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Designing Six Dimensions of Intercultural Teamwork: A next-gen challenge in co-creation processes

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Abstract: By examining remote collaboration as a design problem, this paper provides a rationale for the Six Dimensions of Intercultural Teamwork, a new framework to help teammates understand various differences such as how they build trust, exchange information, and cope with creative abrasion. Collaborative work intensifies when teammates are diverse in mindsets, cultural backgrounds, disciplines, and approaches to problems and projects. Stumbling blocks can also grow when teammates work remotely or are working with each other for the first time. Design processes can help remote teams improve the way they work together by introducing systemic thinking, promoting physical and iterative processes, and making the invisible visible. The COVID-19 pandemic thrust design education and workplace activities into new virtual spaces, amplifying some of the challenges associated with teamwork. Videoconferencing tools and cloud-based software alone cannot build the necessary interpersonal skills for effective communication and relationship-building, nor can they address other challenges inherent in teamwork.

Keywords: diverse collaboration; intercultural learning; design process; wicked problems, visual thinking

1. Introduction and study context

Design educators have begun to recognize the need to teach collaborative skills, as evidenced by the recent publication of *Intercultural Collaboration by Design: Drawing from Differences, Distances, and Disciplines through Visual Thinking* (Murdoch-Kitt & Emans, 2020) and *Collaboration in Design Education* (Lane & Tegtmeier, eds., 2020). These publications suggest that working effectively with teammates—especially across national borders—is now more critical than ever. Likewise, the design discipline has been moving increasingly toward addressing intractable systemic challenges, or wicked problems, a term coined by Horst Rittel in 1973 (Buchanan, 1992; Rittel & Webber, 1973). These complex problems are best tackled by diverse teams—with constituents from various disciplinary and cultural backgrounds

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working synergistically together (Emans & Murdoch-Kitt, 2017). Because collaborating remotely is an added challenge, it is essential to confront the process and system of collaboration and co-creation as a complex design problem in and of itself. Designers are prepared to improve the problems inherent in remote collaboration because their working processes enable them to understand a problem from many different angles (Frankel & Racine, 2010). Thereby, designers can integrate “signs, things, actions, and thoughts” (Buchanan, 1992, p. 12–15) from a variety of disciplines and cultural perspectives into new online environments and virtual teamwork scenarios. The study responds to this challenge by proposing a framework to address common issues for all types of teams, regardless of the relative diversity of their membership.

1.1 Innovation and co-creation

Various forms of co-creative practice (Sanders, 2000; Stappers & Sanders, 2012) can positively affect teamwork, bringing together contrasting viewpoints, methods for understanding and solving problems, and domain knowledge (Leonard-Barton, 1995). This combination, when managed well within a diverse collaborative team, can lead to more interesting and innovative design outcomes than any individual in the group would have developed working alone (Hill et al., 2014). Approaching problems from new perspectives can lead to innovative outcomes that create value for organizations and society as a whole (Patton & Downs, 2003; Rosen, 2009).

According to the Observatory of Public Sector Innovation (OPSI), “Innovation involves introducing entirely new approaches or the application of existing approaches to new contexts” (Roberts & Tönurist, 2018). In order to arrive at new ideas, innovation is often brought about by teams that are diverse in their thinking and approaches to problem-solving—and who give time and space to learn from each other’s differences (Leonard-Barton, 1995). Though diversity does not guarantee critical thinking or superior outcomes, studies such as these show that when constituents of collaborative teams are diverse across many different characteristics, they often do better work (Rock & Grant, 2016).

At the same time, assembling a team and then working together—not just in a perfunctory way—but deeply and innovatively, can be an enormous challenge. For instance, a study of 200 Canadian-based firms conducted by De Clercq, Thongpapanl, Dimov revealed that successful product innovation requires managers to establish fair and mutual respect amongst intra-organizational interactions (2013). To achieve high levels of product innovation, moreover, managers themselves must “go out of their way to integrate their viewpoints with others’, rather than to avoid them, when conflict situations arise” (De Clercq, Thongpapanl, Dimov, 2013, p. 67). While issues of equity, fairness, and respect are critical to teamwork, building these skills takes time and experience, particularly when team members hail from different cultural or social backgrounds (Hill et al, 2014; Meyer, 2014). Teammates’ differences could include work or educational backgrounds, country or language of origin, approaches to problem-solving, and any number of demographic differences (age, race, gender identity, and so on).

