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# Software Platform for Poverty Elimination

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# Software Platform for Poverty Elimination

Kodey Converse, Ben Hylak, Mona Elokda, Alex Tacescu

April 2018

### **Abstract**

This report covers the research and implementation of a poverty elimination software platform. First, social service workers from multiple countries were determine how technology could aid antipoverty efforts. Based on those findings, we designed and developed a mobile application on behalf of a non-profit named Fundación Paraguaya. The application that we developed helps a social service worker track a family's status, and works both offline and online to support fieldwork in rural regions. Social workers are now using this tablet application in countries throughout the world, including Paraguay, Argentina, Colombia, Sierra Leone, and the United Kingdom. The project has since been open-sourced to attract contributors and to keep the platform on the cutting edge of poverty elimination. Our research showed that social service workers are both welcoming to and in desperate need of new technology that will improve their ability to help families fight poverty.

## **Acknowledgements**

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- Professor Emily Douglas, for reviewing our interviews and surveys and helping us find research participants.



## Executive Summary

This project covers the research and implementation of a poverty elimination software platform. We had two primary objectives. The first was to discover unexplored methods of using technology, in combination with the Poverty Stoplight definition, to fight poverty more effectively. Our second objective was to implement a new mobile application, deploy it, and test it with social service workers throughout the world. Poverty Stoplight is a new multidimensional poverty definition created by Fundación Paraguaya. Where most definitions only measure income, the Poverty Stoplight takes a more holistic approach and measures over fifty indicators including education, housing, access to transportation, and self-esteem. To meet the first objective, we interviewed and surveyed social service workers from countries around the world (primarily the United States and Paraguay). Our research yielded a number of findings. Despite stereotypes about the use of technology in third-world countries, social service workers in Paraguay utilized more technology than their counterparts in the United States. Social service workers in Paraguay referenced the results from the Poverty Stoplight survey frequently while making decisions. They worked with the family until they resolved every problem, and documented evidence of the family's progress (for example, before and after photos of a remodeled kitchen). Social service workers in the United States, on the other hand, primarily relied on conversations with their clients and rarely used a standard methodology in this process. Without conventional methods, there was often no tangible way of verifying results.

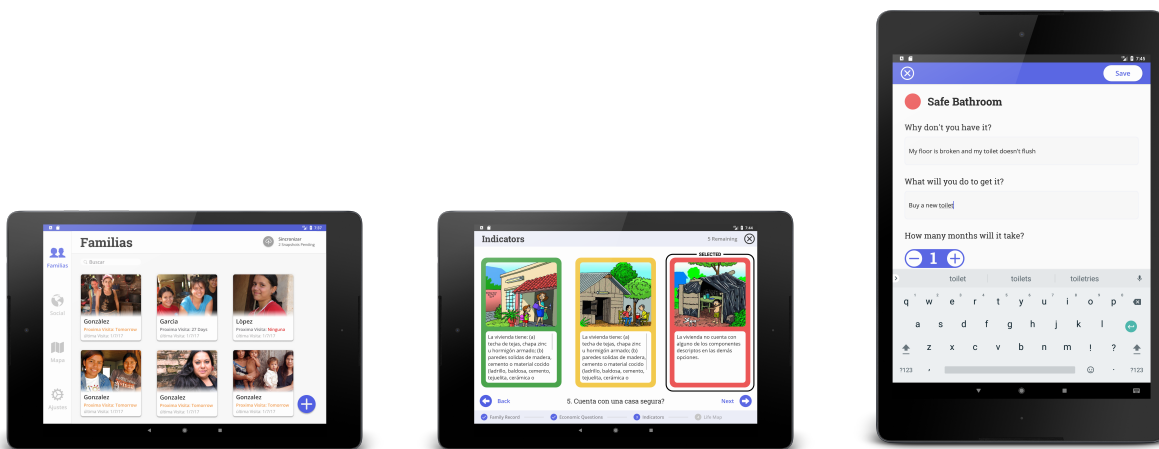
Our formative findings indicate that Poverty Stoplight is ripe for technological innovation, and social service workers can benefit immensely from these innovations. One example is recommended solutions. Our research showed that nearly all social service workers reuse solutions and ask their peers for advice. This finding means that social service workers can only use solutions that they, or the people they directly work with, have experience with. Technology can improve this process. Using the detailed data provided by the Poverty Stoplight, correlations between problems and practical solutions can be established. If one social service worker comes up with a solution to a problem that was helpful to a family, this solution can then be recommended to all of the social service workers in a region, for example. Our research also found that social service workers are extremely overloaded with work. This work can be quite unpredictable, as it is difficult to discover how complicated a client's situation is until working extensively with them. Due to the comprehension of Poverty Stoplight though, it is possible to capture the full scope of a family's position and learn about the difficulty correlated with it.

Our research also indicated that social service workers are especially proud of the families they help. During one interview, a social service worker from Paraguay mentioned that the technology she lacked the most was "a color printer." She explained that they take before and after pictures of families' progress, and those pictures aren't as impressive in black and white. Multiple interviewees also stated they need a better way to share successes with their peers, primarily through photos and videos. If a social network were integrated into the platform, social service workers would be able to share their successes, find peers who have faced similar problems, and communicate more efficiently with one another.

After completing our formative research, we began implementation of the software platform. Although our research identified a number of novel ways technology could be applied, we also found that there were more fundamental concerns. The foundation's surveying platform, a tablet application developed in 2011 by Hewlett Packard (HP), was unstable and difficult to use. Social service workers, for example, mentioned that once a question was answered, the response couldn't be changed. They also reported that when the application crashed, all data in progress would be lost and often the application would need to be re-installed. Moreover, this outdated technology has limited the foundation's efforts to spread the Poverty Stoplight definition. Partners from around the world using Poverty Stoplight want to be able to collect and analyze data without being locked into legacy technology. To solve these problems, a brand new mobile application for social service workers is necessary. The mobile application would replace the outdated platform previously used by Poverty Stoplight social workers.

Following this research, we implemented a next generation mobile application for poverty elimination. The application was designed to meet the basic surveying needs of the foundation, in addition to some of the features identified in our research. Based on the findings of the formative research, we set a development goal attainable in the scope of this project. Next, over the course of multiple iterations, we designed the interface with increasing degrees of fidelity. After the foundation approved the initial visual designs, a *minimal viable product* (MVP) of the full application was developed. The goal of an MVP is to implement the fundamental features required to get feedback before proceeding with development. Fundamental features included authentication, viewing a list of family profiles, and surveying families. In response to analytic tool results and the foundation's feedback, we added the ability for families to choose their priorities and redesigned significant portions of the app. Sodep and the foundation then helped conduct the first usability test with users in Paraguay. The results showed that while the application offered many benefits over the former application, there were challenges that needed to be addressed before the application could be formally released. In response to these results, the team standardized styles throughout the application, improved the survey taking experience and addressed many other usability and technical issues. The application was then successfully released on the Google Play Store. The foundation determined that it was useful, and began making it available to social service workers. The foundation advertised the application to potential and existing organizations implementing Poverty Stoplight during two global live streams (Spanish and English).

