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From the editors

Research articles

connexions interviews

From the editors

EDITORIAL FOR SPECIAL ISSUE ON DESIGNING PROFESSIONAL COMMUNICATION ACROSS CULTURES

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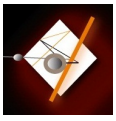
In the last thirty years, two trends have transformed the work of professional communicators. On the one hand, a global economy has increasingly placed professional communicators in multilingual and multicultural work environments. In such environments, cultural borders are blurred and ideas are shared across individuals and teams. On the other hand, advances in technology have revolutionized the ways communication products are produced. Design has risen to the forefront of professional communication. This special issue focuses on the intersection between designing professional communication and work within multicultural environments.

Framing this conversation is the ever-present reality of technological advancement and its effects on different cultures. Many communication products, such as organizational websites, handbooks, mobile applications, wikis, and help forums, are still designed with Western users in mind. At the same time, Internet access across the planet is increasing at an exponential rate. The ways in which users from thousands of cultures around the world access, use, and produce professional communication, however, is still an under-studied phenomenon.



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This research must go beyond simple binaries of Western culture and non-Western culture, however. We must embrace the multiplicity of cultures and contexts that professional communicators confront on a daily basis. There is a variety of promising work, especially in the past 5-10 years, that is beginning to complicate our understanding of the intersections of design and culture in important ways. This work invites us to let go of a mono-cultural model of communication that assumes all interlocutors share the same cultural foundation for making meaning. It invites us to see contemporary professional communication as happening within a complex web of value systems, lifeways, languages, technologies, and cultural proficiencies.

Featured in this issue are four articles that demonstrate the importance of this boundary-spanning scholarship.

Social responsibility of design has gained greater importance as designers tackle wicked problems that complicate the human experience as it relates to technology. These efforts are especially crucial in the developing world as people experience rapid-paced changes brought about by the introduction of Western technology. In his "Role of design education in fostering values of social responsibility in designers," Sanjeev Bothra examines India's design education efforts with regard to social responsibility. As part of his research, Bothra conducted interviews with experts and analyzed educational syllabi and documentation. His findings generated a "model of contemporary networks," in which the individual designer considers issues of the environment, governance, society, production, and consumption. Furthermore, Bothra proposes a "Filter System" for socially responsible design. Central to this system are "responsibility filters" and "ethics filters," both of which must be placed in the "modus operandi" of responsible design. His research not only identifies the lack of socially responsible design education in India, but lays out concrete models for design educators across the world.

Duin, Moses, McGrath, Tham, and Ernst use the design thinking methodology to create a technical and professional communication experience across academic cultures, disciplines, and age groups. In their "Design thinking methodology: A case study of 'radical collaboration' in the wearables research

collaboratory," they report on the work of a team of faculty, graduate research assistants, and undergraduate researchers who utilized wearable technologies (e.g., Google Glass and Google Cardboard) and the design thinking framework to study wicked problems. The researchers chose a variety of wearable tools and applied them in their own courses and projects. This iterative, collaborative, and highly energetic process described in the article generated insights on a radical collaboration model. This is a model for non-hierarchical, experiential, and cross-cultural learning in technical and professional communication. The insights from this model will be compelling to those who work with emerging technologies to enable learners to address complex problems through design thinking and intercultural communication.

In "But is that relevant here? A pedagogical model for embedding translation training within technical communication courses in the US," Gonzales describes how students of a technical communication course collaborated with Michigan's Language Services Department on a tool to facilitate multilingual community work. Through the project, students learned to connect technology and language accessibility, tackle cultural representations, and build translation into the workflow of technical communicators. Building on previous scholarship on translation-related service learning, Gonzales' students focused on adapting visuals and media technologies to meet multilingual needs. Their tangible deliverables provide valuable insights for those who work on technology-mediated multilingual communication.

In "Mapping the cultural context of care: An approach to patient-centered design in international contexts," Kirk St.Amant provides a way to design culturally sensitive materials for patients in different cultures. He uses prototype theory as a mechanism to build an approach he calls "international patient experience design (I-PXD)." To take the I-PXD approach, designers analyze the context of care and identify the variables that patients encounter. St.Amant proposes that designers not only review contextual variables, but also interview individuals to understand their expected context of care. Furthermore, designers should conduct ethnographic research in the patients' context. In so

doing, patients in different cultures receive care in environments that are designed to fit their needs.

We should note that the authorship and participants in this special issue come from different cultures. Their collective conversation serves as a reminder that designing professional communication across cultures matter across and within both the global North and South. This meaningful and exciting work has only begun. The deepening of globalization and technological changes, along with their promises and perils, call for more scholarship that pushes the boundaries of professional communication. ■

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Research articles

ROLE OF DESIGN EDUCATION IN FOSTERING VALUES OF SOCIAL RESPONSIBILITY IN DESIGNERS

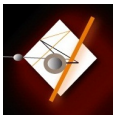
Sanjeev Bothra

Independent Scholar, India

Professional communication and industrial design have become a forceful, persuasive and omnipresent reality in shaping, serving and significantly changing the society and the environment at local as well as global levels. A professional designer is a significant contributor in creating the 'world by design', and shares the social responsibility of the consequences of the acts of design, with blurring of traditional and rigid boundaries of specialization. This research article examines 'what is' the role of the formal design education programs in fostering values of social responsibility in their students, the future professionals. The primary field study and research for this article was undertaken in India as a part of a doctoral research. Nevertheless, it brings forth insights valuable for multiple locations and parallel contexts. The concluding part of the article takes a propositional and conceptual route to derive 'what ought to be'—as models for future action.

Keywords. Contemporary design education, Wicked problems, Social responsibility, Values, Ethics, Responsible design filters.

More than ever before, in the past few decades, professional communication and industrial design have become a forceful and omnipresent reality of human civilization—shaping, serving and changing the world around us. A significant part of professional communication today is involved in, what Victor Papanek had described in his landmark book *Design for the real world* way back in the 1970s, "persuading people to buy things they don't need, with money they don't have, in order to impress others who don't care" (1985, p. ix). Is contemporary design education and praxis largely oriented towards servicing profit-focused clients



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interested in ever-expanding consumer desires? Is this the ultimate role for which design education programs prepare their students? In this article, I examine the larger roles and responsibilities of the designer and their formal education programs.

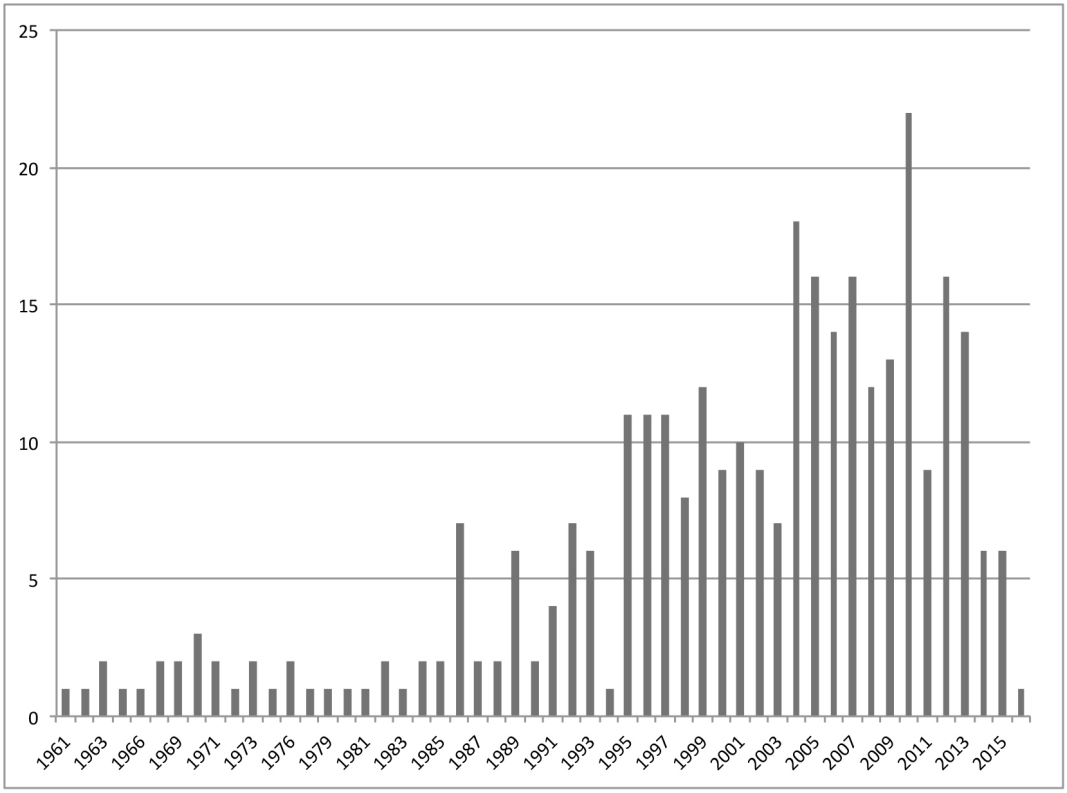
The field study[1] for this research was conducted in India—one of the world's oldest civilizations with a rich traditional heritage, and among the fastest growing economies of the world today. While the country has seen phenomenal progress on multiple fronts, several basic unresolved issues continue to pose complex challenges—social, economic, political, cultural and ecological—as they do in many developing countries. Thus, although the primary research is India-specific, it brings forth insights valuable for multiple locations and parallel contexts elsewhere.

India has witnessed an exponential increase in the number of design education programs being offered (Figure 1, page 13). With the growing significance of professional communication and design in the overall economy, these have become sought-after areas of specialization and work. Affordable and easier accessibility to technology and knowhow, as well as changing market demands and expectations, have led to the blurring of traditional and rigid boundaries of specialization. Besides formally trained students in professional communication design, students from industrial design and other disciplines, with design thinking skills and with understanding of the process of design, take up or join teams that undertake professional communication work. Therefore, I discuss issues concerning fostering of social responsibility values under the broad umbrella of contemporary design education.

Conventionally, education and praxis of professional communication and design have largely been focused on solving 'tame problems', following the tested paths of linear problem-solving or product-oriented models. "For any given tame problem, an exhaustive formulation can be stated containing all the information the problem-solver needs for understanding and solving the problem" (Rittel & Webber, 1973, p. 161).

Figure 1

Year-wise representation of new design institutions/departments and programs in India (Compiled[6]).



It is not as if such tame problems are simple or easy to solve. However, in this article, I focus on the role of design education in India in preparing their students for the non-linear and less conventional path of addressing social and culturally complex problems and challenges, described as 'wicked problems'. Problems that are "difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with *other* problems. Poverty is linked with education, nutrition with poverty, the economy with nutrition, and so on" (Kolko, 2012, p. 10).

I have used social responsibility as an ethical and moral obligation of governments, businesses and, most significantly, individuals, towards welfare of the society at large, above and beyond mere legal compliance. Social responsibility, in this sense, cannot stop at reactive action to address the problems of society; it calls for proactive action from all concerned entities as preventive or, at least, mitigative measures.

In context of the contemporary world, I view professional communication, complexly intertwined with other design disciplines, as a significant contributor in creating a 'consumerist world by design'. The creators of these designs share the responsibility of resulting environmental and social consequences of the acts of design as a whole. In this context, there is a need to examine the roles and responsibilities of the designers beyond the client and the consumer, towards the environment, society and the individual self—as a human being. I place the individual designer at the core of any design action as a change agent. Therefore, the values imbibed during professional design education programs are accorded deep significance for my study.

I begin this article by outlining research questions and hypothesis. After an overview of reviewed literature to identify the gaps, I present a brief description of my research methods. Then, I examine the significance of social responsibility and how it is valued in contemporary design education programs in India. I go on to examine 'what is' the role of institutions and the significance of the role of individuals—faculty members and students—in fostering values of social responsibility. Finally, I present 'what ought to be' recommendations for design education programs for socially responsible design.

Central Question

What is the role of contemporary design education programs in India in fostering values of social responsibility in their students, the future professional communicators and designers?

Sub-questions

1. Why is it significant to examine issues of social responsibility of a professional communicator or a designer?
2. How is social responsibility valued in contemporary design schools and their pedagogic framework?
3. What are the pedagogical and practical challenges faced by faculty members and students within design education programs in fostering values of social responsibility?
4. How do personal beliefs and commitment of individual faculty members and students influence their approach to social responsibility?

Hypotheses

1. In India, issues of social responsibility are not a priority for most contemporary design education programs and their pedagogic frameworks. Institutionally, design schools/departments in India do not have a significant role in fostering values of social responsibility in their students, the future designers.
2. In the absence of substantial institutional emphasis on fostering values of social responsibility, the role of individuals—acquires great significance. Some students and faculty members demonstrate socially responsible design thinking and action because of their own personal beliefs and commitment. These individuals play a critical role in fostering values of social responsibility.

Literature Review and Gap Analysis

The literature review examines the social as well as environmental concerns as a part of the social responsibility discussion in relation to design to establish the background and context of this study.

Papanek's book *Design for the real world*, published in 1971 and later translated to 23 languages, is a seminal work advocating social, ecological and

moral responsibilities of designers. Issues of sustainability, recycling and ethical consumption contemplated by Nigel Whiteley (1994) in his book *Design for society* seem to have become more significant now than they were raised by him more than 20 years ago.

The 1960s and 1970s were a period when concerns regarding anthropogenic environmental issues and their social consequences started gaining wider attention. Rachel Carson's (1962) *Silent spring,* was instrumental in setting forth the environmental movement which led to serious questioning laws affecting air, land and water. Barbara Ward (1966), an early advocate of sustainable development, in her book *Spaceship earth,* emphasized a connection between wealth distribution and the conservation of planetary resources.

The World Economic Forum released a report titled *Global risks 2013* developed from an annual survey of over 1,000 experts from industry, government, academia and civil society who were asked to review a landscape of 50 global risks (2013, p. 10). The respondents rated rising greenhouse gas emissions as one of the three most likely overall global risks. Severe income disparity and chronic fiscal imbalances are among the first two. Thus, the report highlighted the close link between social and environmental ethics.

Lynn White, Jr., in "The Historical Roots of Our Ecological Crisis" in the March 1967 issue of *Science*, raised a significant argument that specific religious philosophies were at the root of the kind of industrialization and colonization that had taken place leading to the ecological challenges that we face today. White points out: "Both modern technology and modern science are *Occidental*" (1967, p. 1204). I add modern design with its strong Western influence to this list, as the "single-style modernist regime of contemporary design schools" as argued by Jan Michl (2010) in his article titled 'A case against the modernist regime in design education'[2].

Alain Findeli (2001), in his article "Rethinking Design Education for the 21st Century: Theoretical, Methodological, and Ethical Discussion" refers to the "central role of economic factor" as an "extremely narrow philosophical anthropology[3]" and describes it as "outdated implicit epistemology of design practice and intelligence, inherited from the nineteenth century." He is of the

opinion that: "it is much too easy to condemn them today, as if they could have been avoided. However, there is no reason to resign ourselves to them any longer." Findeli stresses the need "to lay down new foundations for design education and research within a nonmaterialistic, nonpositivistic, and nonagnosticist, non-dualistic worldview" (2001, p. 6). Harold Nelson and Erik Stolterman (2003), in their book *The design way: Intentional change in an unpredictable world,* describe design as 'an act of world creation' and a designer as 'world creator' (2003, p. 239).

Threats from global warming, political uncertainties, terrorism, wars, nuclear weapons, poverty, diseases, poor nutrition, flimsy products, unsafe localities and vulnerable homes seek the attention of designers, like everyone else concerned about common good and future of the planet. However, science and technology do not have answers and solutions to all the problems—specifically *wicked problems*—faced by the society. Nor have industrialization and mass production been able to provide for the needs of all the people at different levels—especially at the margins—of the society.

New ways of identifying, articulating and addressing the complexities of social and environmental problems—as design problems—through design education is the primary interest area of this article. Such "design problems, experience shows, don't behave quite like normal problems in the sciences and social sciences, which can be dealt with rationally, empirically and quantitatively. And when they don't behave, we have declared that misbehavior 'wicked' and added an overlay of the qualitative to try to rectify the situation" (Diethelm, 2014, p. 1). Referring to Rittel's (1973) theory of *wicked problems*, Buchanan (1992), in his seminal paper 'Wicked Problems in Design Thinking', explains why design problems are indeterminate and, therefore, wicked. The complexities of these problems are defined through the theory of *wicked problems*, which is also used as the theoretical framework for this research.

It is evident that concerns for social responsibility are not new. However, the significance of social responsibility in the context of design, designers and their education is now gaining wider attention. The reviewed literature lends support to the need to examine the issues of social responsibility of designers. It

highlights the significant contribution of design in promoting resource-intensive consumerist activities and their social and environmental consequences.

The review of literature related to design education in India and specific search related to contemporary design education programs in context of the values of social responsibility follows.

The India report by Charles and Ray Eames (1958) is an important vision document in the history of design education in India. As per the recommendations of this report, in 1961, the Government of India established the National Institute of Design in Ahmedabad. This is considered as a significant milestone in the development of contemporary design education in India. *50 years of the national institute of design 1961–2011* published by NID (2013), reconstructs the five decades of institutional history of this first design school of India, is another important source. Another recent work, a PhD thesis by Suchitra Balasubrahmanyan (2012) titled *Genesis of design education in India: The warp and weft of local – global contexts* provides a valuable account of the development of contemporary design education in India.

Though Western scholarship has paid little attention to development of design education in India, in 2005, *Design Issues* devoted its entire Autumn issue to Indian design and design education ('Design Issues - Volume 21, Issue 4 - Autumn 2005') which provide relevant insights to this research.

The conference proceedings of *Designing design education for India* organised by India Design Council at Pune, in 2013, offer a useful compendium on articulation of issues concerning design education as the conference was organised with an aim to create a "guiding (not binding) framework that represents a common rationale/philosophy for design curricula and its implementation" (India Design Council, 2014, p. 12) in the context of proliferation of design education programs and institutions in India.

Design education in India: Retrospection, introspection, and perception, edited by I. S. Mathur is a compilation of transcripts of video interviews of 50 "designers, educators, philosophers, and visualisers" (2014, p. ix) from across generations in context of design education in India. This documentation becomes valuable research resource of 'ideas, concepts, and thoughts' of these individuals.

Blogs by several designers and design educators provide individual viewpoints, as well as information and insights about contemporary design issues India. Notable among these are M P Ranjan's blog—"Design for India". This is an unparalleled blog due to extensive and detailed entries/posts on a wide variety of topics related to design, design education and praxis in the context of India.

There is substantial literature pointing to the social and environmental concerns related to design action. There are case studies from various parts of the world in experiments and explorations that highlight social responsibility of designers. However, there is paucity of literature on the role design education in India in fostering values of social responsibility. The search led to identifiable gaps in the present literature. Hence, empirical research needed to be undertaken to fill these gaps and the lack of availability of required information regarding:

- The significance of social responsibility in contemporary design education programs in India, i.e., how social responsibility is perceived and articulated in institutional manifestos, and mission and vision statements.
- The impact of these perceptions/articulations on the curriculum and pedagogic frameworks of the design education programs.
- The roles that institutions and individuals play in carrying forward the mandate of social responsibility values within design education programs in India.
- The pedagogical and practical challenges faced by faculty members and students in fostering values of social responsibility.

Empirical research contributed to generating new information as well as corroborated whatever little information was available. Thus, my research on values of social responsibility in contemporary design education programs generated new knowledge and contributed in expanding the body of knowledge on design education in India.

Research Methodology

The theory of wicked problems[4], which was initially developed by Horst W. J. Rittel (1972), further elucidated by Richard Buchanan (1992) and Jon Kolko (2012), amongst several others, provides the theoretical framework for this research (Figure 2, page 21).

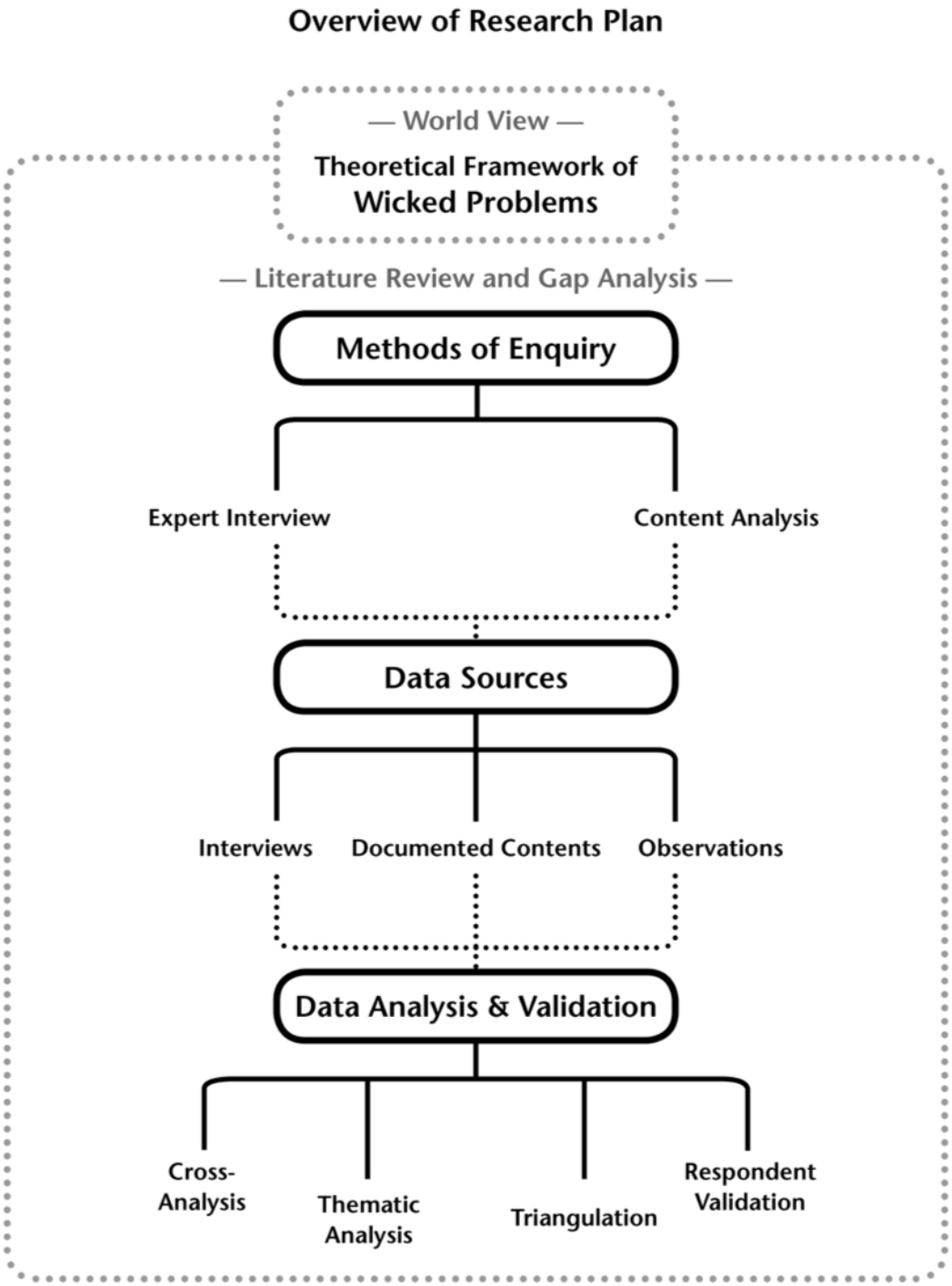
The nature of my investigation essentially dealt with qualitative values and fostering of values; this required application of qualitative research methods. I used the expert interview as a method of empirical research to explore and reconstruct explicit expert knowledge as distinct from everyday common-sense knowledge.

"Since the expert's impression of the interviewer influences the type of knowledge he/she will communicate in the interview, relevant expert knowledge can only be obtained through professional reference to the expert's actual relevance system" which is "central constitutive element of such interviews" (Bogner, Littig, & Menz, 2009, pp. 7–8). As the interviewer, I had the vantage point of being in the role of a "quasi-expert" to probe the experts' views, since I have been a design student, professional communicator and a design educator for over two decades.

The expert's relevance is heightened by "the responsibilities attached to his or her position and function in the field of action under study" or "institutionalized authority to construct reality" (Bogner et al., 2009, pp. 26, 19). I interviewed 18 experts for the present study. There were nine women and nine men in ages ranging from 30 to 63 years. All of them have been, or are currently, involved with design education in India, either full-time or part-time as visiting faculty, for a range of 3 to 31 years. The respondents have been involved with design education programs across India. They represent experiences and provide insights from across more than 20 institutions, where several of them held or still hold key administrative positions as heads, deans or directors of programs. All of them have been design students themselves and are now professional communication/design practitioners.

Figure 2

Overview of the research plan



The data gathered through interviews was corroborated through triangulation method[5]. In this process, curriculum/syllabus and other institutional documents were cross-analyzed. To maintain the integrity of information collected through the interviews and for ethical conformity, the transcribed interviews were sent back to the experts for confirmation, clarification and re-validation. In absence of Institutional Review Board (IRB), or Institutional Ethics Committee (IEC), at the affiliate institution, the rights and welfare of the respondents have been protected. Hence, complete transcripts have not been appended. Interviewees' express consent has been obtained to quote or cite their names.

