



Article

# Collaborative Innovation: Exploring the Intersections among Theater, Art and Business in the Classroom

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**Abstract:** There is a long history of conversations about integrating business and arts-based learning, but they are taking on more urgency today as technology-induced change and global interconnectivity are altering how humans learn, create, and construct new knowledge in unprecedented ways. However, there is much still to be learned about how the disciplines might be integrated and in what ways they can jointly serve the development not only of university students, but of how professional practice itself is defined. Over the past three years, faculty from the Theater and Dance Performance Studies, Art Practice, and Business disciplines at UC Berkeley have collaborated to create a course, *Collaborative Innovation*, that explores both collaboration and innovation at the intersection of these three fields. This paper presents a framework for a genuinely integrated interdisciplinary class that interweaves personal development and growth with problem framing and solving skills, and diverse-team participation and leadership. Quotes from student reflection papers bring alive the transformational experiences students went through in this course. The integration of socially engaged art, business, and theater/performance through collaborative teamwork tackling important and challenging social problems opens unexpected potential for student development as future contributors to society.

**Keywords:** collaboration; innovation; cross-disciplinary; intuitive thinking; qualitative thinking; communication; team building; problem solving; risk taking; design

## 1. Introduction

“To drop the tools of rationality is to gain access to lightness in the form of intuitions, feelings, stories, improvisation, experience, imagination, active listening, awareness in the moment, novel words, and empathy. All of these nonlogical activities enable people to solve problems and enact their potential” [1] (p. 15).

There is a longstanding discussion of the value that liberal arts brings to business education. As far back as 1890, Charles William Elliot, president of Harvard, argued that the liberal arts develop a “sense of right, duty and honor” along with communication capabilities needed in business [2]. Today, driven to define entirely new experiences for and with customers and users, companies are increasingly looking to the arts and artistic processes for the “anticipatory creativity” needed to design those new futures [3]. Embedding liberal arts content in business courses enables students to find informed solutions that are both technically superior as well as critically and ethically evaluated [4]. In addition to designing creative new futures, leveraging liberal arts content positions students for the flexible, increasingly global, and diverse workplaces of the future [4], and to be part of redesigning the

future workplace and thus their own work experiences [5]. Literacy in the arts can prepare students to work collaboratively within a collected intelligence, participate in social networks, negotiate cultural differences, critique existing paradigms, and navigate contradictory data [6,7].

Parenthetically, although it is not the focus of this paper, there is also discussion of the value of business learning to the arts. The textbook *Management and the Arts* [8], for example, covers management fundamentals—from economics to human resources management to fundraising for managers of arts-based organizations. Over time, the development of a business connection to the arts has resulted in the development of new fields of strategic arts, cultural management and cultural entrepreneurship [9]. This paper focuses more on the value derived in business from integration of arts-based pedagogy and curriculum.

From a skills perspective, business increasingly requires intuitive and qualitative thinking, communication and presentation skills, team building and problem solving, and the ability to understand undefined outcomes while allowing for failure and risk taking. The arts can help business students develop needed imagination, critical discourse, spatial thinking and abstract reasoning, and active listening and observation skills [10]. Learning from the arts prepared information technology professionals, for example, to better interpret complex, ambiguous situations, interact with experts from other fields, and constructively evaluate their own work and the work of others. These skills are seen as a complement to the more rational, scientific models that otherwise inform IT education [11] and management practice more generally [1,12].

Development of these capabilities is needed all the more today when technological change is happening at an exponential rate and creating unprecedented large-scale systems change [13] that has caught both educational institutions and industry leaders unprepared. Dealing with the complexities of a highly interconnected and fast-moving world requires a new set of approaches to complement, if not entirely replace, traditional tools and understanding of when to drop familiar tools to make room for new ones [1]. How can we best prepare students—business and non-business majors alike—to not only live, work, and relate to others in this new world, but more importantly to design that world so that we all want to live and work in it? In what ways does professional practice need to be restructured to be nimble and responsive to the changes that are upon us? How and when is it appropriate to “drop the tools of rationality” [1]? The answer, many argue, is in the integration of the liberal arts, or arts-based education, with business education.

Is it enough, however, to simply embed some arts classes into business education, or do students need a deeper experience, a transformation perhaps, that better prepares them for changing world paradigms? Are the professions as we know them today the professions needed for a future world? If not, how should we approach redesigning them? As traditional constructs that support concrete boundaries between disciplines and professions shift and change, arts discourse offers an expanded perspective on the complex systems that structure contemporary experience, creating space in which to offer critique, alternatives, and perspective on their impact. This in turn can allow students to consider not only their own effectiveness in relation to cultural change, but also how they can act most wisely, sensitively, and courageously within their fields.

Collaborative innovation as represented in this paper is more than a pedagogical framework; instead, it more broadly reflects the ways in which professional fields of practice are now entwined. Interconnectivity is fundamental to global networks of cultural exchange. Given this contemporary condition, might collaborative innovation itself define a profession in the future? If that is the case, are we ready with educational models that can teach it? In this paper, we approach these questions through the lens of a *Collaborative Innovation* course developed at UC Berkeley as a joint effort across three disciplines—Art Practice, Business, and Theater/Dance and Performance Studies—and offered to undergraduate students from across the campus. The paper explicates frameworks that can be used to think beyond the role of the arts in business to actual integration of arts and business. While the course facilitates learning through “knowing” (theory-based reading and discussion) and “doing” (application of theory through hands-on exercises), it is the immersive experience across the

three disciplines, guided by structured frameworks, that allows students to engage in a journey of “becoming” [14] contributors in a highly complex and dynamic world. The description of the course and associated frameworks provided in this paper aim to help create common language, identify key skills and capacities of creativity and how they can be developed across disciplines, and show how faculty from different disciplines can work together to create an integrated learning experience that is transformational for students [15].