After implementation, social service workers tested the final version of the application and provided feedback through surveys and usability tests. The new mobile application proved to be more efficient according to social service workers' feedback. Social service workers were very impressed with the design of the new application. Overall, they also found the new application to be a lot more stable than the previous platform. Although the application proved to be a success, further development is still needed. Therefore, the project was made to be open-sourced to allow for future development.



Our mobile application is currently being used in Paraguay, Sierra Leone, Mexico, Colombia, South Africa, United Kingdom, and Argentina. Social service workers use the application to perform their job with less technical complications than the previous platform. Consequently, social workers can more efficiently help families step out of poverty. Over one hundred social service workers have installed and started using the application. Our software application, combined with the power of the Poverty Stoplight methodology, is revolutionizing how poverty is treated.

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# Chapter 1

## Background

### 1.1 Introduction

**Poverty is a Global Problem and Technology isn't Helping** Nearly eight hundred million people live in extreme poverty. The United States is far from immune to this global crisis, having the second highest child poverty rate out of all developed countries (McCarthy, 2016). In recent years, revolutionary technological advancements have enabled computers to detect tumors, identify faces, and interpret verbal commands with a high level of accuracy. Despite technology's rapid growth, the methods used to treat poverty haven't changed. This project combines state of the art technology with a groundbreaking methodology to create a poverty elimination software platform capable of transforming how the world treats poverty.

### 1.2 Defining Poverty

The definition of poverty is the cornerstone of every attempt to alleviate it. It determines when a solution is needed, who is eligible to benefit from the solution, and how to implement the solution. Although poverty differs significantly between regions, its definition remains consistent throughout the world. This definition, called the poverty line, is the estimated minimum income needed for the necessities of life. Income, however, can often be a red herring. Poverty is typically a cause of a multitude of underlying factors such as education, self-esteem, and physical health.

Definitions that consider dimensions of poverty beyond just income are called multidimensional. The need for a multidimensional definition has become increasingly apparent over the last decade. In 2010, the University of Oxford created the Global Multidimensional Poverty Index, an analytics tool for better-capturing poverty based on available data (Alkire, Chatterjee, Conconi, Seth, & Vaz, 2014). Additionally, the World Bank recently acknowledged that income alone doesn't fully capture poverty-

stricken situations and is currently researching a multidimensional poverty definition as well (*FAQs: Global Poverty Line Update, 2015*).

These multidimensional definitions are valuable when considering poverty on a macro level, but lack the granularity needed to change how an individual or family-level poverty is treated. A definition valuable on a micro level must be flexible enough to quantify the unique problems that an individual may face.

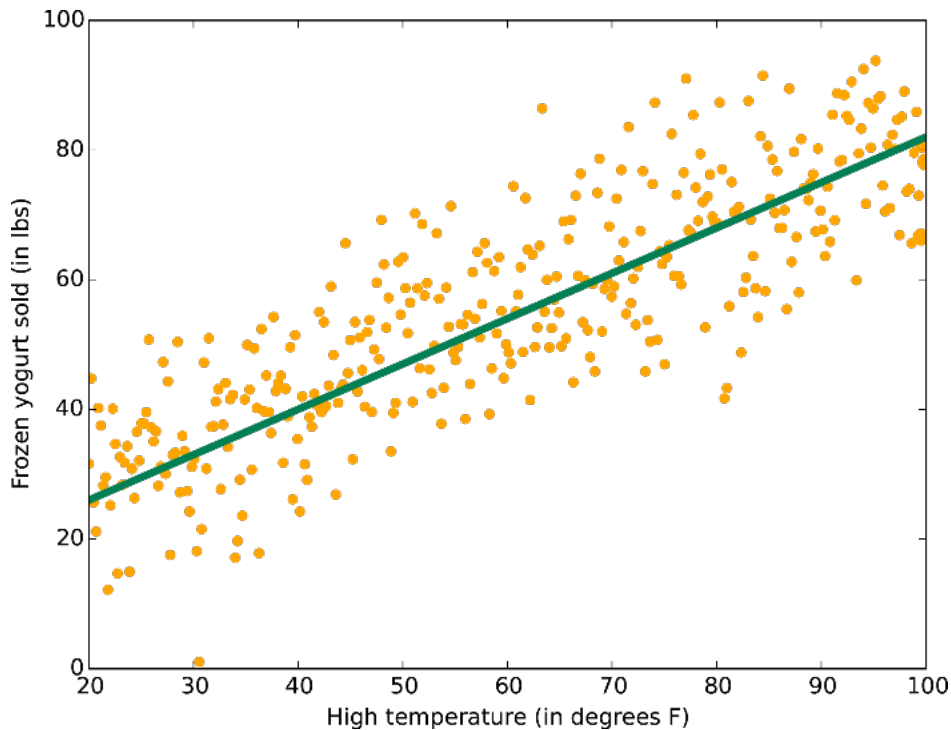
In 2010, Fundación Paraguaya, a Paraguay-based organization, developed a revolutionary multidimensional poverty definition named Poverty Stoplight. The definition enables families to understand the underlying causes of their poverty. Poverty Stoplight separates poverty into six dimensions: income/employment, health/environment, housing/infrastructure, education/culture, organization/participation, and identity/motivation (Paraguaya, 2017). These six dimensions subdivide into a total of fifty-six poverty indicators. When a family self-assesses its poverty, it chooses a red, yellow or green level for each indicator according to its status and a predefined measurement. For example, one indicator in Nigeria is "Access to Drinking Water," where a red level indicates the family is drinking non-potable water directly from a river, a yellow level is used when drinking from an external tap and a green level is used when drinking from a tap in the family's home. Each indicator is tailored to its specific region of use. For example, the "Access to Drinking Water" in Dubai may be different than those in Nigeria.

After taking the self-assessment, families can see their strengths and weaknesses. The families then work with a social service worker to choose priorities and create a poverty elimination plan. Within two years of its implementation in Paraguay, the Poverty Stoplight program helped twelve thousand families overcome income poverty. The program has had success in twenty other countries as well, including Kenya, India, South Africa and the Philippines.

## 1.3 Poverty Stoplight Enables New Technology

**Technology is Progressing Rapidly** When the World Bank created the poverty line in 1990, the World Wide Web hadn't yet been released publicly. In the years since the significance of information technology has increased dramatically around the world. An estimated 67% of the world's population owns a mobile phone (Statista, n.d.) and almost 30% of the world's population has a Facebook account (Facebook, 2018). The continuous growth of information technology can be used in many different ways.