Improving the teamwork experience for diverse collaborators in both education and practice is an intricate design challenge. By employing lateral thinking (de Bono, 2010), designers can connect disciplines and integrate ideas from them together into something new. The ways in which designers focus on making and visual thinking is also a differentiator. As Nigel Cross writes, “design offers opportunities for development of a wide range of abilities in nonverbal thought and communication” (Cross, 1982, p. 226). With this in mind, visual thinking (embodied in activities such as sketching, collaging, creating diagrams, and so on) can provide an opportunity to improve upon and clarify typical approaches to collaboration by offering alternatives to typical communication styles and exchanges. Therefore, visual thinking can be particularly useful in intercultural collaborations wherein linguistic and cultural differences often create barriers to mutual understanding and teamwork.

To better equip diverse teams to take on multifaceted problems together, the study introduces the Six Dimensions of Intercultural Teamwork, a framework developed from design thinking and research methodologies. While this research was developed specifically from studying newly formed, remote intercultural design teams in a learning context, the framework developed from its findings is transferable to a range of remote learning and working scenarios that involve some kind of teamwork.

1.2 Collaboration in remote learning environments

Keeping in mind the benefits and challenges of innovation and teamwork, this paper focuses primarily on the need to effectively incorporate collaboration in remote learning environments. The authors discuss the challenges of diverse and remote collaboration and how these parallel patterns for active learning (Anderson & Krathwohl, 2001; Bloom, 1956) and the design process (Design Council, 2015a, 2015b). The study brings together literature on intercultural learning (Mansilla & Jackson, 2013), intercultural communication (Martin, Nakayama, & Flores, 2002) and collaboration (Hill et al., 2014; Rosen, 2009; Patton & Downs, 2003; Kirkman, 2002) to understand key characteristics of successful diverse design teams.

The result of this research is a framework called the Six Dimensions of Intercultural Teamwork, an organizing structure which acknowledges the flexibility and adaptability within each person. Each dimension encompasses a range of contrasting characteristics to help teammates understand their differences in working styles, unpack stereotypes and biases, learn to trust each other, explore topics of mutual interest together, and work more productively on design challenges together (Table 1). The framework is introduced in this paper as a way to inspire other design faculty and practitioners to facilitate and engage with these concepts as part of evolving remote collaborative practice and diverse teamwork.

Table 1 The Six Dimensions of Intercultural Teamwork, described in relationship to the design process and the revised Bloom's Taxonomy of Educational Objectives.

Dimension	Description
Discover Work Styles	<p>To what extent is your working style:</p> <ul style="list-style-type: none">• Independent?• Interdependent? <p>This dimension runs parallel to the stages of discovery (Design) and remembering (Bloom's) in that it asks teammates to learn about their working preferences and to recall their self-discovery as they learn about their teammates. Activities in this dimension are designed to help build an individual's self-awareness and use that as a basis for conversation about productivity and guidelines for team operations.</p>
Understanding Core Beliefs	<p>To what extent do you value:</p> <ul style="list-style-type: none">• Individualism?• Collectivism? <p>This dimension relates to empathizing (Design) and comprehending (Bloom's). When individuals comprehend their own biases and values, it sets the stage for empathy and the ability to understand their teammates' beliefs, even if different from their own. Activities in the second dimension aim to help individuals become aware of implicit biases, stereotypes, and values, and how these might play a role in their work. From a basis of self-reflection and analysis, individuals prepare sensitive questions to begin engaging with remote teammates.</p>
Establishing Trust	<p>To what extent do you rely upon:</p> <ul style="list-style-type: none">• Substantiated trust?• Relational Trust? <p>This dimension entails teammates acknowledging, accepting, and learning to work with each other's strengths and weaknesses, and prepares teams to begin projects together, which they do by defining a problem (Design) to explore. This relates to applying knowledge (Bloom's) in that teammates are able to build trust by applying what they know about themselves and each other. Activities in the third dimension are focused around exchanging personal narratives and co-creating new narratives as low-stakes productive activities between new teammates. In the process of learning about each other and initiating some small collaborations, teammates begin to build trust while also learning about how technology affects communication and identity.</p>

