

Creating a Multidisciplinary Collaboration Service-Learning Experience in Design Education

S. Joseph-Mathews¹, M. A. Lee^{1,✉} and N. Kreidler²

¹ University of the Pacific, United States of America, ² Western Virginia University, United States of America
✉ mlee2@pacific.edu

Abstract

The design process in most organizations is often collaborative and interdisciplinary in nature. Yet most institutions of higher learning do not offer students the opportunity to work in multidisciplinary teams. This study follows an experiential service-learning project over 3 years to explore the role of multidisciplinary project teams on design education outcomes. Findings suggest that the quality of designs improved over time and students consider experiential learning in multidisciplinary teams to be a valuable component in their education, increasing their job readiness upon graduation.

Keywords: design education, design teams, service-oriented design, design process, design learning

1. Introduction

The graphic design and marketing professions have a symbiotic relationship. Marketing provides the data that designers need in order to tell the story of a brand, product or experience while designers aid marketers' need to improve sales through creating emotional connections to consumers. Design has become an essential part of marketing as corporations are continually trying to keep the attention of consumers. As the marketplace becomes more complex the working relationship between marketers and designers needs to become stronger. Taking an integrative approach to brand, product, and experience development will enable companies to better understand consumers constantly changing needs, stay in touch with technological advancements as well as social and cultural innovations. There is a decent amount of research identifying how designers and marketers are moving more amicably towards collaboration within this space in the profession but there are very few examples of this collaboration happening within higher education.

Although the barriers are numerous to this type of collaboration within higher education (proximity, each area of study is most often located in a separate college or division; learning modalities, marketing most often is taught as a seminar whereas graphic design is taught as a studio; and research output execution, traditional quantitative and/or qualitative research within marketing versus creative scholarship in graphic design), this longitudinal research project took place within a liberal arts institution on the west coast of the United States. The researchers who executed this project over a period of three years, with three different classes of students, learned about one another through a mutual admiration towards service-learning.

In 2019 the American Management Association (AMA) re-emphasized the importance of the findings from their critical skills survey conducted in 2012. These skills, also known as the "4C's" are identified as communication, collaboration, critical thinking, and creativity. Additionally, the National Education Association has identified these same 4C's as being critical to the success of 21st Century Learners. This framework was used as a starting point for the professors working with students from different disciplines. One of the most difficult barriers to overcome when teaching multidisciplinary

students is communication. [Pratt \(2012\)](#) identifies, “...various academic disciplines use language in different ways, and the inability to use the same words consistently leads to challenges.” Collaboration, critical to any successful team is especially important within a multidisciplinary environment. Critical thinking is identified by most institutions of higher learning as a key learning outcome for individual programs and creativity is essential to any high performing design team as well as an important component to understanding how to solve complex problems. [Paul & Elder \(1999\)](#) discuss critical thinking as a self-directed, self-disciplined, self-monitored, and self-corrective thinking, which requires rigorous standards of excellence and mindfulness (p.2). Creativity is a key indicator of competitiveness within marketing, yet there are few examples of how creativity is taught within the discipline. [Shinn \(2003\)](#) identifies that this problem might be resolved by looking for opportunities beyond the business school and borrow creativity expertise from the performing and fine arts.

This study explores how multidisciplinary teams from graphic design and marketing can work synergistically on an experiential service learning project. Good instruction utilizes “learning through reflection on one’s own experience”. Studies have shown that experiential learning can lead to a deeper, more nuanced understanding of the specific subject matter at hand ([Leal-Rodríguez and Albort-Morant 2019](#)). It is identified that experiences like these can improve educational outcomes while creating stronger communication, critical thinking, collaboration and creativity opportunities for the students who participate. A multi-method approach of analyzing student and client feedback with three different classes over a three-year period, was used to assess the effectiveness of this approach to instruction. Based on study findings a model for implementing a multidisciplinary, semester long experiential service-learning exercise is proposed.

2. Literature review

In order to build a successful multidisciplinary experiential service-learning project, we looked at research done in each of the following three areas: experiential learning, service learning and multidisciplinary teams.