## 2. Collaborative Innovation Course: Background and Frameworks

### 2.1. Collaborative Innovation Course Description

*Collaborative Innovation* was first offered in Spring 2016 through the Big Ideas Courses program in the College of Letters and Science at UC Berkeley. The program sponsors cross-disciplinary courses aimed at exposing undergraduate students to dialogue among faculty with different perspectives on a big issue. In this case, the objective of the course was to bring together innovation practices from the worlds of theater, art practice and business to offer students a cross-disciplinary, collaborative problem-based learning [16,17] experience.

The faculty who founded the course proposed three perspectives on innovation: (1) theater faculty described their contribution as a laboratory in developing and generating new performance works around shared life experiences through iterative writing and performance exercises; (2) business faculty focused on using human centered design techniques to leverage technology in creating better customer, user and stakeholder experiences that ultimately lead to better business outcomes; and (3) art practice faculty aimed to have students define the unspoken rules and norms of public space and utilitarian objects and create dynamic, physical, and social explorations that challenge boundaries.

The class was structured in a studio format. It met for three hours twice a week giving faculty and students ample time to connect and learn together. All faculty attended all thirty class sessions during the semester. There were sixty students in Spring 2016, sixty-one in Spring 2017 and seventy-four in Spring 2018. Table 1 provides a breakdown of the majors for students who were declared at the time of the class; twenty-eight percent of the students had yet to declare a major and are not included in the statistics presented. Students majoring in Art Practice, Business and Theater/Dance, and Performance Studies comprised slightly more than a third of the declared students in the classes over the three years. Cognitive Science, Computer Science, Engineering and Media Studies students comprised another third of the classes. The remaining third represented sixteen different majors from Economics to English. The significant diversity in majors represented in the class, along with diversity in gender, ethnicity and socio-economic background provided ample opportunity for students to learn from a wide variety of perspectives and leverage a wide range of problem-solving approaches (heuristics) [18] throughout the course.

The Spring 2018 structure of the class consisted of an introductory week during which students completed two short innovation exercises, one in pairs and the second in teams of four or five. Three two-week modules followed the introductory week, each introducing the perspective on collaboration and innovation from one of the three disciplines. In the first module (theater), students shared an object that is important to them and, in small teams, iteratively built a performance around shared themes identified in their object sharing. They were introduced to body movement and performance design fundamentals and shared a short two-minute performance in class on the last day of the module. After the performance the students received feedback from both peers and faculty. In the second module (art), students developed an understanding of Socially Engaged Art [19]. These explorations iteratively led students through creative processes in which they considered, questioned, and critiqued systems in their lives and communities. They shared their work on the last day of the module and engaged in a formal critique process in which peers provided feedback on the work. The third module (business) took students through the process of finding a customer need for a technology, designing a solution around the customer need, and building a business model around that solution. Students pitched their ideas and business

models in the last session of the module, receiving feedback from peers and faculty. Each of the three modules was completed by a different set of cross-disciplinary teams of students.

**Table 1.** Majors represented by declared students in *Collaborative Innovation* 2016–2018.

Major Category	Number of Students	Percent of Students
Art, Practice, History	19	13%
Business	18	12%
Theater, Dance Performance	18	12%
Cognitive Science	13	9%
Computer Science	12	8%
Engineering	10	7%
Media Studies (Film, Communications)	8	5%
Economics	7	5%
Political Economy/Science	7	5%
Architecture	6	4%
Environmental Studies	5	3%
Sociology	5	3%
Science (Chemistry, Biology)	5	3%
Other (16 majors represented)	18	12%
<b>TOTAL DECLARED MAJORS</b>	<b>151</b>	<b>100%</b>

Table excludes 47 students who were undeclared and 11 students for whom there is no information on their majors. For students who were double-majoring, both majors were counted.

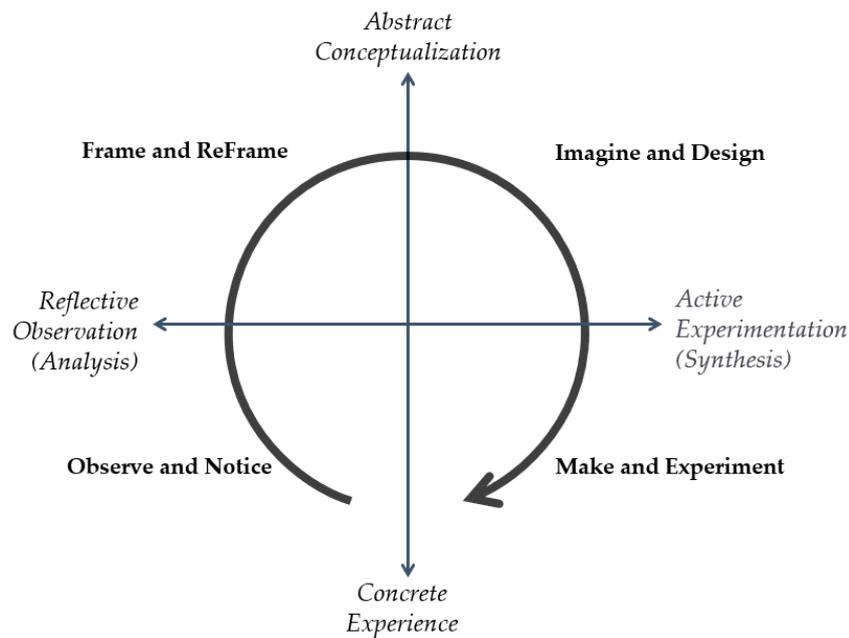
Once the students were grounded in the three disciplines’ approaches to collaboration and innovation, they launched a final project around a topic of interest to them in the final seven weeks of class in which they synthesized and applied their learning from the three discipline-focused modules. Students received input from all course faculty and were taught additional skills around, for example, systems mapping, project management, and team dynamics. These projects have focused on such topics as mental health on the UC Berkeley campus, the toxic effects of Instagram, awareness of social and racial biases, and support for shy or introverted individuals. At the end of the semester, students displayed their work at a showcase event during which they received feedback from peers and course faculty as well as outside jurors who were invited from a variety of departments and industries.