Assessing Information	<p>To what extent do you look for information from:</p> <ul style="list-style-type: none"> • Objective sources? • Subjective sources? <p>This dimension prepares teams for ideation (Design), which involves creating many different ideas, opportunities, or other responses to the defined problem. Understanding how to analyze (Bloom's) information, objects, or ideas is essential to both. Activities in this dimension help teammates explore topics using subjective and objective means of researching, gathering, and portraying data, with the goal of reaching a topic that teammates are excited to explore together. This is the phase in which teammates often identify a wicked problem to pursue together.</p>
Decoding communication styles	<p>To what extent is your communication:</p> <ul style="list-style-type: none"> • Direct? • Indirect? <p>This dimension is essential for critique (Design), which encourages constructive feedback, and evaluation (Bloom's) of self, teammates, and outcomes. Activities in the fifth dimension guide teams in giving and receiving information in ways that all teammates can receive and understand, based on an understanding of indirect and direct communication styles and a format for delivering constructive feedback.</p>
Designing shared goals	<p>To what extent do you set goals that are:</p> <ul style="list-style-type: none"> • Attainable? • Challenging? <p>This dimension naturally leads to teams being able to prototype (Design), which brings ideas to life and enables them to create (Bloom's) new ideas by combining different prototypes together. This process synthesizes what teams have learned and also produces new knowledge. Activities in this dimension help teammates develop attainable as well as challenging goals, break longer projects into manageable phases, assign roles matched to skills and learning interests, and engage in creative work together. This dimension guides teams in how to begin addressing the wicked problem they would like to explore.</p>

1.3 Diverse teams: Challenges and benefits in remote collaborations

In setting the stage for the complexities of working in teams, it is important to note the distinction between the terms *collaboration*, *cooperation*, and other different ways people can work together. “Collaboration is the process of two or more people, i.e. collaborators, working together to co-create something through joint decision-making, in which everyone takes part in the process and responsibility for the outcomes” (Murdoch-Kitt & Emans, 2020). Remote collaboration engages teams or small groups of people in working together using online or virtual tools. More specifically, remote learning in higher education involves undergraduate and graduate students in using online or virtual tools for educational purposes. Remote learning does not necessarily include collaboration, however, and collaboration can occur in other online contexts outside of remote learning scenarios. While collaboration strives to be more equitable, cooperative learning and working generally involves structured and hierarchical roles and an emphasis on completing a provided learning activity versus cultivating a project and outcome together.

In the context of this research, participants engage in both remote collaboration and remote learning to improve students’ readiness for professional practice. This is because today’s professional workplaces require students to hone interpersonal skills and experience prior to entering the workforce. In higher education, this process involves learning about collaboration in order to address the gap that exists between classrooms and the workplace; evolving students’ mindsets in order to effectively work with collaborators’ different perspectives; and doing team-based activities online in order to practice and refine collaborative skills and develop innovative team projects.

1.4 Learning: The need to prepare for workplace collaboration

Even in courses or workplaces that are not typically collaborative, encouraging peer-to-peer learning and support is critical to forging interpersonal communication skills across a range of platforms. Cultivating interpersonal connections in these spaces helps participants feel less disconnected and solitary in their experience, particularly in the context of emergency remote teaching. However, one issue affecting the efficacy of collaboration is the measurable gap between the amount of collaboration preparation students gain during higher education and the importance employers place on being able to work well with teammates and people who think differently.

A survey conducted by Hart Research Associates for the Association of American Colleges and Universities (2015) underscores the need to explicitly teach collaboration skills in higher education. As many as 83% of the employers surveyed consider the ability to work in teams as one of the most important skills for new graduates (and that only 37% of new graduates are adequately prepared in this area). Furthermore, 96% of employer respondents believe that “all college students should have experiences that teach them how to solve problems with people whose views are different from their own” (Hart Research Associates, 2015).

The unpreparedness of students to work in teams is not unique to American culture. In a study conducted at a university in Vietnam, the lack of collaborative skills was considered the largest obstacle for collaborative learning. All students and almost all professors agreed that students did not demonstrate effective collaboration skills (Le, Janssen & Wubbels, 2017).