2.1. Experiential Learning

[Katula and Threnhauser \(1999\)](#) define experiential learning (EL) as the “*process that takes place beyond the traditional classroom...which enhances the personal and intellectual growth of the student. Such education can occur in a wide variety of settings, but it usually takes on a learn-by-doing aspect that engages the student directly in the subject, work or service involved*” ([Katula and Threnhauser 1999](#), p. 240). Experiential Learning “*occurs when carefully chosen experiences are supported by reflection, critical analysis, and synthesis*” ([Levy et al. 2015](#) p. 105). Professional schools have long used EL as a tool to transition students from theory to practice and to build strong practitioner skillsets ([Eyler 2009](#)). Often EL can help students to develop critical thinking and knowledge application skills in complex or ambiguous situations, which may elude some students in classroom environments. ([Celio, Durlak, and Dymnicki 2011](#)).

[Kolb \(1984\)](#) proposed an experiential learning theory (ELT) which examines the process of human learning through individual experiences. Built on the work of previous academics such as John Dewey, Kurt Lewin, Jean Piaget, Carl Rogers and others, [Kolb \(1984\)](#) created the ELT framework and described EL as “*the process whereby knowledge is created through the transformation of experience*” ([Kolb, 1984](#), p. 41). The theory suggests that new and prior experiences can create knowledge for individuals through the process of reflection. As we reflect on the experiences we have, we invariably grasp new ideas and transform existing ideas and concepts we currently hold ([Armstrong & Mahmud, 2008](#)). Experiential Learning Theory (ELT) divides the learning process into four basic theoretical components to create a cycle known as the experiential learning cycle or ELC. It involves: concrete experiences, reflective observation, abstract conceptualization, and active experimentation (Figure 1).

Concrete experience (CE) is the first component of the experiential learning cycle (ELC) and relates to common everyday experiences individuals may encounter. The second component of the ELC is

reflective observation (RO). Reflective observation is a natural occurrence after an individual has experienced something new and is often impacted by preconceived notions and learned ideologies and or perspectives (Kolb 1984). The third component of the ELC is abstract conceptualization (AC). AC takes the reflective process a step further by focusing on channeling those observations into a set game plan or theoretical approach. The last step of the ELC is active experimentation (AE), where students use knowledge gained in the reflective stage to engage in strategic planning geared towards effective implementation (Kolb 1984). Using the ELC model as a starting point, the project outlined in this study had students engaged in a real-world project that exposed them to new situations alongside knowledge and solution creation. Through a structured series of steps, the students were guided through the EL cycle to maximize their learning.

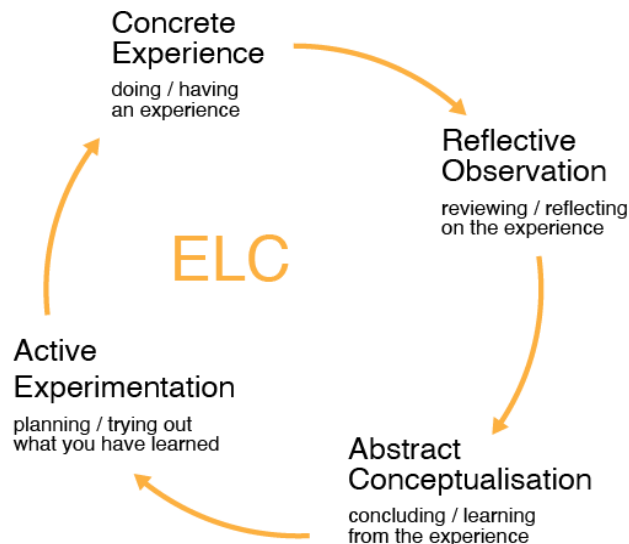


Figure 1. Kolb (1984) Experiential Learning Theory Model.

2.2. Service Learning

Service learning (SL) is defined as a teaching and learning strategy that attempts to integrate community service with an academic curriculum (Learn and Serve America 2010; Celio, Durlak, and Dymnicki 2011). Early pioneers in the field of SL believed it was a revolutionary way to reinforce concepts learned within the classroom setting, especially when those concepts tended to be somewhat abstract in nature. Critics have argued that the “*traditional university-based creative arts curriculum has not sufficiently responded to, nor reflected, contemporary workplace realities*” (Fleischmann and Hutchison 2012, p. 23). As Universities and Institutions of higher learning attempt to better prepare graduates from the arts for careers that intersect between the creative and business fields, the concept of multidisciplinary instruction has gained popularity amongst institutions.

