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Coffee Farms as Design Labs: Manifesting Equity x Design Principles in Practice

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Abstract: New forms of co-design, as a mechanism for collaboration with historically marginalized communities, continue to emerge. From short academic experiences to Corporate Social Responsibility (CSR) initiatives, these programs attempt to highlight the value and importance of co-design in reducing equity gaps, producing relevant outcomes, and broadening participation across stakeholders. In doing so, these initiatives run at risk of reproducing a variety of challenges related to power, ethics, and gender among others, therefore requiring continuous examination and experimentation to address such issues. In this paper, we analyze the implementation of an interdisciplinary course in design carried out at two coffee farms in rural Colombia. Using the EquityXDesign framework, we critically analyze how the course approaches these known challenges in community-based design, and discuss modifications to the framework towards more inclusive and equity-driven design.

Keywords: co-design; equity; coffee

1. Introduction

“The only important thing about design is how it relates to people.” –Victor Papanek

Recent years have seen a rise in inclusive and participatory principles in design, co-design practices, and community-driven exercises. From “alternative spring breaks” in colleges, to Corporate Social Responsibility (CSR) initiatives at companies, to community development projects led by NGOs, there is growing awareness of the importance of co-design. However, many of these initiatives operate at the expense of communities, inevitably re-creating the power hierarchies they had hoped to level. Gardner, in *Discordant Development*, articulates the extent to which multinational corporations leverage the narratives of “community engagement” to further disenfranchise the rural poor of Bangladesh (Gardner, 2012). This paper offers a reflection on the role of academics and practitioners during the implementation of a community-based co- design experience at two coffee farms in rural Colombia. It aims to examine an ongoing co-design collaboration across 4 groups:



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i) university students from the United States (MIT Media Lab and Harvard University); ii) university students from South America i.e. Colombia, Peru, Guatemala; iii) Colombia-based development practitioners i.e. the C-Innova Innovation Center for Appropriate Technologies in Colombia; and iv) coffee farmers and farming communities of Fusagasugá.

In 2017, C-Innova began a partnership with coffee farmers in the highlands of the Fusagasugá region with the intention of democratizing access to technology used for coffee production. For decades, coffee farmers have been severely underpaid for their produce by Colombia's National Coffee Federation, partly due to the lack of robust machinery to process the coffee beans after they were harvested. The partnership sought to leverage emerging technologies to improve the means of production for these farmers, using co-design as a methodology. As such, C-Innova began a collaboration with engineers, designers, social scientists, and business students from universities in the United States and South America. Once a year, for the month of January, students and development practitioners would live and work alongside coffee farmers with the main goal of co-designing technologies, practices, and strategies to improve coffee production. Coffee farms soon became design labs.

This paper offers a critical examination and reflection of co-design within the context of coffee farms and farming communities of Colombia. In particular, we reflect on a co-design collaboration designed as a one-month course curriculum called "Technology Design for Coffee Production Course: A Co-Design Experience", conducted in January 2019. Using the EquityXDesign framework as a critical lens, we examine these power dynamics and the nuances of co-design. We ask: *What does co-design across fields, cultures, and geographies look like in practice? To what extent can we mitigate power inequalities in co-design? How can we manifest equity values in each step of the design process?*

EquityXDesign emerged as an alternative framework to design thinking in 2016:

"[EquityXDesign] is a process for anti-racist and equitable design; it is guided by three central beliefs: innovation's need for inclusion and intentional design, the indistinguishable relationship between the past and the present, and our moral imperative to live in the future we desire to create." (Ortiz, 2017).

We begin by providing context to community-based co-design¹, discuss related work within the coffee industry, and highlight key challenges in co-design. We then articulate the principles behind the design of the one-month co-design course. Next, we introduce the EquityXDesign framework as a critical lens to reflect on the course and offer case-studies of each principle of the framework. Finally, we offer our key reflections, takeaways, and modifications of the EquityXDesign framework. Ultimately, our hope is to provide reflexivity on the role of co-design between academia and local communities, with the aim of offering a new framework for future researchers to assess and design equitable bottom-up collaborations.

1 Throughout this paper, we use the term "co-design" in reference to what Sanders & Stappers (2008) allude to as the 'user as partner model', but different from "co-creation", defined as "any act of collective creativity".