As professional settings are highly collaborative, a lack of collaboration skills can become a challenge later in designers' careers. In a survey of 1,087 design professionals conducted by Magoulas & King (2017), 97% of respondents reported working with professionals in different roles, such as programmers, product managers, and sales people. The Enterprise UX Industry Report (2017-2018) conducted by UXPin (2017) also reveals that collaboration between professional design teams is also a significant challenge. Given the need for collaboration that designers encounter and the lack of collaboration skills development in design education, problems inevitably arise.

There are obstacles to collaboration other than building the requisite interpersonal skills and experience prior to entering the workforce. Teams that work together in-person, remotely (purely digital), or in hybrid form (both in-person and remotely) have different needs, dynamics, benefits, and challenges. For example, Kirkman et al. (2002), conducted a study with members and leaders of mostly virtual teams within a travel organization. Building trust within virtual teams and clarifying and sustaining team processes, such as goals and operating norms were two of the primary challenges. Other major obstacles were the ability to create an inclusive virtual environment, considering individual needs and preferences; finding team members that balance each other's technical and interpersonal skills; and developing approaches for feedback, assessment, and support of team members. The authors' own study, which revealed the same types of issues among long-distance teams of design students from different cultural backgrounds, seeks to address these challenges through the implementation of the Six Dimensions of Intercultural Teamwork (Table 1).

1.5 Evolving: Creative abrasion necessitates adaptation

In collaborative scenarios, creative abrasion is a sort of pressure that necessitates evolution in individuals' mindsets and ideas. It is the struggle or discomfort that comes from people challenging each other's contrasting ideas en route to reaching the team's shared goal. The term is attributed to Gerald Hirshberg, who was director of Nissan Design International at the time (Leonard-Barton, 1995). Creative abrasion is not about consensus—it is about creating the space for drastically different ways of thinking to encounter and interact with each other in a synergistic way (Leonard-Barton, 1995; Hill et al., 2014). Ultimately, it is about shifting from working individually as the sole creator and "evolving" to embrace the different perspectives in the group to cultivate mutual understanding.

While individuals—and entire organizations—often cling to similarity and familiarity (Nemeth, 2018), business success is increasingly attributed to individuals' adaptability to different cultural settings, contexts, and viewpoints, and in demonstrating respect for other people (British Council, Booz Allen Hamilton, & Ipsos, 2013; Daniel, Xie, & Kedia 2014; Rock

& Grant, 2016). Research suggests that experiencing creative abrasion, although not always pleasant, is an essential ingredient for teams who wish to do innovative work (Hill et al., 2014). Diverse teams boost their collective cognitive performance as a result of learning from members' unique perspectives and challenging one another to think differently (Rock & Grant, 2016).

Novel ideas and outcomes are the result of seeing problems from new angles or having a teammate challenge one's sense of status quo. Teammates from different cultural backgrounds are likely to consider very different types of solutions or approaches to the issue at hand. Differences in ideas, opinions, working styles, and perception of the problem itself can lead to challenging communications and struggles. At times, these varied perspectives can sometimes cause communications to shut down completely, as teammates struggle to voice contrasting opinions or conflicting ideas. Often, teammates want to prioritize preserving the interpersonal relationships within the team over finding a creative solution to the problem at hand.

Ultimately, creative abrasion in a diverse collaboration provides a valuable and rare opportunity to learn how to think very differently about something, that is, evolve. Working through all of this complexity means that teammates may need to work harder than they would work alone, but investing the time results in better outcomes. In addition, teammates must preserve open lines of communication. Harnessing the potential of creative abrasion relies on teammates' expanding their empathic horizons.

1.6 Doing: Collaboration vs cooperation

Both collaboration and its close relative, cooperation, require skills such as analysing, evaluating, and creating, which, according to the cognitive domains of learning, are examples of "higher-order" thinking and learning (Anderson & Krathwohl, 2001). Matthews et al. (1995) further discuss the dissimilarities and commonalities between cooperative and collaborative modes of learning. Both approaches promote more active learning and working, and involve practicing social and team skills. Both can be accomplished in various settings: online, in person, or a mix of the two.