In establishing a semester long service learning opportunity for students, real world projects provided the necessary framework to maximize learning opportunities, and to allow for impact creation through the design process. This project sought to create learning opportunities for students that would change perspectives and adjust world views, while simultaneously creating lasting impact within international and or domestic communities. By creating a collaborative, multidiscipline project, students would be placed in a learning environment that closely mirrored the real-world interactions of professionals within the design, marketing and advertising fields.

2.3. Multidisciplinary collaborative teams

According to Zirger and Privitera (2009) “*Current education models build strong functional skill sets, but generally lack multi-college interactions. While a general education model is prominent in many schools, students are rarely put in situations that require them to practice using theory to create workable solutions*” (Zirger and Privitera 2009, p. 131). Marketers and graphic designers often work together in order to deliver powerful advertising and marketing campaigns. However, very few

universities, colleges and design schools offer opportunities for intercollege programs (Zirger and Privitera 2009). In order to establish a multidisciplinary model that closely mirrors professional work environments for both marketing and creative professionals, professors from the business, art, and science colleges integrated their students into a studio environment. These programs very rarely have the opportunity to cross-pollinate within an academic setting. Because of this, designers understand very little about the function of marketing and marketers understand very little about the design process (Zirger and Privitera 2009).

Developing multidisciplinary programs that draws instruction from areas across campus can be complicated (Heller, 2005; Fleischmann & Hutchison 2012). Students do not traditionally understand or empathize with their contemporaries from other disciplines. This lack of empathy can affect decision making and the development of good design practices within a professional work setting (Fleischmann and Hutchison 2012). Research suggests that a lack of knowledge within groups can lead to frequent misunderstandings and team conflict (Fleischmann and Hutchison 2012; Zirger & Privitera 2009). Pearson, Saunders, & Galletta (2016) suggest that multidisciplinary teams need to overcome communication, technology and team diversity challenges in order to be successful. Yet these challenges represent the work reality many students will face upon graduation and researchers argue that the benefits to teaching cross functional teams, significantly outweigh the difficulty often associated with effectively pulling it off (Zirger & Privitera 2009).

One of the goals of this study was to develop a design project that closely mirrored the professional work environment. Multidisciplinary teams represent the future of good design as over 85% of companies currently use cross discipline teams when developing new processes, designs and products (Viol Hacker et al. 2019). This research led us to develop a service-learning project made up of a multidisciplinary team focused on problem solving for a global social entrepreneur.

3. Method

3.1. Project Dimensions

The goals of this project were threefold. First, we wanted to successfully implement a multidisciplinary collaborative project that mirrored real world interactions. Second, we wanted to ensure that every year we improved the project to create better learning outcomes for the students and better deliverables for the entrepreneur. Third we wanted to create a model for collaboration that could be used by other professors across the University. We created collaborative, multidisciplinary service learning projects within advanced level courses from international marketing and graphic design. The students worked across disciplines with a global social entrepreneur to develop marketing and design deliverables. The outcome of this project included a full marketing plan, three design deliverables per design student, professional mock-ups and high-quality files given to the clients.

The two courses were scheduled to meet at the same time every spring. Each class had its own location. The course schedules were coordinated and joint meetings planned every two weeks. These coincided with assignment deadlines that broke the large project into manageable pieces and helped students stay on task. Students in the two courses were divided into groups with each group having two to four marketers and two to three graphic designers. Each group was assigned a particular project and worked with a specific client. Projects were solicited up to a year in advance and social entrepreneurs were rated, then selected based on needs and project characteristics. Professors sought out organizations with unique missions/needs, in an effort to establish a design problem that would maximize student buy-in.

The marketers and designers met weekly, working together on refining the project strategies relating and supporting each other. They also met with clients every week, receiving early feedback and support based on the specific stage of the project. They shared a google drive with research, process, materials, and various documents. They used a group chat to communicate among each other. Each group had a lead marketer and a lead graphic designer who were responsible for coordinating workload, strategy, concept development and communication with all parties involved. They also sent weekly reports to the professors.

