

Defamiliarization and Intercultural Learning in Cross-Cultural HCI Education

COLIN M. GRAY*, Purdue University, USA and Beijing Normal University, China

WEI LIU*, Beijing Normal University, China and Purdue University, USA

XIN XIN, Beijing Normal University, China

DANIEL CHIN, JACQUELINE MARKS, SADIE BUNTING, JERRY ANGLIN, BECKY HUTZEL,
and SAMRUDDHI KOKATE, Purdue University, USA

YUSHU YANG, Beijing Normal University, China

HCI and UX work is increasingly global, and students have the potential to benefit from building their globalization competence. However, little research has described the unique opportunities and challenges of intercultural project work in the context of HCI education, including the ways in which design knowledge is leveraged in a cross-cultural setting. In this research paper, we describe the experiences of a Collaborative Online International Learning (COIL) project team with participants from China and the United States as they worked to identify design opportunities to create “charming” semi-autonomous driving experiences for the Chinese market. Through our analysis of focus groups, synchronous group meetings, and artifacts created over one academic semester, we describe how students engaged design knowledge through the lens of culture and identify strategies that the teams used to constructively defamiliarize their understanding of the design context and potential outcomes. We conclude with opportunities and challenges in coordinating cross-cultural design work and describe new ways in which defamiliarization might be a productive lens to acknowledge and build upon cultural knowledge.

CCS Concepts: • **Social and professional topics** → **Computing education**; • **Human-centered computing** → **Empirical studies in HCI**.

Additional Key Words and Phrases: design knowledge, defamiliarization, intercultural learning, experiential learning

ACM Reference Format:

Colin M. Gray, Wei Liu, Xin Xin, Daniel Chin, Jacqueline Marks, Sadie Bunting, Jerry Anglin, Becky Hutzler, Samruddhi Kokate, and Yushu Yang. 2022. Defamiliarization and Intercultural Learning in Cross-Cultural HCI Education. In *EduCHI'22: 4th Annual Symposium on HCI Education, April 30–May 1 2022, New Orleans, LA, USA*. ACM, New York, NY, USA, 12 pages.

1 INTRODUCTION

The work of HCI and UX designers is increasingly global, requiring knowledge of not only user and behavioral diversity, but also cultural, regulatory, and technological diversity. In parallel with this increased understanding of the complexity of design work in pluralistic epistemological contexts, there is also interest in designing experiences that are equitable and intersectionally responsive, building upon calls for “pluriversal thinking” [6] and decolonizing design [16].

While there is an emerging body of literature that addresses HCI educational practices across cultural boundaries (e.g., [5, 12, 13, 21]), including mechanisms to address cultural difference in design practices [1, 11], relatively little is known about how cross-cultural collaborations might be used to build intercultural knowledge and increase awareness

*Corresponding authors: gray42@purdue.edu and wei.liu@bnu.edu.cn

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

© 2022 Copyright held by the owner/author(s).

Manuscript submitted to ACM

of cultural difference. We connect this emerging line of research to a growing body of literature that describes the kinds of pedagogical knowledge that can support productive learning in HCI [17], the barriers and thresholds students need to pass through in order to be successful practitioners [8, 10], and the ways in which pedagogical frameworks can be used to encourage industry engagement and integration of collaborative project work [15, 18]. We also draw upon work on intercultural competence which recognizes that cultural knowledge is situated and personal, but can be developed. For example, one common model of intercultural development—the Intercultural Development Inventory (IDI)—describes a student’s movement from a monocultural to intercultural mindset, during which they may move through phases of denial, polarization, minimization, acceptance, and adaptation [22]. While the IDI is not focused on the intersection of design and intercultural competence, it does provide a backdrop through which we can view how design students from multiple cultural backgrounds may engage with their own and others’ cultural knowledge.