Collaboration—particularly involving constituents from diverse backgrounds—is required with greater frequency in academia and professional design practice. Therefore, there is an increasing need to address the actual experience and process of collaboration. Collaboration is itself a complex and systemic design problem. Its complexities are magnified and may even feel insurmountable when teammates have different backgrounds and work together remotely. This can result in high levels of frustration, even when people receive some training or preparation before meeting their teammates (Baker & Clark, 2010). Designers must embrace the opportunity to create new approaches to improve the experience and efficacy of diverse collaborations.

Approaching collaboration as a set of interconnected learning experiences that build upon each other stands in marked contrast to teamwork approaches in which individuals work

independently and later combine work, which does not equate to a “real team” or a real collaboration in terms of the team’s performance and outcomes. Even worse, a “pseudo-team” can have a poorer performance than simply combining together individual work (Katzenback & Smith, 2015). Moving beyond a cooperative perspective empowers each team member to feel like an equal contributor to the process and outcomes of a shared project. In point of fact, simply because people work together does not necessarily mean that they are a “real team,” as Katzenback and Smith (2015) point out: “A real team has a small number of people with a common and meaningful purpose, specific goals related to that purpose, have complementary skills, an approach with a set of rules, and mutual accountability.”

The “think-pair-share” strategy is a ubiquitous cooperative learning strategy used at all educational levels (A. Goldman, personal communication, July 21, 2019; Kaddoura, 2013; Big Heart Media, 2010; Cortright, Collins, & DiCarlo, 2005). Individuals are asked to first think about something on their own, then are assigned to pair up with someone. Students are usually provided with instructions at this stage in terms of how to discuss their individual thoughts and summarize them, how to apply their individual thinking to an assignment or activity, and so on. Finally, the pair shares what they accomplished together with the group. The think-pair-share strategy also has parallels in professional practice. Because this is such a common pedagogical approach, cooperative learning is often mistaken by students as a form of collaboration. However, it is important to distinguish that collaborative learning more closely resembles the collaborative scenarios students will encounter in the workplace. Collaboration is less formally structured by a party outside of the collaborative team (such as an instructor or team lead). Instructors or team leads assume that individuals already possess the necessary interpersonal capabilities to work together successfully and place the responsibility on the group to determine their own course of action and outcomes. As this responsibility belongs to the group, teams cannot rely on software and must reach beyond such tools to work effectively together.

2. Methods of Inquiry

Since the study began in 2012, the Six Dimensions of Intercultural Teamwork have been developed and refined using a grounded theory analysis of observational and survey data. Over 230 participants in long-distance intercultural collaborations between North America and the Gulf Arab region have contributed to this study to date. As a strategy to bring together the concepts of collaborative learning and professional practice, this multi-phase study began by analysing survey data collected from 20 academic and professional designers working in visual communication design. The study also integrates secondary literature regarding the benefits and challenges of collaboration in pedagogy and professional practice. Finally, the study involved testing, iterating, and observing activities based on the Six Dimensions of Intercultural Teamwork with cohorts of design students based in North America and the Middle East who worked collaboratively online.

2.1 A grounded theory approach

The data from this ongoing study is analysed through a grounded theory approach in order to understand the efficacy of visual thinking activities in the relationships, working processes, and outcomes of intercultural design collaborations in higher education. Charmaz states that researchers can use this approach to gain a “conceptual handle on the studied experience” through comparatively analysing quantitative and qualitative data; analysing the findings from a theoretical standpoint; applying inductive logic; and utilizing informed practice (Charmaz, 2014; Sarker, Lau, & Sahay, 2000). In this study, the authors derived insights by comparing their analysis of the collaborative cohorts over time (Glaser, 1978; 2010), enabling the analysis of study participant experiences and the development of a new theory, offered in the following section.

2.2 Initial survey

The study began with interviews and survey data collected from a purposive sample of 20 communication design faculty and professionals living in the United States. The authors took care to select participants to achieve a high level of demographic variation (such as age, gender, geographic location, education level) within the small sample of respondents and ensure the respondents’ background knowledge of the research topics. Participants were selected from a variety of different design workplaces and higher education contexts, ranging from individual freelancers to large design studios and small private art schools to large public universities. Three themes emerged from the survey data, including: 1) the importance of collaboration skills; 2) the intersection of design and sustainability; and 3) ability to work with people from different backgrounds.