2. Related Work

In the past decades, participatory design has become a highly contested space (Kensing & Bloomberg, 1998; Sanders & Stappers, 2008). Some have detailed how rural communities should be part of design processes i.e. community based (co-) design or co-creation (De Couvreur & Goossens, 2011). Ssozi-Mugarura (2016) for example, reflects on the role of reciprocity when collaborating on water-related projects with rural communities in Uganda. Chamberlain (2013) describes and reflects on different mechanisms for engagement such as using conceptual designs to facilitate conversations or using immersion sessions to surface learnings, later to be used in designing along with rural communities in West Wales. Hussain (2010) proposes a framework for psychological empowerment in the context of PD processes with children in Cambodia. This participatory, community-tailored approach to design contrasts with Universal Design, developed by Steinfield in 2012, which argues for design that optimizes for as large a user group as possible, as opposed to tailored and localized design that PD proposes.

Agriculture has been a recurrent theme in community-based design initiatives (Dubbeling, 2009; Cerf, 2012; Murgue, 2015). Globally, coffee continues to be one of the most common traded agricultural commodities according to the FAO (2018). However, literature around community-based design in collaboration with small coffee farmers, coffee collectives, and coffee farms remains scant. Exceptions include Andreotti's (2019) work on designing agroforestry systems for coffee growing, Souza's (2010) study of participatory mechanisms for coffee tree intercropping, and Ronner (2019) work on co-design methods applied to climbing bean cultivation. Silverstein (2012) work investigating studies on "participatory ergonomics" for coffee harvesting and Leshed (2018) work on collaborative coffee cost calculation, also explore product-driven design in this space. Our study adds to this body of research and advances the discourses around in-field co-design collaborations, with coffee farms as design labs.

Co-design provides has been growing in popularity, given its numerous advantages compared with hierarchical design approaches. Co-design brings the communities into the design process, blurring the lines between the designers and beneficiaries, empowering communities with the tools to design their own futures. This community-oriented approach to design also seeks to re-center user needs in their local context (David, S., Sabiescu, 2013). As articulated by De Laet & Mol (2000), meaningful design needs to take into account the communities' rituals, practices, and value systems. Co-design de-centers the designer, creating an (ideally) horizontal power dynamic between designer and communities (Muashekele, 2019). It aims to make space for the inclusion of a multiplicity of voices (Björgvinsson, 2010).

Despite its clear advantages, participatory and co-design have received their fair share of criticisms. Cooke & Kothari (2001) have pointed out that participation, in many of its current forms, can serve as a mechanism to legitimize and reinforce the interests of the powerful (Cooke & Kothari, 2001). Feminist theorists posit that participatory design can unexpectedly

reinforce toxic leadership as a power vacuum is created due to the horizontal nature of power dynamics in co-design (Freeman, 2013). This is further exacerbated by the fact that mere access to means and resources for technological innovation can signify a position of dominance and privilege (Merritt, S., & Stolterman, 2012). This paper wrestles with these issues of equity in co-design initiatives and provides recommendations on leveling power dynamics.

In the following sections we detail the course: “Technology Design for Coffee Production Course: A Co-Design Experience”, conducted in January 2019, as a case study. We discuss the thinking, planning, and designing behind the course and detail the projects and outcomes from the collaboration between university students, C-Innova, and the coffee farming communities of Fusagasugá.

3. Methodology

3.1 Overview

The course presented in this paper is part of a joint research project between universities around the world and small coffee farmers in rural Colombia using coffee farms as their design labs. It included 16 participants from 6 different countries. The key goal of the course was to introduce participants to a co-design methodology, build solutions for coffee farmers, and deliver prototypes in 3 domains: technology, marketing, and social organizing. The course relies on collaborative design methods, as well as methods for design education in the context of development such as the Creative Capacity Building (CCB) framework (Taha, 2011). Utilizing the CCB methodology allows for the recognition of a multiplicity of knowledge, while making design-as-practice accessible to all participants. As Sanders (2008) notes, co-design provides a platform for those who are not formally trained in design to participate in the process. Activities included taking part in agricultural practices around coffee, hands-on sessions on using local technology for coffee processing, and field visits to farms, markets, as well as local and national organizations part of the coffee value chain to gather information and gain a better understanding of the coffee production process. These activities were conducted in tandem with the principles of Participatory Action Research (Borda, 2006) and the design thinking framework i.e. empathizing, defining, problem framing, prototyping, and testing, in collaboration with coffee farmers.