To connect these diverse areas of literature, we used the concept of *defamiliarization* to engage design students in constructing cultural knowledge, building awareness of cultural assumptions, and broadening their conceptions of design knowledge. Defamiliarization “is explicitly not a scientific method [...] it provides a lens to help us see our own design practices in a new light” [2]. This concept was translated from literary theory into HCI, with the goal of revealing new modes of interpretation of common phenomena—encouraging designers and researchers to “make strange” our mundane realities and providing opportunities to envision new, alternative ways of being. While little has been written about the role, potential, and application of defamiliarization in a cross-cultural context, we build upon HCI educational scholarship that frames the development of collaborative and communication competencies (e.g., [7, 8]) and the use of improvisational methods [9] alongside a critically-oriented investigation of how design ideation might be productively supported through an explicit embrace of defamiliarization as a means of surfacing and activating cultural difference as a design tool. Carlson and Schiphorst [4] provide one of the few examples of engaging defamiliarization as a support for creative decision making, although this work is not explicitly framed as a resource for design team collaboration. In our project, the concept of defamiliarization is used explicitly to engage multiple perspectives on design context of semi-autonomous driving, viewing both cultural and experiential knowledge as malleable design knowledge that allows student team members from both contexts to interpret, propose, and iterate upon ideas in new ways.

Our research questions for this project are as follows:

- (1) How did the student teams leverage cultural assumptions as design knowledge?
- (2) What strategies did the student teams use to defamiliarize their understanding of the design context and potential outcomes?

2 OUR APPROACH

In this project, we engaged in a collaborative design project with educational partners in the United States and China and an industrial partner in China, seeking to create opportunities for pleasure and charm in future semi-autonomous driving scenarios. We deployed the project using the Collaborative Online International Learning (COIL) model, a “teaching and learning paradigm that develops cross-cultural awareness across shared multicultural learning environments” [19]. Across a 15-week project, student team members from Beijing Normal University (BNU) and Purdue University conducted a series of design sprints, each culminating in a bi-weekly synchronous Zoom meeting, which included sprint hand-offs to the other team and intercultural activities using a Miro digital whiteboard. In this paper, we focus on the students’ experiences of engaging in this cross-cultural design work with the goal of identifying how cultural assumptions were leveraged as a form of design knowledge.

2.1 Research Context

The design project that is the focus of our inquiry builds upon a multi-year collaboration between our respective UX design programs in the United States and China [5, 13]. Before the COVID-19 pandemic, students traveled internationally to participate in study abroad or exchange, using physical presence as the means to build cultural competence. However, while the pandemic brought challenges relating to mobility, there were also new opportunities to experiment with pedagogical models that did not require travel. To prepare to lead this project, the first author took an intercultural pedagogy course offered by their institution that culminated in an action plan for a collaborative project that took place in Fall 2021. As part of this plan, student teams from Purdue and BNU engaged in a 15 week project that was instigated by requests from a Chinese automobile manufacturer who had previously partnered with BNU. The instructors in the US and China collaboratively created a design brief for the student teams, which stated: “*The goal of this project is to imagine the future of semi-autonomous driving experiences. To do this, you will explore a range of potential interactions that feel pleasurable, comforting, and charming to the driver, utilizing visual, haptic, and physical forms of engagement that enhance the driving experience.*” The project brief also outlined strategies for each team to work on their own to address the project goals while jointly meeting in seven one-hour synchronous Zoom sessions to share their progress, hand off their results to the other team, and engage in cross-cultural activities. Due to the challenges of synchronous communication inherent in the twelve time zones separating us, we decided to build institution-specific project teams rather than mix participants from both universities. During the semester, the BNU team visited the automobile manufacturer but otherwise, the industry partner was not engaged in the project work in any direct way. Additionally, the BNU team continued on the project to refine a subset of ideas in the following semester, but the Purdue student team completed their involvement after the fall semester.

2.2 Data Collection

The project teams and instructors were all an active part of the design project and data collection process. In total, nine students (eight graduate students and one international doctoral candidate) and two instructors participated from BNU and eleven students (ten undergraduate and one graduate) and one instructor participated from Purdue. All students were enrolled in a UX-focused program: BNU graduate students were enrolled in a Master of Applied Psychology with a focus in UX Design, and the doctoral candidate had an international and comparative education background; Purdue participants were enrolled in either a Bachelor of Science or Master of Science degree in UX Design. The authors on this paper include a subset of students from both teams and instructors from both programs. All activities were conducted in English in support of broader exchange goals between both universities.