The first theme relates to the ways in which respondents articulated a need for contemporary designers to function well in collaborative settings utilizing skills like conversing, active listening, exchanging constructive feedback, empathizing, and asking questions. The second theme pertains to the need for designers to comprehend complex problems in order to help others better understand them. The third and final theme discovered in the collected survey data suggest a need to incorporate global perspectives into design practice, especially as it relates to wicked problems.

2.3 Critique of secondary literature

Cultural anthropology, organisational studies, and theorists from other disciplines offer some frameworks for understanding cultural similarities and differences, such as Edward T. Hall’s (1989) high-context and low-context cultural continuum. Others are organized around communication patterns according to differences in nationality (Trompenaars & Hampden-Turner, 2011) or cultural values (Hofstede, 2011). In the context of research dedicated to online communities, these frameworks are commonly referenced to explicate how different cultures express information and “exhibit different behaviors online” (Gallagher & Savage, 2013, p. 1030). But while Hofstede’s model of national culture is widely referenced in

organizational studies, it is also criticized as “profoundly problematic” (McSweeney, 2002, p. 13). Signorini, Wiesemes and Murphy pinpoint these problematic aspects as inconsistent, oversimplified, and static. Perhaps most critical in an educational setting is the notion that Hofstede’s model lacks “empirical evidence” and, therefore, the authors encourage educators to embrace a more holistic view of culture that is both dynamic and flexible (2009, p. 253).

Building on these criticisms, this study similarly found that, using these models as a basis for participant self-assessment and subsequent team analysis in earlier phases of this study creates a false sense of cultural absolutes. Based on participants’ self-assessments, many participants positioned themselves along the continuum in locations very different from those prescribed to their culture in the literature. In their written reflections following the activity, many of these participants reported a sense of frustration, injustice, or inadequacy of anthropological or cognitive frameworks for the purposes of the group analysis. Some reported that they felt these existing frameworks reinforced stereotypes, and that they felt a need to express themselves as a blend of various characteristics instead of absolute terms. Furthermore, in the context of collaboration, these frameworks did not offer insight into specific preferences or habits that are especially relevant to the success of diverse teams.

2.4 Observations of collaborative online intercultural learning

Based on respondent feedback from the initial survey of professional designers and design educators, the authors initiated an ongoing study of long-distance intercultural collaborations between their respective design classrooms. To date, the study has involved 14 cohorts of design students, located in the United States and the Middle East. Each group is tasked with addressing a particular wicked problem, usually related to environmental sustainability or social justice issues. The students work together remotely in small intercultural teams. These classroom collaborations provided the foundation for developing visual activities to facilitate different aspects of the teams’ working process and interpersonal experience.

Drawing from these ongoing observations and analysis of data collected from study participants, the findings reveal that the Six Dimensions of Intercultural Teamwork is an effective strategy for working across international borders and remote environments. This theory emerged from the patterns observed in the needs and behaviours of the collaborators, which also serves as a framework for organizing and understanding the visual activities as a progressive sequence.

The Six Dimensions align with the processes for learning, evolving, and doing. It does this by introducing the integrated ideas of learning in relation to an interrogation of the concepts of collaboration vs cooperation; doing as a pedagogical strategy that employs the cognitive learning domains from Bloom’s Revised Taxonomy; and evolving education and professional practice to respond to students’ lack of preparation for workplace collaboration (Figure 1).

Figure 1 *Convergent frameworks: The Six Dimensions of Intercultural Teamwork combine ideas from learning theory with the design process to support teams of diverse collaborators in learning, doing, and evolving together.*

2.5 Methods in practise

In response to comparative observations of these student cohorts over time, the authors developed a series of more than thirty visual activities to address some of the typical problems inherent in diverse collaborations. These have been tried, tested, and refined by the authors in the context of remote intercultural design collaborations as well as other collaborative contexts to promote evolving, learning, and doing. These activities are categorized based on the Six Dimensions which include 1) discovering work styles, 2) understanding core beliefs, 3) establishing trust, 4) assessing information, 5) decoding communication styles, and 6) designing shared goals (Murdoch-Kitt & Emans, 2020). The activities are grouped based on each Dimension to help teammates further understand and build relevant skills. The visual activities take into consideration how to apply active learning and multisensory exploration to both the processes of cultural learning and engaging in teamwork.