The course was part of a longer engagement with 2 coffee farming collectives: De Finca and APRENAT. De Finca is a local coffee farming organization from the Guavio Alto community in the Sumapaz region “passionate for the production of artisanal, organic, quality and sustainable coffee”. APRENAT is a local organization from the Tibacuy region in Central Colombia. Their mission is to “contribute to the conservation of natural resources, ecological diversity, and the ancestral farming culture in the Tibacuy region”. In order to better prepare the course participants for the co-design collaboration, we developed a series of documents describing the coffee production process in each farm, the technological infrastructure

involved, as well as the relationships and human networks surrounding the coffee process using Empathy Maps, Stakeholder Maps (Tschimmel, 2012), and Value Canvas (Atasoy et al., 2013) tools among others (Figure 1). The course adopted the notion of *coffee farms as design labs* as a way of de-centering white-coat labs as sites of knowledge production. In the sub-sections below, we further articulate the 3 learning pillars of the course: (1) Background and Context, (2) Co-Design Immersion, and (3) Co-Production.



Figure 1 Foldable materials created for participants. Each foldable included cartographic information for each farm, stakeholder analysis, empathy maps, value canvas, and brief overview of the organization (left). The foldable also included a comprehensive visualization of the coffee production process for each farm (right).

3.2 Context

The coffee course began with a 1-week orientation in Bogotá. The purpose of this section of the course was to provide participants with background and context of coffee production, coffee farming, and working with farmers, at the local, regional, and national scales. Our aspiration was for participants to situate the realities of rural small coffee farmers without losing sight of the larger picture. Figure 2 shows some of these activities. To this end, we held lectures on the historical context of coffee in Colombia, transformations coffee markets in Colombia faced during the past decade, upcoming trends, and social, political and artistic context surrounding coffee. Foundational concepts were further solidified through hands-on activities such as coffee tasting, use of field research and co-design methodologies, drawing as a documentation mechanism, and the use of social cartographies. This week also included an interactive session with members from our two coffee farming partnering collectives, and a field visit to Colombia's National Coffee Federation, the largest conglomerate of coffee farmers in the country.



Figure 2 Sketch modeling activity between participants and community members (left). Coffee tasting activity as part of the context stage (right).

3.3 Co-Design Immersion

The goal of this stage of the course was for participants to engage in the practice of co-design directly from coffee farms, and in direct collaboration with community members. The co-design immersion consisted of a 2-week stay with APRENAT and Guavio Alto. The intention was for participants to engage in the practice of co-design in coffee farms whilst living and working along coffee farmers. Figure 3 showcases some of these interactions.

Our aspiration was to center this part of the course around relationships, while providing students and coffee farmers with the space to collectively frame and explore projects. All participants spent 1 ½ days in each of the farms, and at the end of the week the group was split into 2, each of which spent the rest of 2 weeks collaborating with its respective community. During each visit, participants were taken through walks led by the community with the purpose of providing geographic context. These walks also allowed participants to experience first-hand the process of coffee from beginning to end. During this week, participants contributed to community work related to coffee (e.g. sowing, selecting, cleaning or roasting coffee). At the same time, these spaces provided an opportunity for participants to use field methods and kickstart participatory processes in preparation for developing projects. Other more structured activities such as focus groups, community gatherings, brainstorming sessions, social cartographies, and sketch modeling, were implemented by participants in collaboration with community leaders and a group of facilitators. Towards the end of this week, teams of participants and communities agreed on a problem framing, and a path to develop a project. Given that several projects required a manufacturing infrastructure not present in the farms, teams and community members moved to the Jorge Tadeo Lozano University in Bogotá in order to begin the process of co-producing projects.

3.4 Co-Production

The goals for the last stage of the course were to (a) build, test, and implement the result of co-design processes developed in farms, and (b) iterate with feedback from the De Finca and APRENAT communities. Our aspiration was for participants to reflect upon the journey of getting to the prototyping stage, identify challenges throughout the process that could be corrected during the implementation phase, and wrap-up the course with identifying avenues for further work.



Figure 3 Clockwise from upper left. Ideation session with DeFinca community members. Concept feedback session with DeFinca community members. Coffee seedling planting. Beekeeping as a connected activity to coffee farming.