Design Education in India—A Brief Background

In this section, I give a brief background of the development of design education in post-colonial India. Further, I examine the Western influence that had impacted the contemporary evolution of design education in India.

To understand the roots of contemporary design education in India, it is relevant to delve into the process of rebuilding and reconstituting post-colonial India (liberated from British rule in 1947), and the development dilemmas faced by the architects of modern India. Under the influence of the colonial rulers, India, with its well-established base of craft traditions, was already experiencing transformational impacts of industrialization and mechanized mass production. Indian thought leaders and influential thinkers like Rabindranath Tagore, Anand Coomaraswami and M. K. Gandhi, "articulated a vision of modern India where the past was seen as resource for building the future unlike the vision of the industrialists and economists for whom prosperity could be achieved only by distancing India from her past" (Balasubrahmanyan, 2012, p. 66).

As the first prime minister of independent India, Jawaharlal Lal Nehru envisioned a self-reliant India and higher living standards for the citizens. Nehru led the economic, social and cultural transformation process of the newly independent nation, with his vision of scientific, technological, industrial modernity, which overshadowed the other alternatives. For this, Nehru was open to assistance and cooperation from outside. In his autobiography, he wrote,

"We shall want help of many foreign experts in many departments of public activity, particularly in those which require special technical and scientific knowledge" (Nehru, 1985, p. 445).

Directly relevant to this discussion is the Government of India's invitation to eminent American designers, Charles and Ray Eames, a decade after Indian independence, "to recommend a program of training in the area of design" (Eames & Eames, 1991, p. 63). Eames prepared the India Report in 1958 which led to the establishment of National Institute of Design (NID) in Ahmedabad, in 1961. This was a key milestone of the formal design education in India. Subsequently, in 1969, Industrial Design Centre (IDC) was established at the Indian Institute of Technology (IIT) Bombay.

Both these pioneering institutions had a strong influence of Western models of design education. Ashoke Chatterjee (2005), former director of NID, points out that "NID was the first attempt by any developing country to use the design disciplines inherited from the Bauhaus as a tool for national regeneration" (p. 5). The Bauhaus influence on NID was actually mediated and channeled through the Ulm-NID relationship. International visitors and teachers contributed to the education program and training of trainers at NID. Besides Charles and Ray Eames; Frei Otto, Hans Gugelot, Arno Votler, Herbert Lindinger, Christian Staub, Wolfgang Siol, Armin Hofman, Rolf Misol, Louis Khan, are a few more names. Faculty members, who formed the teaching force at NID and IDC in the initial years, like H. Kumar Vyas, Sudhakar Nadkarni, Paramanand Dalwadi, Gajanan Upadhayay, Jayanti Panchal, Mohan Bhandari, S M Shah, Manu Gajjar, Mahendra C. Patel, Kirti Trivedi and others, had close connections with Ulm or Basel in the 1960s and later. (Ranjan, 2002/2004, p. 6; Ranjan, 2013).

Design education programs in India had significant influence of what Jan Michl (2010) describes as "modernist monopolization of design education" through the spread of the Bauhaus curriculum of the 1920s in the design pedagogy of practically all industrialized countries after the Second World War, leading to an "aesthetically unified" "single-style modernist regime of contemporary design schools".

This effect further trickled down into the contemporary design education programs. NID and IDC as premier institutions of India had far-reaching influence on the new institutes and programs. On the one hand, they served as models for pedagogic and curricular frameworks for new design education initiatives. On the other hand, many graduates from these two institutions took up academic as well as administrative positions to spearhead design education programs across the country. Thus, as in other parts of the world, Bauhaus (through NID and IDC) became a part of the DNA of several new design institutions in India.

Contemporary Design Education Programs in India and Concerns for Social Responsibility

In the light of the preceding historical background of design education in India, in this section, I examine and analyze how social responsibility is valued in the conceptual and pedagogic frameworks of contemporary design education programs of professional communicators and designers in India.

Kirti Trivedi (2003), former professor of design at IDC recalls: "The National Institute of Design (NID) and the Industrial Design Centre (IDC) were established in the 1960s with public money to help in the social and economic development of India. The early student projects in these institutes reflect this concern." He also points out that, "with the repositioning of design as a marketing tool in the era following the so-called 'globalisation' of the Indian economy, this perception of the role of design has sharply changed" (p. 9).

The profession of designers, described as a 'minority profession' way back in 1980 by Norman Potter in his book, *What is a designer?* (p. 13) remained so India until the 1990s. Individuals who studied design and/or started practicing design in India before the 1990s expressed the same views during their interview. Many respondents resonated that, globalization and liberalization of Indian economy, from 1990 onwards, paved the path for this 'minority' profession metamorphosing into a mainstream profession in India. An examination of the exponential increase in the number of new design education programs of a wider

variety establishes this fact. Through public or private initiatives, or both, these came up either as departments in universities or standalone design schools and even small independent design education initiatives. The growing involvement of private players, with huge financial investments and international collaborations, further points to the growing demand for design education. This was linked to growing demands from the industry offering new career opportunities.

The following chart shows year-wise inception of such design education programs that have come up over the years since the inception of NID in 1961. It shows a notable increase in numbers of these programs around the 199os (not the number of seats), the period of economic liberalization in India, and the exponential increase thereafter. Over the decade between 2006 and 2016, these numbers peaked. It is worth mentioning that the number of seats available for student enrolment in each program have also multiplied rapidly over the years.

The preceding discussion shows that the focus of contemporary education programs is mainly to support the endeavors of the industry towards promoting production and consumption. A close examination further highlighted the fact that most of these programs are primarily geared towards providing training to students such that they become employable design professionals to meet the projected needs of the market and industry oriented towards commercial viability and profit maximization.

In response to how the focus of contemporary design education programs over the last 10 years have changed compared to the earlier period, almost all the respondents expressed that they had not seen any major change in design education vis-à-vis the curriculum. A 52-year-old woman expert, an NID alumnus, a professional communicator for 25 years, and involved with design research and design education for 19 years, explains:

> It is not as if design education has not changed. But, I do not see a big shift or any basic enquiry, which moves away from that Bauhaus mode of teaching, no radical change." She further elaborates: "From five and a half years, the program at the NID has been trimmed to four years. I feel the packaging may have changed; the title or labeling [of courses] may have

> changed; new courses have started like, new media and user interface. But I do not think the premise of design education has changed or has been radically re-examined." She specifically referred to the "huge paradigm shifts that have happened with young learners today. (personal communication, July 18, 2016)

Another 60-year-old expert, who has been a design student, design practitioner and design educator, and has headed several design education programs and institutions, further explains this paradigm shift:

> The change actually has come about from the perspective of the aspiration of the students who apply for design preparation. And that, in a way, defines change. Because aspirations are different, the quality and nature of engagement are different. And the purpose for which now people and through which students engage with design education is different. So, while contents and curricula haven't gone through a major change, there is a major change in terms of the way in which students engage with the education. (personal communication, July 18, 2016)

A 55-year-old expert respondent, practicing design for 31 years and has been a visiting faculty at design schools for 21 years, observes that most of contemporary design education programs are employability driven, training students in the "craft of design" who are good with software skills, who are meticulous with getting the forms right, the kerning right, to get sophisticated looking polished output, but they are not thinking individuals. He describes them as "Photoshop donkeys" and explains: "Because they are good, they don't think. And design is essentially a thinking profession," and require soft skills "on sensitivity, team work, being grounded, developing empathy" (personal communication, July 15, 2016). Such soft skills would be essential to deal with the social and cultural wicked problems and challenges that designers in India need to address.

A study of the manifestos, mission and vision statements, of several design education institutions available in public domain[7] presents the educational intent of fostering values of social and cultural relevance and service, addressing

needs of different sectors, humanizing technologies, raising quality of life, promoting design awareness, and address the larger local and global problems. Following is an example of such a vision and mission statement:

> A holistic design education that shapes the students into responsible contributors to the society. It enables them to identify significant contemporary problems, inculcate critical thinking, critique conventional solutions, and challenge the status quo to arrive at creative solutions through collaborative team efforts at different levels of society and influencing policymaking that lead to innovations. (Industrial Design Centre (IDC) IIT Bombay - Vision & Mission, n.d.)

However, the experts, while responding to the query regarding institutional statements, observed a wide gap between the intent and actualization of fostering values of social responsibility and larger public good. Most of them were of the view that there were fewer opportunities within the curriculum to address such issues. They noted that the major curricular emphasis is on skill-oriented courses that aligned with expectation and demands of the industry and job market by focusing on transfer of skills and techniques; know-how of tools and technology; and client presentation techniques, to sell—ideas, concepts, products, services. The experts were of the opinion that such courses made-up 85% to 90% of the total offering of the courses.

Study and analysis of curriculum/syllabus of several contemporary design education programs further support these observations. In the foundation year of design education programs, the emphasis on skill-oriented courses accounted for between 80% and 84% of time allocation. Courses, which could be connected to aspects of social responsibility, environmental concerns and which could possibly contribute to development of such understanding, ranged between 16% and 20%. In the following years of specialization, this reduced to 5% to 6% of the total time allocation mostly being non-core peripheral courses, while the central focus was high on specialization specific skills, technical inputs for know-how, presentation

techniques, exposure/understanding of the industry, professional projects and practices, for better employability.

My research showed that the issues of social responsibility are not prioritized in most of the contemporary design education programs in India. Furthermore, the philosophical and conceptual intent, as expressed in institutional mandates, does not faithfully translate into actual curricula that foster values of social responsibility in their students, the future professionals.

Role of Individuals in Addressing Issues and Concerns for Social Responsibility in Design

In the absence of substantial institutional emphasis in fostering values of social responsibility during the design education programs, the role of individuals—faculty members as well as students—assumes greater significance.

Most of the experts interviewed for this research shared the view that discussions related to ethics, values, beliefs and orientation of designers in context of social responsibility, environmental concerns, governance and related wicked problems are avoided, or limited to, individual interests of concerned faculty members or students. Therefore, the few specific courses, which have the scope and opportunities to bring forth, contemplate, question and discuss these issues and foster related values, are dependent on individuals. There are no assured and consistent program inputs in these seemingly personal, yet critical, areas of design education. The experts strongly highlighted the lack of definite academic guidelines or curricular emphasis on issues of social responsibility as an integral part of the education of the future professional communicators and designers. They also pointed to the paucity of interested, committed as well as experienced faculty in these areas of concern. They highlighted the absence of faculty training and development programs which could induce the new faculty members and keep the existing faculty members updated with the current development in the areas of concern and clearer directions. Training of trainers emerged as another significant, yet under-addressed, issue.

This emphasis on the role of the individual has been a part of the larger Indian metaphysical tradition from times immemorial. To quote the words of J Krishnamurti, "It is always the individual, never the group or the collective, that brings about a radical change in the world" (Evans & Steen, 2007, p. back cover). Individual personal transformation was central to M. K. Gandhi's ideas of social change as well.

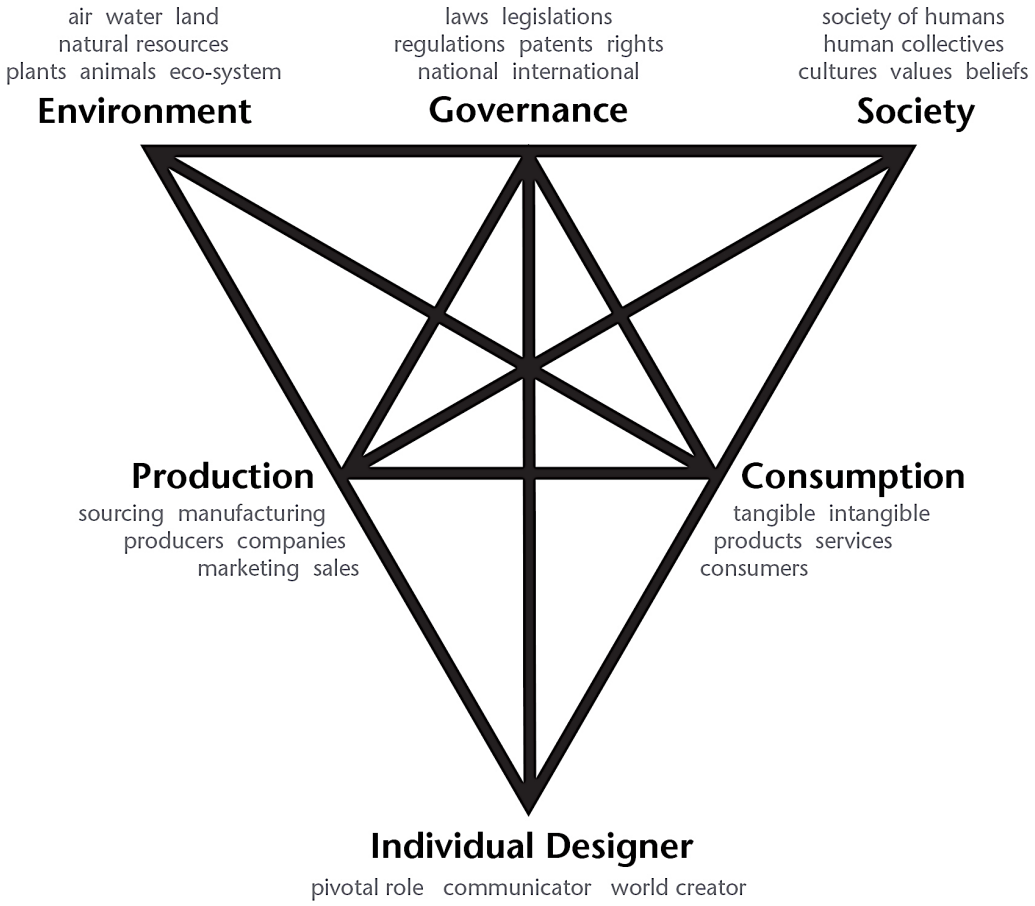
Bryan Lawson (2006), psychologist, architect and design researcher, in his book *How designers think: The design process demystified*, points out: "the designer does not approach each design problem afresh with a *tabula rasa*, or blank mind, as is implied by a considerable amount of the literature on design methods. Rather, designers have their own motivations, reasons for wanting to design, sets of beliefs, values and attitudes" which serves as "guiding principles" of a designer's thought and action (p. 159). A designer's personal beliefs—orientation and understanding of justice, equity, economics, class, caste, color, gender, religion, and politics—influences and reflects in the creation process of a small piece of communication or a large system. The evolution of these beliefs and values during the education and training of the professional communicators and designers also influences the priority of choice in what they set out to address and resolve. Both, the students as well as the faculty members, need to determine and strengthen the 'guiding principles' to build strong character for a socially responsible practice.

Model of Contemporary Networks

To further highlight the complexities a professional communicator or a designer needs to address, as described through the theory of wicked problems, a 'model of contemporary networks' is proposed below (Figure 3, page 30). It represents the complex interrelationships of production, consumption and governance systems, within larger contexts of environment, society and the individual designer in creating the artificial world by design.

Figure 3

Model of Contemporary Networks with Reference to the Individual Designer



In the model, I refer to 'environment' as an inclusive term to represent the environmental components of planet Earth. This includes all the natural resources, the whole eco-system and its delicate balance.

Further, I refer to 'society' as the society of humans—the aggregate of human collectives of appearance, cultures, customs, practices, values, beliefs, status, class, natural or political boundaries and so on.

In the model, I use 'production' as an inclusive term but not limited to represent the nexus of raw material sources, production infrastructures, manufacturing units, industries, factories, producers, storages, transportation networks, technical and creative teams, companies, corporations, product and service providers, marketing, merchandising, retailing, customer care, after sales services, etc.

Similarly, I use 'consumption' as another inclusive term depicting the action of buyers, hirers, users, seekers, consumers of the products and services provided in tangible and intangible forms.

And, 'governance' includes consumer laws, labor laws, antitrust laws, legislation, import and export regulations, memorandums of understanding, embargos, trademarks, copyrights, patents, licensing, taxation, at local, national and international levels.

The production nexus is supposed to serve the interests of consumers with due consideration for the environment and society at large. In the process of serving the consumer, this nexus serves its own interests of profit making. In doing so, if it starts compromising on its expected self-governed roles and responsibilities. External governance in its various forms needs to be in place as depicted in the above model, to maintain stability.

The spirit of all-pervasive consumerist globalization attempts mass commodification by attaching the idea of value and profit to every opportunity and possibility. The process of commodification needs designs in the form of innovative ideas, creative thinking, production engineering, marketing and communication strategies to translate these designs as tangible or intangible but desirable consumables. The faster pace and the wider spread of consumerist fervor and the 'designs' of the market on the consumers, professional communication strategies can further lure more and more people from every possible corner of this planet into the consumerist trap. With 'new' designs of products and services, the society is led into what can be termed in its dual meaning as a, 'consumerist world by design'.

The impact of such a world is not limited to the consumer in isolation but also has direct and indirect impact on society and environment at large, by further

contributing to 'wicked problems'. The model of contemporary networks essentially illustrates the complex interconnect and interdependence of the different components of this network. These components are powerful entities in themselves as well as share a highly contingent and complex relationship with one another. Environment and society, mediated by governance, is seen as the largest components right on the top. Production and consumption represent the powerful and dynamic consumerist forces within this network.

Though the individual human being is a part of the global society, which, in turn, is a part of the natural environment, the individual is also represented separately in the model at the pivotal position in the interaction. Even though an individual is the smallest component in such a network, it is at the crucial pivotal position with ubiquitous presence within each of the components. Thus, actively or passively participating and contributing in the vital balancing act of the contemporary network in totality.

Individuals, in the role of professional communicators and designers, hold huge latent power—as agents of change—in creating the 'world by design'. The act of designing has deep interconnection with society and environment besides its apparently direct link with production and consumption. Therefore, designing for others entails ethical considerations and social responsibility on the part of the designers. Design thinking and design action is becoming complex at the systems level in dealing with 'wicked problems' which several other traditional scientific discipline are unable to cope with. Since the understanding of design is changing, design education needs to take cognizance of that.

Conclusion and Recommendations—Conceptual Models for Future Action

With a brief background of the inception of design education in India, the preceding part of the article presented its expansion in post-colonial India. Thereafter, it presented 'what is' the status and developments of contemporary design education programs with specific concerns for social responsibility of

designers in context of globalization and economic liberalization in India. The three key issues that emerged from my research are:

- gap between the intent, as expressed in institutional mandates, and their actualization in the pedagogic frameworks
- lack of curricular emphasis and definite academic guidelines for consistent and assured inputs related to social responsibilities of designers
- undervalued role of individual faculty members and students in addressing issues and concerns for social responsibility within the design education programs.

Presented below is a conceptual model of 'future actions'. The implementation of the model would require actions need at the institutional as well as individual level—by faculty members as well as students. To bring about change in 'what exists' three closely interrelated stages are proposed below and further elaborated for possible actualization of 'what ought to be':

1. Need recognition,
2. Commitment articulation,
3. Actualization methods

1. Need Recognition

Any positive action for inculcating social responsibility among designers presupposes that, design institutions have to recognize it as intrinsic to the fabric of curriculum. It cannot be a one-off, negotiable part of the program. In addition, it has to be recognized as the basic ethos by each and every faculty member and staff of the program. Only then will the students understand and appreciate the significance of social responsibility. Further, the recognized need has to be externalized as clearly articulated understanding and commitment for change.

2. Commitment Articulation

Articulation of commitment to responsible design and an action plan declared by each institution—through publicly shared documents such as an institutional manifesto, vision document, and mission statement—would create self-imposed moral and ethical thrust to act up to the declarations. A step forward regarding these public declarations would be setting up a mechanism for institutional accountability and progress audits in order to advance towards the achievement of institutional vision and mission, and fulfil the promises made in institutional manifestos. Further, institutions should allow scope for periodic re-examination and re-interpretation of their vision and mission document to update and reconcile it with new developments in pedagogy and praxis as well as to address contemporary changes and challenges faced by the society and the environment. Similarly, individuals also need to articulate their responsible design commitments and possibly detail these by way of personal manifestos to create common ground for the implementation of a shared vision and mission.

3. Actualization Methods

The paper consolidates actualisation methods that can strengthen the role of design education programmes as well as empower individuals with the aim of consistency and assurance in delivering values of social responsibility. Three key components of the proposed actualisation methods are curriculum development, faculty development, and value development.

Curriculum Development. Not surprisingly, none of the institutions claims that its curriculum and courses are directed towards producing 'anti-social' or 'irresponsible' designers. However, the findings of the study assert the need for curriculum development that can effectively carry forward the responsible design mandate. The study also points to the need to identify real concerns of students of the current generation and explore the possibilities of aligning the social responsibility agenda to these concerns. A few isolated courses in existing curriculums are inadequate for carrying forward the social responsibility mandate

in an integrated, holistic manner. Social responsibility must be recognised as one of the overarching values of a design curriculum. In addition, it has to be recognised that the students who are equipped to deal with complex social problems and are better grounded in responsible design issues will not only contribute to the larger social good, but will bring added value to the mainstream industry as well.

Faculty Development. In an education programme, training of trainers and faculty development can be seen as the logical points of intervention to initiate and sustain any change. To lead a programme in responsible design, first and foremost, faculty members have to be prepared to implement the social responsibility mandate of the institution and their own individual manifestos. A professional development programme for faculty has to recognise that not all faculty members will have the required background and understanding of responsible design issues and current developments. Therefore, the faculty development programme has to be prepared to sustainably fulfil the requirement for supported learning of relevant theories, issues, and current trends, and acquiring a deeper understanding of society, culture, environment, people, economy, polity, equity, ethics, sustainability, prosperity, and other related issues. Design educators will have to re-examine, modify or even change some of their older ways of teaching, guiding, approving, and even assessing student projects and assignments. With proper preparation, contemporary design educators will be better able to play the critical role of mentoring future creator-designers; therefore, design schools and programmes should actively facilitate such preparation.

Value Development. To ensure consistent responsible design input and faithful implementation of responsible design values, the article recommends a 'filter system' for the design process of socially responsible design. Broadly, the proposed filters are to provide ways of identifying design propositions, ideas, and decisions that could contribute to irresponsibility and segregating them from those that ensure responsible design decisions.

This filter system would have array of filters. There could be basic sets that could be used as default. The whole filter system would be open to permutations, combinations and modification of the basic filter sets, as well as creation of new ones, to arrive at an appropriate order. Filters could even be customized to vary their filtering strength to deal with specific instances or particular projects. For instance, there could be a set of filters deemed suitable for first year design students. As the students advance in their learning and understanding, they may be given another version of these filters with more stringent parameters. Progressively, they could be prepared to deal with more complex real-world situations. Some components of such filters are discussed below.

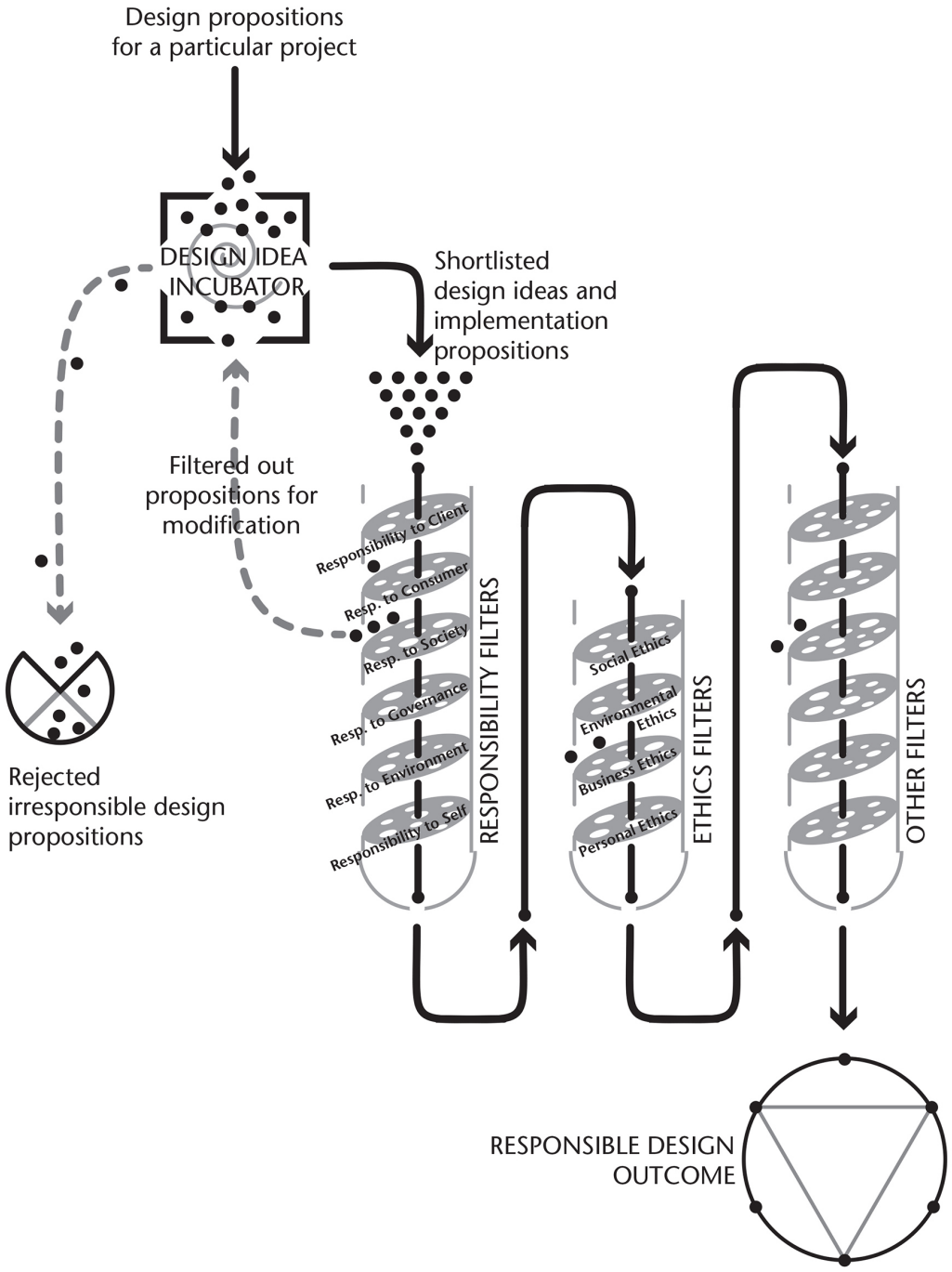
'Responsibility filter' could be constructed by incorporating various components of responsibility expected of a design professional. The earlier description of 'model of contemporary networks' is used as a basis to elucidate the example of the responsibility filter. The design propositions for a particular project have to pass through each of the following filter points, to be acceptable for further action:

- Responsibility to client
- Responsibility to consumer
- Responsibility to governance
- Responsibility to society
- Responsibility to environment
- Responsibility to self.