One example of this strategy is a visual thinking activity called the Teamthink Constellation. This is a self-assessment tool that puts the Six Dimensions of Intercultural Teamwork to use by helping teammates see and compare their different working and communication preferences. This method is known as a Teamthink Constellation because it results in a series of six scattergrams that often resemble constellations. During the activity, teammates individually assess themselves, and then all responses are combined together into six different scattergrams, which correspond to each dimension. The aim of this approach is to introduce participants to the six overarching dimensions which define the Six Dimensions and how their preferences differ with their teammates.

To develop the Teamthink Constellation, several cohorts within this study have used different versions of the self-assessment tool over time to create various types of visualizations from their results. Because the authors have first-hand experience in applying Hall's high- and low-context model as a team assessment mechanism, the model evolved to embrace a more holistic view of culture. Observing the gaps, shortcomings, and limitations of the aforementioned cultural models lead to the creation of the Six Dimensions framework (Murdoch-Kitt & Emans, 2015). The final Teamthink Constellation pulls from and integrates the most successful elements of this and other earlier iterations of team assessment activities.

Teamthink Constellations are usually created with physical materials, although some participants re-create their scattergrams digitally or document them in digital formats to share with long-distance teammates. For example, oftentimes, an individual will use all of their team's self-assessment results to create team scattergrams using sticky notes on a whiteboard (Figure 2), then photograph and share the results with remote teammates. For example, the dimension "Understanding Core Beliefs" asks participants to plot themselves using two axes based on the degree to which they related to the following statements:

- I feel that I have the ability to influence or change things that affect me. My personal values, principles, and their roots contribute to a sense of self-efficacy or ownership. I feel a responsibility to myself above others.
- I feel that my actions can directly contribute to or detract from team harmony. My personal values, principles, and their roots contribute to how I see my role in the community. I feel a responsibility to my community above myself.

The results of the class self-assessment activity using the Six Dimensions (shown photographically in Figure 2) can be translated into digital form (as in Figure 4) so that the individuals, teams, and the larger group can continue to reflect on their similarities, differences, and how to overcome gaps that might cause challenges in work behaviours or communication patterns.

Figure 2 *The Teamthink Constellation is one visual activity that utilizes the results of the Six Dimensions self-assessment, enabling teammates to see each other's characteristics and preferences in relationship to each other. Here, a class that comprises six teams engaged in this visual activity in order to better understand themselves, their small teams, and their large group in relationship to each other. Each team is represented by different colors of sticky notes. This image shows the outcomes of the six scattergrams, one for each of the Six Dimensions.*

3. Results: A new actionable framework

The results of this study indicate that the Six Dimensions of Intercultural Teamwork enable teams to visualize important differences in their working and communication preferences. Feedback gathered from teams who engaged in this process reported higher satisfaction in the collaborative experiences and outcomes than those who did not utilize the activities associated with the Six Dimensions. In particular, this was due to the fact that the visualizations prompted the teams to engage in conversations about how to leverage their differences early in their process, rather than seeing them as areas of division. This reframing of differences as a way to support positive and productive collaborations is a pivotal finding of the study.

In developing, utilizing, and studying participant self-assessments over time, alongside other visual thinking activities and their outcomes, a larger pattern emerged. Prior to the integration of the Six Dimensions into team-based activities, participants consistently experienced similar hurdles at similar points in their collaborations. Some examples include coordinating schedules and time differences; thinking about how their own biases and stereotypes affect how they might approach their partner and the collaboration; trying to connect with each other on a personal level; understanding each other's differing viewpoints; offering feedback; and attempting to tackle projects together. The introduction of the Six Dimensions of Intercultural Teamwork helped address these barriers to collaboration by enabling participants to engage with six critical areas for teammates to understand about themselves— and each other.