For a span of 4 days, participants and community members developed a total of eight projects (described in the next section), followed by a project presentation where participants received feedback from students from local universities and community members. This allowed participants to check their assumptions, and receive ideas for improvement and expansion of the projects. After this presentation, teams returned to farms in order to deploy and test the projects on site. Teams working on coffee production machinery installed prototypes and ran community meetings in order to disseminate knowledge about its design and receive critical feedback. This step was necessary, given that

not all community members were able to actively participate throughout the entire design process, given the harvesting schedules. Teams working on marketing showcased their work, received feedback from farmers, and were able to iterate one more time. They also held training sessions to make sure as many farmers as possible understood design decisions that went into final products. Teams working on social organizing ran, together with community members, examples of the training modules that were developed, and introduced partners to both the content and the documentation built to support it. After projects were implemented, teams created detailed manuals and documentation for community members to manage projects and disseminate if needed. These documents were also given to the C-Innova team with the purpose of integrating the work in upcoming projects.

3.5 Projects

Throughout the course, products for each track were developed at each farm. At the De Finca farm, teams developed: (1) a coffee cooling system and (2) a smoke extractor module for a locally developed coffee roaster; (3) deployment of a marketing strategy in 2 well-established coffee digital marketplaces, along with the development of a website for the cooperative; (4) development and testing of a series of trainings for holding community meetings at the cooperative, tools for improving financial management at farms, and a manual for recruiting new farmers into the cooperative (Figure 4).

In the APRENAT farm, teams developed: (1) an artificial beehive and sensor kit design for beekeeping of angel bees along with a cartography for a touristic “bee route”; (2) honeycomb press for honey extraction; (3) design and prototype of mobile Point of Sale (POS) stations for the farm along with materials for branding and marketing strategy for honey products, and (4) Bamboo-based vertical garden (Figure 4).



Figure 4 Selection of projects developed with the DeFinca community. Low-cost coffee roaster with smoke extraction and coffee bean cooling systems integrated (left). Guide to onboarding and management of association members (right).



Figure 5 Selection of projects developed with the APRENAT community. From left to right, manual honeycomb press, beehive-inspired mobile POS booth, vertical mobile POS booth, bamboo-based vertical garden, sensorized angel bee beehive.

4. Theoretical framework

EquityXDesign is a design framework developed by Christine Ortiz, Caroline Hill, and Michelle Molitor in 2016. As design practitioners, they saw a gap between design methodologies and societal inequalities. Rather than addressing these inequalities, design methodologies tended to overlook participatory and inclusive design:

“EquityXDesign: an additional layer of checks, tools, and activities that, when laid on top of traditional design thinking methodologies, will illuminate racism and inequity — individual, structural, and institutional — that exists in the individuals involved in the design team and potentially shapes the way problems are framed and solutions are proposed.”

It is an attempt at retrofitting design thinking with an equity-centered framework to enable designers to question their subjectivity while keeping beneficiaries at the center of the design process. It is a practice that merges the consciousness of equity design with the methodology of design thinking. It is framed by 3 core philosophies; i) Learning to see: Historical context matters; ii) Be seen: Radical inclusion; iii) Foresee: Process as product; and 5 design principles; i) Design at the margins; ii) Start with yourself; iii) Cede power; iv) Make the invisible visible; v) Speak to the future (equityXdesign, 2019).

The 3 core philosophies lay out the ethos for the framework. They argue that design needs to be framed within the historical context of the people, place, and community we are designing in. Further, inclusive design requires eliminating barriers of entry for all participants and beyond a designed product, the process needs to be done right - raising voices of the marginalized and strengthening relationships across differences. The 5 design principles provide a guide for this equitable design process. Designing at the margins highlights the importance of designing with and for people outside the dominant culture. This begins by critical awareness on the part of the designer, acknowledging their biases and

being conscious of not re-creating those biases in their designers. Equity design also requires an inversion of legacy power structures and a blurring of the lines between designers and the end-user. As seen in the coffee course, coffee farmers were as much designers as there were researchers. However, many of these power structures are invisible and thus, the fourth design principle is to make visible these dynamics with the aim of breaking them down. Finally, equitable design needs to be long-sighted, for new discourses and frameworks are needed to replace current design methodologies to ensure that design, as a field, is moving forward collectively, inclusively, and equitably.

