving situations that can be applied to the project, while also developing a culture of collaboration.

As will be discussed in the case study, a more formal collaboration of 4–6 students is established to work on the client's project as a semester-long team. In the first week of the course, students are asked in a two-page assessment to self-identify particular skillsets from their education and life experiences that employers are looking for in college graduates such as, communication skills, creative problem solving, adaptability, time management, and networking (Appendix D). Students are matched in teams with other members that have different skill sets and majors, thereby providing more diverse perspectives. This informal interdisciplinary approach allows for students to share different disciplinary insights and perspectives with their teams increasing the many possible ways of engaging in problem solving (Klein, 2017; Schaab, 2020). The assessment also serves as a two-minute "elevator speech" that students informally share with other classmates to get to know one another and build a sense of community. Once the formal teams are established, members select roles (Rothwell, 2015) within the team associated with functional tasks (Appendix E).

Throughout the entire semester there are guest speakers that provide knowledge and skills that focus on the needs of the project, such as the chief sales officer who explained to the students how their designed beer would fit into the larger marketing plan. Time is set aside each week so that teams can focus on the project, which will be explained in more detail in the next section. As the semester progresses there are less lectures and students spend more time working on the project. As a project develops, the teacher becomes more of a facilitator by meeting weekly with teams to help manage tension and anxiety and provide feedback to reinforce the relevance of their work on project in relation to the client's needs.

Individual teams work through the design thinking process and in week 12 of the 16-week course provide a prototype and/or pilot plan to the client. The teacher provides a formative assessment of each team project before all presentations and follow-up summaries of feedback provided by the client. In the final weeks of the course, teams begin to crosspollinate ideas and work on a final product and plan that is presented on the last day of class (Week 16). In this case study, all presentations to the client were on Zoom, lasting an hour in length including a question-and-answer session.

Born and Brewed in Michigan

The planning and scheduling of the GVSU/Founders project began in the summer of 2019. The intent was to have students brew and market a locally sold beer with the help of Founders employees who would lecture on topics associated with the industry. As the course and project began in January of 2020, so did the COVID pandemic in the United States, radically changing the logistics of the project and structure of the course. The winter 2020 term started out as an in-person format, although by mid-March because of COVID the course was transformed into a synchronous Zoom-based course. In the fall of 2020 almost all courses at the institution were online, so INT-323 was planned as both synchronous Zoom and asynchronous learning, and by the winter of 2021 students were involved in a combination of in-person, synchronous Zoom, and asynchronous learning.

With or without COVID, a complicated aspect of the project was that each semester, a new set of students were enrolled and introduced to new stages of product design and development, borrowing and reworking ideas from previous course sections, while working through the design thinking process of inspiration, ideation, and finally implementation of a final product and plan (Brown, 2009). Students therein were engaging in a situated learning design that required them to develop an ability to interpret, comprehend, analyze a real-world need, and develop solutions from multiple perspectives and disciplines using a combination of knowledge from their majors, concepts and readings associated with the course such as sustainability, design thinking and creativity, and ideas and skills provided by the guest lecturers. In the initial semester of the course, students worked on Research and Development (winter 2020), the second semester a new group of students focused on Branding and Labeling (fall 2020), and the third semester another new group of students laid out a plan for Product Release, Marketing and Sales (winter 2021). This section of the case study includes a grounded observation with figures as artifacts to demonstrate the process of design thinking in this project and provide evidence of students putting theory into practice by learning through doing.

Winter 2020—The First Semester

In the first semester of the project, 20 students were placed into four competing teams and assigned the task of developing a blueprint, or what is known at Founders as a liquid brief for an up-and-coming test beer that would be sold at Founders taprooms. The liquid brief is used to provide guidance in the brewing and marketing process. Individual teams were tasked with developing a beer that captures a "Born & Brewed in Michigan" theme, while taking into consideration the local economy, "Michigan values," and principles of sustainability (all of which were abstracted and needed to be defined). The liquid brief (Appendix F) provided with this article demonstrates evidence of the students' ability to plan, develop, and creatively and effectively communicating a project.