## 2.2. Frameworks Used to Integrate the Disciplines

Over the three years the course has been taught, nine faculty from the three disciplines have participated. Weekly faculty meetings during the semester along with many preparatory meetings provided time for faculty to learn about how collaboration and innovation were approached by each discipline and to synthesize frameworks used in the class to integrate the various pedagogical and disciplinary practices. The following two sections describe the two frameworks in which the class is now grounded and relevant theoretical underpinnings. The first framework describes innovation as a learning process, which provided space for the integration of discipline-specific approaches to innovation, design, and creative work; the second framework overlays development of leadership skills in the dimensions of inner, other, and outer focus on that learning model.

### 2.2.1. Innovation Cycle

The first framework now used in *Collaborative Innovation* (Figure 1) integrates experiential learning theory [20] and design [21] to depict innovation as a learning process [22]. In learning, as individuals or as teams, we toggle between being present in the concrete world (concrete experience) and being in our heads (abstract conceptualization). We further toggle between reflective observation, or analysis work, and active experimentation, or synthesis work [23]. The four quadrants formed by this learning framework highlight the four core categories of mindsets, skillsets and toolsets associated with design or innovation (and more broadly with problem framing and solving).



**Figure 1.** Innovation as a learning process [22].

*Observing and noticing* happen at the intersection of concrete experience and reflective observation. *Observing and noticing* are tightly intertwined with *framing and reframing* in a process deeply examined in the sensemaking literature. “Sensemaking is a motivated, continuous effort to understand connections . . . in order to anticipate their trajectories and act effectively” [24] (p. 71). The creation and appreciation of meaning or sensemaking is a “definitional property of a cognitive system” [25] (p. 488). Meaning-making systems from an arts-based perspective honor diverse ways of knowing—personal, narrative, embodied, artistic, and aesthetic—that often stand outside sanctioned intellectual frameworks [26]. These approaches often stand in sharp contrast to the rational–analytical–logical systems employed in business [12].

*Observing and noticing* require letting go of assumptions and looking at objects, people, and situations from multiple perspectives. While business students are often taught to rely on critical and analytical methods for observing and noticing [27], in arts education, students often learn how to see the world through a variety of senses, mediums, and perspectives [28]. Physical interaction with the concrete world, emphasized in both theater and art practice, is a way to critically engage with it [26]. Movement, as taught through theater and dance, is core to sensemaking and considered an important element of cognition [25].

*Observing and noticing* can be developed at both the individual and the team levels [25]. The challenge for teams is that as social complexity increases, individuals on the team shift from perceptually-based knowing to categorically-based knowing to make coordination and communication simpler. Imagine, for example, writing an entire paper without using any conjugation of “to be”. Rather than describe someone as drunk, for example, thicker description of the person’s appearance or behavior would be required, moving closer to the concrete experience of the person [1]. Arts-based projective techniques are one means of engaging a team in conversation such that intellectual and emotional connection to a topic at hand are retained [29], facilitating better sensemaking.

*Framing and reframing* happen at the intersection of reflective observation and abstract conceptualization and are tightly intertwined with *observing and noticing*. There are three intersecting means of making sense of the barrage of physical, social and symbolic stimuli in a complex environment. First, as individuals, we interpret stimuli based upon our own experiences and personal mythologies, and then project our interpretations onto the world. Because this is usually unconsciously done, it often reflects more about us than about the broader world. The second approach, practiced widely in the business world, invokes science and analytic reasoning in which stimuli are reduced to numbers

and then to trends and causal relationships upon which action can be taken. The third approach characterizes art-based sensemaking in which careful attention is paid to stimuli by listening deeply with the whole self for meaning. That meaning is then represented in an artistic form that retains and represents the essence of the complexity of the original environment [10]. This representation provides a more nuanced view of the differences between business and arts-based approaches and implies both the possibilities and challenges of helping students learn to integrate them. The ability to retain the essence of complexity while anchoring in a problem frame is critical to teams as they move to the problem-solving half of the innovation cycle.

*Imagining and designing* happen at the intersection of abstract conceptualization and active experimentation and often in a highly iterative fashion with *making and experimenting* as individuals or teams come up with ideas and then bring them alive. In the business sphere, “managers need creativity interventions that avoid both the risk of premature closure (myopia) as well as unlimited opening up (confusion), that balance an orientation to exploitation with exploration, as well as foolishness with reason” [30] (p. 355). There is a tendency in business classes to praise imaginative processes that preference the use of language and abstraction while in arts-based classes there is a tendency to praise students who can visualize ideas easily and readily manifest them in material forms. A wide range of arts-based tools for imagining and designing engage the entire self in envisioning alternative futures [31,32]. By *imagining and designing* across disciplinary boundaries in *Collaborative Innovation*, students learn to see how their peers think and then how and when different approaches to *imagining and designing* make sense.

*Making and experimenting* happen at the intersection of active experimentation and concrete experience. In this quadrant, the concepts conceived in *imagining and designing* are brought alive and shared with others to generate reactions. In groups of business people, there can be deep-seated resistance to engaging in art forms in which they believe they have limited ability, and it can be hard to engage them in making [29]. The ability to bring concepts alive benefits businesses not only in letting them test ideas with potential customers, but also in learning more about themselves as an organization [33]. There are many methods for bringing ideas alive that are often associated with new product or service design and development [34]. A variety of modes of experimentation are finding their way into business as well [35], although the notion of failure continues to be challenging [36]. Arts-based students, on the other hand, are afforded leeway to experiment, test, hack, break, and speculate about alternative modes of being. In art-based disciplines, “... a student’s job is to test assumptions, make mistakes, and question everything, free from the confines of corporate or institutional protocol. Being a student demands humility and assurance that one’s work can founder or collapse without an impact on the bottom line” [37] (p. 35).