The co-design coffee course was designed independent of the EquityXDesign framework as the coffee course came out of prior work that one of the key authors had carried out in Colombia. However, we decided on using it as a framework to analyze our work for several reasons addressed below. In our process, we also considered several other frameworks, two of which were the Design Justice (Costanza-Chock, 2020) and Consentful Tech (Lee & Toliver, 2017) frameworks. We ended up going with the EquityXDesign framework as i) Both authors of the paper attended a workshop led by the team behind the EquityXDesign framework and were inspired by the thoughtfulness behind the framework; ii) Each design principle was well-defined and action-oriented which is helpful for analyzing fieldwork; iii) The framework is still in its early days of its inception and we wanted to build it up through using our work as a case study, to suggest modifications, edits, recommendations for a more robust framework. Our hope is that the EquityXDesign framework and our recommendations below provide a new pathway for horizontal co-design initiatives between future researchers and collaborators. In the next section, we offer reflections on the course through the lens of the EquityXDesign framework.

5. Analysis using the EquityXDesign Framework

In this section, we present our analysis of the course using the EquityXDesign framework. An overall view of its beliefs and values is shown in Figure 5. We navigate through each principle reflecting and driving insights based on the work done through the course.

5.1 Design at the Margins

“Our current innovation conversation is exclusive, accessible only to the powerful and privileged.” (equityXdesign, 2019)

This was one of the most prominent aspects of the course. Although coffee is one of the defining features of Colombia’s economy and culture, due to the decentralized nature of the agricultural practice of coffee, coffee farmers have not been centered by the industry. By living and working alongside coffee farmer collectives, the course sought to convey the wealth of knowledge and experience these groups hold, even when living far from urban centers.

Inverting the equation of the privileged being an educator, and the underprivileged the learner, is fundamental to dismantle this notion of power, particularly within higher education.

From a design studies perspective, our framing of “*coffee farms as design labs*” is an instantiation of ideas present in scholar research around the decolonization of design. By stressing the significant value of knowledge until now considered invisible, by recognizing the centrality of the self-determination project of these farmers associations, and their imminent participation in imagining, designing and building their own future, we answer to the call of Schultz et al. (2018) for turning design education to focus on “techno-mediations” as they relate to designing autonomy and plurality and to futuring”.