If a design decision fails to pass through any one of these filters, it would either need to be reconsidered for modification (or disclosed to stakeholders and regulators who can act with their own conscience) or be discarded. Otherwise, the filter component itself would have to be readjusted for its level of strength or consciously altered.

Figure 4

Visual representation of 'Filter System' for implementation of responsible design.



Similarly, the 'ethics filter' will have components such as environmental ethics, social ethics, business ethics and so on. There could be a separate personal ethics filter that could be applied by the individual during the design decision-making process, over and above the general ethics filter. A 'personal ethics filter' would be suitable to implement a personal manifesto. There could be several such filters with varied construction components and their intensities. Finally, when all the design decisions successfully 'pass' through the array of filters, the resulting design outcome would well pass the 'litmus tests' for social responsibility. I present the preceding discussion of the 'filter system' as a schematic diagram in the figure below (Figure 4, page 37).

A responsible design education programme has to incorporate these filters in its *modus operandi*. The courses, individual assignments, and especially independent projects that students take up in their senior years to apply and demonstrate their learning, would need to pass through appropriate filter systems. This would also help ensure that courses which incorporate the values of responsible design are not one-off, isolated, or elective courses. To establish a design education system, that is amenable to social responsibility issues, right from the beginning till the end, needs to meticulously incorporate the filter system into the assessment rubrics as well.

These filter systems can equally well be applied to professional design practice. The versatility of such filter systems provides ample scope for development and pursuit for excellence. Independently or as part of collectives/networks, for example design schools and professional bodies, individuals can figure out ways of identifying, examining, and integrating new approaches with the view to filter out irresponsible design from education programmes and praxis. With the ever-growing influence and significance of professional communication and design in everyday life, and with growing concerns over its environmental and socio-cultural consequences, now seems a critical time, maybe a tipping point, to bring about a paradigm shift in our ways of teaching, learning and practicing design. ■

Notes

[1] The primary research for this article was undertaken for a doctoral research from an Indian university to formally test the hypotheses put forward in this article that emerged from my personal experience as a student of design and later as a practitioner and teacher over 25 years.

[2] The article is a partly reformulated and slightly expanded version of the original titled "Am I just seeing things—or is the modernist apartheid regime still in place?" invited lecture at the conference of CUMULUS (The International Association of Universities and Colleges of Art, Design and Media) in Bratislava, Slovakia, on October 12, 2007 (Michl, 2010).

[3] The task of philosophical anthropology is to deliver a "theory" of the human being in general. It is, therefore, not to be mistaken for the anthropology of our academic "Department of Anthropology." (Findeli, 2001, p. 6)

[4] Brief description of 10 distinguishing properties of wicked problems:

1. Wicked problems have no definitive formulation.

   The problem of poverty in the USA or Ethiopia is grossly similar but discretely different from poverty in India. Or, for that matter, even within India, the problems of poverty would be distinctive with some commonality with Dharavi slums of Mumbai and a remote tribal village in Chhattisgarh. So no common practical characteristics describe "poverty" uniformly and completely.

2. Wicked problems have no stopping rules.

   It's difficult, maybe impossible, to measure or claim success with wicked problems because they bleed into one another, unlike the boundaries of traditional design problems that can be articulated or defined.

3. Solutions to wicked problems can be only good or bad, not true or false.

   There is no idealized end state to arrive at, and so approaches to wicked problems would mostly be tractable ways to improve a situation rather than solve it.

4. In solving wicked problems, there is no exhaustive list of admissible operations.

   There is no template to follow when tackling a wicked problem, although history may provide a guide. Teams that approach wicked problems must literally make

things up as they go along, since there is no well-described set of operations that may be incorporated into the plan.

5. There is always more than one explanation for a wicked problem.

   The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution, which depends greatly on the individual perspective or the worldview—the Weltanschauung—of the designer.

6. Every wicked problem can be considered to be a symptom of another problem.

   The interconnected quality of socio-economic political systems illustrates how, for example, a change in education can cause new behavior towards nutrition.

7. No formulation and solution of a wicked problem has a definitive test.

   No mitigation strategy for a wicked problem has a definitive scientific test because humans invented wicked problems and science exists to understand natural phenomena.

8. Offering a "solution" to a wicked problem frequently is a "one shot" design effort because a significant intervention changes the design space enough to minimize or negate the ability for trial and error.

9. Every wicked problem is essentially unique.

10. The wicked problem solver has no right to be wrong.

Therefore, a professional communicator or a designer is also responsible for the outcome and impact of their design action. (Rittel & Webber, 1973, pp. 161–167; Buchanan, 1992, p. 16; Kolko, 2012, pp. 10–11).

[5] To corroborate data and validate the findings in this article, two types of triangulation processes were applied:

- Data Triangulation – used for examining the consistency of different data sources from within the same method as with expert interviews.
- Methodological Triangulation – used for checking the consistency of findings generated by different data collection methods i.e., interviews and documented contents.

[6] Compiled from the following web links as the key source of data:

1. http://www.designinindia.net/resources/institutions/educational/design-institutes-india.html
2. http://design.shiksha.com/
3. http://aishe.nic.in/aishe/institutionalDirectoryHomeIndex?hasReportLink=index (All India Survey for Higher Education)

[7] Examples of manifestos, mission and vision statements, of several design education institutions available in public domain (web links retrieved February 10, 2017):

- Ambedkar University Delhi (AUD): http://www.aud.ac.in/aboutus/vision-and-mission
- DJ Academy: http://djad.in/about-us/vision-mission/
- Indian Institute of Crafts & Design (IICD): http://www.iicd.ac.in/vision-mission/
- Indian School of Design & Innovation (ISDI): http://www.isdi.in/about-us.html
- Industrial Design Centre (IDC) IITB: http://www.idc.iitb.ac.in/about/Vision_Mission.html
- MAEER'S MIT Institute of Design: http://www.mitid.edu.in/philosophy.html
- National Institute of Design (NID): http://www.nid.edu/institute/mandatemission-vision-values.html
- Pearl Academy: http://pearlacademy.com/vision-mission/
- Srishti Institute of Art, Design and Technology: http://srishti.ac.in/about-us
- The Design Village: http://www.thedesignvillage.org/overview/

More links can be accessed through 'Design in India' website: http://www.designinindia.net/resources/institutions/educational/design-institutes-india.html

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DESIGN THINKING METHODOLOGY

A case study of "radical collaboration" in the wearables research collaboratory

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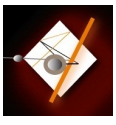
In this research article, we share a case study of the Wearables Research Collaboratory (WRC, wrcollab.umn.edu) showcasing how we came to apply design thinking methodology to the development and deployment of a technical and professional communication experience designed to enable cross-cultural, innovative insights and solutions. Over 12 weeks, our diverse team of eight applied design thinking methodology to our individual and collective investigations of wearable technologies, emphasizing culture and pedagogy, ability to shift perspective and better understand one's position in the world, and the challenges and opportunities posed by these devices. Our discussion includes focus on the cultures of seniority and academic position as well as the importance of learning experiences that reveal the true complexity of problems and that support sustained periods of question finding, ideation, and visualization. We conclude with discussion of radical collaboration as a model for the application of design thinking.

Keywords. Design thinking, Technical and professional communication, Radical collaboration, Wearable technologies, Pedagogy.

The majority of technical and professional communication curricula includes content and assignments designed to meet student learning outcomes that include the ability to critically examine technology, identify cultural and social impacts of writing, and create and maintain content. Assignments associated with these learning outcomes provide important practice in learning processes integral to future work (e.g., usability testing protocols or use of content management



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systems). However, technical and professional communicators increasingly are called upon to address ambiguous and ill-defined problems, such as how to appeal to multidisciplinary audiences and cross-functional teams, how to accommodate users of new apps and new communication devices, and how to adapt to emergent contingencies, understandings, and expectations; i.e., situations in which competencies associated with design thinking are most needed. Pedagogy associated with design thinking includes building prototypes and sharing these with other people; working together across cultures and/or across academic position; and embracing a non-sequential (cyclical) process as a means to develop multiple solutions to problems.

As experiences designed to build competencies associated with design thinking are rare, here we share a case study of the Wearables Research Collaboratory (WRC, wrcollab.umn.edu) in which we came to apply design thinking methodology to a technical and professional communication experience that we designed to enable cross-cultural, innovative insights and solutions. This case study focuses on a period of 12 weeks in which eight of us—two faculty, two PhD candidates, and four undergraduate research assistants—applied design thinking methodology to individual and collective investigations of wearable technologies.

The suite of investigations centered on uses and implications of wearable technologies in terms of culture and pedagogy, ability to shift perspective and better understand one's position in the world, and the challenges and opportunities posed by these devices. Together we deployed devices across undergraduate writing courses, examining the cultural and social dimensions of wearables including Google Glass, Google Cardboard, Oculus Rift, Pebble Watch, and Leap Motion. These studies expanded from our previous work, described in Wearable Computing, Wearable Composing, and evolved concurrently with our discovery of design thinking. The undergraduate students serving as research assistants identified emerging wearables, prototyped methods for studying the devices, and shared their discoveries along with the full team. Together we worked to address ambiguous, ill-defined, and tricky problems as we

collaborated across disciplines and/or across age groups; moreover, we embraced a non-sequential process as a means to develop multiple solutions.

In this article we document our discovery of design thinking methodology during our collaborative process and the resulting impact of this direction on our investigations. We reflect on the cultures of seniority and academic position as well as the importance of learning experiences that reveal the true complexity of problems and that support sustained periods of question finding, ideation, and visualization. We conclude with discussion of radical collaboration as a model for the application of design thinking.

In this article, we focus on communication and design across academic cultures rather than across international cultural boundaries. In an article titled "Intercultural Connectivism," two of our authors previously proposed "to shift focus away from building environments that accommodate different cultural values toward building ecologies in which participants create and share knowledge and make their cultural values toward knowledge, information, and learning as transparent as possible. We are interested in moving beyond awareness and tolerance of cultural complexities and toward pedagogies for knowledge creation in culturally diverse, networked learning environments" (Duin & Moses, 2015, p. 32). The design thinking framework of the Wearables Research Collaboratory is one such ecology—in this case, for collaborating across academic cultures. It is a test case, one iteration, comprised of knowledge, information, and learning among participants across the academic spectrum of experience.

The evolution of design thinking

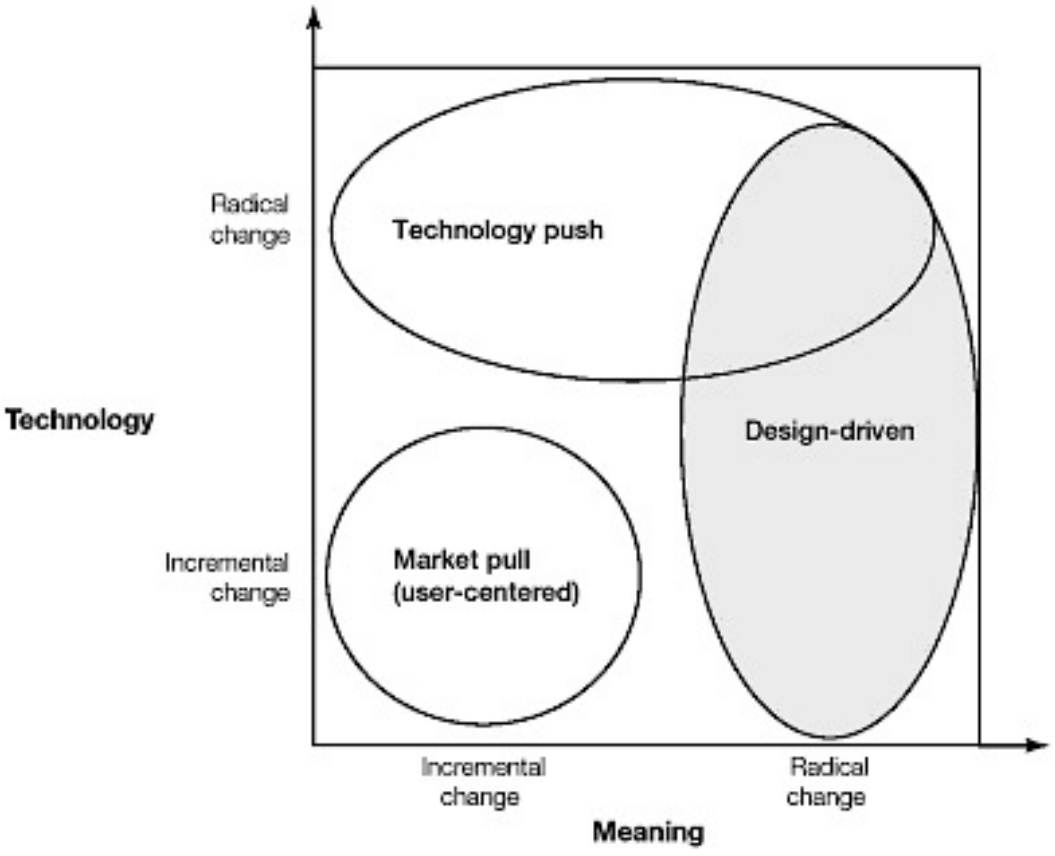
Innovation expert Verganti (2009) in his book, *Design-Driven Innovation*, articulates the strategy of design-driven innovation as one involving radical change. As shown in his figure 1-1 below, more traditional user-centered approaches largely result in incremental change; in contrast, design-driven innovations take a broader perspective, exploring both socio-cultural and technical dimensions. In particular, the process of design-driven innovation involves listening to interpreters or what Verganti refers to as "forward-looking researchers

who are developing, often for their own purposes, unique visions about how meanings could evolve in the life context we want to investigate" (p.13).

Our field of technical and professional communication embraces user-centered approaches to design, and the resulting methods lead to useful, incremental change. In this project, however, we are interested in how design thinking methodology might be applied to the development and deployment of a technical and professional communication experience designed to enable cross-cultural, innovative insights and solutions. By so doing, what design-driven, radical change might result?

Figure 1

From Verganti (2009), Figure 1-1, The strategy of design-driven innovation as the radical change of meanings.

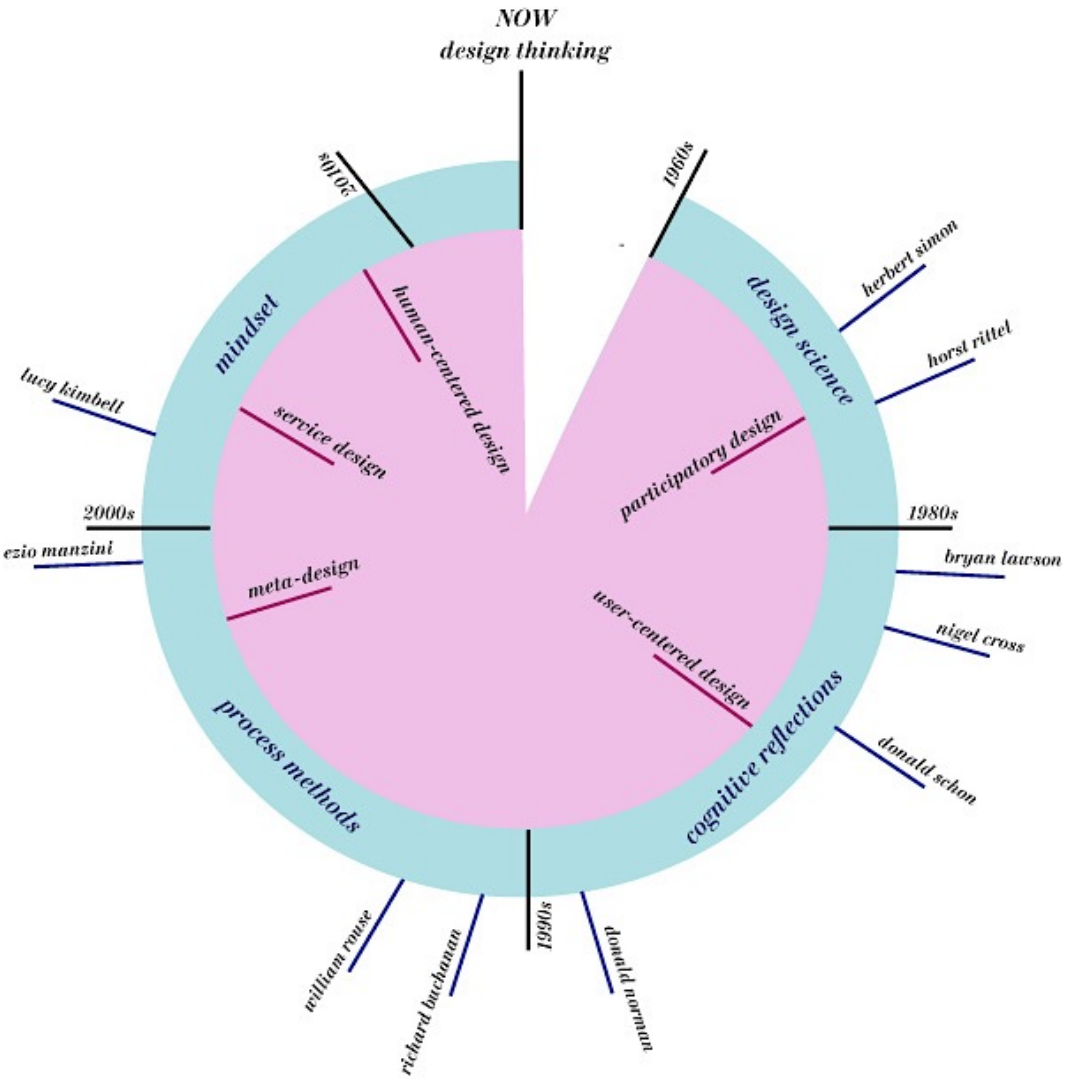


For a more specific definition, Di Russo (2016), senior consultant of design strategy at Deloitte Australia, defines design thinking as "a term widely used outside of the design industry to describe the innovative and human-centered approach used by designers in their practice… [It] has erupted outside of design practice as a new approach for innovation and transformation, piquing the interest of leaders from business, education, government, through to not-for-profit organisations" (p.3). The following illustration from Di Russo's (2012) blog post, A Brief History of Design Thinking, chronicles the development of design thinking. Di Russo describes how in the 1960s *participatory design* focused on integrating end-users into the development (prototyping) phase of projects. The next most significant contribution to design thinking was introduced in the 1980s by Donald Norman who re-defined participatory design into *user-centered design*. A few years after the millennium, *service design* emerged in which attention shifted to an understanding of "the use, interaction and journey of [the] product/service after it has left the hands of the provider." Rather than focusing on the end user, service design emphasizes collaboration with all users and the importance of building relationships and opening up communication. Most recently, *human-centered design* has continued the shift from technological systems to social systems, engaging users, and designing methods to gain direct understanding of audience.

In terms of pedagogy, Razzouk and Shute (2012), in their review of research on design thinking, state that "Helping students to think like designers may better prepare them to deal with difficult situations and to solve complex problems in school, in their careers, and in life in general" (p.343). And Glen, Suciu, Baughn, and Anson (2015), in their work on teaching design thinking in business schools, provide faculty with guidance on implementing six phases for such assignments: problem finding, observation, visualization and sense making, ideation, prototyping and testing, and the design of a business model for innovation.

Figure 2

From Di Russo (2012). A Brief History of Design Thinking.



Arguing for the use of design thinking in composition, Leverenz (2014) defines design thinking as "a human-centered approach to designing innovative solutions in response to wicked problems" and calls for "dramatic change if we want writing to be important in students' lives long term" (p.1). One such challenge is to resist the impulse to "take the wickedness out of writing assignments" (Leverenz, p.7),

which ill prepares students for the the contemporary workplace, where our students increasingly will be called upon to address ambiguous and ill-defined problems. Leverenz argues for, instead, interdisciplinary writing teams to foster divergent thinking and to treat drafting more like prototyping. In her conclusion regarding the risks of using design thinking in writing, she emphasizes that "for design thinking to thrive, it must take place in a culture that supports it" (p.11).

Therefore, contemporary design thinking methodology is both a mindset and a method (Di Russo, 2016); furthermore, it requires a culture to support it (Leverenz, 2014). In terms of mindset, for this project we used materials provided by the Stanford Design School (see Appendix A for two excerpts from these materials) to better understand and practice core attributes of design thinking: ambiguity, collaborative, constructive, curiosity, empathy, holistic, iterative, nonjudgmental, and an open mindset. We practiced a participatory mindset in which others (team members, academic technologists, users, students) were all seen as partners, as active co-creators.

Over a 12-week period, we discovered and applied this design thinking mindset and method to a technical and professional communication experience designed to enable cross-cultural, innovative insights and solutions. The "wicked problem" emerged as follows: At a time when professional communicators are called upon to address ambiguous and ill-defined problems, our curricula and associated courses provide ordered, well-defined processes for arriving at solutions for argumentation, critical thinking, structure, focus, analysis, editing, and rhetoric. Rare are the opportunities for students to practice design thinking or to develop new approaches and share these with other people; to work together cross-functionally across cultures and/or across academic designations; and to embrace a non-sequential (cyclical) process as a means to develop multiple solutions to problems. In short, how might we use design thinking to create a technical and professional communication experience to enable cross-cultural, innovative insights and solutions that reflect the perspectives of all participants?

In the remaining sections of this paper, we share a case study of our collective "radical collaboration" as part of the Wearables Research Collaboratory (WRC).

Case Study

At our first full team meeting, we shared introductions, gave each undergraduate Research Assistant (RA) a Google Glass device as a means to begin experimenting with wearables, and provided details regarding planned investigations centering on the uses and implications of wearable technologies in terms of culture and pedagogy, ability to shift perspective and better understand one's position in the world, and the challenges and opportunities posed by these devices. We held additional meetings to introduce the RAs to the college's academic technology unit where they would experiment with emerging technologies. This collegiate academic technology is known as LATIS, the acronym for Liberal Arts Technologies and Innovation Services (http://latis.umn.edu/). We also met in sub teams (RAs and faculty/grad students) each week to share findings and coordinate the investigations.

During the second full team meeting, a former RA who served during our previous set of Google Glass investigations, Brittah Springer, returned to campus to share with our team about the impact that working with wearables had on her work. As we reflect back, this meeting in which Brittah shared her insight into how this unique blend of cross-cultural faculty/grad students/undergraduate student collaboration had led her to experiment and innovate in ways she had never attempted before, represented a key point in our team's journey toward better understanding the potential use and impact of design thinking methodology.

Another key point came at our third meeting as we determined design principles for the project's web site. This discussion prompted Ann to develop a workshop on design thinking and "radical collaboration" as part of our fourth meeting. This workshop included reference to Introduction to Design Thinking and practice with materials from the Stanford Design School. We also used the diagnostic tool—Plan Your Collaboration—included at the site, A Designer's Guide to Collaboration, to compare our values regarding teamwork, decision-making, leadership, motivation, and diversity during each of four stages of work as defined by the framework: 1) discover, 2) define, 3) develop, and 4) deliver.

Interestingly, while seven of us depicted our collaboration as a very open process, one RA (Linus) indicated a clear difference regarding stage 4) deliver. Linus emphasized that from the point of view of a business major, the CEO has the final say on whether or how to deliver a final product. Linus elaborated on the importance of hierarchy and closed systems in business culture.