After consulting with Founders' management, individual teams collaboratively researched former Founders beers that had not been brewed in the past five years. Teams were seeking a past beer that could be reinvented as a new version for the local sales market. Teams visited beer enthusiast web sites such as Rate Beer and Beer Advocate to review customer ratings and responses to both past Founders beers, as well as beers brewed by their competitors, to better understand the consumer market. Students also consulted with a brewmaster to determine the key ingredients and costs associated with a prototype that they were pitching to the management of Founders. The prototype would include a beer name, mood boards to establish color schemes and themes for labeling and marketing, and target customer (see Figure 2).

Figure 2. An Example of a Student Mood Board Presented to the Client to Explain the Product Theme

By the end of the semester, Founders selected a liquid brief of a beer to be marketed as an Old Fashioned (a sweet cocktail made of bourbon). The Old Fashioned team determined the target audience of the beer would be a 25-plus year-old college educated individual of the middle-income range in the United States. Because the beer was designed in a pandemic, the campaign would focus on a multigenerational market in a way that would inspire individuals to one day reconnect with friends and family. This 13.3% ABV beer was brewed in the summer of 2020 and stored in bourbon barrels until March of 2021. Winter 2020 teams demonstrated organizational skills to plan develop and communicate a product to a client, while adapting to a changing learning environment.

Fall 2020—The Second Semester

While the beer was aging in bourbon barrels, a new set of 12 design thinking students took over the project in the fall of 2020 engaged in the course by means of a virtual learning format. During the semester, students were divided into two teams of six students. Teams were tasked with refining the story associated with the marketing of the beer created by students from the previous semester while rethinking the atmosphere of the product through mood boards to better reflect and design packaging and labeling. Founders also requested that students provide a better understand of how an Old Fashioned beer might fare on the local market.

Students engaged in the process of ideation and prototyping to refine the liquid brief and product label and packaging. For the final presentation of the semester, design teams presented consumer profiles based on data collected from social media surveys they developed to determine purchase behavior with regards to alcohol consumption. Students discovered that almost half those surveyed liked drinking old fashioned cocktails and 65% responded that they might try drinking an old-fashioned style craft beer. More important to the overall project, 93% of respondents stated that they would rather drink in a social setting than buy a six-pack of beers for home consumption. The age range for those surveyed was 21–30 years old which is relevant to the project because one of the marketing goals was to swing domestic and craft curious beer drinkers to craft insiders (those who exclusively drink craft beers) expanding Founders' market share. Students conducted research and provided analysis to pitch a marketing campaign that satisfied the goals of the client. Teams demonstrated "elements of creativity and design thinking in transdisciplinarity with emphasis on collaborative research" (Klein, 2017, p.54).

The product labeling also included QR and Spotify codes on the bottle (see Figures 3 and 4). The students suggested that the QR code on the beer label could better highlight what the company was doing with respect to sustainability. In addition, the code would also include local partner companies such as a Peterson Farms, who for over a decade, have been dedicated to social

Figure 3. An Example of a Beer Label Designed by Students that Represents Friends and Family Reconnecting in a Social Setting

Figure 4. QR and Spotify Codes to be Placed on Beer Bottle Labels

accountability and sustainable agricultural practices. Peterson Farms cherries would be used as an ingredient in the beer. The Spotify code was intended to connect to a multi-generational consumer through selected songs from an array of Michigan-based artists ranging from the past 50 years, reinforcing the coming together and bathing in a sense of nostalgia. Fall 2020 teams were able to refine and further develop a prototype by demonstrating creativity and communication skills to design a product. The project also included out of classroom learning of computer literacy skills in the development of QR and Spotify codes.

Winter 2021—The Third Semester

In the final semester of the project, a new set of students were tasked with taking a deeper dive into the sales and marketing through the lens of an experience economy (focusing on touchpoints such as social media posts), which was not a concept students were familiar with before the course. Students were asked to set the tone of the campaign even before the beer was tasted by creating a meaningful and compelling story associated with the "Born & Brewed in Michigan" theme that provided an emotional connection to an Old Fashioned beer. The students were to be mindful of how the beer could be released as a full consumer experience.