As part of our design and learning activities, we collected a variety of sources of data, including: 1) video recordings and transcripts from bi-weekly Zoom meetings with Purdue and BNU students and instructors; 2) milestone documentation that was handed over at each bi-weekly meeting by both teams; 3) cross-cultural activities, comments, and other forms of interaction on Miro that structured both synchronous engagement during bi-weekly meetings and asynchronous engagement between meetings as questions arose (see a sample activity in Figure 1); 4) two focus groups conducted separately with BNU and Purdue students at the conclusion of the semester; and 5) final documentation and handover materials created by the Purdue team that the BNU team could expand upon in the next semester of their planned work. The focus group included questions that included two key topic domains: 1) initial goals and learning outcomes as part of the experience; and 2) the role of assumptions and worldview as it related to project experiences and outcomes.

where they pre-wrote each theme and reflexively identified any internal structure or sub-themes that we began to build through our conversation—inspired by Braun and Clarke’s reflexive thematic analysis approach [3]. Throughout this process, we used data triangulation and researcher triangulation to ensure that we had an aligned understanding of the research questions we were seeking to answer, continuously reflecting on both our collective experiences engaging in the activities and focus groups and on the analysis we performed as a group.

3 FINDINGS

The vague and future-oriented framing of the project produced some initial anxiety that transformed into confusion and uncertainty early on. Purdue students were unsure of the scope of the project as it had not yet been clarified by the team and industry sponsor in China and were unsure where to start since the project was classified as “blue sky.” BNU students were beginning their first semester of graduate UX coursework and did not have any experience with core design fundamentals or methods. Once synchronous contact with teams was established, both teams also had to build new cultural norms of synchronous communication—learning to negotiate the shy and introverted nature of some of the participants and identifying culturally appropriate interactions that would further the teams’ design goals.

In the sections below, we first describe how the project teams identified and built upon cultural assumptions in their design work, followed by strategies that the teams used to defamiliarize their understanding of the design context and thereby produce more creative work.

3.1 Leveraging Cultural Assumptions as Design Knowledge

Making, leveraging, and seeking to correct cultural assumptions was located at the core of the project brief. The project could have easily been conducted only as a research project, using intentional activities from the Purdue team to better understand Chinese culture, driving norms, and possible future technologically-enabled driving experiences. However, since we had a partnership with a team that already had that cultural knowledge, we instead sought to internalize the attitude from both sides: “It’s okay to be wrong.” We first describe the kinds of incorrect assumptions that were made by each project team and the ways these assumptions impacted design decisions, then identify strategies that the teams used to correct their assumptions and actively build on the assumptions of others in a constructive way.

Making (incorrect) assumptions. During early project planning and the first design sprint, the Purdue team was working on the project without any guidance from the BNU team and did not have any artifacts to build off of that were vetted to be culturally informed, which impacted both of the teams’ abilities to ask questions about and surface potential cultural assumptions. However, as the project progressed and the BNU team began ideating, the Purdue team slowly realized that they had a fear of making incorrect assumptions and basing their design decisions off of inaccurate knowledge. However, as the Purdue team was able to begin interacting with the BNU team and iterate off of each other’s ideas, both teams were able to acknowledge the assumptions each group was making and provide explanations for the other team’s questions. Early on, the Purdue team identified the need to “not [be] afraid to ask questions” and feeling the power to “say your idea is wrong—your assumptions are incorrect.” This approach as part of an explicit strategy that the Purdue team and instructor frequently reflected on early in the semester; as one Purdue team member reflected at the end of the semester: “I worry a lot about trying to be right about things [...] in this project it was a lot better because I didn’t have to think about, maybe this isn’t fully what would work. But just to try it out anyways. [...] We just had so many questions, and we can send [the BNU team] a list of questions, but we can’t just sit here being overwhelmed with all the things we don’t know, we just need to move on in our process.” By the second design sprint,

the teams were including specific sections in their documentation that included cultural and technological assumptions they were making which could then be validated or corrected by the other team.