Throughout these and discussions that continued throughout the remainder of the project, we focused on this question: How are we applying design thinking principles to our work? And we came to define the project as follows:

This project is a case study of applying design thinking principles to the development and deployment of a technical and professional communication experience designed to enable innovative insights and solutions. Students involved in the collaboratory develop new approaches and share these with other people; learn to address ambiguous, ill-defined, and tricky problems; work together across disciplines and/or across academic positions; and embrace a non-sequential (cyclical) process as a means to develop multiple solutions to issues.

Reflections

Shortly after the workshop on design thinking, our full team discussed the importance of providing reflections on the project. The following three reflections illustrate a person's or team's ongoing work; together they provide the core of this case study as they detail our discovery and practice of radical collaboration.

Jason Tham, Ph.D. candidate

With an eye toward the pedagogical affordances of wearables and virtual and augmented reality devices—namely Google Glass, Google Cardboard, and Theta 360 cameras—in writing instruction, I deployed these technologies in a first-year composition course designed for non-native speakers in Spring 2016. My research question was informed by literature from intercultural professional communication as well as the rhetoric of technology design for global users.

The goal of my study was to investigate non-native speaking students' perception of the use and design of popular wearable technologies, and to collect their recommendations for re-envisioning and improving the development of wearable technology in the future.

As part of my study, I provided classroom demonstrations of the deployed devices when introducing the devices to my students. Given the novelty of these technologies and the constraint of class schedules, I realized that it was not enough to simply run workshops in the class and expect students to learn how to work with the devices within a short timeframe. Thus, with the help from the RAs, several video tutorials were created and provided to students so they could have quick references to the nuts and bolts of the devices deployed. While it may seem self-evident that the RAs were appropriate for providing solutions in this task, one of the challenges facing the situation was the need for the RAs to understand the context of the study and the specific needs of the students. To ensure that these were achieved, one of the RAs responsible for producing the video tutorials actually volunteered to attend a handful of the class sessions during the semester and spoke with my students before deciding the kind of video to produce. Such intervention was new to my instructional operations as it required coordination between the RA's visitation to the class as well as my lesson plans. And because the RA had little background in writing studies, it was necessary for some theoretical calibration between us to ensure coherence in the overall pedagogical philosophy of teaching writing with technologies and attending to critical questions of the technology use in educational contexts. Such calibration often took place at the weekly WRC meetings, and one-on-one discussion sessions helped shape the unified tone and delivery in the classroom.

Another cross-cultural challenge experienced during my project was managing the plurality of my own identities as a researcher, a teacher, an advisee, and a student during the time of this radical collaboration. During the time of his project, I was a second-year doctoral student. Among the members of the WRC team was my academic advisor (Ann), a senior lecturer from the department (Joe), a fellow classmate (Megan), and four undergraduate RAs. While being the principal investigator of my own study, I reported my progress to as well as

required research support from Ann during WRC meetings. The negotiation of such roles also happened in my actual deployment of the wearable devices in my class, when Ann came to offer deployment assistance during a class session while also observing my teaching. Ann later provided observational notes about my teaching methods and how the class session went overall. This radical configuration of roles and identities between an advisor and advisee shakes up what I used to know as graduate education and professional development.

Further, my role as a student in Ann's research methods seminar during the same academic year as well as a fellow classmate and WRC member (Megan) complicated my relationships with Ann and Megan during the project deployment period. Often during the seminar I was asked to provide instances of research and research methodologies to other classmates, and teamed with Megan in class assignments. Such complications were indeed desirable as I learned to interpret and assume autonomy over my professional identity as a graduate student and researcher in the process of graduate education. The authenticity between an advisor and advisee, and between colleagues of different cohorts, has helped me define my role in the research process and in relation to WRC as a collaborative unit.

My project involved not only academics but also those providing services to the university. Our college's academic technology unit, LATIS (discussed earlier in this paper), provided most of the devices deployed in the project as well as pointers to how to use or make the most of their functionality for instructional purposes. Besides these technicalities, LATIS also helped me to design my research schematics—from narrowing the research question to defining sample subjects to validating data collection and analysis methods—which in part shaped my overall project outlook. Furthermore, LATIS offered its workspace and staff support to me and the RAs during the period of the study, making it convenient for ad hoc meetings and impromptu technology demos to take place. Adding these together, LATIS was a major factor in the completion of my project. What's exceptional in this experience is that LATIS's involvement was truly germane and ground-up. There was no pre-engineered operational procedure that had defined LATIS's role in my project—and those of other researchers as well—thus allowing each project to

specify individual needs as it proceeded. The cross-cultural (academic and industry) interplay between LATIS and myself was one cause; the extempore, iterative collaboration was another that indeed enriched my project.

Overall, my radical collaboration experience can be summed up with three lessons in professional communication: First, I have learned to empathize with users and focus on their needs. For instance, working with WRC and its RAs has allowed me to better address the concerns of my students in the project. Particularly, the RAs' intervention during the deployment period helped locate the challenges faced by users and devised solutions that are timely and relevant. This puts users at the center of research and avoids structural and ethical manipulation of them by the researcher. Second, my radical collaboration experience with WRC and LATIS has also been constructive in nature. From the beginning of the project, all meetings and conversations have been centered around productivity and invention. As design thinking methodology propels a *doer* philosophy, it complements greatly a graduate education that mostly encourages its students to be *thinkers*. While not being tied to a specific meeting place (we have convened in multiple conference rooms, classrooms, and offices), the WRC manifests as a makerspace that constantly promotes creative problem-solving and discovering new approaches of doing something (i.e., teaching, learning, researching). Given these benefits, this kind of experiential activity should be integrated into the core curriculum of a technical and professional communication graduate education as co-curricular learning.

Last but most importantly, working in a cross-cultural and cross-disciplinary team has helped me learn a key feature of collaboration that is the ability to communicate with different audiences. Such a feature is one of the critical competences that most graduate programs strive to emphasize, but it is often overlooked. A quick survey of PhD level courses for a professional communication degree from around the country yields an apparent observation: No PhD curriculum (including our own) requires its students to work with their advisor or faculty members on any sustained projects. Many programs encourage students to pursue these scholarly activities on their own initiative, but without any integrated support system to promote collaboration. Working with individuals

of varying academic status and industry experience has allowed me to practice communicating my research with specialists and non-specialists. From meetings (with information technology directors and staff) to informal presentations (at departmental parlor events) to public dissemination of findings (via local and national conferences), I have adjusted this delivery for varied audiences. This radical collaboration experience has and continues to provide me with a kind of learning that, cliché enough, may not necessarily be practiced in graduate seminars within a classroom setting.

In this reflection video, Jason shares his thoughts about deploying Google Glass and then Google cardboard in the classroom. Note his discussion of the difficulty with designing this assignment and discovery of his next steps as part of recording this reflection. Jason does not want to limit student opportunity and asks others in the WRC team to help him with the final design of his research project. Jason also shares about this collaborative experience and design thinking. He encourages the WRC team to develop the web site as a collaborative space to put all the work together in one place, as a way to see progress and reflect more on the "behind the scenes" work.

In this second reflection video, Jason shares about his experience with immersive video and themes that he collected from the cultural video project. Note how he calls Linus (undergrad RA) his "partner" on this project. Jason shares about his uncertainty in delivering on the initial goal of the project. Instead of having students do a full immersive presentation, note the change to include a 360 video as part of a larger presentation. With this change, the overall aim of the project remains the same: to have students experience a new environment for persuasion.

Jason also reflects on coding themes inherent in his research: limitations of the devices; social awkwardness with using the devices; cultural differences in using technology. Jason talks about how he will incorporate the students' different cultural views into his research and teaching. He also shares about the multiple venues where he will be sharing his research.

Megan McGrath, Ph.D. candidate

The abilities to shift perspectives and to understand a person's position in the world—and in relation to the world around them—are critical skills when developing thoughtful, well-reasoned arguments. Therefore, I was interested in exploring the potential for virtual reality, such as Google Cardboard, to have my University Writing students see and immersively experience someone else's perspective. My students were beginning multimodal research projects, and the goal was to encourage the students to consider how many sense-making processes are involved in perceiving experiences and communicating them to others. Multimodal projects require attunement to how writers and audiences use multiple meaning-making modes to process information. In order to use multimedia intentionally, students ought to thoughtfully consider how their efforts to compose involve acute sensitivity to audience, context, and purpose.

Since this deployment was fundamentally about engaging and shifting perspectives, it was only fitting to engage multiple perspectives in the deployment's design and development. What resulted was a cross-cultural feedback loop that radically transformed the shape the deployment took from conception to execution. As I conceived of this project, I recorded my preliminary plans and rationale and shared them with the WRC via Google docs for feedback, which was provided at our weekly meetings. Active co-creation, therefore, was heavily encouraged and valued, since Jason had been working with Cardboard in his class for a few weeks, and because the undergraduate RAs had been experimenting with Cardboard at LATIS. The undergraduate RAs and I consulted with LATIS before, during, and after drafting in order to anticipate challenges to the project's feasibility as it took form, making the deployment a particularly participatory, iterative process. Key to making the deployment participatory and iterative was cultivating a nonjudgmental approach when eliciting and offering feedback, in which critique and suggestions were not only welcomed, but considered vital to the deployment's growth. This back-and-forth between conception, experimentation, and drafting represented a convergence of

cultures, at which undergraduates, graduate students, professors, and technology consultants traded and co-constructed knowledge.

Meinel and Leifer (2015) emphasize in their introduction to the edited collection, *Design Thinking Research: Building Innovators*, that "Design thinking is mainly about building innovators who can use the design thinking paradigm to transform ideas into reality, to transform organization, and to transform all aspects of life" (p.1). They provide four specific "rules of design thinking" (i.e., design requirements) for such work:

> I. The Human Rule: All innovator activity is ultimately social in nature. Never go hunting alone.
>
> II. The Ambiguity Rule: Innovators must preserve ambiguity. Never go home with a lone idea.
>
> III. The Re-Design Rule: All innovation is re-innovation. Who is the innovator that preceded you?
>
> IV. The Tangible Rule: Make innovation tangible. Make your 'innovator story' tangible. (pp. 2-4).

The interplay between these particular cultures fostered three of these rules: the Human Rule, Ambiguity Rule, and Tangible Rule. All innovator activity was social, occurring over conversations at WRC meetings and while learning Cardboard's ins and outs through hands-on engagement at LATIS and in Jason's classroom. What one or more of us learned about the device, we would relay in order to build a shared archive. Ambiguity was preserved because few things are certain when working with an emerging technology, and we found that our plans for deployment needed to be flexible in order to accommodate technical difficulties beyond our control, such as a strong enough internet connection or a malfunctioning app. For example, I originally planned to have my students use Cardboard in conjunction with the Body Swap app, which—as the name suggests—allows users to feel as though they have inhabited another user's body and are experiencing the world through the other person's eyes. However, one week before deployment, the app stopped working in the LATIS space, where the

deployment would take place. This malfunction prompted a LATIS specialist to suggest using the Vrse app for perspective-shifting by looking at 360-degree videos from *The New York Times*. Although the Body Swap app would have been more interactive, having students watch an immersive video encouraged them to be making more explicit connections between how what they were sensing influenced the narrative being constructed by and for them, better foregrounding the pedagogical goal of this deployment.

What stood out in this deployment and our broader work within the WRC was the vibrant creative energy fostered by design thinking, because nobody assumed one specific or static role. Because we work with emerging technologies, their possibilities and limitations are still relatively uncertain—and must, therefore, emerge through hands-on experimentation with the devices. This experimentation demands patience, open-mindedness, and comfortability with jumping before a net has appeared. These qualities—at the heart of design thinking—invited each member of the WRC to fluctuate between being an instructor, a research assistant, and a technology consultant, with the lines often quite blurry between these roles. As the RAs experimented at LATIS, they had to adopt a pedagogical mindset as they unearthed possibilities and encountered obstacles: how would the available options fit into a lesson on usability, an exploration of culture, or an exercise in perspective-shifting? As each of us made discoveries, we assumed an instructor role when making these developments understandable and actionable to the rest of the WRC. Each of us became research assistants to Ann, Megan, Jason, and Joe as they deployed, since each project required us to help the lead instructor negotiate a desired pedagogical outcome with a particular technology or set of technologies. This role-shifting between instructor and RA enabled each of us to acquire enough first-hand expertise with selected wearables that we could function as technology consultants to both students and the other WRC members as they deployed. The malleability of our roles thus challenged the forces of hierarchy and routine that can consciously or subconsciously structure and stultify collaborations and shortchange their potential for organic, inventive vitality.

In this reflection video, John and Nathan share about their deployment of immersive video in Megan's course, Joe's deployment on the rhetoric of technology, and their use of the 360 Theta camera. They focus most on their work, assistance with deployments, and issues with the technology. Note their excitement as they share about the special event they planned (pop-up event at the student union), their development of a Qualtrics survey, and the user experience research they plan to add to the project website.

Nathan Ernst, Undergraduate research assistant

Our group worked constantly with technology and people. Our group worked specifically with usability of wearable technology. As the four undergraduate research assistants, we decided to host a pop-up event on campus. The idea of the pop-up was to bring an assortment of wearable technologies to a busy area for any students who are passing so they can take part in researching and articulating their thoughts on different wearables we used at LATIS. We brought Google Cardboard, Leap Motion, and Google Glass with us to the pop-up. Quickly we found that there were a lot of students that were wary at first to engage and try the wearables. We had to invite them to come over and try the wearables. As soon as a few came over we had lots of students and older adults coming to investigate what wearables have to offer. Before the pop-up started we created a survey to give to students after they had experienced wearables. One question we asked them was "Would you incorporate wearable technology in your everyday life?"

The results (Table 1, p. 62) were very interesting to us. Two thirds of those responding would use wearables in their everyday life. Keeping in mind that our sample size was only 18, what I found to be very interesting was that there were six people who would not use wearables in their everyday life. It seemed in my mind that most people, especially those who are young, are always interested in new and innovative technology.

Table 1

Survey results from the pop-up event

#	Answer		Response	%
1	Yes		12	67%
2	No		6	33%
	Total		18	100%

This pop-up was valuable for everybody involved. Students were able to learn about wearable technology, and our research team was able to see how these different wearable technologies were used by first users regarding usability. At the time we only had our own team's experiences with this new technology. So it was really valuable to see what types of technology are relatively easy for people to figure out right away or technology that is confusing to figure out. We found that Leap Motion which is an infrared camera that will track your hands and display them in 3D on the PC screen, and Google Cardboard which is a virtual reality device, were relatively easy for people to understand because they did not involve a lot of interaction. However, a technology like Google Glass that requires constant human interaction to work was very hard for people to understand. It is also very hard to help somebody that has Google Glass on because we cannot see what they are seeing. Overall the pop-up event, an approach that we as RAs proposed, developed, and implemented ourselves, was one of the most important projects we did all semester.

Most important, the RAs became more than a team; they valued each other's knowledge and perspective, and became friends. In this video, all four RAs share about the importance of changing and adapting to learn new things; the importance of transparency, communication, and working as a team; the importance of being part of a professional level of research and technical writing team; the importance of working along with others in a field; and the huge opportunities to do almost anything within the constraints of wearables. As John concludes: Teamwork makes the dream work!

Radical collaboration: A model for applying design thinking

In the Wearables Research Collaboratory, we have begun to explore how a design thinking framework can support learning across cultures of age and academic experience. Our extended question-finding process enabled questions first to emerge through engagement with wearables on the basis of each WRC participant's interest in the devices. In early drafts of this article, we described various interests from professional, graduate, and pre-professional perspectives, which then led us to visualizations in the form of our collaboratively written drafts for this *connexions* special issue. We have identified advantages of working in a team where we crossed cultural boundaries—established by our institution—between participants of different academic experience and rank. Specifically, we sought to sustain a non-hierarchical learning experience for all while working within an institution that arranges cultures by orientations to scholarship by rank, discipline, and years of experience as outlined in Table 2.

With respect to ill-defined and ambiguous problems, our experience has shown us the potential for design thinking to add value to instruction in an important and unexpected way: our prolonged process of question-finding enabled us to explore the complexity of the many problems posed by wearable technologies. That is, while design thinking is a framework for supporting collaborative work on complex problems, it is also a framework for revealing complexity that more hierarchical frameworks for instructional design must of necessity mask.

Table 2

Cultural orientations to scholarship by academic rank and experience among participants in the Wearables Research Collaboratory, 2015-16

Ann Hill Duin	Professor	**John Orzechowski**	Senior
Joe Moses	Senior Lecturer	**Linus Chan**	Junior
Megan McGrath	Ph.D. candidate	**Brian Gapp**	Sophomore
Jason Tham:	Ph.D. candidate	**Nathan Ernst**	Freshman

Learning experiences that reveal true complexity of problems have a different kind of value to students than the clearly defined and partial, simpler problems we present to students in order to protect them from complexities that may overwhelm what we consider to be novices' capacities. Our experience suggests that discovering complexity—to "pedagogically overwhelm"—gives learners a clearer understanding of problems and more fully prepares individuals for addressing complexity when they enter their workplaces. In the aggregate, the complexities that unfolded in the Collaboratory addressed the wicked problem of how to use design thinking to create a technical and professional communication experience to enable cross-cultural, innovative insights and solutions.

We have learned that designing learning environments across cultures requires a communication framework for collaborative learning across cultures. We characterize such a framework in Table 3 (p. 65).

Throughout this project, we also generated enormous amounts of shared documents and video resources as a means to communicate constantly and share discoveries. Findings from these many resources, along with the cross-cultural reflections above, have informed our initial development of a radical collaboration model that may be used to inform the work of others planning to deploy design thinking methodology.

A technical and professional communication experience designed to enable cross-cultural, innovative insights and solutions can begin with a focus on participatory design, i.e., one that involves students (graduate and undergraduate) as well as academic technologists in the development (prototyping) phase of projects. Key here is to bring together innovators with varied backgrounds and viewpoints to enable insights to evolve from diversity (i.e., "radical collaboration," see Fig. 4, p. 66).

However, as Di Russo (2016) has described, participatory design may fail if/when participant or user decisions conflict with those of key stakeholders. Indeed, student input gleaned via a participatory process may or may not be heard or acted upon by those with greater academic authority. In response to such a dilemma, Norman re-defined participatory design into user-centered design

Table 3

Key features of communication design for learning across cultures.

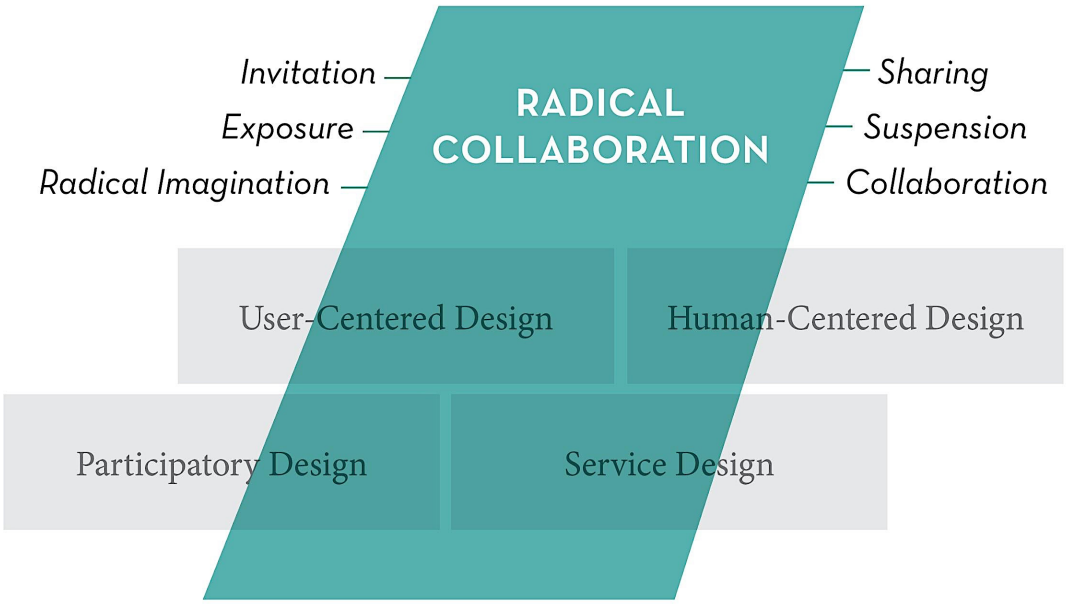
Feature	Communication Design for Learning across Cultures
Exposure	Expose participants to the complexities of problems regardless of experience
Collaboration	Resist hierarchical structures Invite and welcome perspectives across institutional boundaries Value team learning
Invitation	Invite and welcome perspectives that span theoretical, personal, and professional boundaries
Suspension	Suspend beliefs about knowledge boundaries Suspend judgment of people and ideas Suspend closure; sustain openness
Sharing	Explore empathy together as a collaborative learning tool Share leadership, research, teaching roles
Radical imagination	Invite radical change to what learning in academia can mean and be

with the goal of making things visible. The point here in terms of applying design thinking methodology to a technical and professional communication experience is that one must elevate user [student] experience. Understanding user [student] guinea-pigs to co-developers of systems." It requires making the experience and overall process visible.

But how do we gain understanding of what students actually do with their use of emerging technologies, including their journeys and experiences?

Figure 4

Components of a radical collaboration model



Rather than focusing solely on end-user experience, service design further emphasizes the importance of collaboration, building relationships and communication. The key point here is value creation, i.e., focusing on value throughout the process as well as understanding the value that the project brings to students. As part of this project, we asked RAs to meet together to share both excitement and disappointment, to construct collective insights and create collective value surrounding the project. We also met together weekly as a team to generate knowledge; and we met together with LATIS to expand relationships, expertise, and communication. Furthermore, the RAs were invited to share the relationships they had with other entities involved with the design and deployment of wearable technologies (e.g., connecting with Pristine.io).

Human-centered design continues this shift toward social systems, engaging users, and designing methods to gain direct understanding of people. It

brings design together with emotion. Once human-centered design is embraced, a project team can embrace design thinking methodology and focus work on interpreting wicked problems. Along with Zachry and Spyridakis (2016), editors of the recent *JTWC* special issue on human-centered design, we believe that human-centered design is about "accounting for and reflecting shared human values in the creation of the technologies, artifacts, and systems that humanity shares in the collective pursuit of life. Recognizing that values vary from context to context, and that they are subject to change as people and technologies interact, we remain grounded in the assumption that human values are primary and should guide the world that people collectively create" (p.394). Human-centered design spurs design thinking forward with its emphasis on activity and interactions with people of various groups for the purpose of expanding understanding and developing pedagogy that prepares students to address ambiguous and ill-defined problems.

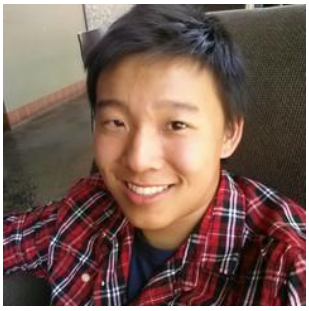
In conclusion, design thinking by its very nature is cross cultural. A model for design thinking begins with a focus on participatory design, with students and faculty innovating together in radical collaboration. It views all involved as co-developers and fosters visibility, curiosity, empathy, and open mindsets. It emphasizes relationship building and collaboration, makes innovation tangible, and is guided by human values. We can deploy such a model as we redesign courses and curricula as well as research/teaching/outreach experiences; by so doing, we move forward in preparing students to both lead and collaborate amid ambiguity. Applying design thinking to the development and deployment of a technical and professional communication experience indeed enables cross-cultural, innovative insights and solutions. ■

Notes and Acknowledgments

First, some background on our work with wearable technologies: Our initial experience with studying wearable technologies began in 2014 with an invitation message from Google: "You've been selected to join the Glass Explorer Program, a group of bold, creative individuals who want to help shape the future of Glass." Ann Hill Duin bought a pair and began envisioning pedagogical implications. She and Joe Moses developed a grant proposal and received funding from the College of Liberal Arts (UMN) to investigate how the Glass device "reframes" writing pedagogy and digital literacies across the curriculum. A 2016 article titled "Wearable Computing, Wearable Composing" published in *Computers and Composition Online*_details our deployments of the Glass device across undergraduate and graduate courses.

Second, we want to thank the College of Liberal Arts at the University of Minnesota for generously supporting this project through an academic innovation grant, and we thank the members of the Liberal Arts Technologies and Innovation Services (LATIS) team for their insight, direction, and collaboration throughout this project. In particular, we thank Alison Link for helping each of us to stretch our design thinking.

In addition to coauthor Nathan Ernst, we thank the three additional Research Assistants:



Linus Chan graduated in 2016 and recently completed s position at Digital River as a Product Marketing Intern. During the project, he wrote: The first instance that I remember interacting with a wearable technology is when I was completely jealous of my cousin's Nintendo Super Scope. This Super Scope was a piece of plastic with an IR sensor on it. It didn't work very well. However, we're now in the year 2016 and we get Google Cardboard, Fitbits and the Apple Watch. As a Research Assistant in the Wearables Research Collaboratory, I want to get my hands dirty. There's a host of new hardware directly purposed for pedagogical reasons. I'm eager to bring phones out in classrooms. I want to meld our present reality with the virtual and really bring engagement and enthusiasm back into learning.