The class of 14 students was divided into three teams who would refine different aspects of the project brief developed by previous students. One team was to further research the newly developing cocktail beer market, such as a recent trend to produce cocktail-flavored beers like Founders' Mas Agave beer that tastes like a margarita (a sour drink made of tequila). A second team was to focus on Founders' Collaboration Series of beers that were developed with other Michigan businesses making connections with the local economy. An example is a collaboration with the non-profit Bees in the D whose mission is to work with organizations to contribute to the health of honeybees and pollinators by introducing bees and hives. The third team was to figure out how to embed the sustainability aspect of the beer within the Founders Big Pitcher campaign which partners with local community organizations that preserve lakes and parks. At the same time, all teams were to work on communication priorities, further developing a marketing plan with deliverables such as displays, t-shirts, posters, and tap handle plates (Figure 5).

Figure 5. Prototypes of Promotional Items Associated with Marketing the Beer

The beer was released on March 24, 2021 as a pilot draft to be sold in the Founders taprooms in 8-once snifter glasses and 32-ounce to-go crowlers (large cans). The taprooms are used to get direct customer feedback regarding beers that Founders might expand onto a larger market. Within the same week of the release students presented a preliminary marketing plan to the client. The management of Founders provided feedback from student presentations suggesting that teams needed to work together to intertwine their ideas into one finished product while developing a message that was simple and quick to deliver and could be understood by both retailers and consumers. It was essential for teams to crosspollinate ideas in order to develop a final marketing plan. For the next four weeks design teams collaborated to provide a final prototype of the three-semester project.

The final project plan provided a revised name marketing the beer as the New-Age Old Fashioned intended to tap into the recent popularity of the Old-Fashioned drinks, new trends in cocktail style beers, while still promoting the beer with a modern twist on nostalgia as presented by the original design team in the winter of 2020. Instead of selling the beer in 4-packs like many high-end craft beers, students proposed that the New-Age Old Fashioned be produced in 24-ounce bottles. The students wanted to keep the Spotify music list but suggested the QR code on the bottle could link back to Founders' webpage with information about the partner companies associated with the New-Age Old Fashioned. Through the design thinking process of empathy and prototyping, students presented a plan that rethought how the product would be messaged and delivered to the customer in a creative way. Students implemented skills and knowledge that were not introduced in a formal classroom setting, such as using human-centered design in the ideation and prototyping of the product and marketing plan, taking ownership of the project, while still meeting the client's goals.

In thinking about the complete experience economy, students proposed that the final version of the proposed New-Age Old Fashion could be rolled out during harvest day event which would include a farmers' market, highlighting local food growers that Founders works with. During the event, the New-Age Old Fashioned bottles could be served at tables in the taproom with whiskey-style glasses on the rocks (ice cubes) and garnished with an orange slice and cherry (Figure 6). The beer would be released to the market as a companion series brew linked with Iron Fish Distillery which is located on a small farm that engages in sustainable agriculture to grow the grains used to distill barrel aged whiskey. Iron Fish Distillery would supply wooden whiskey barrels to be repurposed for Founders' brewing process and providing a local flavor to the beer.

Finally, design thinking students pointed out that the project used 18 wooden brewer barrels to produce the beer. One tree is normally needed to construct 3 barrels and in 2021 Founders produced 9 different barrel-aged

Figure 6. Photo of a Crowler and Garnished Glass Prototypes of Social Media Post

beers. The students proposed that Founders partner with Archangel, a non-profit organization who would be commissioned to grow a Founders Forrest to replenish old growth trees. The students creatively provided ideas in their presentation that achieved the client's goal of embedding sustainability into the product.