The discipline-independent learning process represented by this framework facilitated conversations about the different mindsets, skillsets and toolsets each discipline brought to the class and allowed faculty to discuss differences both among themselves and openly with students, while at the same time having a shared baseline. This in turn opened opportunities for students to explicitly identify their own preferences for how to engage with the innovation cycle, and to have meaningful conversations with their teammates about their differences and how they might usefully be reconciled to achieve their shared project outcomes. Each of the six innovation activities in which the students participated during the semester led the students through this innovation cycle or learning process, and students were encouraged to regularly reflect on where they were in the cycle as a team, and where they thought they needed to go next. This allowed for explicit attention to problem framing and solving approaches and thus to mindset, skillset and toolset development among the students.

### 2.2.2. Inner, Other, Outer

The second framework the course faculty found useful in integrating the three disciplines identifies three modes of attention employed by successful leaders: inner, other and outer focus [38]. *Inner focus* entails paying careful attention to internal physiological signals that inform understanding

of the self and employing cognitive control which permits pursuing goals despite setbacks and distractions. *Other focus* develops cognitive and emotional empathy for others and social sensitivity to identify what others need. *Outer focus* drives exploration of the broader system in which one works, often facilitating discovery of unexpected connections.

*Inner focus* appears often in descriptions of the integration of arts and business curricula. College “is a prime moment for students, including many older students, to question and redefine their core sense of who they are” [39] (p. 4). A frequently-mentioned benefit of integrated courses is that they allow students to explore themselves as individuals including their personalities, aspirations, and contemplation of their callings [2]. Reflection on experiences helps students connect to their academic work, what they are learning about themselves and others, and what they would like to learn in the future [40]. Arts-based projective techniques and making, using a variety of art forms [32,33], are an effective means of exploration and discovery about self as well as about others [29].

Much of the exploration of inner came through exercises run by theater/dance and art practice faculty, perhaps due to the “making” nature of both disciplines. “The premise underneath the making process is that the act of making art can foster a deep experience of personal presence and connection. . . . [this can] help to develop a sense of personal authenticity that can be the foundation of authentic leadership” [29] (p. 64). The business representation of inner focus was more abstract—words describing the brain science of self-awareness [38], and was less easily internalized and immediately practiced by students.

*Other focus* appears in the business literature around developing empathy for customers (e.g., [41]), largely through observation and interviewing [42,43], and developing relationships with colleagues [44]. In the arts, other focus is explicitly developed through projective techniques as well as illustration of essence using artifacts that embody universally recognized qualities, situations or ways of being to which people can relate personally [29]. Understanding of a student’s own inner experience is crucial to allowing them to question and empathize with the inner experience of others (other focus). Without focus on the other’s inner experience, innovation can lead to inappropriate and potentially even harmful effects. “Audiences are never ‘others’—they are always very concrete selves” [19] (p. 23).

In *Collaborative Innovation*, students toggled regularly between inner and other focus as a means of learning about both themselves and their peers. In part, this was facilitated by explicit focus by faculty on developing teaming [44] capabilities among the students. Students started their projects with conversations about shared goals, roles, team process and how they could meaningfully leverage the diversity in experiences present on their teams. They checked in periodically on these topics and made needed adjustments on the longer projects. Teaming assessments administered at the end of each project allowed students to make real-time changes to their individual behaviors as well as to their team interactions.

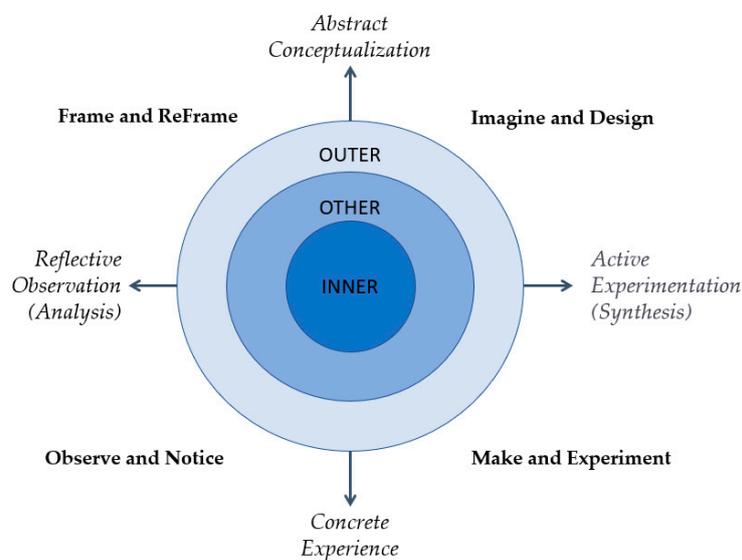
As complexity increases, systems understanding and creation of fluid, networked organizations will become increasingly important thus making *outer focus* particularly relevant today. Adaptability, resilience and tolerance for both uncertainty and ambiguity are required to live and work in a world of complexity [45]. A rich business literature on systems modeling provides analytical approaches to mapping the interactions among entities in a system, including simulating systems dynamics [46,47] as a means of developing outer focus. Socially Engaged Art positions itself at the nexus of these complexities by offering disciplinary flexibility to navigate the contradictory needs and experiences of our contemporary moment. In particular, “socially engaged art functions by attaching itself to subjects and problems that normally belong to other disciplines, moving them temporarily into a space of ambiguity. It is this temporary snatching away of subjects into the realm of art-making that brings new insights to a particular problem or condition and in turn makes it visible to other disciplines” [19] (p. 5).