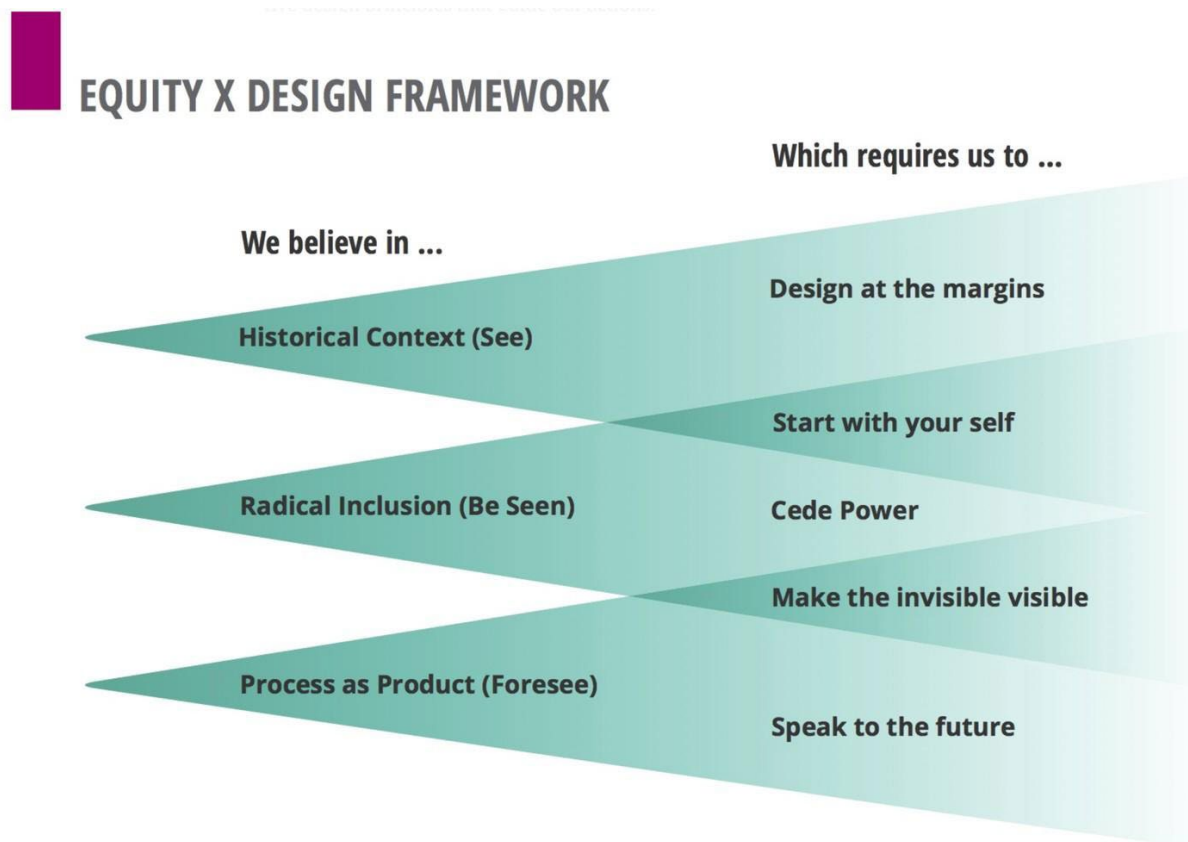


Figure 5 Equity by Design framework. Diagram taken from equityXdesign (2019).

5.2 Start with Yourself

“Our identities (race, gender, upbringing, social status, home language, etc.) create our lens for the world and how we make sense of it.” (equityXdesign, 2019)

This is one of the aspects where the course fell short. The curriculum did consider spaces

for participants to reflect both individually and collectively about their work and presence in a historically marginalized community. Additional informal spaces were provided for students to voice concerns or ask questions about the history of the relationship with partnering communities, trust, continuity and power dynamics among others. Although healthy relationships with communities, the building of deep, organic trust, concerted plans for continuity, and acknowledgement and defuse or diminishment of power relations were all key directives in designing and implementing the course, we did not intentionally acknowledge or deconstruct these processes. As we mentioned in our introduction, the course is part of a larger process and arc for change built in partnership with communities. During this process, measures were taken to address power imbalances brought by the presence of external agents in coffee growing communities. For example, we engage in local communal activities such as sowing and harvesting, and collaborate on smaller projects driven entirely by local communities. However, in the design and implementation of the course, we failed to include content geared towards deconstructing what those measures were, how we used them to frame the presence of participants in communities, and how participants can integrate these principles into their professional practice. In summary, we failed to translate these decisions into potential participant learning. This lack of surfacing prior work also holds true to gender dynamics, even though the EquityXDesign framework accounts for the importance of highlighting this aspect. Gender imbalance is common in rural Colombia, and one of the objectives of the work done prior to the course was to intentionally dismantle the imbalance thus, 10 out of the 16 participants and 4 out of the 6 course organizers were women and women-identifying. Part of our reflection in this section is a call to further researchers to build this dimensionality in their future work.

5.3 Cede power

“Equity requires a nonviolent, action-oriented spirit of co-creation and co-invention, necessitating an inversion of legacy power structures.” (equityXdesign, 2019)

From its very title, “a co-design experience”, the course sought to make clear that the act of designing will lean towards horizontal relationships. As discussed before, initiative, branding, and resources to set change into action already manifest dominance. Through a continuous emphasis on the need of collaboration, and the centrality of local knowledge over academic knowledge for example, the course actively attempts to diminish these dynamics. The most basic expression of this was a focus on asking questions, rather than on providing answers or “solutions”; on listening rather than on speaking. Further, the research materials we provided, alongside deep engagement with De Finca and APRENAT, emphasized the importance of local knowledge(s) as opposed to colonial approaches to co-design. The decision to run the course in Spanish was another expression of ceding power. Through translation and facilitation, the legitimacy of local language over efficiency or pragmatism was established.

Another potential source of power differential were institutional brands, more specifically from educational institutions. Coming from a strong institutional brand such as the

Massachusetts Institute of Technology (MIT) involved many contradictions and several opportunities. Where appropriate, De Finca and APRENAT used the institutional branding to further relationships with coffee distributors and build on their marketing efforts. Further, they used the institutional branding in securing new grants and relationships, strengthening their supply and value chain of coffee production.

5.4 Make the invisible visible

“The relationships between people and problems are often governed by sets of heuristics — techniques that allow problems to be solved with speed, agility, and economy.”
(equityXdesign, 2019)

Two salient “invisible” dynamics were made visible for all stakeholders throughout the course. First, the complex relationship between some coffee farmers’ associations and Colombia’s National Coffee Federation. Though we did not hear this directly from our partnering communities, countless interactions with farmers in the region, and many others that attended the course as speakers and spectators, revealed a hegemonic, dominant, and sometimes coercive relationship between small coffee farmers and the Federation. Although this circumstance might be common knowledge to farmers across the region, it does not match the perception of the federation at the national and international scale. Conversations with De Finca and APRENAT community members made starkly visible the anatomy of this relationship, bringing to light the marginalization and power dynamics at play.

