



► Michael L. Best, Column Editor

Global Computing Remaining Connected Throughout Design

Applying the unique experiences of designing technologies for vulnerable communities.

A PPROXIMATELY 3.5% OF the world's total population are migrants: 272 million in 2019. This number has continually increased over the past 25 years, from 2.8% in 1995 (174 million), and 3.2% in 2005 (221 million).² Nearly two-thirds of these migrants seek economic opportunities such as better employment. While this strategy has benefited millions of internal and international migrants, booming markets and rapid urbanization have resulted in a constant demand for cheap labor, and in some instances, cases of forced labor and human trafficking.¹ Computing technology has begun to play an increasingly critical role in every step of the migration journey, from pre-departure to transit to integration or return to one's home country. It might also be leveraged to play a role in enhancing the rights of migrants. This column presents four cross-cutting challenges to co-designing technologies for and alongside migrant communities, drawing on the experience of developing Apprise, a mobile phone application to support vulnerable migrant workers to report exploitative work practices.

Understanding the Context: Perceptions, Problems, and Opportunities

Effective solutions cannot be generated by simply identifying surface-level symptoms of problems, but rather require a deep understanding



A migrant in Samut Sakhon, Thailand, uses the Apprise app.

of the multidimensional root causes (political, economic, and social) that enable these problems to continue. A participatory approach is necessary to break away from external notions of a community's needs and avoid the

reoccurring issue of seeing technology as an instant fix for issues affecting development. By prioritizing community participation before design ideation, teams can work together to identify these underlying factors, re-

sulting in more people-centric rather than tech-centric solutions.

As an initial step in our development of Apprise, we undertook a stakeholder analysis to identify key role players in each of the sectors that we work in across South East Asia: fishing, seafood processing, manufacturing, sex work, forced begging, domestic work. Across our four-year engagement, more than 1,500 stakeholders provided valuable insight to inform and shape the conceptualization, design, development and evaluation of Apprise, including vulnerable workers, survivors of trafficking, and frontline responders (FLRs—those with mandates in assessing working conditions for signs of labor exploitation and human trafficking such as NGOs, community-based organizations, government officials, labor inspectors, and IGOs).⁵ These interactions aimed to identify the issues that FLRs and migrant workers faced, and if/how they believed computing could support them to overcome these issues.

Throughout these interactions, our aim was to amplify the voices of migrant workers in precarious work situations through representative and transformative means of participation.⁷ Technological solutions created even in a perhaps well-intended vacuum and then imposed upon other populations have become notorious for failing with their tech-centric rather than people-centric approach. For this reason, we began our conversations asking stakeholders if there was a role for technology to help in addressing the issues they had identified. In each sector, we sought to understand from workers which group of stakeholders they feel most comfortable confiding in about work conditions. These stakeholders needed to have access to workers, a mandate to perform outreach in vulnerable communities, and most importantly be seen as a trustworthy by workers. In fishing and seafood processing, we work with government labor inspectors and NGOs; in manufacturing, we partner with private auditors within supply chains; in sex work, we collaborate with NGOs and sex-worker-led CBOs.

Continued Participation throughout Design Cycles

Further building upon this initial participation, it was critical to include

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intended users throughout the design and evaluation phases of system development. Using a participatory and value-sensitive design approach, we identified key values of autonomy and privacy that were critical for migrant workers and frontline responders.⁴ These values informed the design of the system, the data collected, and the security considerations protecting user data. In the many cases where stakeholders presented competing perspectives, these values were used as a basis for negotiations and in some cases to adjudicate between design options.

Other design considerations we were able to identify included the importance of developing simple interfaces that prioritized learnability and the capability of operation in environments with intermittent connectivity. Considering aspects of autonomy, privacy, and trust, we designed Apprise to screen for indicators of labor exploitation by having a migrant worker respond to a series of yes/no-worded questions on a FLR's mobile phone. These questions are self-administered in an audio format with a set of headphones, using a combination of positively and negatively worded questions to ensure that any onlooker would not be able to interpret a worker's responses. These answers are recorded and uploaded to the FLR's account for post hoc analysis, enabling them to identify sector-specific practices of exploitation and provide a repository of case data for further investigation. Apprise's worker-centric and inclusive

design practices were recognized by the Worker Engagement Supported by Technology (WEST) community and highlighted in its white paper "Realizing the Benefits of Worker Reporting Digital Tools."⁶

Privacy, Security, Legal and Other Risks

While privacy and security are important for all tech users, these factors become even more critical for vulnerable populations and particular attention needs to be paid to the risks that collected data can create for individuals or groups of migrants. Risk assessment and risk mitigation should be an ongoing process throughout the whole data life cycle, minimizing data that is collected, stored, analyzed, and how long it is retained. Well-defined data governance roles and processes are also required to facilitate effective and appropriate data sharing and usage.³ These policies should be considered as part of the initial design, and in consultation with migrants (among other stakeholders). Consideration should be paid not only to data breaches and leaks, but also to the impact subpoenas for information from government or private parties would have on intended users. Worker engagement and other feedback platforms must pay particular attention to legal, financial, and reputational risks, specifically with respect to defamation cases.

In the evaluation of our initial pilot in fishing and sex work sectors in Thailand, there had been consensus amongst FLRs and migrant worker communities that the ability to capture photos and attach them to interview responses would increase the effectiveness of Apprise. We workshopped this suggestion at our next stakeholder consultation, discussing privacy concerns, and developed sharing strategies that would limit how images are shared within teams. There was one lone voice that spoke up during the workshop, warning of the increased risk that this functionality would bring to migrant worker communities should a data breach occur or a subpoena be received to share data. At the end of the workshop and based on the value dams and flows method that informed our design, we decided not to include this

new functionality, despite the improvements it would make to a FLRs ability to follow up on certain cases. This example is indicative of the need for higher levels of care in risk assessments when designing with and for migrant populations. These assessments should be continual and inform what data to collect, store, analyze, and retain.

Sustainability and Scalability of Digital Tools

Apprise was purposefully designed to be easily scaled to numerous geographies and scenarios to facilitate scalability. Making questionnaires available in more languages is a straightforward process involving the translation and verification of the questionnaire and new languages can be rolled out quickly upon request to enhance replicability in any part of the world. Using the ILO's Indicators of Forced Labor as a standard for developing preliminary interview questions, new lists can be updated and modified for sector-specific applications through consultation with stakeholders. Apprise was also designed as a complementary tool to be integrated

into the existing workflow of FLRs and to not include any additional resource burdens that would inhibit implementation. It does not require the construction of additional infrastructure to facilitate its usage, as it leverages an existing, widely available, relatively low-cost technology (the mobile phone). After initial adoption and refinement of best practices, it does not necessitate further resources that would lend it to be unsustainable in the longer term. This makes Apprise an example of a low-cost, potentially high-impact solution that is both sustainable and scalable.

Based on our collective learning experiences throughout the process of developing Apprise, we call for researchers, funders, and developers to take a broad perspective on needs assessment, stakeholder participation, risk assessment, and sustainability in conceptualizing and designing tech solutions for development. While these people-centric approaches may include a significantly longer lead-in time than more tech-centric approaches, this deep understanding and shaping of the project sets it up to be responsive to

the financial, cultural, technological, political, and environmental context that it is rooted within. If these factors are considered from very inception, perhaps we can avoid much of the disconnect between intention and actual impact that mark this space. □

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