Working to correct team assumptions After the BNU team began their studio work as part of the second design sprint, the Purdue team was able to present ideas to the BNU team to insure that they were creating designs that were applicable in (or built off of) both cultural contexts: the United States and China. This communication stage was also valuable in building off of each other's designs because the Purdue team was able to see the specific issues and framings of driving behaviors that were being targeted by the BNU team in order to reassess how their work was or was not correctly addressing issues in the China space. Both teams recognized and capitalized on opportunities to identify and correct their cultural assumptions, building on the synchronous intercultural activities, using these corrections as a source for additional design ideation. For instance, the Purdue team included a member that had never ridden in a taxi; they reflected: "So [the taxi experience I have designed] is what I think it's like based on some movie I saw so that was hard for me trying to envision the space but as far as exploring, that was fun." The BNU team reflected on their assumptions about driving in the US as part of a design sprint focused on traffic jams in their early hand-over documentation: "We thought that traffic jams should not exist in the US because compared to China, the US is vast and sparsely populated. However, after the [synchronous] exchange [with the Purdue team], we found that traffic jams are also very serious in big cities like New York and Los Angeles." Even with these open sharing sessions where assumptions could be corrected, it did not fully replace the need for more complete cultural knowledge; as noted by one Purdue team member: "we struggled with the traffic space [...] we can be told as much as possible about it, but it's different to actually be able to experience it."

Constructively leveraging assumptions as design knowledge. In the latter half of the semester, the teams were able to streamline their design process to be more effective with ideation, sketching, and creating designs based off of the other team's design concepts. Once both teams began to feel as if they were fully collaborating and iterating off of each other's ideas, the teams were able to engage in activities to learn about the other team's culture and underlying social norms to foster more meaningful connections and a deeper understanding of the other team's problem space. For instance, in the second sprint, the Purdue team presented concepts relating to a taxi driving context, which was then taken up and iterated upon in the third sprint by the BNU team. Thus, the concepts—with inscribed assumptions—became design material and knowledge that supported further ideation by the other team. This back-and-forth of design concepts became another way for the team to promote cultural exchange beyond the biweekly synchronous meetings, and primed the teams to ask and answer questions to build upon the work of the other team. The Purdue team found this approach to "help[] us design better for [the Chinese audience] specifically, instead of thinking of it from an American perspective," while the BNU team reflected on their deeper realization of the need to understand the context of use: "In addition to focusing on the design of the product itself, we can think from the context of the use of the product." As the Purdue team reflected at the conclusion of the semester, one team member framed this use of assumptions as a welcome source of surprise: "the most meaningful work we did was building off of [the BNU team's] work [...] We're just gonna [build] this component and show you something that might surprise you. And then you'll show me something that would surprise me as well."

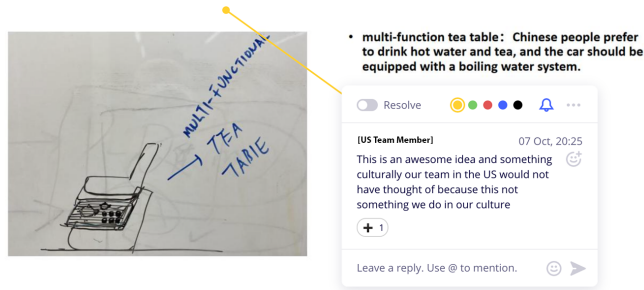
3.2 Strategies for Defamiliarization of the Design Context and Outcomes

Due to the ways in which the project brief asked for students on both teams to leverage cultural assumptions and expectations as one source of design knowledge, the instructors also encouraged students to explicitly "play around" with their understanding of a design context as strange or unfamiliar. Each team operationalized these defamiliarizing

strategies in slightly different ways, but with similar goals of seeing a familiar situation in a new light. The BNU team framed defamiliarization as a means of “pay[ing] more attention to what already exists in life and think[ing] about whether it can be used in other environments,” allowing them to “use this technology for innovation, divergent thinking on the original things, iterative production of new products, and realizing the results of secondary creation.” The Purdue team reflected on how their American perspective might allow them to bring in a lens of open mindedness with new ideas about how automotive experiences could exist in a Chinese culture context, using defamiliarization as a way of “normalizing” their lack of cultural knowledge. We first describe how the multidimensional and vague idea of charm was leveraged as a tool for defamiliarization, then identify how intercultural engagement helped each team identify new opportunities for building conceptual novelty, finally reflecting on how different representational forms influenced the defamiliarization of new concepts.