The second, less surprising dynamic that was made evident through the course was the divide between the rural and the urban. By virtue of oscillating with the city (Bogotá) and rural farms, it was evident to participants the challenges rural farmers face not only in connecting their economies to mainstream consumers, but also the disconnection between urban citizens and the struggles of their rural counterparts. These challenges go beyond the economic, transcending to the cultural, political and even environmental stages. Some of these complex connections were deconstructed along the course, others were made evident to participants through personal interactions with farmers.

5.5 Speak to the future

This was an area where we could have been more intentional as designers and organizers of the course. The entire design of the course was present-oriented and made little acknowledgement of the future, in terms of the longevity and sustainability of the projects, and also in terms of acknowledging the differing understandings of “the future”. While the course recognizes the importance of self-determination and autonomy as key pillars of co-design, we should have anchored these within the framework and understandings of the coffee communities. In fact, most of the language surrounding the design of the course continued to be heavily influenced by “western” academic fields of thought. Here, we are presented with the opportunity for the decolonization of design. We discuss this further in our modifications in the next section.

6. Discussion

As seen in the section above, the EquityXDesign framework provided a lens to critically reflect on the design and implementation of the co-design coffee course. However, several dimensions of our work did not fit neatly within the definitions of the 5 principles. We came to realize that we both fell short in embodying the principles proposed by the framework, but also that the framework was an incomplete lens to assess the multi-dimensions of the coffee course, cutting across geographic, industry, and cultural lines. In this section, we offer modifications to the 5 principles in hopes of providing a more robust framework for future researchers to design and evaluate their co-design initiatives with communities.

6.1 Design at the margins without over-glorifying design

As designers, we have a strong bias towards the power of design, both as a process and a tool. In many ways, this bias has served as well in helping to break down complex problems whilst developing innovative solutions. We worked with the De Finca community to co-innovate solutions in the categories of the production of coffee, marketing and branding of the business, and developing an association for coffee farmers in the Guavio Alto region. Despite the usefulness of design thinking, however, it is not a panacea to society's problems. Many of such problems are complex and multi-faceted and as such, require multi-faceted approaches. While design as a problem-solving framework aims to plug many of these gaps, it is more effective when used complementary with other skill-sets. In the case of De Finca, design thinking gave us a framework to conceptualize the problem we were trying to solve, along with potential solutions. One of the problems we chose to work on involved improving the quality of coffee beans. Design thinking helped us define the key problem: we needed to build a cooling system for the coffee roaster so that the beans can cool down at a consistent rate. Whilst design thinking is a useful framework in framing the problem and solution(s), we also needed technical engineering skills to build a cooling system for the coffee roaster. Thus, as much as design is a powerful tool, it cannot exist in a vacuum and needs to work hand-in-hand with other disciplines.

6.2 Start with yourself and build relationships

Building relationships and fostering trust with the local communities are at the core of co-design. These relationships cannot be fostered overnight and require years of engagement. The success of the coffee course was a result of years of deep relationship-building that the group of Colombian practitioners cultivated with the De Finca community. While self-reflection is an important part of the fieldwork process, researchers also need to be able to step-out of themselves in order to build authentic, long-term relationships with their community collaborators. De Finca's community was extremely welcoming and open to collaborating with foreign researchers because of the trust fostered over the years.

6.3 Cede *and* redirect power

Ceding power is merely step one of the process of leveling power dynamics when working with communities. Beyond ceding power, we needed to redirect power to these communities by craving spaces for their voices to be amplified. As much as we were intentional about ensuring equal representation of local vs. foreign participation at all co-design exercises, we failed to account for the language barrier between English and Spanish speakers. English was frequently the dominant language in many co-design exercises; especially as participants grew tired and impatient from long co-design exercises, they reverted to their native tongue. These are the covert ways in which power manifests and language excludes and includes. Given that many of the Colombian participants, the coffee farmers and Colombian university students, felt more comfortable in Spanish, speaking in English excluded them from these exercises. More than serving as a communication barrier, language reinforced power structures of the global “north-south” divide and muted the voices of the communities we were working with. In order to mitigate future power inequality, we will be accepting MIT and Harvard participants/researchers with Spanish-speaking experience. Thus, it is not enough for researchers to cede power to local communities but to take it a step further by redirecting and re-centering the roles and voices of communities in co-design.