Brian Gapp is now a senior in the undergraduate program in Technical Writing and Communication. During this project, he wrote: In the past I only encountered wearables on a sparse basis, firstly when borrowing my high school classmate's Oculus Rift while it was still in its earliest testing form. Seeing the OR when it was still quite new, my curiosity of wearables blossomed; what is their quality, importance, and value? At my family's last phone plan renewal, my dad and sisters had free Fitbits included with their new phone plan purchase, and it was neat for us to investigate those. After testing the movement-recognition Leap Motion device at the U of M, I became more interested in consciousness of wearables' controllability than their design alone.

John Orzechowski graduated in May 2016 and accepted a position as an Interaction Designer (UX) with Cerner Corporation, a leading Health IT company, located in Kansas City, MO. During this project, he served as project manager of the WRCollab website. He wrote: I have had exposure to Google Glass, Google Cardboard, Oculus Rift, etc. and the question I continue to carry with me throughout my research is "how can wearable technologies improve the human condition?"; after all, UX research is the foundation of usable design. I bring my passion of UX to my work as a researcher and have been thrilled with the amount of untapped capabilities wearable technologies offer. With a UX scope and experience with wearable technologies, I have been able to individually focus my research on accessibility, information architecture, and qualitative design analysis of wearable technologies.

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About the authors

Ann Hill Duin, PhD, is a professor of scientific and technical communication at the University of Minnesota where she studies the impact of emerging technologies on the future of teaching/learning and higher education. During the project, she wrote: My experience with "emerging wearables" began in March 2014 with an invitation message from Google: "You've been selected to join the Glass Explorer Program, a group of bold, creative individuals who want to help shape the future of Glass." I bought a pair and started using them!

> Ultimately, the Glass device was pulled from the market and this opened us to the realm of exploring new dimensions of pedagogy and digital literacy through the deployment of Google cardboard, Oculus Rift, Pebble Watch, Leap Motion, etc. Most importantly, we launched the Wearables Research Collaboratory—a cross-generational, cross-cultural, cross-disciplinary open collaboration—through which we are applying design thinking methodology to individual and collective investigations of wearables.

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Joseph Moses, PhD, is a senior lecturer of writing studies at the University of Minnesota where he is developing an agile writing framework for instructional design in technical communication. During the project, he wrote: As soon as we started using Google Glass during the Spring of 2015, the device imposed itself physically between us and our familiar understandings of audience, author, setting, purpose, message, and presence.

> Wearable computing, in the instance of Glass, complicates our experience of audience in ways illustrated by the case of Emotient, a startup recently purchased by Apple. The Emotient app's function is to detect emotion by analyzing facial expressions. Emotient's Glass app scans faces for cues that indicate levels of attention, engagement, and sentiment and produces data streams for analysis. How should we orient students to rhetorical situations in which audiences are both present and transmitted? Do we train our students to captivate audiences or to capture them in data streams? Do we teach audience analysis or audience analytics?

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Megan McGrath is a PhD candidate in the Writing Studies Department at the University of Minnesota—Twin Cities, where she teaches first-year writing and technical and professional writing. Her research examines how emerging technologies, such as wearables, influence agency, identity, and social norms. In the process, Megan's work also focuses on helping students cultivate digital literacies in ways that draw attention to the power structures enabling and constraining—and enabled and constrained by—technology use today. During the project, she wrote:

> My experience with wearables began in the fall of 2014, when Dr. Ann Hill Duin, Dr. Joe Moses, and I started exploring Google Glass and its potential to expand and enrich communication. The more I used Glass, the more I became especially interested in how it might extend the concept of the think-aloud protocol and encourage more mindful reading, thinking, writing, and researching. At the same time, I wondered if its hand-free, seemingly-seamless, first-person POV might actually impede metacognitive awareness, which quickly blossomed into an interest in what—and whom—wearables make visible and invisible, familiar and unfamiliar. Specifically, I've been intrigued by how wearable technologies influence, and are influenced by, our

constructions of identity, when wearables are used for communication, community formation, and learning. I'm continually fascinated by and look forward to continuing to explore how wearables affect the ways we see and ascribe meaning to ourselves, others, and our experiences in the world.

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Jason Tham is a PhD candidate in the University of Minnesota's Rhetoric and Scientific and Technical Communication program. He studies how emerging technologies invite different ways of thinking and learning, and the increasingly intense flow of information occurring between people and machines. One of his long-term projects is the study of the scale and intensity of interconnected complex learning networks in the digital communication context. During the project, he wrote:

> My experience with the WRC has been rewarding. With the support from WRC researchers, I am able to investigate the uses and implications of emerging wearables in general and technical communication, as well as integrate innovative approaches to teaching writing using wearables. My current research revolves around two interrelated domains: **culture** and **pedagogy**. With regards to the former, I am studying what international users think of the designs (hardware and software interfaces) of current wearable devices, and argue for the importance of reducing the disparity between the imagined and the real needs of wearers. To do so, I deploy wearable devices in my composition classroom and invite students to experience, analyze and critique, and conceptualize wearable designs. This bleeds into my pedagogical domain of research, where I observe and theorize how to best facilitate learning with wearables. Last year, with the help from WRC members, I devised a way to enrich student peer reviews with Google Glass through first-person point-of-view video and audio recording. This

year, I am reimagining student presentations using Google Cardboard, 360° camera, and virtual reality video editing applications to produce immersive presentational experiences.

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Nathan Ernst is a second-year student in the undergraduate program in Technical Writing and Communication. During the project, he wrote:

> So far my experience with wearable technologies has been amazing. I've had the opportunity to research many types of advanced wearable and virtual reality technologies that most people don't get to try at all. I am working hard with the other research assistants to generate a lot of ideas about the uses of current wearable technologies in our society and culture. Wearables are the future.

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BUT IS THAT RELEVANT *HERE*?
A Pedagogical Model for Embedding Translation Training within Technical Communication Courses in the US

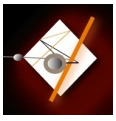
Laura Gonzales
University of Texas at El Paso, USA

This article illustrates how self-identified monolingual technical communication students can prepare to work with translators in the creation and dissemination of multilingual content. Drawing on a case study that traced a collaboration between a Language Services office and a technical communication course in the US, the author suggests technical communication students can benefit from understanding the practices and activities of translation, primarily by being better-prepared to design and work with multilingual audiences in cross-cultural settings. Through a discussion of this collaboration, the author argues translation is a valuable aspect of contemporary technical communication, helping students understand the challenges and affordances of designing for a wide range of users.

Keywords. Translation, Technical Communication, Pedagogy.

Introduction

During the Spring semester of 2015, I worked as a technical translator in a small translations office serving the Latinx community in Grand Rapids, Michigan. My job was to both to translate technical documents (e.g., birth certificates, medical records) from Spanish-English (and vice versa) and to serve as a project manager for incoming translation projects that needed to be delegated to additional translators. At the same time, I was teaching an undergraduate upper-level technical communication course at a Predominantly White Institution (PWI)



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in the Midwest. My class consisted of 25 students, all of whom identified English as their primary and dominant language. Being in their last semester of college, a majority of students in my class either had already acquired or were currently seeking employment as technical communicators or professional writers for various organizations (e.g., magazines, publishers, businesses, non-profit organizations).

Given my own background and training as a bilingual technical communication researcher, teacher, and practitioner, I wanted to use my technical communication course as a way to help students experience the diverse, expanding, and overlapping responsibilities and practices of contemporary technical communicators. As recent work has indicated, contemporary technical communicators in the United States now frequently have to navigate a wide range of practices, moving beyond traditional notions of creating and editing content to developing interactions that require training in design and user experience (Blythe, Lauer, & Curran, 2014; Brumberger & Lauer, 2015; Gonzales & Turner, forthcoming; Lauer & Brumberger, 2016). In addition, training in translation and intercultural communication is increasingly being valued in technical communication programs, as technical communicators prepare to work with diverse communities and contexts in multilingual settings (Groznaya, 2013; Haas, 2012; Maylath et al., 2013; Thatcher & St. Amant, 2011; Walton, Zraly, & Mugengana, 2015; Williams & Pimentel, 2014; Yu & Savage, 2013). Given the chance to teach technical communication students in their last semester of their undergraduate career, I wanted to provide an opportunity for students to experience a fast-paced collaboration with professionals who work across activities, languages, and contexts to serve their communities (Baca, 2012; Bowdon & Scott, 2003; Scott, 2008).

The brief (one semester-long) collaboration between my technical communication students and the translations office in which I worked resulted in a practical illustration of how translation training can be embedded into technical communication programs, helping students both understand and enact aspects of successful bilingual and multilingual technical communication, even when students don't identify as bilingual or multilingual themselves. Although all of my

students came into my course identifying as monolingual[1] English speakers, this collaboration helped them understand how technical communicators can collaborate with translators to better understand the practices and activities of translating technical content.

In this hybrid teaching case and industry perspective, I'll first provide an overview of recent conversations connecting technical communication and translation training. As I demonstrate in the literature review, the emerging connections between translation and technical communication in the US echo ongoing calls for intercultural and international technical communication pedagogies both in and beyond Western contexts (i.e., the US). Following this overview, I provide some background on the objectives and goals of my technical communication course, outlining how students collaborated with a translations office to develop bilingual materials that provide access to information for the Spanish and English speaking Latinx community in Grand Rapids. Finally, drawing on sample student projects, course assessments, and reflections, I provide implications and applications for how and why English-based technical communication courses can provide students with valuable training in translation.

Intercultural, Multilingual Pedagogies in Technical Communication

Issues of race, culture, power, and language have been central to the work of technical communicators for decades (Agboka, 2013; Barnum & Huilin, 2006; Haas, 2012; Jones, 2016; Longo, 1998; Scott, Longo, & Wills, 2006; Savage & Mattson, 2011; Savage & Matveeva, 2011). As Haas (2012) explains, "race and place matter to technical communication research, scholarship, curriculum design, and pedagogy. In fact, they are key to what can be imagined, what gets imagined, and who imagined in our profession" (p. 279). Thanks to the important work of technical communication researchers and teachers, and to ongoing efforts by organizations such as the *CPTSC Diversity Committee*, research on technical communication pedagogies continues to advocate for increased diversity and intercultural training for technical communication students, faculty, and

administrators (Jones, Savage, Yu, 2014; Savage & Matveeva, 2011). As part of this work, emerging research emphasizes the role of technical communication in social-justice advocacy, presenting technical communication training as an opportunity for students and practitioners to enact cross-cultural competency, empathy, and dignity (Colton & Walton, 2015; Walton, 2016; Jones, Moore, and Walton, 2016).

While frameworks for teaching and practicing socially-just, cross-cultural technical communication are widespread and varied, the overarching consensus in these approaches is the understanding that teaching technical communication in culturally-situated ways "require[s] alternative teaching approaches," to both support linguistically and culturally diverse students in technical communication programs and to equip future technical communicators to work with linguistically and culturally diverse clients and communities outside of the University (Matveeva, 2015). As technical communication pedagogies continue to work toward intercultural frameworks, it is also critically important for technical communication teachers and researchers to "understand [the] historical, colonial, apparent and unapparent ways" in which concepts like "diversity" get (mis)represented, addressed, and supported in our programs (Jones, Savage, and Yu, 2014, p. 133).

For instance, as technical communication research and training continues expanding outside of the US, interests and need for international technical communication have contributed to the development of "educational practices" in technical communication that aim to "equip students to succeed in today's globalized workplace" (St. Amant, 2011, p. 3). This push for globalization has led "undertakings that were once reserved for rare occasions, such as technical translation, [to] become commonplace business practices" (St. Amant, 2011, p. 2). In turn, as technical communication programs prepare students to work in global contexts, issues of translation and multilingual technical communication continue to gain interest and attention (Maylath et al., 2013; Verzella & Tommaso, 2014). Yet, Agboka (2013) clarifies, it is important for technical communication researchers and teachers to prevent equating a push for globalization with efforts to ethically increase diversity in technical communication. Indeed, Agboka (2013)

clarifies that it's important for technical communication researchers to understand the connections between diversity and power in technical communication, and to train students to do the same. For this reason, Agboka (2013) "invite[s] more research and scholarship involving specific case studies, research methodological approaches, and analyses of communication practices that intersect with social justice in international contexts," and, I would add, in U.S. contexts working with international immigrant populations (p. 30).

Although I have always aimed to embed discussions and awareness of race, culture, and language into my technical communication courses, working in a small, community-based translations office helped me ground theoretical discussion of difference in everyday activities within existing organizations. That is, as I worked as a technical translator in a community-based translations office, I had the opportunity to witness (and participate in) field convergences (Maylath, Muñoz Martín, & Pacheco Pinto, 2016) between intercultural technical communication, race and linguistic relations, and translation. Facilitating the transformation of birth certificates, legal records, and other technical documents across languages, and witnessing how these translations impacted the lived realities of immigrant community members from various nations, helped me operationalize the exigence for intercultural, multilingual technical communication training. In turn, in this article, drawing on established models for teaching intercultural and multilingual technical communication, I argue for more specific training in translation within traditional technical communication programs in the US. The purpose of this discussion, then, is not only to present translation as a profitable practice that can enhance the success of international technical communication, but, perhaps more importantly, to also highlight how training in translation can help technical communication students to understand the power dynamics and linguistic complexities embedded in all contemporary technical communication work.

Translation in Technical Communication: Moving Beyond the Metaphor

Translation has been referenced in technical communication work for quite some time, helping technical communicators create and disseminate information and technologies across diverse cultures and contexts (Agboka, 2013; Batova & Clark, 2015; Maylath, 1997; St. Amant & Olaniran, 2011; Sun, 2012; Weiss, 1997). As early as 1997, for instance, Weiss argued, "technical communicators have always been translators, or bridge builders, between different groups and audiences" (p. 322). Here, Weiss used the term "translation" as a metaphor to describe the language adaptations that all technical communicators engage in as they create and distribute content to various audiences. That same year, Maylath (1997) provided one of the earliest frameworks for teaching technical communication students to prepare documents for translation across languages, in an effort to help students gain an "awareness of their own language and its key differences from other languages" (p. 343). In this way, translation was initially described as either a metaphor for the work of technical communicators or as a supplementary activity that helps technical communicators reach wider audiences. Yet, as Maylath, Muñoz Martín, and Pacheco Pinto (2016) explain, "Despite diverse attempts at acknowledging the importance of approaching professional communication as translation or as involving translation-related skills (e.g., Hoft 1995; Weiss 1997, 1999; Melton 2008), the activity of translation in itself "often remains *invisible* both in the literature and in the training of (international) professional communicators" (p. 3, emphasis added). Although courses in intercultural and international communication are now common in a wide range of technical communication programs, explicit training in translation remains limited for U.S.-based technical communication students (Ding, 2010).

As much as the word *translation* has been used metaphorically to describe technical communication work, researchers such as Grabill (2009) note a hesitance to perceive all technical communicators as mere information conduits who metaphorically "translate techno-science for others" (n. pag.). Instead, honoring technical communicators' roles as researchers and rhetoricians, Grabill

(2009) urges technical communicators to leave behind the translation metaphor and "move toward: a focus on rhetorical problems, a focus on groups and organizations, a focus on how things like 'culture' work, [and] a focus on the materiality of rhetorical work." Achieving the moves that Grabill suggests now requires strong, reciprocal collaborations between technical communicators and translators, experts in both areas who can work together to help diverse people and organizations communicate with each other (Yajima & Toyosaki, 2016; Walton, Zraly, & Mugengana, 2014). The critical move here is a step away from the metaphorical understanding of technical communicators as "translators" or transmitters of information to a practical understanding of translation as a culturally-situated, rhetorical activity that is now broadly relevant in technical communication practices.

Drawing on recent conversations that highlight the value of translation in technical communication (Maylath, Muñoz Martín, and Pacheco Pinto 2016; Walton, Zraly, & Mugengana, 2014; Yajima & Toyosaki, 2016), this article explores how technical communication students can gain training and expertise in and through activities of translation. Stemming from a case-study tracing a collaboration between a technical communication course and a translations office, this article illustrates how technical communication students can use translation as a framework for engaging in culturally-sensitive, multilingual, cross-cultural communication. As technical communication continues highlighting the importance of culturally-situated, cross-cultural technical communication (Brumberger, 2014; Sun, 2012), we should also continue to develop pedagogies that reflect the importance of these concepts. In the section that follows, I'll introduce the Language Services Department at the Hispanic Center of Western Michigan, a translation and interpretation office that partnered with my technical communication course for this project.

Technical Communication and Translation in Practice: The Language Services Department at the Hispanic Center of Western Michigan

The Language Services Department is a translation and interpretation office located inside of a non-profit organization, the Hispanic Center of Western Michigan. Although the office is situated in a non-profit, the Language Services Department does charge a fee for translation and interpretation services. However, all profits made within the Language Services Department get fed back into the overall non-profit organization. In this way, the Language Services Department functions as a small, community-driven business, working to make partnerships with hospitals and government organizations to gain income that then gets reinvested into the community.

Although the Language Services Department is a business, being situated within a non-profit organization results in certain resource and personnel limitations. For instance, the office does not employ marketing personnel. Instead, the translators and interpreters in the office work together with Sara, the office director, to develop promotional materials that might increase the resources coming into the organization (and in turn increase the income of employees within the business).

The Language Services Department employs over 25 translators and interpreters. These employees are trained in-house, meaning that the Language Services Department recruits bilingual members of the community and trains them to work as professional translators or interpreters. Interpreters facilitate conversations between Spanish-speaking community members and medical practitioners, counselors, case workers, and city officials in various contexts (e.g., home visits for Child Protective Services; legal hearings with local police; town and city meetings; parent-teacher conferences). In addition, translators in this organization are responsible for performing written translations of birth certificates, medical documents, school records, and other community materials (e.g., flyers, neighborhood operational guides). Translators in the Language Services Department perform "mirror translations" of technical documents,

meaning that the translated documents identically match the design, layout, and formatting of the original text (Gonzales & Turner, forthcoming). In this way, a person with no knowledge of the original language can see where each piece of the original document is represented in the translated project. Hence, by formatting and designing texts across languages, translators in the Language Services Department perform technical translations, which Byrne (2006) defines as "a type of specialized translation that deals with technology and technological texts" to make visuals and digital resources accessible across languages (p. 3).

In part due to resource and personnel limitations, employees in the Language Services department frequently work across activities—serving as translators, technical communicators, designers, user-experience researchers, and marketing specialists, often simultaneously. Because the Language Services department is located in the heart of the Latinx community in Grand Rapids, the office often serves as an emergency resource for Spanish-speaking community members, those who come in during a crisis to request assistance translating an important document or attending a meeting with English-speaking officials or medical practitioners. In this way, this office serves as a perfect site for students to experience the converging activities of translation, technical communication, and user experience, primarily as they are enacted by individuals who want to support their community. Employees in this organization have fluid responsibilities and work descriptions, providing a useful perspective of the various activities embedded in contemporary technical communication contexts.

Technical Communication Course Profile

Serving as one of the core courses in the program's Professional Writing Major, the Technical Communication that I during the Spring of 2015 (WRA 320: Technical Writing) was intended to help students enact "principles and practices of effective writing in the workplace" (institution course catalogue, 2015). According to the course catalogue, skills to be learned and practiced in the course "include[d] audience and organizational needs, visual rhetoric, information design, electronic publication, ethics, technical style, usability testing, and team writing."

As evidenced in this course-catalogue description, the course I taught aimed to prepare students to work not only as technical communicators, but also as agile information designers, user-experience researchers, and visual communicators who can address the needs of various audiences. In this way, this course intended to introduce students to overlapping and expanding activities among technical communication, user experience, and information design, reflecting the disciplinary convergences now common in professional contexts (Blythe, Lauer, and Curran, 2014; Brumberger & Lauer, 2015).

As the instructor, it was important to me that students understood how these different but converging skills can and should be applied when working with the diverse, multilingual audiences. As many technical communication researchers have repeatedly argued, being able to work with diverse communities is now a standard practice for technical communicators—professionals who must understand how their content and designs may be adapted across languages, cultures, and contexts (Agboka, 2013; Batova & Clark, 2015; Sun, 2012). Rather than leaving training in cross-cultural, multilingual communication for specified international or cross-cultural technical communication courses, my goal is to purposely embed these conversations in the "traditional" curriculum, thus using a service-learning model to technical communication pedagogy (Baca, 2012; Bowdon & Scott, 2002) to provide students with an accurate representation of how issues of culture and language are intertwined among all technical communication activities.

The Readings

Course readings primarily included selections from Johnson-Eilola & Selber's (2013) *Solving Problems in Technical Communication* and selections from the 2015 special issue of *connexions: international professional communication journal* focused on translation and technical communication. In addition, the course was structured through an emphasis on what Moore (2013) describes as "relational work, or work that draws attention to the complex relationships among people, ideas, places, events, institutions, and things" (p. 63). That is, as students in the

class read about the tools (Swarts, 2013), contexts (Spinuzzi, 2013), and ethics (Scott, 2013) of technical communication, they also listened stories and provided input about technical communication and translation projects as they were being enacted by our partners in the translations office. Rather than introducing our partnership with the translation office in a single assignment, this collaboration was introduced from the beginning of the course, so that connections between course material and our partnering organization could be carried throughout the semester.

Because a majority of my students had limited previous experience with intercultural, multilingual communication, particularly as it is enacted in multilingual work contexts, it was easy for initial conversations about linguistic and cultural diversity to be dismissed or isolated as scenarios that happen "out there" in "special" diverse sites. While my students were incredibly respectful and bright, their lack of lived experience in multilingual, intercultural contexts led to some initial difficulty understanding how and why this linguistic diversity is actually relevant to all technical communicators, and not just those who come from or aim to work with diverse populations. It was for this reason that I chose to pair our collaboration with a translations office with what may be considered "traditional" or "standard" texts in technical communication scholarship—texts that don't necessarily address issues of linguistic and cultural linguistic diversity directly. In this way, it was my students' responsibility to make the connections between these traditional texts and practices and our community partners, noting how the professionals in the translations office can and do contribute to the class's understanding of technical communication more broadly.

The Assignments

As students read and engaged with the course readings and as they built relationships with their community partners, they were asked to complete two major projects with several layers:

Project #1: Defining Technical Communication. After reading scholarship discussing the expanding and overlapping activities of technical communicators (e.g., Blythe, Lauer, and Curran, 2014; Brumberger & Lauer, 2015), and after practicing technical communication in multilingual contexts through their community partnership, students were asked to provide (through both a written memo and a verbal presentation) a definition of technical communication that was grounded both in their own experiences and in the scholarship they read. These definitions were to be assessed based on students' ability to weave examples that were both theoretical and practical, linking to their own research and experiences as well as those of others. Students who successfully completed this assignment were those who could provide concrete citations and experiences that grounded their approaches to defining technical communication work.

Project 1 desired learning outcomes included:

- Students read and become immersed in current definitions of technical communication.
- Students understand technical communication as a fluid and constantly evolving field and practice that shifts due to contextual and cultural factors.
- Students develop their own informed orientation to culturally-situated technical communication work.

Project #2: Developing a Tool to Facilitate Multilingual Community Work. In addition to their emerging understanding of technical communication, students were asked to work in teams to develop a tool (e.g., infographic, video tutorial, website component) intended to facilitate a particular goal or activity in the collaborating translations office. Since students became increasingly familiar with the purpose and goals of our partnering translations office, and since they began to establish relationships with translators in the office, their goal was to think of a way to contribute to the organization through the development of a specific tool, visual, or platform.

Project 2 desired learning outcomes included:

- Students practice ethical listening with clients in multilingual, intercultural settings.
- Students practice designing, testing, revising, implementing feedback, and sharing technical communication work with community partners.
- Students understand technical communication as a linguistically and culturally situated practice through their first-hand experience with community partners.

Since the translations office was teaching us about their work, our goal as ethical technical communicators in this course was to then reciprocate the efforts and time of our collaborators by developing something that might make their work easier. The targeted audiences for these tools would range from Spanish-speaking community members with Limited English Proficiency (LEP) to English-speaking funders and business owners who could benefit from the translation services offered by the Language Services Department. The specific goals and materials developed by students depended on the ongoing activities currently taking place in the Language Services Department, hence helping students practice the flexibility and adaptability that they may have to enact in their future workplaces.

In the sections that follow, I'll provide specific examples of how students' understanding of translation and technical communication developed simultaneously through their partnership with the Language Services Department. In particular, I'll explain how working with the translations office allowed students to operationalize three themes that emerged from the course: 1) Connections between technology and language accessibility, 2) Challenges of cultural representation in technical communication, and 3) Incorporating translation in technical communication workflows. All of these factors, I argue, helped students prepare to work as technical communicators in diverse contemporary contexts.