**The Rise of Machine Learning** Every post liked, article read, and link clicked is being collected and analyzed to determine interests, hobbies and political affiliations. With this information, advertisers can understand what users want to buy and for whom they'll vote. The technique making this pos-



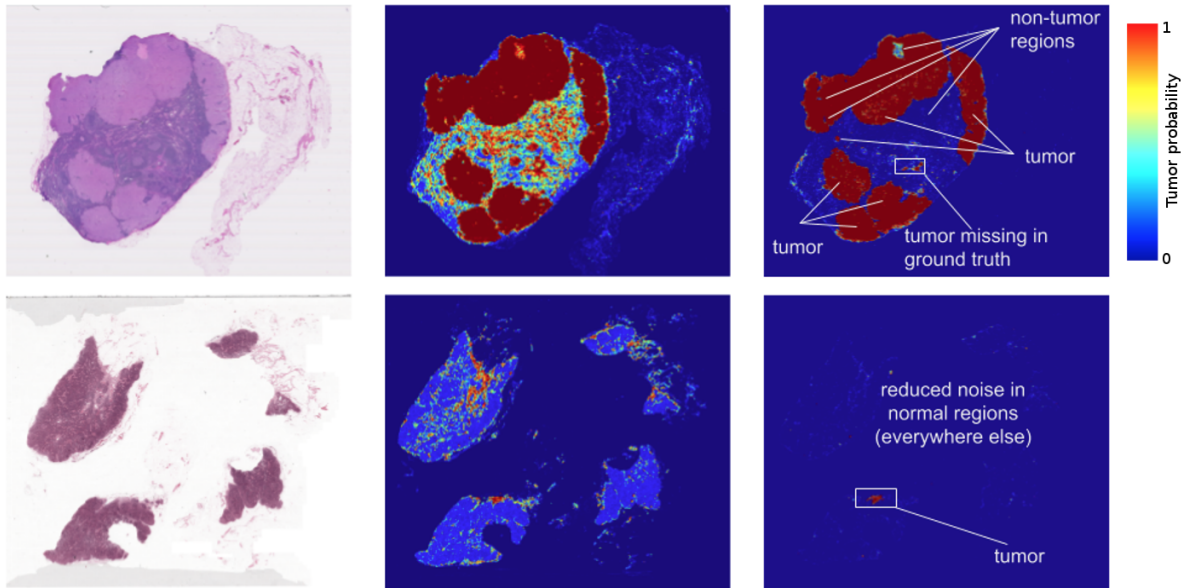
**Figure 1.1:** An example of predicting a trivial data set using machine learning. Source: (Bhatia, 2017).

sible is *machine learning*. Machine learning identifies trends in data. Some cases, like the data set in Figure 1.1, are straightforward. With higher temperatures, more people purchase frozen yogurt. The linear trend in this example is easy to spot.

Most cases aren't as trivial. Figure 1.2 shows research performed by Google Brain to identify tumors. After looking at four hundred high-resolution images of tumors, the machine "learns" how to recognize tumors with twenty percent higher accuracy than most pathologists (Liu et al., 2017). Rather than replacing doctors though, this technology can be used in tandem to highlight suspected tumors, making doctors both more accurate and more efficient.

**There isn't Enough Data to Solve Poverty** This relationship between tumors and pixels would not have been possible without substantial volumes of detailed data. The poverty data collected by most countries, however, is far from complete enough for useful machine learning applications. As mentioned, income can define people in poverty, but not give any insight into the cause of their debt. Rather than using the sparse economic information collected, the few applications of machine learning in poverty have used satellite imagery. Aerial images, for example, can be used to roughly detect poor areas by looking at the regional glow of lights at night or the absence of paved roads and water sources during the day (Bohannon, 2016). Although this work is awe-inspiring, the practical implications are limited and not applicable to urban areas where the majority of impoverished people live in the United States.





**Figure 1.2:** An example of classifying a complex data set (cancerous tumors) using machine learning. Source: (Liu et al., 2017).

**Poverty Stoplight Can Change That** Unlike the poverty line, Poverty Stoplight provides a comprehensive view of poverty, both within a family and within a community. This detailed data could enable yet unexplored applications of technology in the fight against poverty. Machine learning, for example, could be applied in some different ways. It could automatically recommend solutions for a client's problem to social service workers, or their caseload could be balanced automatically based on how involved their clients' situations are. It is currently unknown whether either of these possibilities would be useful and, more importantly, what else is possible.

**Existing Antipoverty Technology** Technology has made it easier for social service workers to find solutions, even in topics they aren't as familiar with. The most notable example of this is Aunt Bertha. Aunt Bertha, a website launched in 2010, allows people to "search for free or reduced cost services like medical care, food, job training and more" (Bertha, 2018). Users of Aunt Bertha can search for services based on location and category, giving them a quick way to discover solutions. Another example of antipoverty technology is *Fresh EBT*, a mobile application that helps food stamp recipients make the most of their benefits (Stahl, 2018). It allows users to check their EBT/Snap balance easily, create recipes, organize shopping lists and even find coupons to maximize their spending power.

## Chapter 2

# Objectives

The purpose of this project is twofold.

1. Discover unexplored methods of using technology, in combination with the Poverty Stoplight definition, to more effectively fight poverty.
2. Based on the findings of the first objective, implement a poverty elimination software platform that and deploy it throughout the world.

**Objective 1: Technology to Eliminate Poverty** Poverty Stoplight is ripe for technological innovation, but most of these opportunities have yet to be explored. The first objective is to understand how state of the art technology can aid social service workers using Poverty Stoplight in the fight against poverty.

**Objective 2: Poverty Elimination Application** After understanding how technology can benefit Poverty Stoplight, we will develop a software application for social service workers based on our findings. After completion of the project, we will establish an open-sourced project to enable and encourage developers from around the world to freely contribute.

**Time frame** We spent twenty-one weeks fulfilling these objectives, with a typical workload of between sixty and one-hundred hours per week. Understanding the opportunity to use technology was the focus of the first seven weeks, while we spent the last fourteen weeks on iterations of design and implementation of the software.

## Chapter 3

# Formative Research

**Fundación Paraguaya's Need for Technology** Initial research showed that poor technology is crippling the foundation's growth. The foundation's surveying platform, a tablet application developed in 2011 by Hewlett Packard (HP), no longer fit the needs of the foundation. The application was unstable and difficult to use. Moreover, this outdated technology has limited the foundation's efforts to spread the Poverty Stoplight definition throughout the world. Partners from around the world using Poverty Stoplight want to be able to collect and analyze data.

In response to this need of a centralized database for information, the foundation began planning development a REST API. This database allows for interoperability between separate systems. The foundation wants to use this database to be able to quickly develop new platforms using one set of information (for example, a mobile and web application could access the same data). All of this technical planning and development has been the focus of Sodep, a Paraguay-based software development company contracted by the foundation.

With the foundation's decision to create a new centralized database, it would create a new suite of software tools labeled the *Poverty Stoplight Platform*. The foundation had discussed basic requirements with Sodep, such as the ability to take surveys and submit it to the database, but had yet to begin user research.