Building on “charm” as a use quality. Given the lack of existing research on the cultural and future-oriented context of driving in China, one of the main strategies that the Purdue team used was to fall back on the term “charm” as a means of inspiring potential design experiences for the end user. Since the term charm could be framed in multiple different ways, switching among the expectations that charm could evoke (and under what conditions) allowed the teams to identify design ideas from multiple perspectives, with charm serving as a desired “use quality.” Löwgren defines use qualities as “properties of digital designs that are experienced in use and the designer can influence at design time” [14]. Specifically, the Purdue team leveraged three different applications or framings of charm, which were frequently iterated on by the BNU team: charm through immersion, learning, and personalization. As one example of operationalizing charm as a use quality, in the second sprint the BNU team created a concept for a “multi-functional tea table” that would allow the passenger to drink hot water and tea—operationalizing charm as comfort. This perspective on tea drinking was then taken up by the Purdue team in the next sprint, where they operationalized charm as a form of immersive engagement, where a holographic experience could augment the heating of the tea or hot water. In Figure 2, we show the original BNU team’s concept and the resulting Purdue team’s concept along with comments from the opposite teams regarding their experience that illustrates their engagement with intercultural qualities of the concept through the lens of charm.

Advancing novelty through intercultural engagement. Communication among the two teams promoted the generation and interpretation of concepts through the lens of culture. The concepts did not always result in an accurate depiction of cultural norms, but the active engagement with assumptions allowed the student teams to be reflexive in how they initially understood cultural considerations in relation to their concepts and then how these considerations could be better understood, resulting in more informed design outcomes. As one example of this reflexivity, the first design context that the Purdue team considered was a family vacation/road trip. The team assumed that this was a shared cultural phenomenon and were surprised to learn from the BNU team that mass transit was more common. The Purdue team reflected on this experience through the lens of: “what we knew versus what we know now” identifying “how that affected our designs because we make sketches, ask questions to the BNU team and then realize that some of those sketches that we did maybe don’t pertain to their society, and we reflected on those sketches that no longer fit.” In another example, the BNU team recognized that their initial design assumptions about their own cultural context were potentially incomplete. As their team reflected on their experience, they came to realize that existing technologies could be improved by viewing the design context in a new way: “I always thought that DiDi’s application design has done a good job, but through user research and specific situation analysis, and digging deeper into user needs, I found that it still had many problems, such as not being able to know the seating arrangement in advance and not being able to see the information of fellow passengers, and we can solve these difficulties better through design, and it seems there

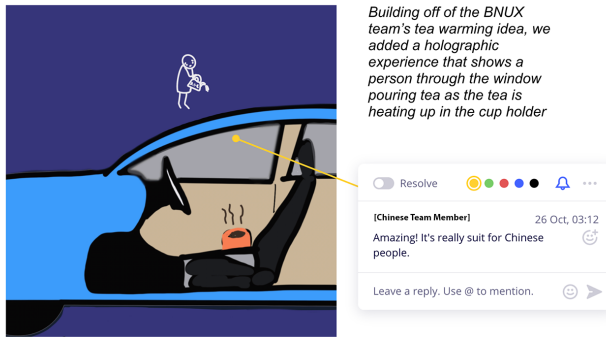


**BNUX Team
Documentation
Sprint Two**

3. Holographic AR Window Experience

In this design, our team determined the primary users to be the passengers in the car. Designed as a source of entertainment, we designed the following features:

- Augmented Reality based games for users projected on the windows which can be played using gesture control.
- The user can draw on the window which then is projected on the outer side of the window as 3D holograms.