Theme 1: Connections Between Technology and Language Accessibility

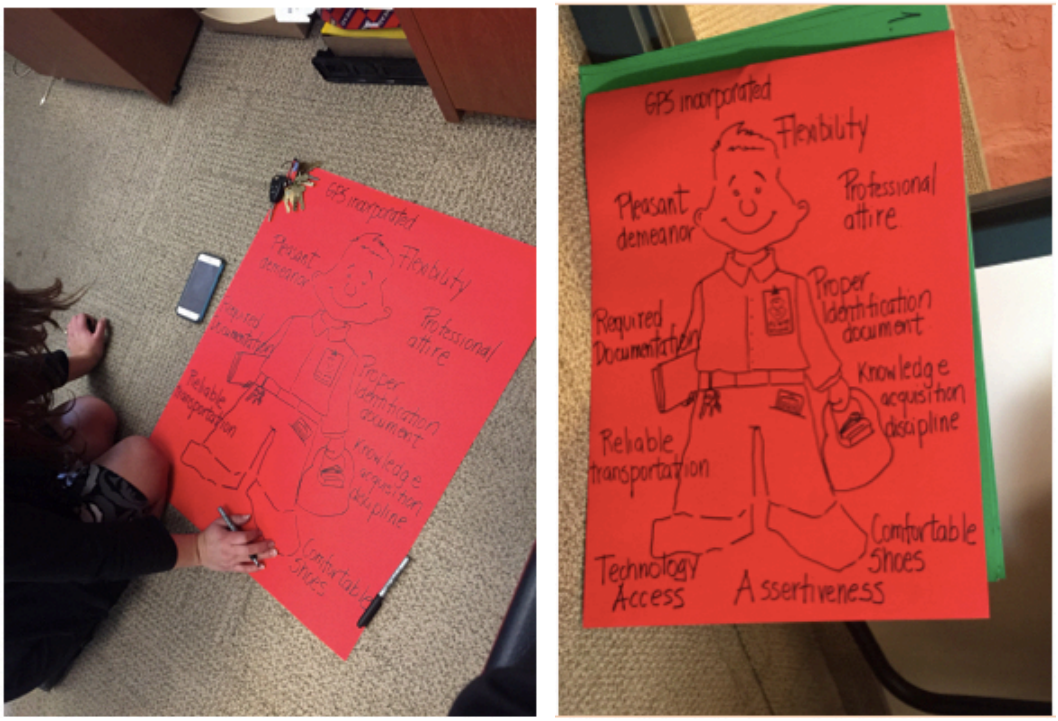
Students in my technical communication course were assigned to read several articles discussing usability, accessibility, and user experience, including Ceraso's (2013) "How can Technical Communicators Plan for Users?" and Mirel's (2013) "How can Technical Communicators Evaluable the Usability of Artifacts?" in conjunction with pieces about the role of translation in digital environments (e.g., McGinnis and Hanson's (2015) "Social Inclusion: Text optimization for translation and readability in a multilingual world"). As they read, students also Skyped into and physically visited the Language Services Department office (depending on their own transportation and scheduling availability). During these visits, students witnessed how translators in the Language Services Department navigated digital platforms as part of their work.

For example, students Skyped into the translations office on a day when Sara, the director of the office, was creating materials for her upcoming professional interpreters' training. Although we regularly scheduled Skype sessions with the Language Services office, these meetings were frequently more of an office observation rather than an interview or specific discussion with translators. Since the Language Services Department is so busy, students often used our Skype sessions as an opportunity to observe what employees in the office were doing, rather than having the undivided attention of these employees for a designated period of time. During this particular Skype session, students observed as Sara created a poster for her interpreters in training. As evidenced in Figure 1 (p. 89), Sara was using a black marker and red poster board to sketch what she called "the qualities of a successful interpreter." These qualities include having reliable transportation, knowledge of the discipline, flexibility, and professional attire (among others).

After witnessing Sara design this poster during our Skype session, a group of students in my class wondered if the organization could benefit from having a digital version of the poster that could be re-used during different training sessions. After having a follow-up conversation with Sara regarding this possibility after

Figure 1

Sara Creating a Poster of a Professional Interpreter

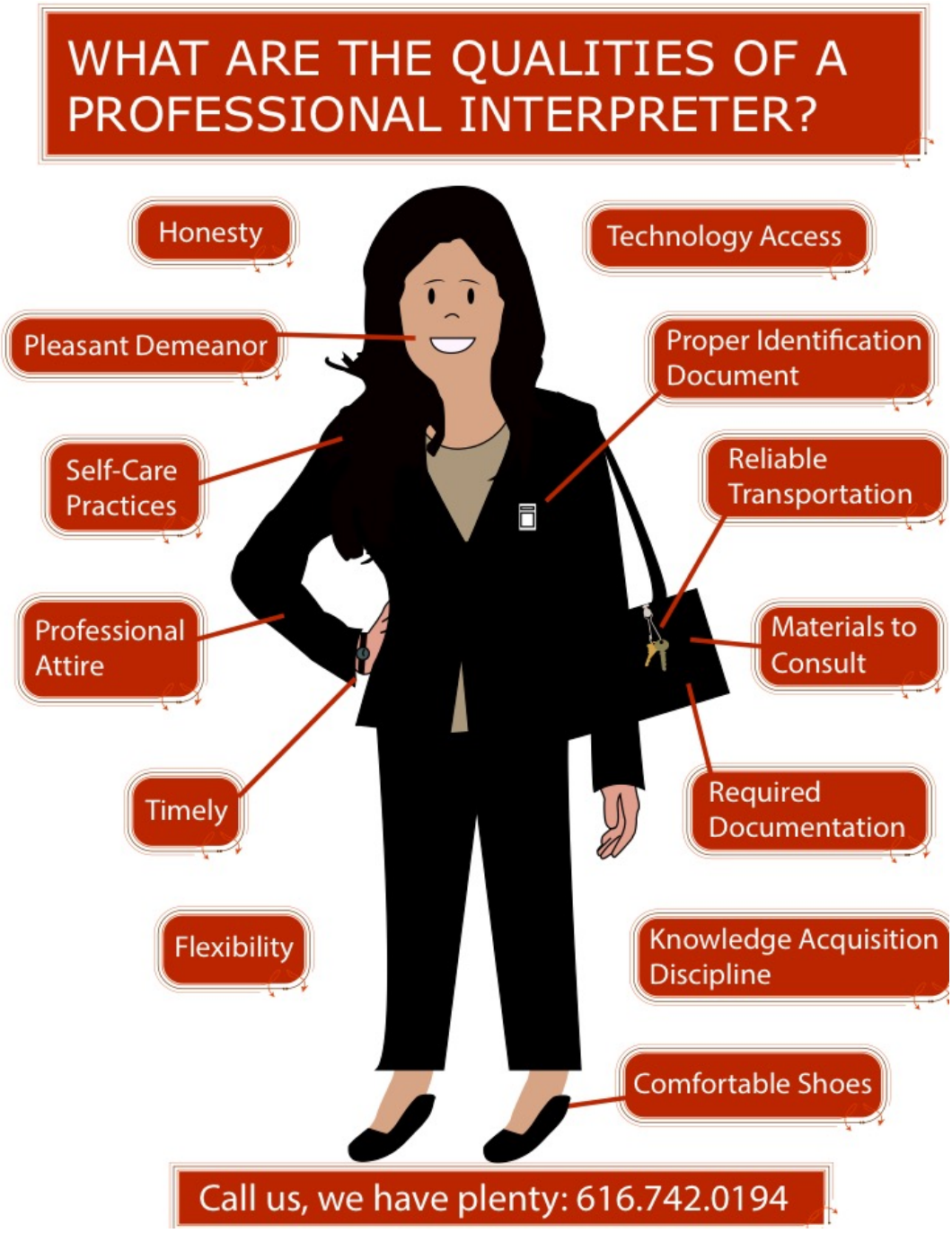


going through several rounds of feedback where they considered how to create a design that would be easily accessible and translatable, students in this group shared the poster depicted in Figure 2 (p. 90) with Sara and the Language Services Department. As evidenced in Figure 2, students in this group used their project to design a poster illustrating the qualities of a professional interpreter. This poster is now distributed during all interpretation trainings, and is being developed into magnets in both English and Spanish that can be used as marketing materials for businesses and organizations who may be interested in interpretation services.

As evidenced through this brief example, as they learned about the activities embedded in a small Language Services office, students participating in

Figure 2

Revised Professional Interpreter Poster



this collaboration contributed their emerging understanding and skills in technical communication. In this way, students' understanding of translation and cross cultural communication grew alongside (rather than in isolation) from their understanding of technical communication as a field of research and practice. As students crafted and revised their definitions of technical communication through our course assignments, they centralized discussions of linguistic and cultural diversity without being necessarily prompted to do so.

During another Skype session, students witnessed how Holly, one of the translators in the Language Services Department, struggled when translating government seals that required the re-creation of advanced graphics or logos. Because the Language Services Department does not have access to design software like Adobe Illustrator, to successfully complete complex projects like those involving intricate seals and logos, translators like Holly had to rely on their own creativity adapting Google images with Microsoft Paint and PowerPoint. In addition, when translating logos and images, employees in the Language Services Department had to manipulate sentence structures to address space limitations and alphabetic symbols, for instance only using tools that could accommodate the Spanish "ñ" and account for Spanish accents (e.g., "Á," "É"). Thus, as students read about access, usability, and user experience in theoretical terms through the assigned readings, they also had the opportunity to witness how translators navigated technological and linguistic challenges in a small community-based business.

One team of students designed a banner that could be displayed in the office to describe the mission of the Language Services Department for both employees and potential funders: 1) Providing Language Accessibility to the Latinx community in Grand Rapids by translating technical information for city residents and by providing interpretation services for community members at city meetings and medical/legal appointments, 2) Providing financial sustainability to the department through the funds acquired in the office, and 3) Providing leadership and professional development opportunities for bilingual community members interested in becoming professional translators and interpreters. Initially, the students in this particular team used several different platforms to draft banner

Figure 3

Banner Designed by Technical Communication Students

designs, including InDesign, Photoshop, and other web-based services. However, after going through several rounds of revision, the team decided to design their banner on Google slides, the product of which can be seen in Figure 3, above.

In her final course reflection, Maggy, a technical communication student who worked to create the banner illustrated in Figure 3, explained the role that usability and accessibility play in effective bilingual technical communication, stating,

> One of the biggest challenges technical communicators face is working with whatever tools are at your disposal. I know we initially struggled with this as we were deciding which tool to use in creating our banner design, and we eventually settled on Google Slides because we knew the Language Services Department would have access to it and be able to edit and translate it as needed. Google slides is open access and can incorporate

> signs and symbols in multiple languages, including Spanish, which is not always the case in the other tools that we used. Without knowing the kinds of tools that your client has, it can be tricky to design materials in a way that they can be living documents and not just stagnant texts. For instance, if we had used InDesign or some other software that the Hispanic Center doesn't have, they probably would have had to start over if they ever wanted to update or translate their banner. Even if you have access to a tool, if you don't know how to use it effectively, and if it doesn't include features needed to reach diverse audiences, it's not a useful tool.

In her reflection, Maggy discussed access and usability in terms of both technology and language, identifying ways in which her decision making was guided by an understanding of the Language Services Department's culture and institutional resources, as well as her knowledge of how platforms facilitate translation across languages (i.e., "Google slides is open access and can incorporate signs and symbols in multiple languages, including Spanish"). Although reading about access to technology through our course readings provided a foundation for students like Maggy to approach their community partnership, it was through interactions with the Language Services Department that students got a chance to experience how resource and language limitations impact the everyday activities of technical communication professionals. By seeing how professionals in the Language Services Department adapted technologies to meet their needs when specific resources were not available, Maggy's understanding of successful technical communication relied not just on a mastery of tools and technologies, but rather on an understanding of which tools are available and suitable for the needs of specific communities.

Theme 2: Challenges of Cultural Representation in Multilingual Technical Communication

In addition to acknowledging and accounting for the accessibility of tools and technologies across languages, students in my technical communication course

were faced with the challenge of representing diverse, multilingual communities in their designs. For example, one of the first needs noted by my students after meeting the Language Services Department was the fact that the office did not have a specific logo or design strategy that could be used in all materials used to bring profit into the organization. For this reason, a team of students decided to work together to design a logo for the department.

As students conducted research to design the logo, they learned that the Language Services department employs translators and interpreters who come from over 22 Central and South American countries. Through their conversations with these employees, students noted the national and cultural pride that each employee held for their specific country of origin, conducting several interviews with employees at the Center, all of whom identified their cultural background with one or more Central or South American nations. As students developed potential logos, they worked to incorporate the employees' cultural backgrounds into design mockups.

Figure 4 (p. 96) illustrates some of the design ideas initially developed by this team of students, all of which aimed to represent a wide range of nationalities with Spanish language speakers in their design.

In addition to experimenting with typefaces and colors, what students in this group struggled with the most is what one student described as "fitting all the nationalities and cultures of the center into one logo." Indeed, as the work of Sun (2012) and Brumberger (2014) illustrates, accounting for the multiplicity of histories, languages, and backgrounds often embedded in cross-cultural design (without resorting to stereotypes and generalizations) can be a tough challenge for technical communicators and user experience designers. For this reason, technical communication researchers are aiming to move beyond what Sun (2012) describes as "ad-hoc cross-cultural communication guides" that present lengthy lists of "DO's and DON'Ts'" as heuristics for effectively designing across cultures (p. 8).

As students got to know the employees in the Language Services Department, they were able to understand the cultural and linguistic complexities encompassed in designing a representative logo. They saw that terms like "Hispanic"

Figure 4

Logo Design Ideas

or "Spanish" served as general identifiers for people, cultures, and languages with complex layers of meaning. While they had been advised by their community partners to include South and Central American flags in their design, "fitting" all the nations of the departments employees in one logo proved to be a challenge. In their final logo design, the students in this group decided to include patterns that would resemble the colors of South and Central American flags, without including country-specific seals or logos that would alienate or prefer one nation over the other. In this way, the students decided, each individual who saw the Language Services logo could use their own experiences and histories to identify with specific colors and other aspects of the design.

In her final course reflection, another student, Donna, discussed the challenges she faced as a technical communicator working in cross-cultural, multilingual settings, particularly when designing this logo. She explained,

> We had to put into account every single nation and nationality that we were representing. We had to do this in a way that was appropriate and meaningful not only to English speakers, but also to Spanish speakers. These types of obstacles are extremely meaningful to me as a technical writer, mostly because it's out of my comfort zone—speaking for other nationalities that aren't my own can get a bit awkward for me, just because I don't always know what could possibly be offensive or inappropriate. Throughout my time working with the Language Services Department, I've learned how to ask questions when working with communities from other cultures to make appropriate and also engaging content. I wanted to design something in this logo that was inclusive without generalizing.

Donna's reference to cross-cultural design that is both "appropriate and meaningful" echoes the goals of technical communication researchers who emphasize the need for cultural awareness and sensitivity in successful cross-cultural design (Brumberger, 2014; St. Amant, 2002; Sun, 2012; Vogel, 2009). By aiming to create an "inclusive" but not "generalizing" design, students in Donna's team learned how to honor cultures without essentializing them, even in situations that were, as Donna explains "outside of [their] comfort zone." Since Donna and other members of the class got the chance to meet practitioners in the Language Services Department, they were able to see how each individual Central or South American culture and language was embodied in the lives of specific people. Hence, doing research on "Hispanic" or "Latino" cultures may not have rendered the same personalized results that these students experienced by meeting individuals from these particular countries.

Theme 3: Incorporating Translation in Technical Communication Workflows

Technical communication researchers are increasingly pushing for a move away from thinking of translation as an afterthought to content design and development. That is, as Batova & Clark (2015) explain, it is no longer enough

for information to be created in a single language to be later adapted into other languages and cultures. Instead, successful technical communication is now often created in multiple languages simultaneously, with designers, developers, and translators collaborating through several stages of the design and dissemination process (Gonzales & Zantjer, 2015; Maylath et al., 2013; Sun, 2012).

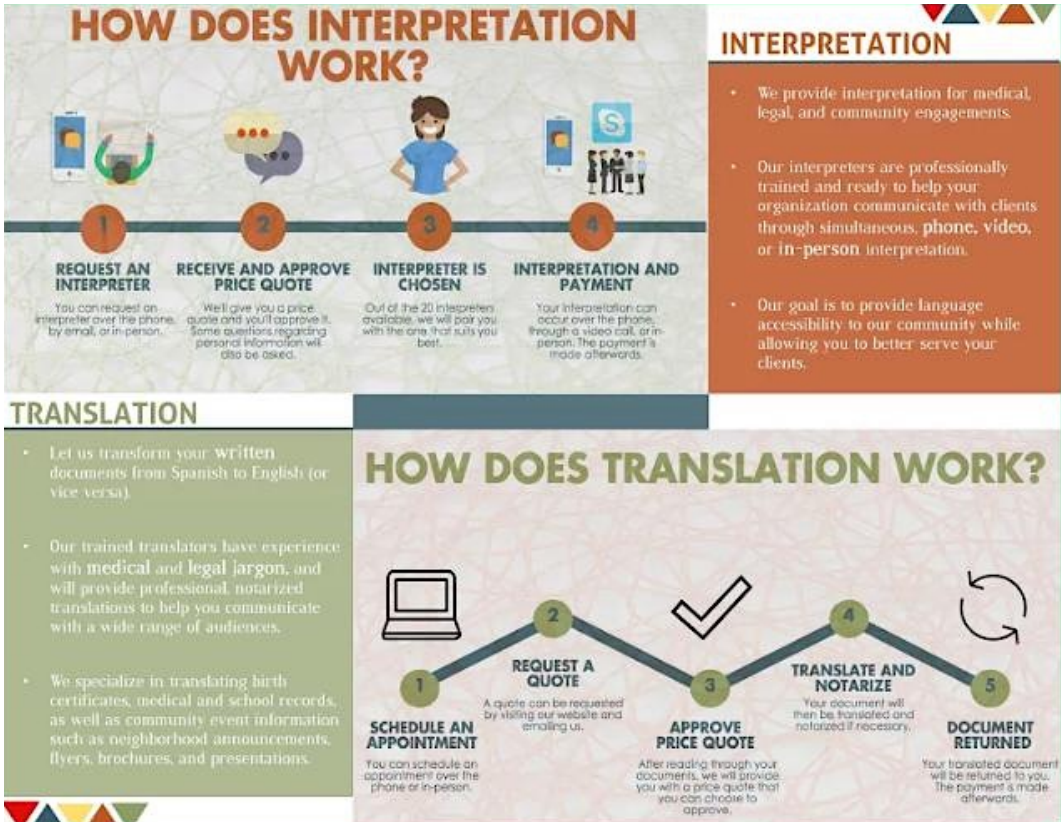
Through their collaboration with the Language Services department, students in this technical communication course were able to practice and visualize *how* translation can be incorporated into technical communication workflows. More specifically, one group of students focused developed infographics to describe the process of requesting and receiving translation and interpretation services through the Language Services Department. To do so, students had to consider the various activities enacted by employees in the Language Services Department throughout these transactions, considering how information moves across systems, documents, tools, and languages simultaneously.

Figure 5 (p. 98) represents a flyer designed by technical communication students after studying the processes of translation and interpretation as they are enacted in the Language Services Department. As the infographics in Figure 5 illustrate, translation and interpretation projects require the coordination of several activities, including an initial project assessment and quote, approval and negotiation of terms between the client and translator/interpreter, the completion of the translation project itself, as well as proofreading, notarization, and certification cycles.

To understand how employees in the Language Services department handled translation and interpretation requests, students in this group had to observe translation and interpretation projects as they get distributed among professionals from start to finish, understanding how information was being transformed across languages for particular clients. For example, students in this group learned how one translator researched the specific cultural background of her clients before deciding on specific Spanish word choice translations. Students observed as translators converted files from various formats into editable texts that

Figure 5

Translation and Interpretation Infographics



could be adapted and revised. Finally, students observed as translators made specific design decisions throughout their translation process, providing mirror translations that gave access to information for both professional clients and for community members. For technical document translations, for instance, the project manager in the Language Services Department had to contact translators with certain types of language and technological expertise, in order to ensure that the translation would adhere to professional standards in specific areas (e.g., medical, legal, areas).

Through this work, in addition to developing materials for their partnering organization, students also developed a critical understanding of how

communication can be designed specifically for multilingual audiences. In her course reflection, another student, Grace, described her experience designing these workflow infographics for translation and interpretation projects, explaining,

> For me, the experience of creating translation and interpretation infographics was about learning to ask questions that considered all the people we serve as communicators before crafting any content. To me, all communication should be ethical communication—or communication that aims to reach diverse users in their language of choice. This means that as technical communicators we can't expect our messages to be understood by all, but we must do the research to ensure that we are meeting the cultural and language expectations of our clients and communities. It's not enough to only consider one audience, but we have to consider multiple audiences from multiple backgrounds. In the case of our flyer and infographics, we had to think of a way to honor the work that translators were doing while still communicating the information clearly to potential clients.

Grace's discussion of the need to conduct research "before creating any content" exhibits the complex, iterative design cycles that technical communicators must engage in when working with translators to disseminate content across languages. Although Grace herself was not creating content in Spanish, her experience working with interpreters and translators in this collaboration, specifically seeing how information is transformed across languages, helped her understand the need to pause and ask questions before making assumptions about how information may be received by specific users. In addition, Grace's concern with "honor[ing] the work that translators were doing" in communicating with clients echoes current calls to further understand translation as an intellectual practice relevant to technical communication work (Maylath et al., 2013; Walton, Zraly, & Mugengana, 2015).

Implications, Limitations, and Conclusions

Embedding training in translation and cross-cultural communication is not a new phenomenon in technical communication programs. For example, since the late 1990s, collaborations within the Transatlantic & Pacific Project led by Bruce Maylath at North Dakota State University have been pairing technical communication students in the US with translation students across the globe, leading to dozens of publications describing the impacts of translation and technical communication collaborations (Vandepitte et al., 2015; Sorensen, Hammer, & Maylath, 2015; Verzella & Mara, 2015).

The projects and partnership described in this teaching case and industry perspective are unique in that they illustrate how technical communication students enacted design and writing activities in their work with a professional translations office. Unlike previous translation-technical communication partnerships, the final deliverables in this case study included visual tools and designs that are reflective of the type of products technical communication students may develop in contemporary workplace contexts. The focus here was not necessarily on linguistic transformations alone, but rather on how visuals, technologies, and media could be used and adapted to meet the needs of linguistically and culturally diverse users. Through this work, students practiced the technologically-mediated elements of technical communication, while interacting with professionals and community members with diverse histories and perspectives.

Rather than having theoretical discussions about cross-cultural, multilingual technical communication and then fitting these discussions into practice across media, this course was designed to help students make these connections through their own experiences. Students had to understand how tools and technologies facilitate and limit communication, particularly in cross-cultural, multilingual environments. In turn, situating this partnership with a small Language Services office located within a non-profit organization also provided some perspective for technical communication students aiming to work in community-driven organizations with limited resources.

Although this particular case study is an isolated instance of a technical communication and translation partnership, the presented implications of this project suggests future studies could further explore how translation training can impact the training of contemporary technical communicators aiming to write and design technology-mediated content for diverse communities. Students' final reflections and their emerging definitions of technical communication suggest that this partnership provided an opportunity for self-identified "monolingual" students with limited cross-cultural experience to more deeply understand the constraints and affordances of successfully executing technical communication work for multilingual audiences. As technical communication researchers and practitioners continue developing strategies for preparing students to succeed in the constantly enacted in contemporary professional contexts, partnerships like the one described in this study may prove increasingly valuable. More importantly, as we continue training technical communication students in the United States to work ethically and responsibly with diverse users, it's important that we continue highlighting the importance of cross-cultural collaborations grounded in reciprocity and integrity, where all linguistic and cultural knowledge is considered intellectual, valuable, and critical to successful technical communication. ■

Notes

[1] In this article, I use the term "monolingual" to reference individuals who self-identify as speakers of a single named language (i.e., English). I acknowledge that the term monolingual is broadly contested and is frequently used in relation to additive models of language and language acquisition. However, I use the term monolingual in this article with an understanding that languages are fluid and constantly evolving, and that there are multiple Englishes used in various cultures and contexts within and beyond the US.

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MAPPING THE CULTURAL CONTEXT OF CARE

An approach to patient-centered design in international contexts

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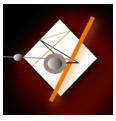
In today's interconnected global society, health and medical communication must increasingly cover a growing range of international and intercultural contexts. Meeting the communication and design expectations of audiences from different cultures and in other nations, however, is a complex process. By focusing on usability, individuals can create materials that effectively meet patient expectations associated with the context(s) in which care—or processes related maintaining or improving one's health and wellness—is administered. To facilitate this process, this entry presents international patience experience design (I-PXD) as an approach that can help individuals better understand the dynamics of usability in different contexts around the world. By using prototype theory as a foundation for mapping the contexts in which patients use materials, I-PXD allows individuals to identify the variables affecting usability in different parts of the globe and design materials to account for those factors.

Keywords. International patient experience design (I-PXD), Prototype theory, Usability, Contexts, Variables, Mapping.

Introduction

The interconnected nature of today's world means health or medical events occurring in one nation can quickly ripple across globe (e.g., the international spread of the Zika virus in 2015-2016) (Ding, 2014; Hennessey, Fischer, & Staples, 2016). Individuals sharing health and medical information thus need to



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increasingly think in terms of designing materials for globally dispersed audiences. Specifically, these individuals need to understand *international patient experience design* (I-PXD)—the process of designing materials to meet the expectations of patients in different cultures. Doing so is not easy. Rather, successful I-PXD involves understanding and addressing the cultural context(s) in which patients use materials. This entry examines how prototype theory can provide a mechanism for achieving effective I-PXD.