## 3.1 Research Methodology

**Research Goals** With more confidence in the possibility to use technology with Poverty Stoplight, the next step towards realizing the opportunity was to understand what this software would do. A Research Plan (Appendix A) was developed that defined the eight high-level objectives listed below:

1. Understand social workers' process in helping a family
2. Discover various roles and behaviors of social workers

3. Find difficulties in the current process
4. Understand how information is stored and found
5. Understand social workers' technology situation (e.g. in daily work)
6. Understand families' technology situation
7. Understand how social workers interact with families
8. Discover how to best display Poverty Stoplight data

**Semi-structured Interviews** Research began with *semi-structured interviews*. Semi-structured interviews follow a list of questions designed to prompt discussion but allow the interviewer to explore new topics as they arise. This flexibility helped us cover our research goals while not restricting the conversation to our existing knowledge. The interview targeted both social service workers with and without knowledge about Poverty Stoplight. Questions designed for non-Poverty Stoplight social workers aimed to understand the way they assessed clients' situations and how they might use Poverty Stoplight if they had it. Questions directed at Poverty Stoplight social workers sought to understand their typical workflow, their pain points, and what technology tools they thought were missing.

**Interview Validation and Recruiting Social Service Workers** Professor Emily Douglas, an expert in the field of social service work, reviewed the draft of interview questions. Douglas had some suggestions, including reducing the interview time to around thirty minutes to avoid taking too long for social workers. After making the edits, Cecilia Mongues, lead field coordinator at Fundación Paraguaya, reviewed the questions and provided contact information for the social service workers she managed. In her position as the lead field coordinator, Mongues had a bird's eye view of the work being done within the organization and was valuable in this interviewing process. The list of contacts from Mongues contained eighteen social service workers working in various locations and with different groups of people. Also, we reached out to around thirty organizations and social workers in the Worcester area with help from Professor Douglas.

**Supplementary Surveying** After conducting interviews, surveys were distributed to validate our findings further and reach a broader audience. The first survey was for social service workers in Paraguay. Once again, Cecilia screened the survey and then distributed it to her staff. In total, there were 49 responses to this survey. The second survey was for all social service workers, irrespective of their familiarity with the Poverty Stoplight. The survey was sent to local channels and contacts found over the internet and received twenty-six responses.

**Coding Research Results** The surveys, combined with our interviews, met all of our research goals. Next, we worked to express the findings from all of our research coherently. After struggling to employ traditional coding techniques with our collected research, we used a *findings and recommendations matrix* to merge similar findings and quantify them. Commonly applied to user research, it is a table where, at a minimum, each row has a finding and a recommendation. We decided to further augment its utility by adding the following columns.

1. **Category.** Interventions, Record Keeping, Technology or Workload
2. **Mentioned In.** A list of interviews/surveys that the finding was mentioned in
3. **Importance.** High, Medium, Low or Noted
4. **Remarks.** Extraneous information about the finding or recommendation

Although simple, it allowed us to categorize all of our findings from the survey and the interviews together.

## 3.2 Results

Some key findings emerged from the research. The full findings and recommendation matrix is listed as Appendix A; the most relevant findings are discussed below.

Many of the findings covered how social service workers determine appropriate solutions for their clients. Both in the United States and Paraguay, social service workers rely primarily on experience and often reuse past solutions. In the United States, solutions often involved referrals for other resources, such as government or community-based programs like *Meals on Wheels*. In Paraguay, social service workers reused solutions like having the family start a cleaning business or obtaining dental health. Both groups also often rely on their peers for advice and suggestions. In Paraguay, social service workers had monthly meetings where they could share success stories, severe cases, and ask for help developing solutions.

Since social service workers often rely on experience and recommendations from peers, they met the idea of recommended solutions positively. One social service worker said that recommended solutions would even solve another significant problem in Paraguay. Due to widespread lack of internet access, she was unable to research solutions in the field. A set of recommended solutions, she said, would allow her to explore previously unknown solutions without needing an internet connection.

The lack of internet was reiterated in throughout both interviews and surveys. More than half of social service workers in Paraguay said that lack of internet access "regularly" or "always" impeded their ability to find solutions for a family. The survey also revealed most social service workers had neither

work nor personal computers. Instead, they used tablets supplied by the foundation and personal phones for work. Unlike Paraguay, social workers in the United States usually had designated work computers, either a laptop or a desktop. They also rarely, if ever, experienced difficulties accessing the internet.

Although social service workers primarily use paper to take notes, most respondents also reported using digital platforms for their work. In the United States, nearly every social service worker was using a different platform. Many platforms reported weren't built specifically for social work, including Salesforce, Epic Medical Charts, and Excel. Social service workers using Poverty Stoplight, on the other hand, used a platform called *JSFI*.

In addition to the short digital notes, social service workers in Paraguay keep a physical folder for each family to track their progress. In that folder, they keep the *Registration and Monitoring of Interventions Form* for each family along with *evidence* of the family's progress. When the family goes from red, or yellow, to green, the social service worker has to collect physical evidence of the growth. This evidence takes many different forms; for example, certificates from the city allowing a family to start a business or a before and after picture of the family's kitchen. If the intervention were improving dental health, for example, a would take a picture of the person missing several teeth, and another picture of the person has a beautiful smile. This evidence would then be reviewed by their manager to ensure they are making progress in their cases.

Social service workers in Paraguay helped us understand that evidence had far beyond managerial requirements. When one interviewee was asked what technology she was missing, she answered without hesitation "colored printers." That answer was surprising, but further inquiry revealed that social service workers in Paraguay enjoy showing off the evidence to their peers. They take pride in their ability to help families escape poverty, but in black and white pictures, the progress wasn't clear. One social service worker also mentioned using before and after pictures to motivate families to work towards solving their problems because, as she put it, "we can't do anything for a family if the [mother] is not interested." The idea of uploading pictures in the new Poverty Stoplight platform was met with approval and excitement. One interviewee mentioned that "[pictures] would be fantastic," and enthusiastically added that "video would be even more amazing."

### 3.3 Conclusion

Despite prevalent stereotypes about third-world countries, social service workers in Paraguay utilized technology more than their counterparts in the United States. Social service workers in Paraguay also followed more empirical methods than those in the United States. This difference is due to the Poverty Stoplight methodology. Many of the groundbreaking possibilities for technology to fight poverty, like recommended solutions, require the more empirical approach provided by the Poverty Stoplight. We

also recognized that more technology is necessary to improve communication between social service workers, particularly regarding past and current cases.

Before these opportunities can be realized, more basal needs must first be met. Without reliable surveying functionality, Poverty Stoplight won't be able to grow and more advanced technology won't be useful nor possible. To solve these problems, a brand new mobile application for social service workers is necessary.

## Chapter 4

# Development and Implementation

Using the knowledge that we collected during Formative Research, we'll design and implement a mobile application. This chapter is split into *phases*, each containing a portion of the work done during implementation and separated by some milestone, such as feedback from users or the foundation. Before these phases are discussed, we'll describe some of the techniques that we used for time management to provide a context for the rest of this chapter.