**US Team
Documentation
Sprint Three**

Fig. 2. Examples of a “tea table” concept iterated on by BNU and Purdue teams.

is no best but better.” Similarly productive exchanges among the teams emerged in relation to driver and passenger safety, driving regulations, and night driving.

Using different representational and methodological forms. Both teams used a range of prototyping forms to express and develop their ideas across the six sprints, and as the semester progressed, each team’s approach to expressing their concepts began to converge in ways that supported their exploration of the design space. In Sprint 3, the Purdue team began to express some of their more complete concepts in the form of quick GIF animations to better capture elements of the use context and the overall experience. This animated approach to describing the concepts then inspired the BNU team to try out different representational forms, including Lego mockups of an auto-loading car trunk, storyboards with photographic overlays, and meme-inspired collages of digital content. These differing representational forms demonstrated each team’s interests in finding a broad prototyping vocabulary to describe their design concepts, and the evocative nature of these prototypes tended to invite conversation about cultural assumptions and perspectives in ways that were perceived as non-threatening by the students. This sharing of perspectives also extended to the methods used by each team. In one synchronous activity where students were asked to identify the methods they used as a team and the methods they saw the other team using that they wanted to try, the BNU team mentioned that they

used a “petal figure” as a method, which the Purdue team had not previously heard of. This conversation inspired a sharing of an image of the petal method in action, opening a space for the student teams to identify different methods they could use to understand their problem space in a new way. Other exchanges of methods included the Purdue team’s “speed dating” approach to rapid evaluation and the BNU team’s use of rendering and 3D models for concept prototyping.

4 DISCUSSION

Through this project, we seek to build both on critical scholarship regarding diversity and worldview in HCI and design contexts more broadly, and specifically on how strategies such as defamiliarization might be constructively used to support design learning and the formation of intercultural competencies. In this section, we will identify the benefits and challenges of the strategies we used to engage a cross-cultural design team, first focusing on the uptakes for design theory in an HCI education context, and then more practical guidance for future cross-cultural HCI partnerships.

4.1 Connecting Culture, Design Knowledge, and Strategies of Defamiliarization

Through this project, students were encouraged to build new connections between their cultural assumptions, potential design concepts, and awareness of multiple subjective experiences and ways of being. In doing so, the teams had an opportunity to both discover the limits of their cultural knowledge *and* use their naïve assumptions as a defamiliarizing force for constructing new potential futures—a designerly framing of intercultural learning that is atypical in traditional COIL projects. Building on this experience, there are a number of ways in which future intercultural learning experiences in an HCI context could leverage connections among design knowledge, cultural knowledge, and defamiliarization.

As a point of departure, we can ask what it meant for student designers to frame design knowledge as cultural, subjective, and situated. As demonstrated through reflections from the two teams, identifying and leveraging assumptions as design knowledge was a key indicator of success—allowing designers to be simultaneously aware of the limits of their cultural knowledge and able to engage with those limits in playful, speculative ways that were still left open to falsification or challenges based on other cultural perspectives. Through this process of defamiliarization, students were able to shift from a research-oriented to futures-oriented form of engagement, rejecting assumptions of design process that are only empirically-rooted or objectively defined as they had experienced (and even modeled) in previous design projects.

Although the project collaboration was a success, with key learning in both cultural knowledge and design exploration, we also reflect on multiple unanswered questions that might be useful in framing future pedagogical practices and scholarship. For instance: How can intercultural knowledge be constructed in and framed through everyday design activities? Is “culture” a lens through which a designer can view methods or process, or is it necessary to engage with it as a separate epistemological or praxiological dimension of design work? Are other strategies beyond defamiliarization useful in engaging both cultural and futures-oriented exploration?

4.2 Coordinating Cross-Cultural HCI Project Partnerships

While as a whole, students attained the outcomes we anticipated, there are also numerous challenges that emerge when seeking to support experiential learning on different continents, in differing cultural contexts, and with different pedagogical and disciplinary norms. In reflecting on our experiences, we have identified several aspects of engagement that were successful, and some that could use further support in future partnerships.