Usability and Context

What determines if something is usable for a given audience? Often, it is the setting—or context—in which one uses information or materials to perform a process (Garrett, 2010; Hassenzahl & Tractinsky, 2006; Norman, 2002; Nielson Norman Group, 2014). If, for example, I provide readers with instructions on how to take blood pressure, those instructions must address

- The materials individuals can readily access in the setting where they perform such tasks (e.g., access to a digital blood pressure monitor vs. an analog blood pressure cuff and stethoscope).

- The individuals who, in that setting, can use those materials to achieve that objective (e.g., an automated monitor the patient uses vs. an analog blood pressure cuff and stethoscope used by a healthcare provider).

Accordingly, for materials to be usable, their design needs to reflect the context in which individuals perform the related process.

This connection means the first step in designing materials is to understand the context or setting in which the intended audience will use them. In health and medical environments, such factors can apply to a range of items and individuals depending on where care—activities associated with health and wellness—is administered. This approach, moreover, applies across media—from a printed document to a web-based interface to an app on a mobile phone.

To understand this *context of use*, individuals need to identify those elements—or variables—that can affect how individuals perform a task in a given

setting. Such contexts of use, however, can be quite complex. Individuals therefore need to identify and understand those contextual factors/variables directly connected to usability (i.e., *variables of use*) and those that are not (Petroski, 1994). After all, every item or individual in a given setting might not be essential to using certain materials as intended.

Culture and Context of Use

Such factors can be difficult to track in one's native culture. When expanded to different international contexts, the complexities can be even more pronounced (Sun, 2012; Otto & Smith, 2013). This situation arises because the context in which individuals perform a given activity can vary from culture to culture (Otto & Smith, 2013). Many Anglo-Americans, for example, visit a physician to obtain a prescription, which the physician issues after diagnosing a condition; the patient then takes this prescription to a pharmacy where a pharmacist dispenses the related medication (a two-place, two-person process). In France, however, it is not uncommon (particularly with less acute conditions) for individuals to go directly to the pharmacy and consult with the pharmacist, who diagnoses the condition and fills the related prescription in the same place (a one-place, one-person process) (French 'pharmacies,' n. d.). This difference means U.S. materials on how to obtain a prescription might not work in France, where audiences might question the "extra step" (i.e., going to the physician first, and then going to a separate pharmacy). In this way, a failure to recognize—and design to address—such differences related to context of use can affect the usability of materials in certain international settings. This concept is central to I-PXD.

I-PXD, or creating usable health and medical materials for international audiences, requires an understanding of the contexts in which individuals will use those materials. Specifically, one needs to know where the members of a particular audience will try to use a given item/perform a particular task and what other factors are expected to be present in that environment and to be used to perform that process. The task is thus akin to mapping a terrain. That is, the individual creating the materials must

- Review the environment.
- Identify variables of use essential to performing the process in that setting.
- Design materials that reflect the dynamics of that context.

Through mapping such contexts of use, individuals can create materials that better reflect user expectations of and experiences relating to design—the objective of I-PXD.

This mapping process is important, for contexts of use can be cluttered with items—some essential to performing a process, others not. When projected to the contexts found in other cultures, nations, and regions, determining what items one needs vs. are not required to perform an activity can be complex (St.Amant, 2016). Individuals therefore need to identify the *variables of use* (i.e., those factors affecting if or how something can be used) in a given context of use to facilitate effective/usable design. The individual creating materials must then determine how such variables are connected to use/usability in that context. The resulting materials then need to be designed to include such variables and reflect the experiences/situations of the user in that setting.

These ideas of context of use associated with variables of use exist across almost every context in which an activity can be performed. The variations in the context that can occur from culture to culture can, however, seem unpredictable and almost infinite. Thus, effective *mapping of the context of use* is essential to successful user experience design (UXD) in different cultural and national environments.

Location, Experience, and Design

Context of use is generally connected to physical location. As such, the materials and individuals available to perform a process in one physical setting might be different from those found in another. This situation means designing for usability in international settings is partially about culture, but it also involves place. Designing materials for Russian patients living in and seeking care in

Russia needs to reflect the realities of the items and individuals generally found in healthcare contexts in that physical setting. (Such factors reflect the *realities of usability* in that context.) If, however, a Russian patient seeks healthcare in Canada/in a Canadian-located context of care (e.g., flies to Canada to receive medical treatment), then related materials must reflect the physical realities of that new context of use (e.g., different materials available and different individuals present in this context).

Accordingly, while certain aspects of design remain connected to culture (e.g., the language used to convey information) others (e.g., content) will need to change to reflect what constitutes usability in that new physical context. These dynamics mean individuals should avoid designing one set of health and medical materials for members of culture X (e.g., all Belizeans). Rather, they should design such materials for when members of culture X engage in a process in location Y (e.g., a Belizean patient receiving a medical exam in Belize vs. in the U.S.). In this way, the dynamics of usability and design are connected to culture, but they also need to be adapted to recognize the realities of the physical location where those materials will be used. I-PXD, in turn, focuses on understanding how such factors of culture influence expectations of usability/how to use items in a given setting.

Usability and the Context of Care

This connection between context and usability can be particularly acute when it comes to designing material for patients—the individuals who receive care (Meloncon, 2016). Such materials generally provide patients with the information needed to perform activities associated with maintaining or restoring a particular health-related condition (i.e., staying healthy or returning to a certain state of health). The issue, however, becomes the variables patients expect to encounter in the context where they use such health- or medical-related materials. The individuals developing these materials thus need to understand such contexts to create content patients can use effectively in that setting. This process of designing to address patient needs and expectations has been referred to as

"patient experience design" (Meloncon, 2016). It requires an understanding of patient expectations relating to information and to the context in which patients access and use that information.

In terms of health and medical communication, the context in which individuals use materials is often associated with some aspect of receiving care. (In this case, "care" refers to processes that maintain the patient's current level of health or restore the patient to a particular level of health.) These materials generally cover the kinds of care patients administer to themselves or that others must perform on/for the patient. The idea is to provide patients with the information needed to effectively perform, engage with others, or decide upon in relation to different activities associated with receiving care. (Do I wish to perform this process on myself? Do I wish to allow another person to perform this process on me? Do I wish to have this process performed at all?)

To develop such materials, individuals need to know

- The context in which care will be administered to the patient.
- The individual(s) who will administer care in this context (i.e., the patient or someone else).
- The items the individual(s) need(s) to administering this kind of care in this context (St.Amant, 2015).

These three areas represent the variables of care one must identify to understand a particular context of use associated with caregiving. These areas are also the variables one must address the when developing materials to meet patient expectations of usability in a given *context of care* (e.g., the setting in which care is administered to/received by a patient).

Such contextual factors, however, can vary from culture to culture and from location to location in a nation or region (St.Amant, 2015). The challenge becomes mapping such variables in a way that involves their effective identification and use when designing materials for patients in different cultures and nations. Prototype theory, from cognitive psychology, can help with such mapping.

Prototypes and Credibility

According to prototype theory, humans often associate a given image with what a particular object or item should look like and what that object should do (Rosh, 1978; Aitchison, 1994; St.Amant, 2015). For example, when an individual hears the word "cup," a particular image of a certain kind of item generally appears in the person's mind. That mental image represents the prototype, or best example of what something should look like for the person to consider it a cup. At the same time, the individual also accesses a set of expectations associated with the characteristics of use of that item (e.g., cups are used to hold liquid for drinking) (Aitchison, 1994).

When that person encounters a new object, she or he compares it with his or her prototype (i.e., ideal representation) for "cup" to see how closely that new item matches the prototype. The closer the match, the more likely the object is to be considered an acceptable version of a cup. The lesser the match, the lesser the chances the item will be considered an effective representation of a cup. Likewise, the individual will expect that object—identified as a cup—to be used in certain ways (i.e., as a drinking vessel) based on this identification.

These factors of identification affect usability. If, for example, I need a cup to perform a process in a particular context, I will seek out that item when performing that process. In this setting, items that look like my ideal for a cup are usable ones, for they help me perform the desired process. Items that do not resemble a cup, by contrast, are less usable in that context. Moreover, once identified, I will tend to use the cup only in certain ways in that context—ways associated with my expectations of how individuals use cups in that setting. Materials that fail to account for these factors might reference another item individuals can use to perform the same function as a cup in that context. The issue thus becomes

- Will the user recognize the object as one that can perform a needed function.
- Will the user view this alternative as an acceptable one for performing this process.

Prototypes can thus influence usability in relation to a given context of use.

What is particularly interesting about this process is that it is not a matter of comparing a prototype—in its entirety—to another object in its entirely. Rather, individuals compare the characteristics, or features, of a prototype to those of a new object when trying to determine what that object is (Aitchison, 1994). The more characteristics a new item has in common with a particular prototype, the more likely that new item is to be considered a "recognizable" or "acceptable" or "usable" example of the item represented by that prototype (Aitchison, 1994; St.Amant, 2016). (The more something looks like my prototype for a cup, the more likely I am to identify it as and use it as a cup.) The fewer common characteristics, the less likely I am to identify the item as something and the less likely I am to use it in a particular way (associated with identification) in a given setting. The objective of I-PXD is to use these prototype associations as the foundation for researching and understanding cultural expectations of usability in different contexts of use.

Prototypes and Culture

From an I-PXD perspective, the interesting aspect of prototypes is what something should look like and can be used for can vary from culture to culture (Kostelnick, 2011; Kostelnick, 1998). This is because the prototypes humans have for different items are based on exposure over time (Aitchison, 1994). That is, the more you see something in a particular context in your native culture and are told "this is a cup," the more likely you are to associate what a cup looks like and what features it should have with that item you've seen repeatedly over time. Similarly, the more often you see that item used in a particular way in a particular setting, the more likely you are to expect that object to be in that setting and to be used in that way in that context. Thus, experience influences expectations, and this connection has important implications for design and usability.

In the case of a health and medical context, the issue becomes what something should look like to be recognized as a credible medical device or be used correctly/as intended in that setting can vary from culture to culture based on

experience. A pinard horn—a hollow, often wooden tube that resembles a cup—is often viewed as an appropriate and acceptable stethoscope/technology for listening to heartbeats (i.e., a stethoscope) or listening to the movements of a fetus in utero (e.g., an ultrasound-like process) by patients in the care-related contexts of many emerging economies (Maternova). For individuals in other cultures—such as the United States—where different technologies are associated with performing those processes in those contexts—such a technology might be considered an unrecognized and inappropriate item to use in those settings.

Accordingly, health or medical materials that contain images with or discuss uses of a pinard horn in relation to cardiac or neonatal care might be usable—based upon recognition of the item—by some cultural audiences, but not others. Moreover, as noted, such expectations are often connected to associations with the physical context—or location—in which individuals have come to expect such care to be administered. As such, they can vary for location to location within and outside of a given culture. In this way, prototype theory can serve as a foundation for studying contexts of care by helping individuals identify key variables of use in those contexts.

It should be noted that this use of prototype theory for understanding and guiding cultural design expectations is not new to professional communication. It has, for example, been used by others to present frameworks for examining the design of websites and of other online materials for audiences from other cultures. (See, for example, St.Amant, 2005a; Treiblmaier, 2007; Tong & Robertson, 2008; and Zemliansky, 2012.) Similar uses of prototype theory have also been suggested as a mechanism for international visual/image design in general (see St.Amant 2005b). More recently, some individuals have advocated expanding this use of prototype theory to examine health and medical communication in international contexts (see St.Amant, 2015; Meloncon & Frost, 2015; Zhang, 2016). This entry seeks to build on such previous work by connecting the use of prototype theory more directly to usability and design in international settings. In so doing, this entry also seeks to provide a more complete approach to integrating the use of prototype theory into international health and medical communication.

Prototypes of Context

From an I-PXD/usability and design perspective, prototype theory can help designers map a given context of use in different cultures. That is, most individuals have a particular prototype—or visual model—for what the setting in which one received care should look like. (If, for example, I say "examination room," an image of a specific-looking kind of room with particular items in it usually pops to mind.) So, humans have a prototype for "*context of care*." Accordingly, the more a given setting addresses or resembles that prototype, the more likely individuals are to consider care-related information based on or associated with that setting as "credible" and "usable." This visual model of context of care can serve as the foundation for developing materials designed to present usable information on processes that take place in that context. The key question is how to review the prototype certain patients have for a particular context of care in order to identify those characteristics /variables (items or persons) individuals expect to be in that context and expect to be involved with performing a given activity. (These could be care-related activities individuals perform on themselves or allow others—recognized healthcare practitioners—to perform on them.)

To address such expectations, one needs to identify two central factors:

- *Object variables/characteristics*: The tools or other items/materials one expects to encounter in a given context of care. These variables/characteristics can include everything from the implements one expects to find in a given setting (e.g., medical devices) to the furnishings expected in a given space (e.g., stools, counters, etc.). These are the items one associates with expectations of how a care-related activity is to be performed (e.g., using a blood pressure cuff while the patient is seated on an examining table).
- *Human variables/characteristics*: The individuals one expects to encounter in this context: specifically, those persons who will administer care or use the available objects of care in a given context to perform a particular care-related activity (e.g., the individual who will use the blood pressure

cuff to take a diagnostic reading as the patient is seated on the examining table).

Mapping these two variables effectively involves identifying what actions patients expect to take place in a given context of care. What, for example, do patients expect to be done to them in a given setting? What will be used to perform this action, and where will the patient be located as this action takes place? (Do they, for example, lie on an examining table while a stethoscope is used to monitor their heart rate?) Similarly, who in that context performs certain care-related activities using those materials? Does the patient perform the activity on her- or himself, or is a physician/ nurse/some other individual expected to perform such care-related actions in such a context? By knowing what activities individuals expect to encounter, individuals can design materials that meet these expectations of care and that patients can use effectively in the related context of care.

This approach is central to international patient experience design (I-PXD). That is, prototype theory can be used to map the experiences of patients who have received care in different settings in other cultures. Individuals can then use this mapping to design materials that more accurately reflect patient experiences in such culture-specific locations and contexts of care. In so doing, individuals can develop materials that better meet such expectations and thus are easier for the patients receiving care in that context to use effectively and as intended.

Variables and Mapping the Context of Care

These factors become the variables affecting I-PXD in a given context of care. As such, they are also the characteristics patients in other cultures associate with the prototype for credible/acceptable setting for administering and receiving care. The individuals designing such materials therefore need to use this prototype-related information to map such contexts and develop designs/materials that reflect what and who patients expect to encounter in these contexts. Such a prototype-based map or model can facilitate the creation of materials—from written documentation to visual instructions to web-based content—that meet patient

expectations for that context and are thus more usable in relation to patient expectations of that context.

The question becomes how to access the prototypes other cultures have for a given context of care? From an I-PXD perspective, the first step to answering this question is identifying the context in which a particular kind of care-related activity takes place in the culture of the intended audience (e.g., "Where do individuals in culture X check their blood pressure?"). Doing so could involve interviewing the members of/patients from a given culture to ask where such activities are usually performed (e.g., "Where do you go to have your blood pressure checked?"). It can also involve doing a review of the current literature on that culture to determine where such care-related activities tend to occur in that culture.

Once the context of care is known, the next step in the I-PXD process is identifying the variables patients expects to encounter in that context. To do so, individuals should

- Review multiple images or descriptions of that context in that culture to identify the variables that repeatedly appear in that environment (a process based on guesswork and the reviewer's ability to "see" items that appear in a different cultural setting) (St.Amant, 2016).
- Interview multiple individuals (and/or conduct focus groups comprised of individuals) from the intended cultural audience and ask them to describe the process of receiving care in that context. Doing so will require the interviewer to repeatedly stop individuals in mid-description to ask clarifying questions (e.g., "When you say this action is performed – Who performs that action? What do they use to perform it? How do they perform the action?"). Such interviews should be done with multiple interviewees from a culture to track how often certain objects or persons are noted in relation to performing particular caregiving activities in a given context of care. From this process, certain variable should emerge as more common and thus the characteristics/variables of use associated with credible/usable care-related actions in that context.

- Engage in observational/ethnographic research of such contexts. In this case, the researcher would observe the process by which care is commonly administered in a given location within a culture and note how care-related activities are performed, by whom, and using what. By engaging in such observational research over multiple instances, researchers can begin to identify aspects/characteristics that repeatedly appear in relation to performing the related care-giving activity in that environment.

As with many UXD processes, individuals can use this initial I-PXD data to create wireframes/beta materials that can be reviewed by and tested with the related audience and modified based on feedback.

Conclusion

Culture is a complex factor affecting communication expectations and practices in a variety of ways (Otto & Smith, 2013). As such, culture has pronounced implications for design and usability in different international and cultural settings. These factors can be particularly problematic in health and medical context where one must create materials for patients receiving a particular kind of care. By using and I-PXD approach founded on prototype theory, individuals can better understand the dynamics of the context of care in different cultures. These individuals can then conduct the research needed to map such contexts to identify the variables to address when developing materials to meet the needs and expectations of patients in different cultural settings. ■

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connexions INTERVIEWS

connexions interview with

DENNY HUANG

Transcript of the interview with Denny Huang, Managing Partner at TANG User eXperience Consulting, in Shanghai, China.

The interview was recorded for issue *5*(1). It was conducted by Quan Zhou, via Skype, on September 25, 2016. The interview was transcribed from the recorded interview by Alex Kies and *connexions*' section editor, Quan Zhou.

Following post-production, the video recording of this interview will be uploaded to *connexions*' Vimeo channel at https://vimeo.com/218350777

Can you describe your work? What are you mostly responsible for within your organization?

I am the managing partner of Tang User Experience Innovation Consulting. We are a local Chinese firm. We provide user experience strategy, research, and design surveys. So our main methodology is from user-centric, so that we can create holistic channel experience for all kinds. Currently I am in charge of what we call the consumer industries… it means industries like hotels, fashion, luxury, these kind of industries. So actually, most of our clients… they are from this industries… are

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coming from international companies, like… Intercontinental Hotel Group (IHG), Chanel, Burberry, Microsoft, Samsung, these kind of companies. We are helping them to do… kind of… localization work in China, like research and design, for example. That is mainly what I'm doing in our company now.

What's it like working with a company like TangUX, and how would you describe your experiences there?

I would say that we're kind of open. We have a very cool environment, just like… I mean… Silicon Valley companies like Google. So we have a cool-designed office, and we have very kind… we can say flexible, open environment here. And most importantly for me, I think we are a great place to learn new things—I mean… partly from our clients, partly from our colleagues. In one hand our clients are coming from… I mean companies from many different industries including smart appliance devices like AR, VR, these kind of new things; traditional… like … e-channels like websites, apps, kiosk card, so many different things. So these can keep up… keep up with new, trendy things.

And in the other hand, our colleagues are coming from very different backgrounds. Some of them are strategists with a business background, some of them are designers… like from human-computer interaction, visual designers, design strategists. So… and some of them are researchers coming from psychology backgrounds. So quite a very diversity of background projects and industries so that this can keep us open and young to always the new things. So that this is for me that… this is the most important thing to work here.

What would you identify as some of the key elements of doing UX localization?

For me, based on our experience before, we summarize this kind of UX localization into three dimensions. The first dimension we call… called "Conflicts." And for conflicts, this is our biggest issue, which is strongly against the local users' habit or culture. For some of them, like a time format, it is too easy to understand. But there are some kind of conflicts, which are also very important. For example, the zip code is… how to say… widely used in the western world to track order status. But in

China, most people do not remember the zip code of that… area, and also zip code is very… vigorous… how to say… I mean not as clear about, really, the destination. There is a wide range of area. So in China, people rarely use zip code. So for some international companies, if they use zip code as a must-to-fill options… must-to-fill content, which will be… block Chinese user. So this is the first layer we called "Conflicts."

The second layer we can call "Cross-Cultural Issues." For these kind of issues, people still can complete their task but their emotional responses are not good. Users feel that the product is not designed for China. For example, many Western websites… or e-commerce sites will use e-mail to get notifications, to track order status, but that is not offered in China, because in China e-mail is used mainly in an official environment. When people buy things from a website or something, people prefer WeChat or SMS to check this kind of status—especially WeChat which is often not very common for these kind of international companies.

And third layer we call—How to say?—"Needs Dissatisfaction." These are due to cultural differences. Lots of local functions, content and features are not provided by these kind of international companies, but they are very common in China. For example, QR code is widely used in China now. It can be used to pay both online and offline. You can use it to visit a website. You can use it to download an app. You can see… many places… in the shops, in the subway, on the airplanes. It's everywhere. But most international companies are not provided this kinds of things. But also there are other kinds of examples, like "Fa Piao," which is invoice in western world. In China, invoice—the Chinese, we call it "Fa Piao"—has a very rigorous requirement from the Government, but many international companies cannot provide these kind of functions.

So our company summarizes into three layers. The first we call "direct conflicts," the second we call called "Cross-Cultural Issues," which the Chinese user feels is not designed for them, and thirdly we call this "Needs Dissatisfaction." Actually, a lot of companies are not providing these kinds of functions… more like this.

What would you say are some challenges to UX localization? And how to overcome these challenges?

Based on our experience before, the past way international companies are doing this: they would find local Chinese research companies to do user testing and user experience evaluation that will fix these kinds of issues of bugs from global design team. But this way of work… people still feel this kind of product or service are not designed for China. I think the most reason is because the global headquarters team has different view with the local Chinese team. So when people are working with this kind of localization projects, the headquarters will ask the local team to follow what they think. This is based on our experience with many international companies. So I would say in order to overcome these kind of issues or challenges, I also suggest—How to say?—three layers.

The first of course is "Awareness." Especially, I think the global team needed to listen to the local team, and more importantly to listen to the local user. So we strongly suggest when we do user research or user testing, we will invite the people from the global team, so that they can really have empathy for the Chinese user that they are really different. Only after they have… the… from this perspective, their attitude change that… feel that the local Chinese team… user is so different that they will really value the local insights and also provide resources and budget to do this kind of localization.

And… after the global team has awareness of this, I think the second part is the strategy to do it. For example… some international companies care more about brand building in China, but some international companies care more about… like, e-commerce part in China. This kind of different strategy will highly affect how we do UX localization in China. And also, the relationship between the global team and the China team is very important for this. And also, the clear strategy between each team is also important, to keep the localization where it really works.

The third part of course… after the strategy is clear… I think the key part is the "Execution." How we do this kind of localization is also important. We should deeply understand Chinese culture, like e-commerce environment, user needs and even like… targeted personas of China, which is often slightly different than the headquarter's definition. From my personal experience before, for example when they

do execution, in the past many of them are using foreigners to do local research. They just fly to China and have two or three days of listening to what people said. It helps, but if we want to deeply learn the difference between local and global, I think we need… maybe we need to find local people to do this, or maybe we just spend more time so we can really deeply understand the culture… why people feel it. I have a case before, all kinds, I wanted to do UX localization in China. They have a Western design agency to do it… but when we saw the design, most of the people do not like the design. People said Chinese users like red. Red is very popular in China, so they use red. But Red has different meanings in China. Only the local, really very deep understanding can clearly define in what kind of environment or scenarios we can use the red and what kind of red we can use. So that's based on our experience before.

So I would summarize the key challenge is… how the global team supported the local team to do this kind of work. And we should, figure it out from Awareness, Strategy and Execution—this kind of three aspects to do it.

How do corporations balance globalization and localization?

We always face this kind of issue when we work with international companies, because you know, from a global perspective, they want global consistency so that we can create a greater brand image. Also we can cut cost, we can share the same platform, same development team, same mechanics. But from a local perspective, when we talking with the Chinese team, they would say that the Chinese is so different from the Western world. And especially the Chinese e-commerce environment and also the mobile Internet are so advanced that most of the Western companies or Western environments are e-commerce and mobile internet. So they keep fighting on this.

So… but we summarize it as there are four factors we should consider. Of course we do not want it too global, the Chinese users' environment and expectations are not considered, but also we do not want to go too local. If we go too local, that means that we need additional… we need additional cost of local team, maintenance, and for sure, a lot of cost issues for companies. So we'd summarize it in four factors. The first is what we call the "Target User" or we call the "Target Cust…" "Persona." For many comp… for many brands the local Chinese… the target person or target

user is very different from the mainland. For example, for some kind of ice cream brands, in the US it may be just sold in supermarket—it is just not a premium brand. But in China it is a premium brand. It is a very high price, and of course their target user is kind of upscale. That means the value propositions are also different with the global team.

And, the second… we should consider is "Brand." For some kind of Brands, like we work with many luxury brands. For this kind of brand, the Chinese user wants it to be an international brand. They do not want it to be too local. If it is too local, people will not use it. But for some brands, there are kind of daily things like faster use… so for this kind of brand it should be very local because it has very big competition from local Chinese companies.

And thirdly, of course, is from… design perspective. For design perspective, especially I would say interaction design and functions and content may be more important than visual. As for visual part, people are prepared for these sort of international design, so people are ok with it. But for interaction it is often different with global. For example, in China it only takes two, no more than three steps to finish booking a hotel. But when work with many international hotel brands, they usually ask for five or even six or even more steps. They ask for a lot of information. This is … from this perspective, I would say that we should, follow the Chinese perspectives. That's… that is very important, yeah.