*Other focus* was brought alive for students in *Collaborative Innovation* primarily through the problems they tackled in their team projects. Starting with the Art Practice project, students took on meaty and challenging issues such as drug abuse, sexual assault and loneliness that forced them, through research and discussions with others in and outside of the class, to examine the dynamics

of the systems surrounding these issues. They learned various approaches to modeling systems, identifying the enablers and inhibitors of change in those systems, that allowed them to bring the problem space alive, create meaningful discussions around the space, and ultimately to imagine ways in which they might intervene in the system to make change.

The course faculty found development of inner, other and outer focus a compelling means of presenting materials to the students in *Collaborative Innovation*, of integrating elements of each practice, and of integrating across practices. In theater, dance and performance, for example, inner–other–outer balance plays an important role in character development, storytelling, stage blocking and choreographic choices, and bodily expression. Thus, as students learned the basics of constructing a performance, they physically enacted both the innovation cycle and the experience of inner, other and outer focus. In their art practice work, they captured the complexity of significant societal problems in physical artifacts that generated thoughtful discussion. In business design, they embedded understanding of others in product and business model (systems) design.

After using the two models independently for a couple of years, the course faculty recognized the deep relationship between them, as depicted in Figure 2. Applying the innovation cycle to development of inner focus allowed students to observe themselves, reframe mental models they held about themselves, imagine new ways of being, and then test those new ways on others. An other-focused innovation cycle maps best to human-centered design (or what is popularly called design thinking today) in which others, such as customers or users, are observed, insights are garnered to frame an opportunity to help those others, solutions are imagined and then prototypes are built to test the ideas. Outer-focused innovation leverages an understanding of complex systems and institutions often providing context for design for inner and other.



**Figure 2.** Inner–outer–other and the innovation cycle.

The interactions among inner–other–outer played out throughout the semester in *Collaborative Innovation*. Students start the semester by introducing themselves in an online discussion format, sharing where they come from, experiences that have been important to them in their lives, what they are passionate about and anything else they think might interest their classmates. These personal introductions, even though online and in a class of more than seventy students, set the stage for deep interpersonal engagement and learning throughout the semester. Students subsequently share an object that means something to them, identify issues about which they are passionate, write about where they come from, and finally reflect on their learning from their initial introductions to the end of the class. As they move through the materials, they observe and notice themselves, frame and reframe where they see their fit in the world, imagine new ways of positioning themselves and experiment, often during in-class presentations, with those new positions.

An important learning for the course faculty was the importance of the interactions among inner, other and outer for student development and personal growth. For example, students explored themes related to their inner experiences and world-views through facilitated constructive interactions with others and ultimately the creation of a dance/theater performance and an art sculpture. Through these creative explorations, made in diverse teams engaging with each other's experiences and personal stories, students developed a better sense of the outer world. Thus, it became clear that the innovation cycle provided the basic tools and structure and was brought alive for the students as they toggled among inner, other and outer foci in an iterative process moving through the innovation cycle. This learning is represented in the following analysis of student reflections about the class.

### 3. Student Reflections on Learning from Course

#### 3.1. Data Sources and Analysis Methods

The empirical exploration represented below in the form of quotes from students in the Spring 2018 *Collaborative Innovation* class (indicated in the text in the form (CI, xx) where xx is the number of the student response) is in response to the following assignment:

*Reflection assignment:* This assignment provides you an opportunity to focus on and root into your own journey through *Collaborative Innovation* this semester. Write a reflection on your journey starting with reviews of your prior work: Look at your earliest writings and responses to initial exercises, particularly your first discussion of who you are and what you wanted to get out of the class. Then re-read your "coming from where I'm from" writings. Write a paragraph in response to the prompt: "on this part of my journey, I learned this about myself . . . ". Then add a one-paragraph assessment of your experience with your classmates in the teams you worked with this term reflecting on: the pairings, groupings and final group, the interactions, transactions and conversations, what you learned most about yourself from others, what you learned most about others. Close with one sentence describing what the word innovation means to you now that you have taken this class.

Students in Spring 2018 submitted this assignment after the final showcase of the semester. Of the seventy-four students in the class, sixty-five submitted usable papers; seven students failed to complete the assignment and two were in file formats that were unreadable. We collected the reflection papers and de-identified them, removing names of individuals and teams. We then assigned three people to code the papers [48,49]. In the first round of coding, we asked each person to highlight the items they found interesting in the reflection papers. The team met, discussed similarities and differences in the items highlighted, and clustered the highlighted materials.

The results of that analysis are captured in the following three sections highlighting the themes identified in the coding: (1) internalizing inner–other–outer; (2) teaming at the heart; and (3) transformation through iteration. They reflect an overall sense that the students learned to toggle between their personal and team explorations as they iterated through the six team-based applications of the innovation cycle. They fluidly moved among inner and other in each of the phases, developing and then pursuing a shared passion to make a difference in the outer world. In their words at the end of the term, "Innovation means the unique and creative process that occurs when converging mindsets and experiences from all different fields of study to solve the wicked problems of the world" (CI, 31). Parallel constructions show up in the academic literature: "Leadership relies on three very different types of courage: the courage to see reality as it actually is, and not as others would have us see it; the courage to envision previously unimagined and unimaginable possibilities; and the courage to inspire others to bring possibility back to reality" [3]. As one of the students put it: "... innovation ... means bringing purpose to my identity, as well as thinking fearlessly with others who are similarly fearless" (CI, 45).