### 4.1 Project Setup

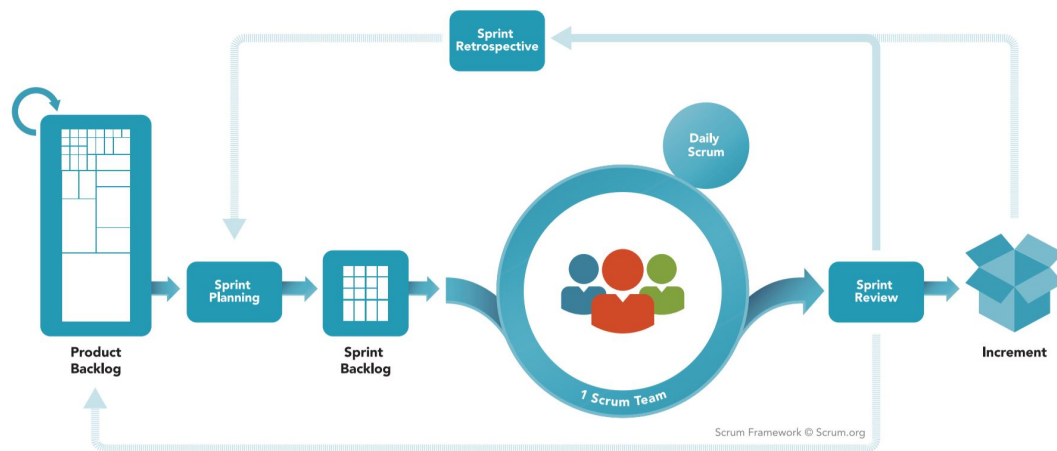
**Tools Helped us Create the Platform** Many tools and processes contribute to the success of a project, but their importance often goes unnoticed. We mention key examples here.

The first tool is *Scrum*, a management framework for tackling complex projects through iterations rather than upfront planning. Throughout development, developers maintain a *backlog* with all the tasks and features required to complete the entire project. Development is broken up into short cycles called a *sprints*. At the beginning of each sprint, the highest priority tasks are removed from the backlog assigned to team members to be completed by the end of the sprint. Every day, there is a *daily scrum*, a ten-minute meeting where team members can update one another on their progress. Each sprint concludes with an update to the application that is shared with the client (in our case, Sodep and the foundation). Lastly, after a sprint is complete, the team holds a *retrospective*, reflecting on what worked well, what didn't, and what could be changed to improve the next sprint. In addition, our team occasionally met one-on-one with each other to reflect on a more individual basis, making it easier to give candid feedback and minimize embarrassment and defensiveness.

Implementing scrum allowed us to adapt quickly to changing requirements from the foundation and recover from unplanned setbacks. Most importantly, it allowed us to deliver a working product every week that we could then receive feedback on from the foundation, Sodep, and social service workers.



# SCRUM FRAMEWORK



**Figure 4.1:** A visual model of each component of the Scrum methodology. Source: (Scrum.org, 2018).

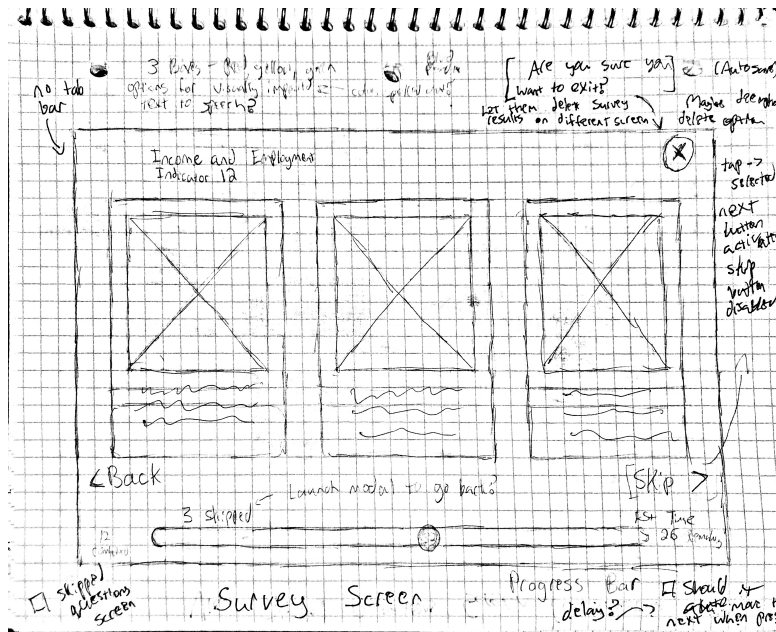
**Technical Tools** We used an online code management service, *GitHub*, to coordinate our development tasks. Our code is publicly available using GitHub, making it possible for both us and Sodep to examine it and download it. GitHub also enables the use of third-party tools to assess code quality, something that Sodep requested that we use as well. We integrated a *continuous integration* service that ran a full suite of tests after every change to the application. These tools help us collaborate and release new versions at the end of every sprint.

## 4.2 Phase 1: Preliminary Design

**Introduction** In the first phase, we planned and designed the user interface of the mobile application. We started by reviewing our findings from the formative research, deciding what was obtainable within the scope of our project, and weighing the value each feature would add for social service workers and the foundation. Next, over the course of multiple iterations, we designed the interface with increasing degrees of fidelity. Finally, after visual designs were completed, an interactive design was sent to the foundation and Sodep for initial feedback.

**Reviewing Research Findings** Some findings from our research broadened our understanding of social work but didn't directly correspond to a specific feature. To make sense of all the results, we