Communication was our most persistent challenge to overcome—with implications for the ICTs we were able to use, the hours in which we could meet synchronously, the social norms of engagement, and language ability. Even though none of the Purdue participants spoke Mandarin, our synchronous conversations were still meaningful and productive due to the BNU team’s use of real-time translation software (Figure 3). Additionally, the use of a Miro digital whiteboard perhaps provided significant flexibility in communicating the design work of each team, inviting comments from the other team, foregrounding of assumptions, and engagement in collaborative activities in each synchronous session. In addition, communication persisted beyond our synchronous sessions, with team members commonly leaving questions to be answered by the other team in threaded comments on project documentation in Miro or on purpose-built frames that included a longer list of questions. Due to the misalignment of US and Chinese social applications, only two Purdue students and their instructor were able to successfully join a WeChat group that included all BNU students and instructors. Even with this gap in real-time communication for all participants, Miro served as an effective mediator for communication in both asynchronous and synchronous forms.

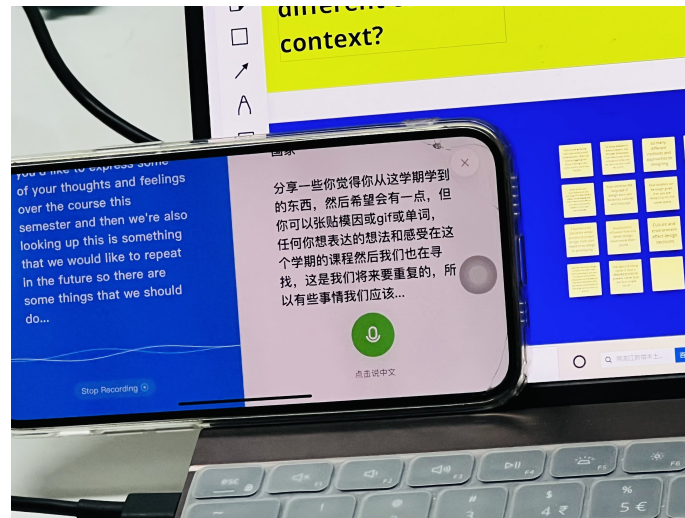


Fig. 3. Real-time app translation during our synchronous sessions for the BNU team.

Social and cultural expectations of collaboration also took multiple weeks to reconcile. The BNU team was just beginning their first semester of UX coursework, and thus were learning about core UX concepts and methods while immediately practicing them in the context of this intercultural project. In contrast, most members of the Purdue team had two or more semesters of UX course experience, and had also worked with industry partners in one or more previous experiential studios. Students used this potentially disruptive lack of alignment of conceptual UX knowledge to instead bridge across their expectations of each team’s experiences and expertise, finding areas of common ground, areas where they could celebrate and learn from new approaches to UX prototyping and evaluation, and even new methods. For example, the Purdue team was initially very impressed with automotive renderings that the BNU team produced, and later, short animated prototypes to demonstrate product functionality by the Purdue team attracted interest by the BNU team. As another example, a method used by the BNU team that sought to identify the “historical