In the winter 2021 final presentation, students provided the client with a blueprint for launching of the beer detailing an experience economy that would positively influence a consumer's view of the product. The students engaged in systems thinking to recognize the product in terms of market trends, while applying the design thinking process to build upon the work of previous prototypes to achieve the client's goals for the project. Through design thinking as an interdisciplinary process, students were able to draw from various "disciplines with the goal of integrating their insights to construct a more comprehensive understanding" (Repko & Szostak, 2021, p. 9) of the product and marketing plan.

This research project set out to understand the process of design thinking in relation to a real-world application. The case study demonstrates that students interacted with a client to produce a product that could be brought to market along with a fully developed marketing plan that was researched and formulated through the design thinking process. In all three semesters through the design thinking process, students demonstrated the ability to engage in workplace skills that can be transformed into their future professional lives.

Analysis of Student Perspectives

The artifacts described in the case study provide a rich description of the learning process, while thoughts and reflections from students engaged in the teaching and learning experience provide an additional layer of insight into the design thinking process and knowledge and skills gained in the course. Throughout each semester, students were asked to reflect on the project, presentations, and course materials through discussion forums and personal assessments which provided snapshots of student perceptions and purported values of the teaching and learning process. The student reflections were analyzed for explicit examples that presented an application to course and project, as well as personal insights into learning and working with a client.

Students in general expressed that participating with Founders on a real-world project was a positive experience. Students expressed a range of thoughts from the project being really fun and something they were proud to talk about with friends, family, and co-workers to "thinking outside of the box" and engaging in a process that will change the way work is done. As noted by an integrative studies major in the first semester of the project:

> Working with Founders has been pleasant and gratifying in many ways. Working with a company in the world outside of school and creating a real product for them is a task that is foundational to how I will handle business and creative innovation for the future. By understanding how the Design Thinking Process works, I was able to use those skills to complete this project with my team.

The practical application of the educational experience provided students with a desire to learn. As noted by a business major in the final semester of the project:

> Very rarely do I find myself as involved or interested in a course throughout the entirety of a semester as I was with this class. I feel that a fair amount of the courses I have taken thus far in my educational career have left me wondering, when would I possibly apply this to my own life.

Students noted that they were able to make the connection between class materials and future applications such as creative thinking and team collaboration.

In all three semesters of the project, students expressed ownership of the work they were doing with an awareness that they were "dealing" with an actual business and Founders was counting on them to produce a made in Michigan product. A fall 2020 graphic design major noted in a reflection on the course:

> I was surprised just how applicable what I learned in this class could be to my major. A lot of time graphic designers can get carried away with aesthetics and forget usability, or marketability in this case. I spent a lot

> of time working on a redesign of my original design for the label because I was excited to do so.

This is not to claim that there was not anxiety and sometimes confusion on the direction of the project as is also found in the business world. A psychology major from winter 2021 term expressed that, "we are lost but we are lost together. I learned to listen to other people's opinion and work off their ideas." The student is expressing the somewhat chaotic process of design thinking that can be disorienting but also the usefulness and importance of collaboration and effective communication.

The real-world pressure also provided students with a certain satisfaction in developing an actual product and plan (Keestra, 2019). As an advertising and public relations major from fall 2020 expressed in a reflection:

> For the first time after reading the syllabus, I felt intimidated, but I was still reserved on whether or not the class would be like any other class. I can say without any hesitation that for the first time in my four years of attending GVSU I was acutely challenged. For the first time, I had to buckle down and use everything I ever learned from other classes and put them to use.

Students were keenly aware that they had a responsibility to an actual client and not just a hypothetical case study from a textbook, which provided them with both a challenging and satisfying experience. The transdisciplinary nature of working with a client and stakeholders provides the student with a "socially robust knowledge that retains its relevance and value" (Keestra, 2019, p. 117).

From the very start of each semester, course materials noted the importance of establishing collaborative culture (Brown, 2009; Kelly, 2016; Senge, 2008) in the learning process so that students would feel safe and secure to express their ideas in a supportive space. The premise is to create a collaborative culture that allows students to achieve a greater creative capacity. In reflecting on creativity, students mentioned that they are sometimes afraid to be creative because they do not want to fail or have others criticize their work. Thus, a collaborative culture provides an environment where students can experiment and take risks, without worrying about failing. As previously noted in this article, the course has been intentionally designed to provide students with formal and informal setting for collaboration to reinforce the ability to share ideas (Tan, 2017).