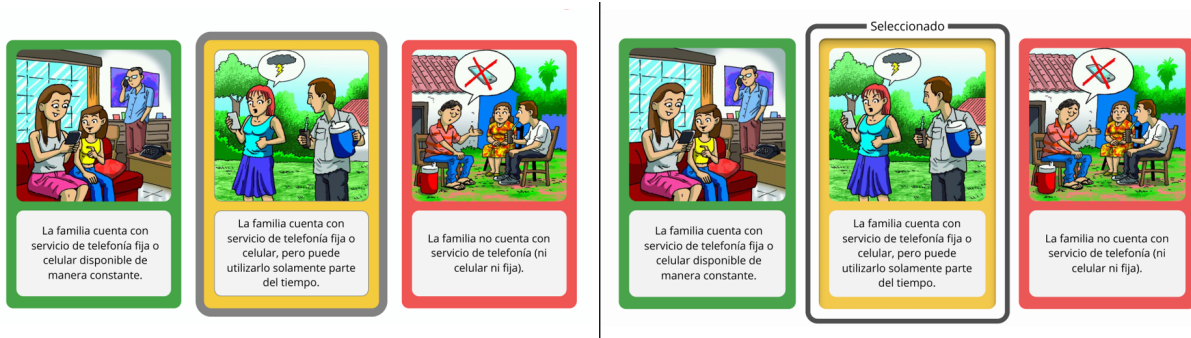


**Figure 4.3:** An example of one of the low-fidelity wireframe designs for the application.

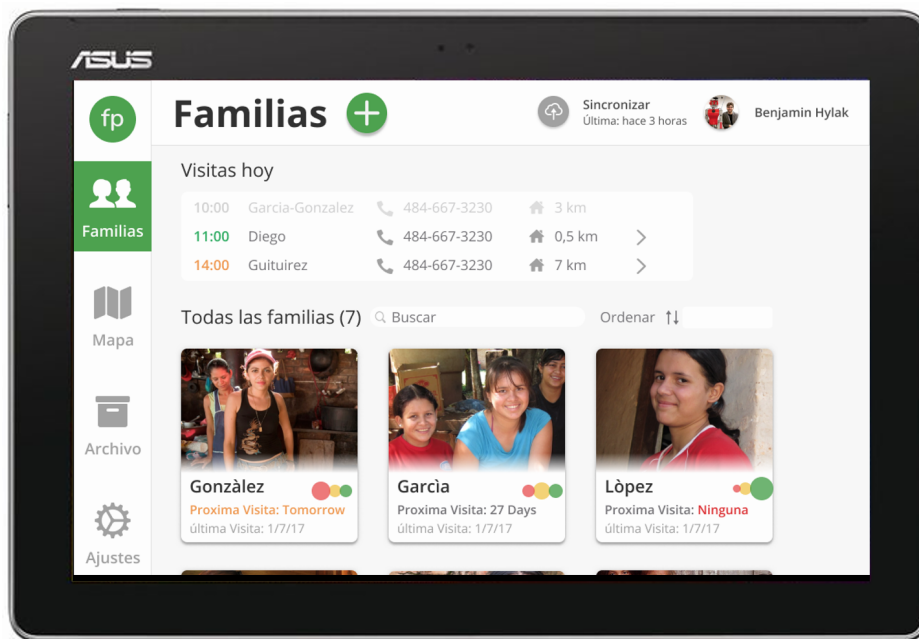
**Structuring the Interface** The old application opened to a screen with two actions available: view past surveys and take a new survey. From our research, it was clear that this design did not reflect the social service workers' mental models of their work with a family; families were more than just a survey result. Our application opens to a view of all the families being worked with. From there, a new family can be added, or an existing family's profile can be opened and re-surveyed. This design also parallels the physical folders social service workers in Paraguay use to store family information in.

Overall, the platform is divided into four areas: Families, Social, Map, and Settings, aligning with our research findings. Social service workers can navigate between these sections using a tab bar without losing their spot (like opening the Map, for example, while looking over a family's survey results).

**Designing for Accessibility** Different sections of the app have different users. The survey portion, for example, is completed by the family. Families, especially in Paraguay, tend to be less experienced with technology. Many design patterns that are obvious to us might be confusing to them. Both families and social service workers could also have disabilities, like poor eyesight or colorblindness. Such limitations were purposefully accommodated by our wire-frames. One example is seen while selecting an indicator. Rather than drawing a connected border (Example 1), the selected state is indicated with a disconnected rectangle labeled "Selected." (Example 2). Another example is text size; all text, especially in the survey section, was made extremely large to promote readability. Even for users without disabilities, both examples can be useful on cheaper tablets, which typically have a lower



**Figure 4.4:** An example of a change in the indicator selector to make it more accessible.

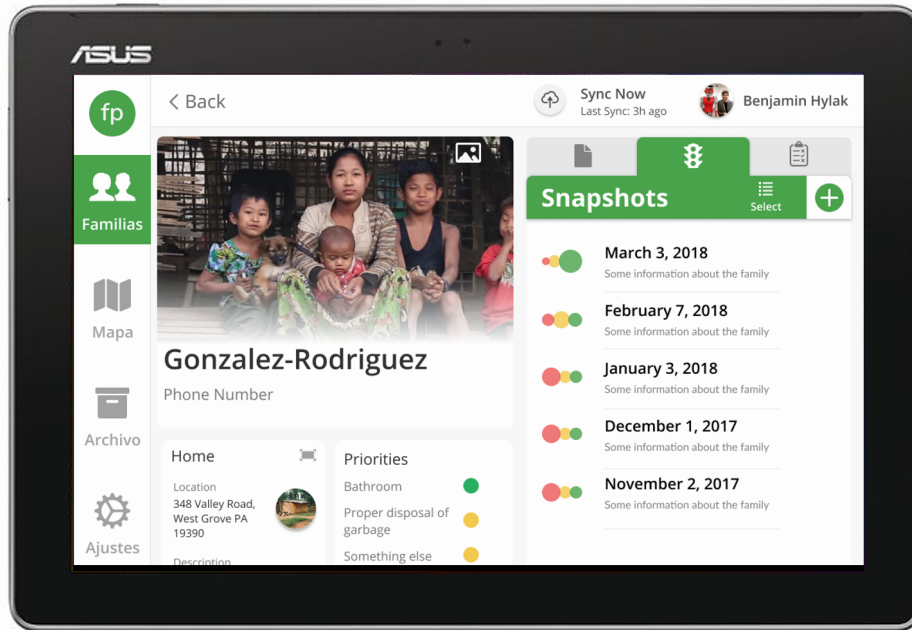


**Figure 4.5:** The design of the application dashboard listing all families at the end of Phase 1.

resolution and narrower color range.

**Emphasizing Visuals** Photos were found to be extremely important to social service workers, so visual content was prioritized in the designs. A family picture was incorporated into the designs and can be seen both on the family's page and their card in the view of all families. We also included before and after pictures that can be viewed when opening up a priority. Likewise, in the indicator portion of the survey, the space available for images is maximized.

**Color and Font choices for the Application** With wireframes finished, we completed the visual designs. We opted to use the foundation's primary color (green) throughout the app. We chose to use Open Sans (a sans serif font) throughout the app. Although Sans Serif fonts are typically known to

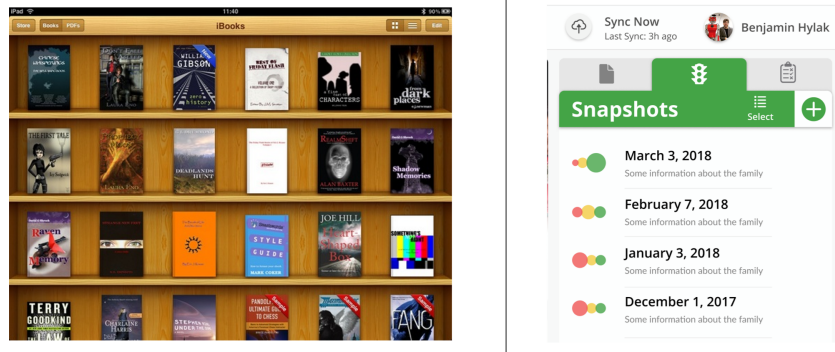


**Figure 4.6:** The design of the application family page showing family information at the end of Phase 1.

have poor readability in large blocks of text, Open Sans is in a category known as *humanist*. Humanist forms are softly rounded and have an axis mirroring that of a pen nib while writing calligraphy. In result, it both looks great as a headline and is readable even at small sizes and low-density displays.

**What Skeuomorphic Design is and Why We Used it** The initial visual designs could be labeled as a mix of both flat and skeuomorphic design. In skeuomorphic design, elements of the user interface imitate their real-world counterparts (like books on a shelf). The family's page, for example, has tabs that separate the family's information. In the initial user interface designs, these tabs somewhat mimicked the tabs of a paper folder. We thought that strong visual cues would make the application more familiar to users with a less technical background (see Figure 4.7).