DIMENSION 2: UNDERSTAND CORE BELIEFS

Figure 3 *Understand Core Beliefs: Activity. This is a blank scattergram with descriptions for each of the axes. Respondents can choose to what extent they are individual or collective in their work or daily actions. Being able to select from each of the two options acknowledges the blend of characteristics embodied in most people, instead of forcing them to choose one characteristic over another, which may reinforce stereotyping and cultural biases among teammates. This is just one example from the full activity, which invites teams to create these scattergrams for each of the Six Dimensions.*

Incidentally, many teammates who engaged in these hands-on activities (away from the screen) and later shared results with their remote teammates reported a stronger sense of engagement and connection to their team. In courses that include many different teams, visualizing the scattergrams can be done as a large group activity. The approach provided the best of both worlds: hands-on interaction with the Six Dimensions data, and a common point of reference that the team could easily return to when working through challenges. By working with all of these different areas, teams became much more well-equipped to manage some of the challenges highlighted earlier in this paper, such as explaining how teammates express information or different behaviours online. This self- and team-assessment method also enabled participants to get a sense of the whole group in addition to their smaller (in-person or remote) teams within the larger group. Physical displays of the scattergrams can also be digitized and saved in the cloud for quick reference throughout the collaboration.

DIMENSION 2: UNDERSTAND CORE BELIEFS

Figure 4 *Understand Core Beliefs: Outcomes. In this example scattergram, Understand Core Beliefs, each team used a different colour sticky note to plot themselves and each other relative to the two axes. The design of the scattergrams enables each team to discover and discuss teammates' characteristics. One team is highlighted here (pink squares) to illustrate the wide range of results that can manifest between individuals. Quotes at left illustrate the value participants saw in this activity.*

In addition to serving as a self-assessment for individuals and their diverse teams, the Six Dimensions of Intercultural Teamwork catalyse critical conversations among teammates while providing an organizational framework for their working process. In the context of a collaborative team, visualizing individual inclinations and work habits enable teammates to proactively discuss differences as assets and to anticipate ways to productively utilise or work through them together.

4. Analysis & Discussion

This section discusses and analyses both theoretical and applied outcomes in terms of the significance of the Six Dimensions of Intercultural Teamwork. In comparing the outcomes of cohorts who applied some aspects of the Six Dimensions framework before embarking on project work to cohorts who did not utilise the Six Dimensions, those who engaged with the framework self-reported better outcomes in terms of team cohesion and satisfaction, and were more likely to deliver finished products on time. The majority of participants who utilise some or all aspects of the Six Dimensions describe their team's final product as including multiple perspectives and / or moving beyond any idea they would have had if working alone.

The Six Dimensions of Intercultural Teamwork work in parallel to the design process, which describes a methodology for evolving an idea. This correspondence is significant because effective learning about teammates is essential to supporting intercultural collaboration, and effective learning about a topic is necessary for the design process to have an effective outcome. The design process itself is action-oriented, with progressive phases that overlap. The Six Dimensions also encompass a progressive evolution that addresses the problem of building interpersonal connections between teammates alongside the issue of helping teams figure out how to approach a project together.

The conversations prompted by the Six Dimensions scattergrams are a hallmark of their efficacy. Perhaps one reason teams can more easily discuss their scattergrams is because assessing oneself along the Six Dimensions of Intercultural Teamwork is not about defining individuals in absolute terms. The framework is flexible in order to accommodate the nuances and apparent contradictions inherent to human nature. For example, an individual may simultaneously embody feelings of independence and interdependence, may practice both indirect and direct communication depending on the situation, or could place equal significance on objective and subjective information. An important component of understanding these dichotomies, however, are an individual's preferences for working in group settings.

5. Conclusion

As higher education continues to respond to COVID-19 by transitioning to remote working and learning environments, communication and collaboration in remote teams have become essential parts of the classroom experience for many. As such, the Six Dimensions of Intercultural Teamwork are transferable. Diverse teams and collaboration opportunities exist beyond design, creative disciplines, and the classroom. The authors therefore hypothesize that this framework will have wider applications across many disciplines and contexts. Designing optimal collaborative experiences is particularly pressing in this moment when the need to create resilient plans for continuity of education at all levels is paramount.

International and diverse teams are essential as designers and non-designers unite across disciplines to improve wicked problems (Emans & Murdoch-Kitt, 2018; 2017). Moreover, the findings presented in this paper suggest an approach to innovation that integrates remote and collaborative methods into the process of teamwork to enable designers to see a problem holistically and understand the interconnectedness of communities, organizations, and other stakeholders. Empowering diverse teams to work better together not only helps them to come up with better ideas or pursue difficult problems, it also addresses a widespread need to instill cultural appreciation and respect while expanding the range of voices who contribute to global discourse and social progress (Resnick, 2016).

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