### 3.2. Internalizing Inner–Other–Outer

Student reflections emphasized the inner–other–outer framework extensively, including in their definitions of innovation: “Innovation: The process of puzzling together one’s personal background, true passions, excitement, and belief in a greater world while working with others to create something unique” (CI, 64). They described understanding and sharing of the inner to develop relationships with others: “The more of my inner [that] is visible the more others are willing to share about their inner” (CI, 11). In the other direction, they described the extent to which others helped them discover their inner: “. . . I was able to have a lot of very interesting conversations about everything from education to passions to dreams. These conversations inspired me to think more critically about my own path in life and made me more aware of the things I want to do after graduation” (CI, 20).

Inner and outer focus were also tightly connected for students in *Collaborative Innovation*. “Understanding my inner, outer and other stood out as important both for inside and outside of the class. The dialogue between my own body and the world around me was surprisingly also very artistic. . . . *Collaborative Innovation* has taught me to redefine creative expression and to learn from the outside world” (CI, 53). Throughout the course, students identified issues that they cared strongly about, which ultimately drove the formation of their final project teams. Students were able to draw upon their own strongly felt concerns, find others who shared similar concerns, and build artifacts that helped them and others outside their teams process those concerns leveraging the use of art-based projective techniques and drawing upon illustrations of essence [29].

Students made connections among inner, other and outer in their reflections that went far beyond notions that were explicitly presented to them in the class. The setting, creation of a safe space and extensive opportunity to interact with a wide range of individuals through the six team projects seem to have provided them with the space needed to explore and develop these capabilities.

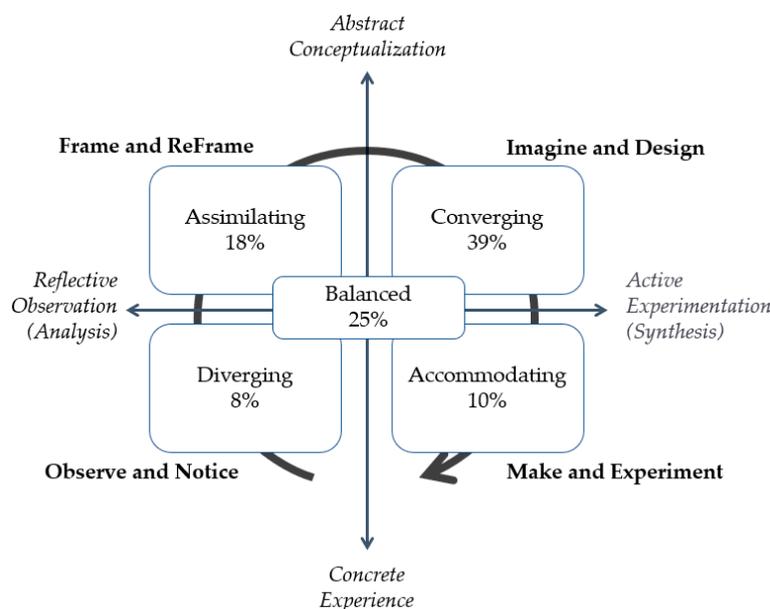
### 3.3. Teaming at the Heart

Collaboration was explicitly taught in the course through a teaming [44] curriculum (explicated on [teamingxdesign.com](http://teamingxdesign.com)) that had students share individual profiles with one another as a launching point for their project work together, and gave them regular peer feedback to learn about and improve their interactions on the team. Teaming [50] was at the heart of learning for the students, and they described this class as unique in their university experience in the ways in which it developed their teaming skills. “I realize that I had a very different expectation of the class from what I now have. In the beginning, I thought that this would be a class that would make us focus on group projects in a sort of traditional way; some of us would end up doing most of the work, our topics would get picked for us, and we were to focus on the group . . . rather than developing ourselves as well. . . . after taking the class, I realize . . . the growth I have undergone thanks to working with a group of people” (CI, 50). In addition, many of them said that they “. . . got to make some really great friends” (CI, 30) in the class.

Engagement in teams was critical in forcing some students out of their comfort zones, while allowing others to shine. “Sometimes it is best to let people gravitate towards their talents and work with their unique abilities, and other times it is beneficial to encourage group members to step outside of their comfort zone and stretch their abilities to create balance among the group and have each individual member grow as much as possible” (CI, 61). These opportunities were made apparent through the three discipline-focused modules: “. . . on the dance module portion . . . I learned that I rely on mental-visual images of movement during my creative process, which allowed me to adjust my working style” (CI, 41). They gave students a view into the contributions they could make outside their major: “Because I am mainly a dancer, choreographer and performer, I was afraid that I wouldn’t have much to offer since the class didn’t necessarily revolve around dancing. However, I discovered that the creativity and innovation that I put into dance could also be incorporated to so many other aspects of group projects . . . ” (CI, 59).

Diversity on the teams provided an experience students sought at the beginning of the semester. “... I had never seen such diversity in one class since I came to Berkeley. There were people of different genders, sexual orientations, ethnicities and personalities. ... in college it was difficult to find diversity because similar people tend to gather into friend groups based on interests. It felt very freeing” (CI, 58). Diversity was crucial to the functioning of the teams, as it provided the variety of perspectives [18] needed to innovate. “The best teams should challenge one another, offer diverse perspectives, and maintain a fun working environment for the best outcomes” (CI, 4).

As one means of understanding diversity, students frequently mentioned the importance of knowing their learning styles, which are associated with the four quadrants of the innovation cycle [23]. Figure 3 shows the learning styles associated with the cycle and the breakdown of learning styles for the Spring 2018 cohort whose reflection papers were analyzed. (Note that the number of converging learners, who are very good at finding answers to problems and do well on standardized tests, is approximately 50% in business student populations [51], but is only 39% for this cross-disciplinary population.) Students found knowledge of their own learning style valuable: “I found out that I was an accommodator. This solidified my knowledge of myself as a manager/facilitator and made me take a more active role in using this component of my personality in the final project” (CI, 13). They found it helpful to know the learning styles of their teammates as well. “... we all can be classified as a specific type of learner, and we should keep in mind what other learning styles we should look for in collaboration” (CI, 14).