In reflecting on the creative process in the course, students noted feeling comfortable in expressing their ideas. Students acknowledged that when everyone feels welcomed and safe, there is more creativity in a team. Students also were able to note the connection between community and creativity as expressed by a winter 2020 marketing major:

> A couple of key things I really took away from this class were creativity and idea sharing. One thing that I think always slips out of someone's mind

> when they have a great idea is that other people can make your idea even greater! And the team's full potential can be reached.

Students noted that diverse opinions within teams allowed for greater ideas and with different points of view comes more ideas and solutions to problems which is consistent with interdisciplinary theory. Creative solutions emerge when students are exposed to different backgrounds, experiences, and values from others on their team providing perspectives to promote problem solving capacities (Klein, 2017; Schaab, 2020). Students are better able "to assemble new sets of potential solutions to a given problem" (Repko & Szostak, 2021, p. 17) by viewing the project from various perspectives. A winter 2021 communication science and disorders major explained:

> Working within our small teams, and now branching out and "cross pollinating" between other teams, has really taught me a lot of useful skills which can be utilized throughout life. Being able to not only work together in groups, but also exercise each other's creative capacity has been challenging. Being innovative is a special skill, which I think can be seen as necessary for future employers.

The student's statement goes beyond a general or vague concept of creativity and collaboration and is an acknowledgment of important skills learned in the course that were associated with the design thinking process.

The case study provides a description of the artifacts created through collaboration noting energy put forth to solve a problem for a client. The student reflections provide a deeper understanding of the process by noting the relationships, connections, and patterns that are intertwined in the learning process to the materials produced. A winter 2020 marketing major expressed a transformation in the understanding teamwork:

> I've learned a lot through the process of developing something in a team for this class. Normally I'm not a big fan of group projects, because usually someone always thinks they are doing more work than others and when you are only completing a group project for a grade, that can be frustrating. However, when you are put into groups to create something real and that's sole purpose isn't for a grade but to help make something that's benefits can be used in the real world, everyone is more motivated. You aren't so much worried about who has put in the most work but are focused on the end result.

The student notes a dissatisfaction that students often have with "group work" from previous frustrations with other courses. In the design thinking process involving a real-world application, the student realized that good team members are invaluable. Design thinking as a transdisciplinary collaboration process merits consideration for courses in other disciplines.

In a final discussion form of each semester, students were prompted to answer, what were difficult, interesting, and useful ideas or theories from the

course. In respect to the category of difficult, most students reference a particular reading from learning materials. In reference to what was interesting, students tended to go in many directions ranging from readings, to processes, and to ideas. Regarding the ideas or theories that they found useful, almost a majority of students mentioned empathy. Students noted that empathy is important because it gives new insight into understanding others. A winter 2021 student noted:

> I am a finance major and one day want to own my asset management firm. Looking at that line of work, empathy and great storytelling are beyond important to success. I have to create a good enough story to convince people to trust me with their hard-earned money. And empathy will make me put myself in their shoes and see what they want and how I will get that for them.

Students did not always restrict their appreciation of empathy to the initial design stage, but instead tended to couple it with other stages of design thinking (which is taught in the course).

Students connected empathy to human-centered design and the importance of emotions. As with a marketing major in winter 2020 who connected empathy to storytelling:

> Prior to taking this course, I had marketing courses that taught individuals to engage in emotion but did not offer a reason why. Being someone that likes the rhyme and reason I often struggled to see the empathy and emotion that goes into storytelling for a product, service or business. After making the connection, I started to piece the puzzle together on what storytelling can really do for the audience.

In marketing a beer for Founders, students expressed that empathy was the key to creating stories as a way of cultivating certain emotions. Students were able to conceptualize that a good story puts our ideas into context and can give greater meaning to events, ideas, and/or products providing an emotional connection with the consumer.