This project was designed with the intent of groups learning from one another under the direction of their professors, while working with a global social entrepreneur to solve real-world marketing challenges. The key to the success was a combination of clearly outlined structure and constant mentoring and re-evaluation of where students were at, versus what the project required of them. [Zirger and Privitera \(2009\)](#) outline a detail list of prerequisites for the smooth execution of a joint, cross-disciplinary group student project and their work was used as a guide for the development of this semester long design and marketing class. These are as follows: 1. Create joint departmental commitment through joint or overlapping class times; 2. Multidisciplinary faculty involvement; 3. Maintain a portfolio of real-world projects that are applicable to classroom use; 4. Develop a relationship with potential project sponsors or organizations who understand what will be required of them; 5. Set clear objectives up front; 6. Create appropriate assessment tools.

3.2. Design Process

In order to achieve our second objective of improved educational and design outcomes, the service learning exercise was evaluated, edited and reconceptualized over a three-year period. Ultimately, the constant revisions resulted in a step-by-step roadmap of the design process. The professors made changes to the structure of the project based on student feedback from questionnaires that were administered after the project completion as well as from comments provided in course evaluations. Figure 2. outlines the Process Roadmap for the entire project; from the moment clients are chosen, to the final design deliverables. (Figure 2.)

The convoluted design process that happens between ideation and finished deliverables is somewhat straightened by adding steps to support the needs of both the marketing and the graphic design disciplines. After clients are selected, the project is initiated by the professors and presented to the students. Next, each team starts researching the client and the market. Problem statements and then objectives for the project are set early in the process in collaboration between clients and students, followed by students proposing concrete design deliverables to achieve said objectives. After this initial phase, the marketing and design assignments split. Marketers start building the marketing campaign, which included elements such as PEST, SWOT, and competitive analyses, as well as an evaluation scorecard, market segmentation, the 4PS, target market, positioning, implementation timeline and financial budget. While the designers prepare a design brief, create sketches, rough drafts, refined compositions and mock up the final deliverables. At the end of the semester, the marketing plan and design deliverables are presented to the clients and classes at a joint meeting where the groups explain and defend their work. This roadmap was a realization of our third objective.

4. Results

4.1. Student Survey

A survey was disseminated to all students who participated in various projects in three separate design and marketing classes over a three-year period, at a small, private university, in a western US state. The same two classes (Advanced graphic design and International Marketing) were repeated each year for three years, so none of the students would have the opportunity to take the class twice. A total of eighty students participated in the classes over a three-year period and 58 of those students responded to the questionnaire for a 73% response rate. 62% of the survey respondents identified as female and 38% identified as male. 37% of respondents took the survey in 2019, 41% took it in 2020 and 22% in 2021.

Students were asked to evaluate communication within teams, perceived value of the project, interaction with the client, and interest in repeating a similar project in another class (if possible). They were also asked about how useful the project will be in their job search and in post-graduation employment. Results from the survey were used to evaluate the collaboration and communication component of the 4Cs. Overall, over 90% of respondents rated the project as an 8/10 or higher, in terms of collaboration value. 77% of respondents rated the communications within teams of the project as either good, or outstanding. 93% of respondents stated that they directly interacted with

clients, 89% of the students indicated they would like to do the project again if they had the opportunity to do it in another class and 95% of the students stated the collaboration was a good experience for them. 95% said they believed the project will be useful when applying for jobs and 98% considered the project will be useful when working after graduation.



Figure 2. Process Roadmap for Multidisciplinary Service-Learning Project.