- [5] Zhu Di, Colin M Gray, Austin L Toombs, and Wei Liu. 2021. Building a Cross-Cultural UX Design Dual Degree. In *IASDR 2021: The Ninth Congress of the International Association of Societies of Design Research*.
- [6] Arturo Escobar. 2018. *Designs for the Pluriverse*. Duke University Press. <https://doi.org/10.1515/9780822371816>
- [7] Anthony Faiola. 2007. The Design Enterprise: Rethinking the HCI Education Paradigm. *Design Issues* 23, 3 (July 2007), 30–45. <https://doi.org/10.1162/desi.2007.23.3.30>
- [8] Colin M Gray. 2014. Evolution of design competence in UX practice. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14* (Toronto, Ontario, Canada) (CHI '14). ACM Press, New York, New York, USA, 1645–1654. <https://doi.org/10.1145/2556288.2557264>
- [9] Laewoo Kang and Steven Jackson. 2021. Tech-Art-Theory: Improvisational Methods for HCI Learning and Teaching. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW1 (April 2021), 1–25. <https://doi.org/10.1145/3449156>
- [10] Ahmed Kharrufa and Colin M Gray. 2020. Threshold Concepts in HCI Education. In *2nd Annual ACM SIGCHI Symposium on HCI Education (EduCHI 2020)*. Honolulu, HI. <https://educhi2020.hcilivingcurriculum.org/paper/threshold-concepts-in-hci-education/>
- [11] Florian Lachner, Constantin von Saucken, Florian 'Floyd' Mueller, and Udo Lindemann. 2015. Cross-Cultural User Experience Design Helping Product Designers to Consider Cultural Differences. In *Cross-Cultural Design Methods, Practice and Impact*. Springer International Publishing, 58–70. https://doi.org/10.1007/978-3-319-20907-4_6
- [12] Shaimaa Lazem and Susan Dray. 2018. Baraza! human-computer interaction education in Africa. *Interactions* 25, 2 (Feb. 2018), 74–77. <https://doi.org/10.1145/3178562>
- [13] Ziqing Li, Colin M Gray, Austin L Toombs, Kevin McDonald, Lukas Marinovic, and Wei Liu. 2021. Cross-Cultural UX Pedagogy: A China–US Case Study. In *LearnxDesign: The 6th International Conference for Design Education Researchers*. Jinan, China.
- [14] J Löwgren. 2006. Articulating the use qualities of digital designs. In *Aesthetic computing*, Paul A Fishwick (Ed.). MIT Press, 383–403.
- [15] Ingrid Mulder. 2015. A pedagogical framework and a transdisciplinary design approach to innovate HCI education. *IxD&A* 27 (2015), 115–128. https://research.tudelft.nl/files/5506483/A_pedagogical_framework.pdf
- [16] S Rose O'Leary and Benedict Turner. 2020. Towards a Decolonized Future: Desettling HCI. In *2nd Annual ACM SIGCHI Symposium on HCI Education (EduCHI 2020)*. Honolulu, HI. <https://educhi2020.hcilivingcurriculum.org/paper/towards-a-decolonized-future-desettling-hci/>
- [17] Alannah Oleson and Amy J Ko. 2020. Toward the Development of HCI Pedagogical Content Knowledge. In *2nd Annual ACM SIGCHI Symposium on HCI Education (EduCHI 2020)*. Honolulu, HI. <https://educhi2020.hcilivingcurriculum.org/paper/toward-the-development-of-hci-pedagogical-content-knowledge/>
- [18] Paul Parsons, Nancy Rasche, Colin M Gray, and Austin L Toombs. 2020. Vertical Integration in UX Design Studios. In *EduCHI 2020: A (Virtual) CHI 2020 Symposium*. <https://educhi2020.hcilivingcurriculum.org/wp-content/uploads/2020/04/educhi2020-final49.pdf>
- [19] Jon Rubin. 2017. Embedding collaborative online international learning (COIL) at higher education institutions. *Internationalisation of higher education-A handbook 2* (2017). <https://studyabroad.uic.edu/wp-content/uploads/sites/256/2020/08/Rubin-Embedding-Collaborative-Online-International-Learning-at-Higher-Education-Institutions.pdf>
- [20] Johnny Saldana. 2015. *The Coding Manual for Qualitative Researchers*. SAGE. <https://market.android.com/details?id=book-ZhxiCgAAQBAJ>
- [21] Eunice Sari and Bimlesh Wadhwa. 2015. Understanding HCI education across Asia-Pacific. In *Proceedings of the International HCI and UX Conference in Indonesia* (Bandung, Indonesia) (CHIUXID '15). Association for Computing Machinery, New York, NY, USA, 65–68. <https://doi.org/10.1145/2742032.2742042>
- [22] Andrew Wiley. 2016. Intercultural development inventory (IDI): Independent review. *ACS Ventures, LLC: Las Vegas, NV, USA* (2016). <https://idiinventory.com/wp-content/uploads/2017/12/2016-IDI-Validation-ACS-Independent-Review-Phase-3.pdf>