6.4 Make the invisible visible *by* listening to community wisdom

The importance of listening to community wisdom was another learning point for us. As researchers from the “global north”, we brought our personal biases and institutionalized forms of knowledge into the field. As we encountered technical challenges, our immediate response was to resort to hi-tech solutions. However, our work with the De Finca community re-centered the value of local forms of knowledge and working within the local ecology and landscape. As an example, Franklin showed us a broken Arduino project built by researchers a year before. The researchers had built a device to monitor the temperature of the cooked coffee beans. While the researchers had good intentions, they did not account for the long-term unintended consequences of their solutions. Unfortunately, the device stopped working a few weeks after the researchers had left and Franklin did not have the tools nor knowledge to repair it. This example highlighted the importance of working within the knowledge framework of the local communities. Further, we sought to seek feedback from the De Finca community during each step of the design process. Instead of working with hi-tech tools, we worked with materials that Franklin had available, redesigning a roastery cooling system made out of an old pot and a fan. This modification enabled a consistent cooling speed and temperature of the coffee beans, improving the quality of coffee produced. The cooling system was co-built with Franklin and the De Finca community and within local frameworks of manufacturing and production.

6.5. Speak to the *near and far* future

In the EquityXDesign framework, design principle #5: Speak to the Future addressed the importance of discourse in shaping the narrative of the future. However, it does not account

for the differences in the meaning of “future” for the researchers vs. coffee farmers. Time and temporality are felt and experienced differently in different contexts. For researchers on an academic calendar, taking 3 weeks to a month to work on a project *feels* like a long commitment. However, from the perspective of the local communities, these collaborations are seen as limited and short-term. Further, these short-term collaborations are disruptive to their workflow, especially if there are no plans for future engagements. Local communities have to take time from their daily harvesting schedule to spend time with researchers, introduce them to their tools and technologies, and educate them on the local context. Thus, it is important that we clarify what it means to “Speak to the Future” and further, what that means in the context of “near and far future(s)”.

One of the pitfalls of co-design is the short-sightedness of these collaborations. Many co-collaborations are one-off projects with no plans for future engagements. Such collaborations reinforce extractive and exploitative frameworks while co-opting the narratives of co-design. We, therefore, propose a framework of near to far futures to get researchers to consider the time and temporality of their engagements and mitigate exploitative relationships. Communities need to see the value in investing time with researchers and tangible outcomes from each co-design collaboration. As opposed to using vague terms like “future”, researchers need to define the “nearness” and “farness” of these collaborations by coming up with explicit roadmaps for current, short, and long-term engagements. These engagement plans are critical to equitable co-design.

7. Conclusion

In this paper we present the EquityXDesign framework as a lens to analyze and study community-based co-design initiatives. We introduce a case study of a course around technology design for coffee production in close collaboration with two coffee farmers’ collectives. By juxtaposing the framework over the design and implementation of the course, we reveal gaps in the design of the course, as well as opportunities for expanding the EquityXDesign framework in the particular context we apply it. This leaves a window of opportunity to apply this framework in other areas of design (e.g. health, education, etc), as well as in other areas where co-design can prove relevant (e.g. governance, infrastructure). We present our analysis of the course using the five principles of the aforementioned framework, discussing gaps and potential retrofits to both the framework and the course.

This examination reveals the enormous difficulty inherent in planning and practicing co-design that is informed by principles of equity, justice and decolonization of knowledge. Such practice, as we learned through this analysis, requires significant amounts of intentionality, trust over time, and plurality. In that sense, this work is in many ways a criticism to the quite common comfort of cashing in corporate design and design thinking. Through toolkit-ing, and concept-boxing, these approaches to exploring solution spaces for wicked, complex problems, over-simplify community-based design.

By studying co-design initiatives through an equity lens, we propose new ways to practice and study these projects. Avoiding the glorification of design in any of its versions, leaning towards relationships, redirect power embedded in relationships and dynamics, center local knowledge, and envision near and far futures, are some of our key calls to action. A more comprehensive approach to community-based co-design that considers these factors, can potentially provide a more robust blueprint for designing and implementing initiatives in this space.

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