Figure 3. represents the word cloud that was generated from student responses when asked to indicate key takeaways from the project (Figure 3.) The cloud indicated that students believe they are learning and gaining valuable experience while working on the project. It also identifies that the students recognize the importance of communication and the value of working with a real-world entrepreneur.

group^{class} experience^{well} marketing^{working}
 actual learned^{really} working^{project} com
 munication^{client} entrepreneur^{able}
 work different^{communicating} needs

Figure 3. Independent Grading Student Responses Word Cloud on Key Project takeaways

4.2. Project Grades

In addition to students evaluating the project experience via a survey, project grades were also evaluated as a means of assessing student performance over a period of time and evaluating the second objective. At the end of the three-year period a design rubric was created for the course which evaluated design proficiency. Two independent professors not associated with the course, did a blind evaluation of the projects without any knowledge of the specific semester any of the projects were created within. Table 1 offers the grading criteria for the rubric. These grades were then assessed to evaluate student performance over time in the class and to evaluate whether there was improvement in design outcomes between when the course was first offered in year one, to the final offering of the course in year three. Table 2 offers the mean scores for the independent assessment of the project deliverables.

Table 1. Grading Criteria for Design Deliverables

Principles Elements of Design	Application of principles of balance, proportion, unity, emphasis, direction and continuity. Effective use of space, pictorials, graphics, typography and color (if available.)
Project Objectives / Marketing Objectives	Considered marketing objectives and need of the client. Concept behind solution. Content: in depth and appropriate. Clear hierarchical arrangement of elements. Use of graphics such as color, forms or images. Consistency. Clear navigation or flow of information.
Project Objectives: Image and Text, Typography	Application of visuals. Integration of text and image. Hierarchy and placement. Tracking, kerning, leading, alignments, spacing, legibility, flow of text, formatting, widows, orphans. Line breaks and spelling.
Craftsmanship & Execution	Rendering, mounting, presentation, file editing (where applicable) binding. Fulfilled project requirements.

Table 2. Project Scores for Design Deliverables

	Project 1	Project 2	Project 3	Project 4	Project 5	Mean Grade
Year 1	85.6	80	78.6	93.1	58	79.06
Year 2	87.6	76.6	90.6	83	N/A	84.45
Year 3	78	89	88	86	N/A	85.25

5. Discussion

5.1. Changes to the project structure

The goals of this project were threefold. First, we wanted to successfully implement a multidisciplinary collaborative project that mirrored real world interactions. Second, we wanted to ensure that every year we improved the project to create better learning outcomes for the students and better deliverables for the entrepreneur. Third we wanted to create a model for collaboration that

could be used by other professors across the University. For this final objective we sought to develop a document that would outline the changes we made to ensure we had a roadmap to use to help other researchers to implement joint collaborative multidisciplinary projects in the future. The key research question under review was whether the changes made between year 1 and year 3 of the study resulted in improved educational outcomes and design deliverables as identified through blind reviews of grades and design deliverables, as well as self-reported student data.

Objectives 1 and 2- Students were placed in collaborative teams similar to corporate settings. During the first year of the collaboration, the marketing and graphic design courses met several times per semester during class time in the Business School. Students were also asked to meet with their groups outside of class but did not have to report back to the teachers every week. The project was due as a whole at the end of the semester. While some groups produced strong work, several groups struggled with miscommunication in the group and their results were weak. The graphic designers were not able to communicate with clients and often did not get the needed information from the marketing leader. Similarly, some graphic designers ghosted their marketing counterparts, and their work did not correspond with marketing strategy and lacked depth and understanding. At the end of the first year, we did not consider the project to be successful despite several students reporting that they thought the project was a valuable experience. Based on the quality of deliverables produced and feedback from the entrepreneurs, we felt there was a significant amount of work to be done in order to meet our first objective of creating a successful collaborative project. We felt collaboration, communication, critical thinking and creativity were not optimal. As such, we looked to the literature to help design a better model.

After examining several existing experiential learning models, we structured the project on [Kolb's \(1984\)](#) Experiential Learning Cycle (ELC) of concrete experiences, reflective observation, abstract conceptualization, and active experimentation (Figure 1). In 2019, students completed just one cycle during the entire project. When they finished their presentations at the end of the semester, they received constructive feedback, which provided reflection. However, we very quickly realized that the feedback provided would not be implemented, due to the semester end. This was something that would need to be rectified in future classes as students also commented about this in the first survey results.