The student perceptions of their experience working in the design thinking process with a real-world client depict that they were actively engaged in the project, while taking ownership of their learning experience and developing skills that should transfer to professional careers.

Conclusion

The process of design thinking in the GVSU/Founders project allowed students to engage in authentic learning that incorporated a real-world experience. When design thinking is integrated into curriculum, students can intellectually as well as practically experience working with a client (Dreamson &

Khine, 2022). Their ability to discover new ideas, relationships, and ways of problem solving can be further developed through practical applications that foster lifelong skills necessary for navigating the job market of the 21st century (Scheer et al., 2012).

There has been much documentation suggesting that future employees would prefer a curricular emphasis focusing on innovation and creativity (Hart Research Associates-AAC&U, 2013; Jacobs, 2018). It has also been argued that students' perceptions of the value of their studies also influence their motivation to actively engage in course materials (Fischman & Gardner, 2022; Tinto, 2016). As noted in this research, design thinking can be used to provide a sense of purpose and a space for creativity (Brown, 2009). Students in this partnership with Founders were able to experience a behind the scenes view of the company involving themselves in day-to-day functions, and not just a product line or sales numbers from a textbook. This article provides evidence that design thinking develops pragmatic skills for lifelong learning (Appendix B) and ought to be further integrated into curriculum.

Interviews with Founders employees associated with the partnership note the project was not the complete everyday experience of designing, brewing, and marketing a beer because students were not on the same timeline to produce and did not experience some of the pitfalls, such as working with individual state laws of the industry, nor was it just a learning situation for the students. Founders employees noted that the project allowed them to observe how other departments work together to bring a beer to fruition. As a member of Founders' communication department noted:

> I suppose it's not new information but talking through the various stages of beer development really made me realize how much work truly goes into it. Like many companies I'm sure, it's easy to become siloed in whatever our specific job is in the process, but when it is laid out like it was for the syllabus, it really shows how many people are involved in the process. And what a symphony it is in terms of coordination and collaboration.

Founders' employees expressed that the project was mutually beneficial for students and their company. As expressed by a graphic designer, "From this I've learned that a well-fostered partnership can help with truly understanding the essence of a brand. I believe we've also been able to gain new perspective about what the Michigan means to our consumer." The partnership provided Founders with a different perspective on the market and a better understanding of how prospective future employees think. The feedback from Founders employees reinforces the importance of engaging in human-centered design when developing and sustaining similarly structured learning projects. The ideas expressed by Founders employees might warrant additional research into such partnerships to better understand the perspectives of clients in workforce development and higher education.

This research provides insight into the importance of developing transdisciplinary learning partnerships between business communities and higher education to engage students in practical learning experiences and skills that can be transferred into future careers and creative endeavors, enabling them to "chase the what if." The transdisciplinary approach in INT-323—applying theory into practice by engaging students in innovative problem solving through the implementation of human-centered design by incorporating empathy and creativity—draws from an interdisciplinary approach of holistic thinking (Repko & Szostak, 2021) which enhances the ability of students to solve a real-world need. Students demonstrated an ability to research and produce a beer, though the skills learned can be transferred into other projects (Oxman, 2004). As professed by a winter 2020 advertising and public relations major:

> The concept that I learned that will be the most useful in the years to come will be the importance in telling a story and the need for collaboration in the creative process. I say that because I am using them now in this course and will in the future with a career in advertising. There will always be a need to tell a story and the ability to do that successfully will be the make or break of a company's or a person's career background. When it comes to collaboration in the creative process, I will always be open to working with others to improve the overall essence of any project I participate in.

The creative solutions of brewing and marketing of an old fashioned beer emerged from the "associative thinking and communication among people with different backgrounds, experiences, value systems, and expectations" (Klein, 2017, p. 64). The competencies associated with design thinking as a transdisciplinary way of engaging in teaching and lay the foundations for lifelong learning. Students involved in such partnerships developed abilities to effectively communicate, create a shared vision, allocate responsibilities, make decisions as a team, and work professionally with a client (Ash, 2009; Klein 2017).