The fourth part is "cost" which is very important. So … we needed to talk to the global team and of course the local team to check how much resources, how much cost we can spend on on this part. So that we can define a strategy, find the right balance on the globalization and localization. So… in general, I think this kind of balance all starts from the global team having a clear mindset that the Chinese user is different, the environment is different, the best practice is also different. And, of course, the Chinese market is also one of the important markets… so that they can provide resources and budget to do this. So… this… that is based on our experience.

How would you describe your journey into UX localization?

So I'm… more talking about it from our company perspective. I remember around six or seven years ago, many kind of… international companies are actually doing localization on translation. So for them, localization is more like translation… for them. For some kind of advanced companies, they will also finding us to do usability testing … user experience evaluation for them. So we find the issues, we report them to them. And … but we don't know what will happen after they get … got our input. Maybe they just do the research then ignore it when they… do the design, I don't know.

But the situation has changed around three or four years ago, maybe because the Chinese market is becoming more and more important for global business and also they face more and more competition from the local brands. They started to do exploratory research to define target persona, to learn their environment, to learn their journey, to identify pinpoints and opportunities. And also they will… we will find a local design agency to work with them. So at that time, for this kind of advanced—How to say?—localizing… localization international companies were doing this kind of work. And, now of course we find more and more companies are doing this.

Recently—I mean this year—we found out a new trend. Some of the international companies I think are already beyond localization. Actually, they want to innovate for the local market—especially for the China market. They want us to do… kind of… more work to identify new opportunities even if it hasn't been used in their headquarter before, so we are working with these kind of things. So we can see that as the Chinese market becomes more and more important for their business, and the competition becomes more and more rigorous for them, they will stand more and for them—it's even beyond the localization… it's more about … it will go to more like innovation for the local. So that's, that's… a phenomenon we have seen before.

Do you think it's getting more competitive for your business? Are there other companies in the Shanghai area that do that kind of business?

Yeah, that is… there is another trend is that… for this kind of user experience research and design work, many of our clients are finding local consulting agencies or design agencies or research agencies to work with them. So on the one hand, of course, for this kind of international companies, they say that as they are foreigners, they want to find Chinese to work with them so that they can integrate both local knowledge and global insights together. And, even, we found very interesting trend is that for many of our clients, the local Chinese companies, now they also prefer the local Chinese companies to work with them. On the one hand, they found … they already know that the local Chinese team can do most cost-effective way to work with them as many local companies can provide very valuable… valuable insights for a relatively low price compared to many Western companies. This is from my point of view. And, the other point of view is that for this kind of international design agency… consulting agency… they are facing a problem that non-Chinese people… they think that they do not know the Chinese environment so they are also prefer… prefer for this kind of local companies. So I think the trend has changed. Several years ago, both the international companies and the local clients, they preferred international companies to work with them. So I think it is, also changed.

Would you describe TangUX as a UX consulting firm?

Yes, we are described as consulting, but we are also providing design services, I mean detailed design service for our clients. So… when we work with our clients we start from research. We define a UX strategy for them. We even define the product and service strategy for our clients. Then we go to what we call the "concept design," or design style definition… and then we go to detailed design, including service design, interaction design, visual design, and… or even interior design. So… this is also an advantage for us… because for—in China, for this kind of international… agency, they are facing a problem that people are thinking they are too "concept," are too—How to say?—too far away from the… the local business, because their concept is more like 3 or 4 years or even more years later, they can feasible in China… so it can

be critical. But they don't want it to be too critical. It only solves this year's issue. So… we try to find a balance between innovation and implementation. We do not go too far towards innovation, but we are also not too focused on figuring out the current issue. So that's our position. We… we found the phenomenon that more and more of the Chinese clients care about this. But maybe several years later when Chinese companies are bigger or strong enough, they are starting about to do innovation for five or ten years later. But, currently… I think the phenomenon is like this.

Would you say your clients tend to be the bigger companies?

Oh… not really. Actually, I would say our clients… for this kind of, like Intercontinental®—they are Fortune 500 company. For this kind of company, we have around like 50-60%, but we have like 40-50% from start-ups or mid-scale companies. And… we even find a more interesting phenomenon that in China this kind of smaller companies, start-ups, they care more about user experience. They spend much. They spend more time—more budget. And they have top management support. Most of our projects for this kind of smaller business companies or start-ups—actually, with their founder or CEO, this is a little bit different. When we work with big clients, bigger companies, like Fortune 500 companies, they usually have a very complex, big company structure… so actually we can do very small things for them. We do testing for them, we do research for them, or we only design like… we only design website for them, or we only design app for them. But when we work with some kind of company—not big enough with them—we have—How to say?—we have top management support so that we can go beyond the… go beyond the UX work or specific channel work, so that we can plan strategy for them. We even have them to plan strategy of product… of strategy… of service from user perspective. Of course, we will balance with them from… from business... but it's already beyond the UX research or UX design. And we also plan holistic channel strategy for them, what's the position of a retail store, what's the position of a website, what's the position of an app, what's the position of like WeChat. And of course we will design for each channel.

Now we… we've… it's very often to think… think about holistic experience or service experience, but when we worked with big clients, it is often have very big upscale… upscale… embarrassed to do it. But when we work with these kind of not-that-big company, we can really to let the user… I mean the service experience way—or we call the holistic experience way—really works. Yeah, that is so different.

What suggestions do you have for learners who are interested in a career in UX in an international context?

For this I just share one insight. I would say local insights with global vision is very important. I mean… just now we all talked about localization, local culture, local environment, local user, and local best practice. We consider this very important; we have discussed it. But, of course… but… global vision or global view is also so important when we do this kind of work… because, for example, from a local perspective, even when people are doing transaction things, they want it to be local. But when we… when they want to see the visual, the animation is kind of designed—I mean, purely designed things—they prefer for… they want it to be global… internationally trendy things. They… they don't want it to be too… too local.

Because, I mean, from the innovation and design-trend perspective, there are many things happening around the world. We… we need to learn it, and the Chinese users are very keen to pursue… pursue this kind of global innova—new things, cool things, cool technology… trendy things. So… I would say global vision is still very important. So we have, in our company, around 50% of our colleagues have international education background or have worked in… in Western… world before. That is much fruitful when… so the international-background people and the local-background people working together. ■

connexions interview with

HUATONG SUN

Transcript of the interview with Huatong Sun, associate professor of Digital Media & Global Design at the University of Washington | Tacoma, USA.

The interview was recorded for issue *5*(1). It was conducted by Quan Zhou, via Skype, on January 16, 2017. The interview was transcribed from the recorded interview by Quan Zhou, *connexions*' section editor, and Alex Kies.

Following post-production, the video recording of this interview will be uploaded to *connexions*' Vimeo channel at https://vimeo.com/218351634

Can you describe your present career in light of international professional communication?

Hi, everyone, my name is Huatong Sun. In Chinese, this should be pronounced as Sun Huatong（孙华彤). My current career is that I'm an associate professor of Digital Media Studies and Global Design at the School of Interdisciplinary Arts and Sciences at the University of Washington, Tacoma campus. And I'm also an affiliated professor of Human Computer Interaction at Fudan University in Shanghai, China. I'm with the Cooperative Information & Systems Lab—a lab

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that specializes in human-centered social collaborative computing research in China. And I want to thank you for the opportunity for me to reach out to the *connexions* community. I've been following your publication. So, it's very nice.

What previous experience in international professional communication, if any, has prepared you for your present career?

That's a very interesting question… and it's kind of funny that when I first arrived in the United States many years ago for my graduate study… people liked to ask me a question: what my culture shock was. So when I first arrived there, in the United States, in graduate school near Lake Superior, in upstate Michigan, people thought I should have some culture shock. And… but the strangest thing was I didn't have culture shock, and I don't know how to answer that question. And… so… I found that I was able to quickly adjust to the new environment. And I also found that I didn't change much.

So… that kind of experience always… always made me wonder about… my cultural background and people thinking about culture. And… I also remember that… so in the second quarter, I took a… an international business communication class. So in one class activity, I was asked to role-play as someone who came from my same cultural background—as an Asian woman. According to the protocol, I should keep silent because I'm an Asian woman, and we know that Asian women or Asian people tend not to speak a lot at business meetings—people tend to remain silent. I felt very uncomfortable at that meeting, but even though I don't usually speak much at business meetings. But when I was told I should not speak, I feel so uncomfortable. That is also some other thing that made me… become interested in cultural issues in professional communication.

At the same time, that was the time, you know, when the internet boom started, and because of telecommunication technology, because, you know, of email and other things, I could keep in contact with my parents, my friends, and also my boyfriend. Usually they say that happens when you're in long distance, a couple can

get broke up, but we didn't break up. My boyfriend ended up being my husband later. So that's part of digital technology I was thinking of. Wow, that's interesting…

So, I would say that these issues… cultural issues and digital technologies always intrigued me so that leads me into the study of culture and technology in the international context.

What would you say are particular accomplishments of international professional communication practice, research, and/or pedagogy in your region of the world or elsewhere?

I remember when I applied for graduate program in the United States. I contacted some professor at the University of Minnesota—Laura Gurak. I am very grateful to her. She wrote an email back to me. She said that the human side of technology is on the rise. I still remember that sentence in my email. I was not able to get full financial aid from that program, so I didn't go to that university. I remember what she said. I found that the human side of technology is getting more and more attention, and we see a convergence of social science, humanities and computer science.

So… I was also thinking about another case when I was in college. I was a college newspaper editor at that time. I covered news in my school, at Fudan University. So as a Chinese Literature major, I interviewed some science students who bought computers, and put computers in their dorm. That was back in 1994, I think. And… so it was a big news that college students were able to afford and have a computer in their dorm. You might remember that at that time, when we used computers we have to go to the computer lab. All computer labs always had carpets, air conditioning, because they want to protect and take care of computers.

And you need to change slippers to use computers. But then suddenly a group of students were able to chip in and purchase computers and put them in their dorms, so that news I covered and published in our college newspaper. And it then was also published on the front page of WenHui Daily（文汇报）a few days later. [Note: As a counterpart of New York Times in China, WenHui Daily was the largest circulated daily newspaper in the Shanghai area then.] And… it was a big accomplishment for a student who was a news reporter. But at that time, I didn't realize many years later I'm doing studies in digital media and also I can be a computer scientist at the same

time. So we see the convergence of the digital media—I would say the social sciences, the humanities—and computer science.

I also remember that many years ago when I first went to ACM CHI Conference, the top conference in the field of human-computer interaction… I was one of the very few who studied culture of computing technologies there, but nowadays when I went to that conference, I saw a lot of social scientists, anthropologists, and—you know—all kinds of people. And now some computer labs in top HCI schools hire social scientists as postdocs to work together. So that is… I think that is a big accomplishment.

At same time, I think the second thing I would like to talk about is that not only scholars and media professionals… pay attention to the impact of computer algorithms. I think ordinary people are more keen to understanding the algorithms and use the technology to fit their lives. I'm teaching "social media" in my… in our communication program. This course was offered… we begin to offer… a few years ago… five years ago. And I taught it every year. I saw the change of teaching that course. This is a 200-level undergraduate course. When I first taught that course, my students had a very naïve understanding of social media, but three or four years later, they have very sophisticated understanding of social media, and some of the sophisticated understanding can be compared with some research that we have been doing. So… I feel that this is another change. People don't take technology for granted, and people now know and see the ideology or algorithm behind technology.

I would say these are two particular accomplishments in our field, and therefore, I also see our role as professional communicators becoming even more important in this technological culture.

Can you talk specifically about some accomplishments or trends in design thinking?

I don't think I'm the best person to talk about accomplishments in design thinking. What I've been doing is that I bring design thinking to our students, so that they are able to become better. When I say better, I mean culturally sensitive designers and innovators. Or maybe, in another way, I do see some trends of design thinking, but

not particularly related to my area, so I don't want to make—you know—a generalization.

So… related to my research interest, I see the trend about critical design. Critical design has been at the forefront of HCI lately. Because I'm teaching in a Critical Media Studies program, I have been trying to introduce that critical design movement into my classroom. It's a very challenging exercise… because we need to help students understand the critical side of technology—the ideology and algorithms behind technology… and also to help them to design and improve some of those cultural sensitivity components in the prototypes they are doing in class. So… it can be, you know, depending on the classroom—depending on the group of students—this… this exercise can be successful.

And sometimes it… it asks the teacher to be very careful about introducing the theories and then to help students understand theories, and also helping students realize this is a journey. I think one of the issues when we teach critical design or teach some innovative design thinking approaches in our classroom, we need to remind ourselves and our students that this is a journey and you can fail in this journey. For example, I'm teaching a new class this quarter. We call it "Mobile Communication and Social Practice." We are using a social practice view to look at how to design mobile communication apps. I told my students in the first class…after so many years of teaching critical design, I reminded them that—you know—this is a journey, you might fail. You should not feel depressed that your project, your design prototype, is not as good as some other group's prototype. The most important thing I want you to take away from this class is that you'll be able to write a thoughtful critical reflection at the end, so you know what you learned, and you learned from your… you… if you're lucky, then you've learned something that you can apply for future design. And if you're not lucky… then you'll learn how to avoid some pitfalls. I think I need to constantly remind students of that. I think it is important to remind students to be an adventurer. They're doing an adventure. This adventure can be successful; or it might not.

For our audience, will you briefly discuss critical design?

According to Shaowen Bardzell and Jeff Bardzell and their collaborators, critical design aimed to designing for change to improve the current state of human existence. Of course this is part of the definition. And… I used this definition as a discussion starter for my students. I ask students to think about that. "What is critical design?" Because my students usually take other critical media courses already, so they kind of have some sense of that. So… they'll tell me that critical design is more than usability. It's more than… so, it goes around effectiveness and efficiency. And… it also… looks at issues of diversity of culture, and it looks issues more than ethnicity… groups. So it challenges status quo, challenges old structure, and it should be innovative. These are usually the points my students would bring up in class, so then we kind of form this as our understanding of critical design concept for the class, yeah.

What would you say are some challenges of international professional communication practice, research, and or/pedagogy in your region of the world or elsewhere?

I feel that there are two kinds of challenges. The first is whether we're more connected or further divided. In particular, after the recent American Presidential election, we talk about the bubbles different cultural groups live in, and they don't necessarily communicate with each other… yeah. So I think that at the end of my book, *Cross-Cultural Technology Design*, I was hoping that we can have more culturally sensitive technologies. In my case, I hope there'll be more culturally sensitive mobile messaging technologies that will serve local user needs, but at that time I didn't see those cases when I was finishing the book manuscript. A few years later, I saw the emergence of WhatsApp®, Kakao Talk®, WeChat®, and LINE®, and I thought, "Oh, wow! These apps came!" And, actually, they… they came from different cultural contexts, and they represent different cultural ideas and ideologies in their designs. It's very fascinating. I began to do the fieldwork. I conducted multi-site international fieldwork, and I interviewed users in the United States, in Japan, South Korea and China. I got some interesting findings. I'm still working on data analysis and this will be part of my second book. The second book is called *Cross-Cultural Social Media*

Design. Or maybe I'll call *Global Social Media Design*. I haven't made a decision yet. But anyway… so… as I've been watching the development of these kinds of culturally sensitive technologies, I kept wondering whether we are more connected or further divided. This is the first challenge I'm talking about.

The second challenge I'm talking about is that I feel that even though we made a lot of progress to promote international professional communication… I think we're still far from celebrating our accomplishment. I remember when I went to the 2001 SIGDOC Conference. That conference's theme was about going international. I don't remember the actual wording for the theme. But it's about going international… but there was only one session devoted to the theme. Only a handful of people came to our session. I went to that conference because I submitted a paper for that, but unfortunately only three people came to our session. That was back in 2001. I also remember two months ago I went to the DUB Retreat. DUB is a collaborative group at the University of Washington as you know. It stands for Design, Use, and Build. So we have an annual retreat that reviews people's work and shares the work. I'm part of the DUB group. So the theme of that year's DUB retreat was about International Technology something… I don't remember clearly. So… one panelist asked the question, "So how many of you are doing international HCI research?" In a big hall that had maybe 100 scholars, PhD students, master's students, only 4 or 5 people raised their hands. So I see there is still a long way for us to go.

How do you see technology or changes in technology impacting, maintaining, or altering international professional communication practice, research, or pedagogy in your region of the world or elsewhere?

I feel technology redefined the locality of the world. One thing I keep saying—and when I offer workshops, you know, to industry… to… professionals, I would say that "Every local technology is also a global technology, and every global technology needs to be local." So… I think that the synergy, engagement, interaction of both local and global, it's very important. And this, we'll be able to address some of the issues: We talked about the old Hofstede's Cultural Dimensions theories. If we see culture as

cultural production, we'll see more of the synergy and the interaction of the local and the global. And we will be able to address to those issues.

I want to talk about that class I'm teaching this quarter, "Mobile Communication and Social Practices." So… we are kind of using Lucy Suchman and Jeanette Blomberg's article—that 1999 article, "Reconstructing Technologies as Social Practices." So, I think one of the… I should say that article talks about three aspects that will help us to redesign technology as social practice. One is critical… understanding the critical analysis of technology. And the second is the ethnographic studies of technology use. Third is seeing technology design and use as cultural production. I feel this part is currently missing in our current research and design practices.

How do you apply design thinking in professional communication pedagogy?

This is something I have been thinking and have been doing… I found that introducing design thinking in professional communication classes help students to become better designers. I was thinking about the class I just finished last quarter, that's "Print Design." When I first taught this course many years ago, I primarily just covered the basics of graphic design principles because that class is an introduction of visual design for professional communication students. Students who take that class usually have no experience about design—print design—also about design technologies such as Adobe InDesign. So our goal was to teach students to be able to use print design jargons, and be able to use industry standard software Adobe InDesign to connect these two things. After a few years I found that while students liked that class, I got kind of bored. And I encountered a book called *Design: A Very Short Introduction* from John Heskett—I would say… a guru in industrial design. So… I began to introduce some of the thoughts in my class. That was the starting point, later I found if I introduce design thinking, I can make this class more interesting and more useful to my students.

So nowadays when I teach that print-design class, we start with something actually related to Critical Design. I told my students that design could have changed the world—better design could have changed the world. So we started to look at

design thinking. I kind of introduced that concept to students. Later… then we moved to the real business of print design, design jargons, rhetorical situation, to help students to understand the rhetoric behind each successful design, and know how to revise rhetorical strategies to fix poor designs. And after students get confidence and develop some skills about print-design projects, usually towards 2/3 of the time, I begin to introduce those concepts such as creative confidence that comes from… David Kelly. We watch videos, ask students to see how they think of that—whether they are more competent in their print design skills. I should also say that in my class, we also work hard to build a community of practice. In that way, when they have major projects, I ask the student to present that project to the whole class and then I assign respondents to give constructive feedback. So… I give students a certain format so that they can get constructive feedback. So students are used to that they are going to get constructive feedback or criticism from their peer students… their peers—their fellow students. So after a few rounds they are used to getting this kind of feedback, and I also found that they feel more confident about their design skills. Now they don't feel shy about their designs, right?

Toward the end of the quarter, I ask students to watch a TED Talk video that was done by a NPR journalist John Hockenberry, "We Are All Designers." John Hockenberry connected design with his own experience. He's a very famous journalist, but he was confined to a wheelchair since a car accident when he was a college student. Even though he was confined—you know—to a wheelchair, he still won several prestigious journalist awards. He conducted interviews in war areas. Particularly because my students are in the media studies program, I feel that that talk relates to them and they can see that design actually is everywhere. And… everyone is a designer. So by directing the class this way, I feel that I was able to boost the students' confidence. And… thinking about our students… the majority of our students—more than 60% of our students—are first generation college students. They… they need to have this kind of reminder that they will be able to… conquer… work towards the… maybe some bad luck in life, and then… everyone has disadvantage, and that disadvantage can be part of an advantage of design. So that is how I use design thinking in my regular design class.

What kinds of international and intercultural experiences and skill sets has higher education taught students to help them transition to industry? In what ways could higher education do a better job of preparing the next generation of graduates for international professional communication?

I think that what we can do to help our students… that—first, that through our own research—and bring our own research to classrooms to help students to see the invisible global influences. I would say that this is the responsibility of the core as international professional communication research we have, yeah.

So… when I teach other classes that are not related to the international communication topics, I still remind students about those international cases, and if possible I would include some international communication project. So for example, in my social media class, we always look at how social media technology is used in different countries. And… in my print-design classes, it's not international print design—but we still talk about that—how people in Middle East might interpret an ad in a different way. People read from right to left—they don't read from left to right. And, and… how are you going to avoid these kinds of problems?

In addition to that, I think that we need to help our administrators and other colleagues to realize the global impact… And… I'm thinking about my own case. I work at the University of Washington Tacoma campus. Every day when I drive to work I can see the Port of Tacoma. The port is connected with big ports in East Asia, including China, Japan, and South Korea. So our daily experience is actually impacted by that. However, I do not think that many of my colleagues are fully aware of that. When we talk about our mission of urban serving, people will tend to talk about serving local communities. I would like to add that this local community is also very global. For example, Tacoma has a bigger number of immigrants, and… it's said that Tacoma has the highest… mixed-race marriage rate. I don't think my colleagues know that. And I didn't know that, either, until later the mayor gave a talk at my campus. I was able to learn a bit about that because I serve on the Global Honors Council, and I think that we're lucky that we have an honors program that has a focus on the global dimension.

I remember that when I worked at Miami University. Miami University had a plan called Miami Plan… in the past. When I started working there, they changed the name into Global Miami Plan. So I see more and more universities realize the importance of the global. And, um, what we need to do to help our colleagues to see that, you know, the global part—aspect… it's everywhere. It's not something you can avoid. So… last year we got some questions for our Global Honors program. Some people said that "I'm teaching math; I don't see how this is related to the global." Some of our Global Honors students say that "No, I don't think so. Um… you know, think about that we have the numbers… the numbers came from the Arabic—the Arabic numbers." So, yeah, actually it's global.

What has industry done well to help higher education teach international and intercultural experiences and skill sets or to help their own employees develop such experiences and skill sets? What else might industry do to help prepare the next generation of graduates for international professional communication?

I don't know if my answer will be accurate… I will say… will fit to the question, but I have a lot of thoughts about our collaborations with industry professionals, so maybe my answer is about my thoughts about how we should collaborate with industry professionals.

First, in my own experience, I found that we are lucky to have the industry partners, because they help our colleagues, our administrators, to see the importance of the global vision. Sometimes, it's hard for us to persuade our colleagues that, you know, we need to have this kind of global-related research—we need to include international components into our professional communication curriculum. I will not… just think about, "Oh we have a… a International Professional communication course, so that, you know, we're sufficient. We already achieved this competency for our curriculum." I think that we need to include that mission, that international professional communication vision—or the global vision—into… into all the classes. This should be part of the competency… or literacy—global literacy or global competency. So… it's nice to have a couple of collaborators—industry partners—

come to our school… then share their experience so that we… we can, you know, persuade our administrators and colleagues.

But, also, I think that we want to be very careful about collaboration with industry partners, because our industry partners or our industry friends could also be confined by their particular experiences. Um… so in the past, in my first job, I was the internship coordinator. I did regular site visits with our intern employers and also helped form the local advisory board. So while I interviewed them during site visits, they tend to tell me what kind of skills they want our students to learn. Now, they're not necessarily in the international communication area, but I know this is what you usually expect when you partner with industry people—yeah, industry professionals. I think they provide very thoughtful insights. We should respect our industry partners' suggestions. However, I think our goal is not just help our students land jobs, and the jobs that work this year might not work for next year. I want to actually help our students and help prepare them to get ready for the career trends in 20 or 30 years, right? It's a changing career trend. We want to help them to be innovators. So I think that we want to be very careful when we collaborate with our industry partners, because professional communication can be very skill-oriented, and we could get a request saying that "Oh, you should cover this particular technology. You should cover that particular tool set." We… we want to be very careful about that, because we don't want to… we don't want to forget the foundation of liberal education we promote—right?—in our curriculum, through rhetoric and other professional communication courses.

So… I also remind my students that when they are taking my class… some class—skill-oriented classes—I want to remind them they need to get the literacy—the foundation, not necessarily the particular skills. So in my class of Cross-Cultural Communication Design, of course we cover skills and toolsets, but also I want to remind them—I said—I want to remind them the difference. So usually towards the end of the quarter, I show them a photo that was taken in a German supermarket by one of my friends—I saw that picture on her Facebook, and I asked her to use it in my class. So that is a picture of a lot of different brushes you find in German markets. So in German supermarkets you see brush for mushrooms, brush for vegetables, brush for pots, and also so many different things. It's very amazing! You don't see so

many different kinds of brushes… from American grocery stores… or Chinese tool stores. So… I told my students that my class will not help them to make a brush to clean mushrooms. That's not the goal. But I help them to gain that competency—or the understanding to learn—how to design a brush that can help them clean mushrooms. Yeah, I think that we want to be very careful that we're not… giving students brush to clean mushrooms, yeah. We actually helping them to design that brush that can be used to clean different kinds of things. ■

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