In the second year we conducted the collaborative project, we broke the project into smaller assignments to shorten the cycle and required the leaders to submit weekly reports. Students then found it easier to stay on target with smaller tasks, repeating the ELC each time. They were able to receive feedback, reflect, conceptualize, and grow with each assignment and build on their learning during the next phase. As a result, the quality of work increased which was reflected in students grades and survey results. Despite better end results in terms of design deliverables, (which we used as a proxy to evaluate creativity) and better synergy between the groups (which we considered to be as a result of improved collaboration), we still felt there was room for improvement in communication across disciplines and noticed that the critical thinking being utilized was still too discipline specific. This was also mirrored in the survey results.

Accordingly, during the third year, we assigned group leaders from both marketing and graphic design students. We also mandated weekly meetings with the clients. This further strengthened communication in between the various constituents of the project, the project results, and once again the grades improved while student's responses to the survey reflected positively with the changes. Entrepreneurs were happy with the outcomes as the design deliverables and the final marketing plan were strong. The plan demonstrated stronger collaboration and students referenced improved communication and knowledge sharing between disciplines which we felt addressed communication and critical thinking improvements.

The findings in Table 2 indicate that there is a significant difference between year 1 grades and year 3 grades. The lowest for year 1 is 58% and the highest is 93.1%. Conversely the projects from the third and final year of the class consistently fell in the top percentile of project grades with a low of 78% and a high of 89%. Year 2 grades are close to year 3 but different from year 1 with the lowest of 76.6% and highest of 90.6%. This would suggest that in addition to students evaluating their experiences more favourably between the first and third years of the projects, the final outcomes in

terms of design deliverables were also improved between years 1 and 3. These findings suggest that we were successful with objectives 1 and 2 in creating a successful collaborative project and delivering on better learning outcomes (as assessed by the improved grades and survey findings) as well as the improved design and marketing deliverables as assessed by the independent graders. Objective 3- Once we felt satisfied with both the process and the changes made during the three-year process, we evaluated the student surveys responses and reflected on the most successful groups thus far. These reflections resulted in a step-by-step roadmap that can now be shared with our wider University to help professors who are attempting a collaborative project across disciplines.

6. Conclusion

6.1. Learning Outcomes and 4Cs

Through identifying solutions for global entrepreneurs, students gained valuable knowledge about the design process, marketing, critical thinking, team communication skills, project management, client management, and solution identification. Learning outcomes from this project can be qualified through “4C’s” that were identified by the disciplines of Management and Education as critical components of student learning: communication, collaboration, critical thinking, and creativity. The additional knowledge gained through this research, allows educators better direct students on future projects. All four C’s — communication, collaboration, critical thinking and creativity were present as both positives and negatives within this project.

Communication is typically seen as one of the greatest barriers between disciplines. This project had to overcome communication barriers between Marketing Professor <-> Design Professor, Marketing Professor <-> Design Students, Design Professor <-> Marketing Students and between Marketing Students <-> Design Students. We have measured how students perceived the communication functioned in between the various constituents through questions in the survey. Group members also evaluated each other with many of the scores relating to communication. Communication also figured into individual student grades that they received for the project. After the first year, we saw an improvement in how students perceived the communication worked.

Collaboration is difficult to qualify between students within a singular major, let alone a multidisciplinary endeavour. The value of this experience was seen in the student’s responses to the survey and further reinforced when identified that this collaboration would give students a competitive advantage when entering professional practice. The benefits of this project will allow students to think differently when approaching future work, and allow the firms who will be hiring them to move forward with more complex objectives on day one. Collaboration is reflected in the outcomes of the project as neither the marketers nor the graphic designers would have been able to do each other's work and could not build on it. The results of the collaboration can be seen both physically when we compare the marketing projects before the collaboration and after, and through the student surveys.

Critical thinking was demonstrated throughout the project but most notably seen within the research that informed the overall design direction and process. The rubrics revealed that as professors became more familiar with directing the multidisciplinary efforts of the students, the more complex and deeper the research became — identifying that critical thinking became a greater skill of students. Within this project critical thinking had to move beyond the individual and be understood within a collective. Students were able to learn more from one another by making connections between ideas and concepts across disciplines. Constant iteration of research and multiple mindsets processing information towards deliverables forced students to work beyond their known capabilities. The rubrics indicated that the design solutions were built on research and understanding of marketing needs that the projects before this collaboration lacked.