This article adds to the scholarship of interdisciplinary and transdisciplinary teaching and learning by demonstrating that design thinking provides students with ways of actively engaging in course materials while developing practical skills such as collaboration and human-centered design which will prepare them for future careers (Everett, 2016; Newell, 2013; Schaab, 2020). The success of this course is built on developing a culture of collaboration where students can navigate through disruptive and transformative learning spaces while being accountable to a client (Trechsel et al., 2023). This course structure includes a combination of traditional lectures with nonformal hands-on learning focusing on a real-world need and can be replicated into other disciplines and courses. In particular, the replication should provide a transdisciplinary collaboration with a community partner or client to solve a complex need or problem in a disrupted format which is "characterized by uncertainty, indeterminacy, value conflicts, unexpected outcomes, and

lack of ready-made criteria, answers, and solutions" (Klein, 2017, p.59). This learning model is a catalyst for creativity and innovation providing students with autonomy in their learning process.

Design thinking, which was once a process associated with designing products, now provides a process for innovation in business and public services and solutions for social problems (Beligatamulla et al., 2019; Kimbell, 2011). Multinational corporations, as well as local communities, attempt to solve complex problems through collaborative approaches that resemble the process of design thinking (Ramaley, 2015/2016). There are unlimited real-world needs that can be studied through the lens of multiple disciplines, which would better prepare college students for professional and personal lives (Everett, 2016; Schaab, 2020). From observing the case study, a strong argument can be made that design thinking should be further incorporated into coursework of other disciplines providing students with real-world experiences where they can develop skills that will be used in their professional and personal lives.

The situated learning design of INT-323 which merged formal and informal settings required students to interpret, comprehend, analyze a real-world need, and develop solutions from multiple perspectives and disciplines. This model can be replicated and transitioned to meet learning objectives of most courses in a variety of disciplines. For example, the graphic design major reports they had not learned about the importance of usability of designs in courses. The communication science and disorders major reports learning the importance of collaboration and innovation. A marketing major notes learning about teamwork and a finance major about empathy. The design engages in a transdisciplinary learning process that allows students the ability to synthesize relationships, connections, and patterns that are intertwined in a real-world experience, while reflecting on the knowledge and skills they have learned in college. Working with actual clients or partners connects colleges and universities to local communities and validates the quality of teaching and learning provided by institutions of higher education.

Appendix A

Interview Questions for Founders Employees

1. What is your understanding of Design Thinking?
2. How does the student project reflect normal business practices at Brewery?
3. Do you think this project is a good real-world experience for the students and why?
4. What have you learned from this partnership?

5. Do you think Founders should do more projects with GVSU students?
6. What additional thoughts about the experience might you want to share?

Appendix B

Brooks College Guiding Principles

- A collegial and collaborative student-centered environment where we support each other and work together, bridging fields and disciplines, both within the college and across campus, in an open and transparent manner.
- Equity, inclusion, and diversity across our curriculum, faculty and staff, and the students and communities we serve.
- Integrity in our student-first worldview, and integrity in our actions.
- Shared, democratic principles of self-governance and decision making.
- Global perspectives that support critical analysis of and engagement with complex systems and legacies across our teaching, scholarship, and community engaged work.
- Action-oriented educational initiatives, high impact practices, and experiential learning.
- Interdisciplinary research and teaching that challenges disciplinary and field boundaries, expands how we understand and define knowledge, and generate results-oriented work that can be applied to real-life wicked problems and challenges.
- Risk-taking and innovation that encourages alternative approaches to scholarship, teaching, and learning.
- Academic freedom to ask the questions that need to be asked, and approach the answers, however that might unfold.
- Social, environmental, and financial sustainability in all that we do.

Appendix C

Grand Valley State University General Education Student Learning Outcomes

1. Explain how complementary and competing perspectives contribute to the ongoing discussion about information, innovation, and technology.