**Figure 3.** Learning styles for spring 2018 *Collaborative Innovation* cohort.

Diversity also sets up conflicts that, if not managed well, can lead to team dysfunction and reduce team outputs [52]. Students highlighted communication and active listening as the way they overcame conflicts. In many cases, good team communications in their minds depended first on their ability to see themselves more clearly which allowed them to listen better to others. It also depended on them being able to accept others’ perspectives. “I used to prioritize my opinions [over] others and did not value their ideas as much as I should have. ... the process of sharing and exchanging ideas made me realize how important it is to accept other people’s ideas because I learned that my idea is not always the greatest” (CI, 5).

Students also highlighted learning that teams can be very different from one another in how they function, and still be successful. Several learned that they needed to be more flexible in the roles they took on in any given team, as the diversity of experiences on the team, the focus of the team’s

work and the need for their own skillsets varied. “In working with others, I discovered that true diversity means that every group interaction will be quite different and people will always respond and react in different ways. Within those group contexts, I have a responsibility to both be true to who I am and also to support my team, which sometimes requires compromise if my own goals are not initially aligned with those of my team” (CI, 35). For many, this was surprising, as they had imagined themselves as playing very specific roles on teams in the past. “I learned to change my approach while working with different kinds of people, to best utilize our individual strengths” (CI, 55).

Ultimately, developing trust was core to the students’ team experiences. Some credited the class with creating “a safe and supportive community, largely through . . . discussion forums. It felt like . . . we were more than a class . . . we were an experience living itself” (CI, 16). Others acknowledged “I learned what it means to be open and vulnerable, and how to candidly express my story, to complete strangers. I learned how to listen and absorb the stories of others. And, most importantly, I learned how crucial having trust in others is in this process of creation” (CI, 7). This development of trust proves to be crucial to allow innovation in the creative process. “Inviting possibilities demands a great deal of trust in the uncertainty of the creative process, even though giving oneself over to uncertainty seems like an unlikely goal” [37] (p. 35).

Leadership was also a constant theme throughout the reflections, even as it was ill-defined. Many of the students who wrote reflections talked about their role as a leader, which means that there were more leaders in the class at any given time than there were teams. In part this was due to the realization that they could be a leader of a part of the innovation process: “I realized my strength as a leader in the diverging process, and how I needed a converging leader to complete my skills on a team” (CI, 7). One student reluctantly took on a leadership role upon finding that he was the one forming the ideas for the team’s final project and despite hesitations declared that “I learned more about myself during this part of my journey than any other period of my college career” (CI, 12). In a similar vein, others began taking on a leadership mantle upon hearing from their teammates that they were viewed as having leadership capabilities.

### 3.4. Transformation Through Iteration

The four quadrants of the innovation cycle appear less obviously in the student reflections than the inner–other–outer construct does. One reason for fewer explicit references to the innovation cycle could be that the inner–other–outer framework was mentioned indirectly in the assignment instructions, while the innovation cycle was not, which could be changed in upcoming offerings. There is a further opportunity, however, to build the innovation cycle more visibly into the final project by requesting that students formally and regularly reflect on where they are in the cycle, and where they would like to go next. The course faculty change each year as well, and some more directly integrate the innovation cycle into their own materials than others. As new faculty are integrated into the course in upcoming years, there is an opportunity to have them more explicitly integrate the innovation cycle, at the same time refreshing discussions about what frameworks best represent the work done together, and how those frameworks might be evolved in future offerings.

Nonetheless, students mentioned several specific skills and tools taught in each of the innovation cycle quadrants. The critical balance between diverging and converging (*imagining and designing*) was noted by a few: “. . . my biggest takeaway is that I learned how to diverge. As someone who prefers structure and stability, I realized I am quick to converge and create a tangible solution. I always considered the idea of diverging, especially once an idea has been chosen . . . as ‘going off track’ . . . which is never a good thing” (CI, 9). Some came to gain “great respect for narratives. Hearing someone’s story, told in their voice and through their eyes . . . ” (CI, 38) was a means of *observing and noticing* and *framing and reframing*. Others saw the value of narrative (*making and experimenting*) in achieving their dreams: “I realize a good business plan and model is all about a passionate story. If I want my small start-up idea to succeed I need to dig into where I come from and create a compelling story that can help develop, support and sell my idea” (CI, 64).

Critique, a mechanism used primarily in the arts to give and get feedback, surfaced importantly in the reflections. Working through team difficulties was facilitated by “learning how to critique and receive critique constructively . . . ” (CI, 25). In this class, critique functions as a framework in which to clarify both the intentions of a group and how effectively they were able to convey these intentions to those outside the group. It consists of a formalized process of inquiry, guided by questioning such aspects as motivation, the reason for specific formal choices, and how the group might change their process in the future. This framework allows students to get to the core of their choices and responses and to elicit deeper engagement than their initial understanding and decision-making led them to. As Christina Bertoni, Professor at Rhode Island School of Design says, “I think of critique as an articulation exercise, a way to get people to consider rather than judge” [37] (p. 214). In addition to feedback on the outputs of each of the team efforts, students were given the opportunity to give feedback to and get feedback from their teammates describing both the contribution they made to the team and opportunities to improve. Because of this feedback, for example, one student worked to improve his ability to balance listening and advocating as he moved among various teams.