In this course, marketing students were able to see the dominance *Creativity* has within design, and to be part of the design process. Students saw first-hand how to think ‘out of the box’ and understand the benefits of a solution mindset. Although creativity was not measured separately for each discipline but through the graphic design rubric; the marketing students were exposed to the design process, creativity and the value of iteration within this project while design students yielded the value of

research, creating deeper connections to the population they were designing for and issued much more creative solutions because of this connection.

Collaborative design projects are not only beneficial to students in terms of mirroring real world scenarios, students also appreciate and value of them as part of their learning experiences. These projects gave students the opportunity to create portfolio materials that positively impacted real clients, social entrepreneurs in a developing country. This multidisciplinary, semester long experiential service-learning project has demonstrated that with guidance students are able to create transitions from theory to practice within a classroom setting. Holston (2011) identified that, “The ability to collaborate, manage the increasing complexity of design problems, to design ‘in context’ to target audiences, and be accountable for design decisions through measurement transforms designers from ‘makers of things’ to ‘design strategists’” (p.2). We are tremendously grateful to have had the opportunity to grow these design strategists and are looking forward to transforming the next class of makers.

References

- Armstrong, S. and Mahmud, A. (2008), “Experiential Learning and the Acquisition of Managerial Tacit Knowledge”, *Academy of Management, Learning and Education*, The Vol. 7 No. 2, pp.189-208. <https://dx.doi.org/10.5465/AMLE.2008.32712617>
- Celio, C., Durlak, J. and Dymnicki, A. (2011), “A Meta-analysis of the Impact of Service-Learning on Student”, *Journal of Experiential Education*, Volume 34, No. 2 pp. 164–181
- Eyler, J. (2009). *The Power of Experiential Education*. *Liberal Education*, 95(4), 24-31.
- Fleischmann, K. and Hutchison, C. (2012), “Creative exchange: an evolving model of multidisciplinary collaboration”, *Journal of Learning Design*, Vol. 5 No. 1 pp.23-31
- Holston, D. (2011), *The Strategic Designer: Tools and Techniques for Managing the Design Process*. How Books, Cincinnati, OH.
- Katula, R. and Threnhauser, E. (1999), “Experiential education in the undergraduate curriculum”, *Communication Education*, 48 (3) p. 238
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
- Leal-Rodríguez, A. and Albort-Morant, G. (2019), “Promoting innovative experiential learning practices to improve academic performance: Empirical evidence from a Spanish Business School”, *Journal of Innovation and Knowledge*, Vol. 4 pp. 97-103.
- Learn and Serve America. (2010). What is service-learning? Retrieved March 16, 2010, from <http://www.servicelearning.org/what-service-learning>
- Levy M, Gentry D, Klesges LM. (2015), “Innovations in public health education: promoting professional development and a culture of health”. *American Journal of Public Health*, 105 (Suppl. 1):S44–5. <https://dx.doi.org/10.2105/AJPH.2014.302351>
- Paul, R., & Elder, L. (1999). *The miniature guide to critical thinking: Concepts and tools*.
- Pearlson, K. Saunders, C. and Galletta, D. (2016), *Managing and Using Information Systems: A Strategic Approach*, John Wiley & Sons, Jan 11.
- Viol Hacker, J., Johnson, M., Saunders, C and Thayer, A. (2019), “Trust in Virtual Teams: A Multidisciplinary Review and Integration”, *Australasian Journal of Information Systems*, Vol. 23, <https://dx.doi.org/10.3127/ajis.v23i0.1757>
- Pratt, Mark (2012), *Evaluation of Interdisciplinary Collaboration in Design Research*, https://www.sjsu.edu/anthropology/docs/projectfolder/Pratt_Mark_project.pdf p. 44. Dillon Beach, CA: Foundation for Critical Thinking Press.
- Shinn, S. (2003). "Intelligence@ work," *BiZEd*, September/October, 19-23.
- Zirger, B. and Privitra, M. (2009), “New Models of Cross Disciplinary Collaborative Education”, *Metropolitan Universities*, v20 n1. pp.130-146.