2. Collaboration—work together and share the workload equitably to progress toward shared objectives learned through structured activities that occur over a significant period of time. Students will:
   - Use knowledge of group dynamics to select appropriate roles.
   - Use knowledge of group management to create effective plans.
   - Successfully follow the group's plan.
   - Assess their contribution and the contribution of others.
3. Integration—synthesize and apply knowledge, experiences, and multiple perspectives to new, complex situations. Students will:
   - Connect academic theories with personal experiences to illuminate both.
   - Draw conclusions connecting examples, facts, and/or theories from more than one field of study.
   - Generalize skills, abilities, theories, or methodologies for solving problems in new contexts.
4. Problem Solving—design and evaluate strategies to answer open-ended questions. Students will:
   - Construct clear and insightful problem statements that prioritize relevant contextual factors.
   - Identify multiple approaches for solving the problem within the given context.
   - Design and fully explain solutions that demonstrate comprehension of the problem.
   - Evaluate the feasibility of solutions considering the context and impact of potential solutions (e.g., historical, ethical, legal, practical).

Appendix D

Institution Sustainable Practices

Assessment Paper I—The student will submit a two-page paper reflecting on his/her skillsets based on previous educational background (research course, major, theories, etc.) and real-life (jobs, positions held, professional development, etc.) experiences (5% of grade).

- Creative Problem Solving: Root Cause Analysis, Systems Thinking, Design Thinking, and Consensus Decision Making
- Effective Communications: Oral, Written, Presentation, Social Media
- Adaptability and Flexibility in Various Settings
- Strong Work Values and Ethics: Accountability, Integrity
- Project Development, Planning, Budgeting, Management

- Computer and Software Literacy
- Networking and Relationship Development
- Time Management
- Planning/Organization: Personal Management

Appendix E

Roles and Responsibilities in Teamwork

- Coordinator—Scheduling and organizing team activities.
- Secretary/Recorder—Records key ideas associated with discissions, serving as the team memory.
- Information Seeker—Takes inventory of the knowledge, soliciting research and tasks relating to the project.
- Opinion Seeker—Helps the group determine where agreement and disagreement exist and avoids group think.
- Gatekeeper—Controls channels of communication, keeps team on task and encourages all members to contribute.

Appendix F

Project Name: Old Fashioned—Proposal 1

Background and Problem Statement	• Own your backyard • Gain a greater market share here in Michigan • Be the number one brewery in the area • Yearning for a connection
Objectives	• Bridge the generational divide • Taking it back to the roots/ bringing the Brewery back to Michigan roots • Provide nostalgia, comfort, and a sense of belonging "An experience that bridges divides and opens hearts. To bring people together to tell their story, share their memories and find what makes us not different, but the same. By bathing in the comfort that nostalgia brings, we find community. We become more than old fashioned, we become timeless."
Target Audience	• Michiganders, 25+ years old, gender-inclusive, middle income

Key Product Attributes	• 13.3% ABV • The flavor profile of the beer consists of bourbon, vanilla, cherry, orange peel sweetness, balanced by earthy, herbal background character with a low bitterness level. • The physical characteristics of the beer would be dark brown with a small head (bubbles at the top of a glass), and a smooth feel to the mouth.
Key Product Benefits	• Sustainable • Multi-generational • Conversation piece
What the Product IS NOT	• Not ordinary • Not a chugger • Not just an experience, it's a memory
Similar or Competitive Products	• Old Fashioned Pale Ale • Kentucky Old Fashioned Barrel Ale • Wild Turkey Old Fashioned
Key Ingredients	• Re-envision the Barleywine into an Old Fashioned • 2-Row base malt # @$.30/per # • Munich Malt # @$.60/per # • Light Caramel # @$.55/per# • Cara Pils # @$.50/per# • Malt Extract # @$.90/per# • Black Malt # @$.75/per# • Nugget hops # @$8.00/per# • Lemon drop hops# @$6.50/per #(sourced from WA) • Cherry Concentrate usg @$34.10/per usg • Orange Zest # @$10.53/per # • Add Summit Hops for the citrus profile • Introduce cherries for a slightly sour • Bourbon Barrels 12 @125.00 each

Biographical Note

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