The most common observation students made about the innovation cycle addressed the highly iterative nature of the innovation process. “Sometimes you need to just let ideas settle in and marinate” (CI, 3), one said and “Learning isn’t about optimality, but rather trying, trying and trying again” (CI, 54). “Innovation . . . is a continuous evolution of ideas, obstacles, and further enhanced ideas. It is the best part of the human experience, because the process is like that of reaching a fulfilling life” (CI, 40). While they liked the notion that they should “trust in the process” which “takes a lot of stress off of me” (CI, 32), they appreciated the malleable nature of the process and their role in making the process work for them. “I’ve learned that innovation is a result of many iterations and discussions” (CI, 29) and requires “the willingness to embrace challenges and the ability to recognize existent deficiencies while transferring ideas/inspirations into perceptible forms” (CI, 31). Through their experience, they “learned to become more mindful of the process itself, which naturally forced me to reflect on my strengths and shortcomings to cycle myself back into upward self-growth” (CI, 40).

### 3.5. Experience-Based Learning to Become

For the *Collaborative Innovation* faculty, the magic of the class as represented in the student reflections—the deep learning about inner–other–outer, teaming with heart, and transformation through iteration—would not have been possible without the integration of the three disciplines not only by the faculty, but by the students in their experiences with one another. With faculty facilitation and strong frameworks to anchor their exploration, students found their own ways of internalizing the learning, and ultimately of seeing the ways in which they might become [14] contributing professionals in the rapidly changing world. In the process, they gained capabilities in both collaboration and innovation, thus—possibly—collectively defining a new profession: collaborative innovator.

Students in *Collaborative Innovation* clearly saw different possibilities for their own direction and development after the class: One of the prospective business students in the class, for example, declared “Before, I wanted to just work for a large consulting firm; conform to their mission statements and lead others using old techniques and philosophies. But after taking this class, that just sounds boring!” (CI, 64). Another said “The very most impressive thing I learned about myself in this class—or I would even rather say developed—is the awareness that I do not just want to stress out about having a perfect career and getting . . . promotions and money and all that stuff but rather that I want to focus on myself more as well as my environment” (CI, 65). She changed her focus from getting a job in Mergers and Acquisitions at Goldman Sachs to considering a Corporate Social Responsibility position in a company she “can relate to”. The class, she said “definitely left a lot to think about and the process hasn’t ended yet”.

From the perspective of the arts disciplines, a dance student declared “I feel more secure pursuing dance because I have gained knowledge outside of performing. Moreover, what I realized is that it’s not so much having hard and fast business classes that make me feel more secure, but rather knowing I have valued skills other than just performance skills. The ability to work in a group and

facilitate creative ideas to realization is an incredibly practical and highly valued skill. . . . Going into this class I assumed my ideas would not be valuable because I am a performance major. I did not see how I could contribute to projects with lofty, abstract ideas. I think my biggest takeaway from this class is that my creativity can be of value in a practical sense" (CI, 2).

The disciplinary diversity in the class clearly opened windows of possibility for students. A chemistry student, for example, was taken by the "theater frame of focusing on social justice" (CI, 10) while a humanities major responded that "The biology and chemistry majors taught me about the research-oriented process of testing and validating hypotheses. I know now how to leverage such diversity within the context of [the] innovative cycle" (CI, 40). Thus, while the class started with a simple definition of inner as self-awareness, in ways that surprised the faculty to some degree, it took on a much deeper mission: providing a sense of new possibilities and a transformative experience for students.

While much of the curriculum was designed by faculty before coming to the class, and the frameworks leveraged for the class are based on existing theory, the elements came together in surprising ways and had a much more profound effect on the students than expected. Much of this seems to be due to the creation of a safe space in which students from highly diverse backgrounds were able to come together to tackle complex problems. The intensity of a six-hour per week in-class format allowed for rapid iteration through project work to start, exposing students quickly to a wide range of people and approaches. This provided them the comfort needed to explore diverse perspectives, approaches and solutions in depth during the final project, and ultimately the opportunity to examine their own possible contributions to the broader world.

#### 4. Conclusions

The opening of the paper describes accelerated change in the world, and the resulting possibility that professions as we know them today will have to evolve, change and potentially be entirely redefined. Professionals in the future will need to be highly adaptable to change, uncertainty, and complexity. To be impactful in their fields, they will have to be sensitive and flexible in framing and solving problems. And, they will have to be able to do so while teaming with a diverse population of others. In short, future professionals will have to be adept at "becoming". Dall'alba [14] draws on philosopher Martin Heidegger's notion that being human means having possibilities or possible ways to be, and thus that we are all in a perpetual process of becoming. Ultimately, she argues, education is about transformation of the self.

Student reactions to *Collaborative Innovation* bring alive their experience of that transformation, their experience of the journey through the ambiguities associated with the evolution of and constraints on possibilities, and their learning about the need to balance openness versus resistance to change. "Getting to learn by doing and work in teams solving real and important issues really brought me back in touch with what I want to do in the world. It has felt like a transformational semester in which I am now shifting my focus and priority to . . . pursue the work of design, teaming and problem solving as a career" (CI, 62). ". . . job satisfaction will come from wearing many hats with a mission that requires deep thinking and multiple variables" (CI, 10).

The class provided them with fluency in a set of approaches they can use in an ongoing "becoming" process. Using models such as the innovation cycle will allow them to leverage a wide range of mindsets, skillsets and toolsets as they try to understand and respond to problems. They can leverage understanding of inner, outer, other focus, constantly iterating among them to adjust and adapt their focus as the environment in which they are working evolves. The transformative experiences in this class would not have been possible without integrating the perspectives of multiple disciplines—both from a content and faculty perspective, as well as from a student diversity perspective. These processes and perspectives allow students to simultaneously experience personal transformation and transform their fields of influence in ways that align with their deeply held values. As these newly minted "collaborative innovators" continue their transformation journeys, teaching or involving others as they go, perhaps they will design a new profession as well.

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