**Feedback** After completing the visual designs, we assembled a static, but interactive, mock-up. This mock-up allowed Sodep and the foundation to experience the flow of the application without the application being developed. Our main contact in Sodep, Gloria Martinez, along with Gustale confirmed that the designs met the requirements for Poverty Stoplight, requested research supporting our design decisions, and ultimately suggested some minor revisions to phrasing.



**Figure 4.7:** An example from an existing mobile application and our application of Skeuomorphic design.

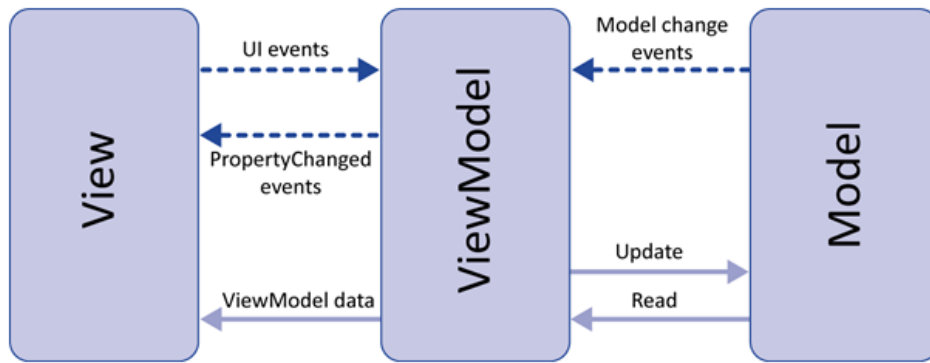
## 4.3 Phase 2: Basic Survey Administration

**Introduction** In the second phase, we implemented a *minimal viable product* (MVP) of the full application. The goal of an MVP is to implement the fundamental features required to get feedback before proceeding with development. In this application, those fundamental features included authentication and the ability to survey new and existing families. After implementation, the first user test was conducted.

**Architecture** Before beginning development, we had to make a number of basal decisions. Our first decision was what language to use. Since the majority of tablets used by the foundation run Android, there were two options: native Android and React Native. Native Android code is written in Java and, most importantly, the developer environment is supported by Google, the creator of Android. React Native, on the other hand, is developed by Facebook and written in JavaScript, but it has the benefit of being cross-compatible between Android and iOS. The cross-compatibility comes at the cost of stability; React Native acts as a layer between the code and the operating system, so any changes Google makes could break the application. Knowledge of React Native is also less common than Java/Android, making it harder to recruit new developers. We determined that the risk of instability and familiarity was not worth the benefit of React Native, and chose to develop in native Android.

Next, we designed the *data model* for our application. The model shows how the data will be represented in our application (for example, our model includes representations of a survey and a family, referred to as *classes*.) To design the model, we created a *class diagram*, which included each class, its functions, attributes, and constructors. The creation of class diagrams also made it easier to communicate the design across the team.

We chose to use the *Model-View-ViewModel* (MVVM) design pattern for our application's structure. This pattern uses a *view model* to mediate between the *view* (the interface) and the *model* (data). The



**Figure 4.8:** The main concepts of *Model-View-ViewModel*, and how it is typically used. Source: (*Implementing the Model-View-ViewModel Pattern*, n.d.).

view model is responsible for updating the view when changes occur and changing the model in response to actions from the view. In addition to MVVM architecture, we designed the classes to support dependency injection. Dependency injection is a method of easily managing and using dependencies within an application. Both techniques significantly improved the readability, testability, and flexibility of the code base. These three benefits contributed to the quick pace we maintained throughout development.

**Working with Sodep** Both our application and the Poverty Stoplight Server was being developed in tandem. As with most development, unexpected changes can sometimes cause regression in functionality. To insulate our development from constant changes to their development server, we set up our local development server. This server was regularly updated, but only after changes were confirmed to be stable.

**Testing from Across the World** Although the development took place in Worcester, the application's users were across the world. This posed a few challenges. Imagine, for example, that a social service worker reported that the application crashed during a survey. Without the ability to directly converse with the user due to language and distance barriers, it would be challenging for us to replicate the exact circumstance that led to the error. The problem might even be specific to the model of tablet they have.

In response, we integrated an issue and crash monitoring framework, *Instabug*. With Instabug, crashes trigger a notification containing detailed logs and all of the steps the user took leading up to the crash. It even allowed us to message the user directly asking for more information if needed. It also grouped all instances of the same crash together, allowing us to more easily identify correlations.

Another challenge was understanding how the app was being used. To capture real-world usage, a platform called *Mixpanel* was used. When users take specific actions in our app, like logging in or opening a family, those actions are recorded as events. We can then reconstruct the full path a user



took to complete a specific goal. Mixpanel also provided detailed information about the time of these events, allowing us to, for example, understand how long each section of a survey took or how long it took for the application to sync.

**Features Implemented** As mentioned previously, the focus of this phase was to implement a minimal viable product. To be minimally viable, the application had to integrate seamlessly with the Poverty Stoplight Server and be functional enough to test the design choices that we made. Specifically, the application needed the following features.

1. Authentication
2. Connect to Poverty Stoplight Platform Server
3. Record a new family
4. Open a family's profile
5. Take a survey with background and indicator questions
6. Upload taken surveys to the Poverty Stoplight Platform Server

Overall, these features gave users the ability to log in and survey families while also being able to work offline. Further features would undoubtedly be needed to be useful, but these features would be sufficient to start collecting feedback.

**Feedback** We received feedback from Sodep during weekly meetings, and from the foundation at the end of the phase. Our meetings with Sodep helped us understand aspects of both the Poverty Stoplight Platform server and web client, and gave us technical requirements that we used as guidelines as we developed the application. The comments that we received at the end of the phase from Fundación Paraguaya, mainly Eduardo Gustale, helped us understand how functionally complete the application was in regards to basic Poverty Stoplight surveying.

Sodep informed us about the technology that our application should work on. Throughout the phase, Sodep assisted us with using the Poverty Stoplight Platform server and web client to connect our application to it. We also discovered that instead of a minimum Android version of 5.0 and 8" screen requirements that we originally thought, we would need to support screens as small as 7" and a minimum Android OS version of 4.4. They also mentioned that it is it would be challenging to try to update the application once it is in use, and suggested that we find some way to send notifications through the application for new versions.

We used Eduardo's feedback understand what we should prioritize going forward. Eduardo said that the most critical feature missing was the family Life Map. Core to the Poverty Stoplight methodology, the family *Life Map* empowers families to take control of their situation. The life map was a



physical calendar where red, yellow, and green stickers indicated a family's status for each indicator. This helps a family identify not only their weaknesses but their strengths as well. With this, the family can specify what they want to prioritize solving along with the strengths that they are most proud of. While the families would still receive a physical version to keep, adding the life map to the application allows social service workers to quickly identify the family's priorities, strengths, and weaknesses. He also mentioned that the indicator questions were great and that they should stay in a locked horizontal orientation, but that other parts of the survey didn't also need to be horizontal.

Lastly, we used our newly added analytics tool to better understand how the application was being used. We noticed that members of Sodep and the foundation were using the application primarily while holding the tablet vertically, not horizontally like we had originally expected and designed for. We also noticed that the application was periodically crashing during normal usage, a problem that we would certainly need to address.

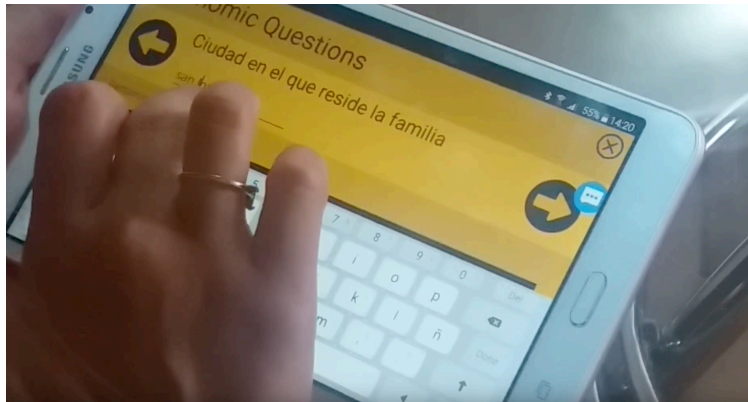
## 4.4 Phase 3: Family Information and Redesign

**Introduction** In the third phase of implementation, we added the ability for families to choose their priorities and redesigned significant portions of the app in response to both analytics and feedback from the foundation. At the end of the phase, we conducted our first usability test with users in Paraguay.

**Supporting Older Devices** In the previous phase, issues specific to older versions of Android were identified. Fonts weren't loading, buttons were missing text, and crashes were prevalent. Although we were performing limited tests on older versions, we had no standards tests, so small details would often go unnoticed. In this phase, we developed what we called a *pre-flight checklist*. This checklist detailed tests we would manually run through on each Android version before releasing a new update of our application. It covered all of the major user flows and pointed out common problems to look for.

**Adding a Life Map** When Gustale reviewed the app, he emphasized the importance of the family Life Map. In this phase, a digital version was implemented. After a family is finished answering the questions in a survey, the family can choose what red or yellow indicators it will prioritize. To add a priority, the family must answer three questions.

1. Why don't you have this?
2. What will you do to get it?
3. When will you have it by?



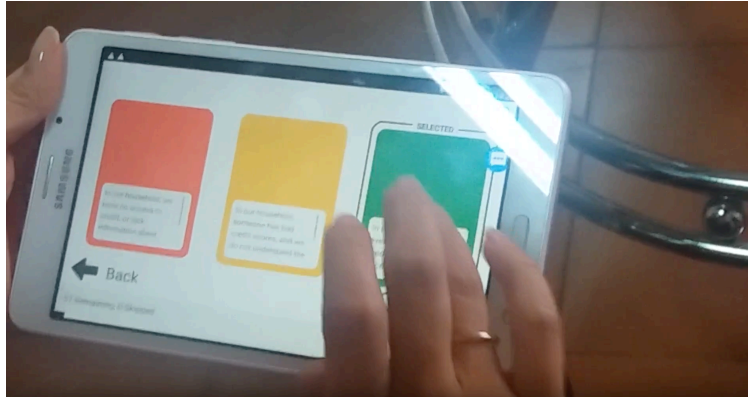
**Figure 4.9:** The keyboard used so much space that there was little room for survey questions.

After answering these questions, the indicators selected as priorities are highlighted in the life map, and the detailed responses are displayed to the side of the life map. In this phase, the life map didn't yet support adding indicators that the family was proud of.

**Family Profile Redesign** The original designs of the family profile had a few flaws. We realized that along with the explicit feedback about needing to support 7" tablets, the primary usage of the application vertically was not what we originally expected. The application was designed to work exclusively for landscape mode. We realized that the application is-prioritized content with more than half of the screen used for the family's picture and address, leaving room only for a narrow list of indicators on the side. Lastly, as we planned for additional functionality (like taking notes, or viewing progress), we found there wasn't much room available. In response to these issues, we redesigned the family profile to make better use of the available screen real estate and to support future functionality better. With the new found space, the small indicator list was changed to the full family life map.

**Results** At the end of the phase, Gloria Martinez from Sodep assisted us by running usability tests with three social service workers in Paraguay. A usability study is an evaluation method where potential users' actions are thoroughly recorded during their first use of the application with limited prior instruction. The focus of the research is to understand how usable the application is. We use this method of feedback in future phases as well because it tends to be clearer than written feedback. Each session was recorded on video and Martinez took notes on verbal feedback from the participants (Appendix O). These videos and notes held some valuable feedback.

The analytics we collected after the second phase seemed to indicate that users normally held the tablet in a portrait orientation while using our application. The usability studies further confirmed this. The redesigned family page supported this well, but the survey section only supported landscape orientation. Furthermore, when typing responses, the majority of the screen was taken up by the on-screen keyboard. This resulted in poor usability, particularly on smaller tablets (Figure 4.9).



**Figure 4.10:** An image showing the affect of a slower Internet connection on the indicator images (appear to be missing).

An issue with the application's color scheme became apparent. The app was originally designed to match the theme of Poverty Stoplight; red, yellow and green. Green was used as the *active* color for buttons throughout the app, and yellow was the background color of the survey. Due to the strong association of these colors with Poverty Stoplight, users repeatedly thought the colors had an alternative meaning. For instance, they thought the green button on the family page meant the family was out of poverty and the yellow background color of the survey seemed meant the family was in poverty.

The Internet connection being used in Paraguay was slower than the United States, leading to two separate issues with syncing. Because indicator photos were downloaded during the survey, many photos weren't loaded by the time the indicator section was reached (Figure 4.10). Additionally, users noticed that the syncing process would seem never to stop, sometimes lasting for over twenty minutes. This led to additional confusion when families or available surveys didn't show up right away.

Some of the users requested "more friendly text" throughout the application. For example, before choosing priorities, one user suggested adding a message that said: "We invite you to begin your new life." Another user felt that more prompts throughout the app would make it easier for people less familiar with technology (especially families).

Regarding the life map page, users "loved" that the responses were able to be reviewed on the side. When filling out the details for a priority, the responses were mostly positive, but all of the users requested that we ask how many months it will take to complete rather than ask for a specific date. One user specifically mentioned that she "doesn't like deadlines."

Users repeatedly stated that our app was much faster than the old platform. They were also impressed that the responses to questions could be changed at any point during the survey; one user even asked "[how] many times [she could] go back" to previous questions. They also repeatedly mentioned that they "loved" the idea of the family picture, both in the family profile and on the family card. Lastly, they appreciated the ability to quickly submit feedback through the app. With the old application, there was no way to communicate bugs or issues to the development team.

While the user tests were being conducted in Paraguay, we had a visit at WPI from the founder of Fundación Paraguaya, Martin Burt. During the visit, we had the chance to have a one-on-one meeting with Burt and introduce the application to him. He was very impressed by the progress of the application, remarking that "[it] is going to change the world." Later during the visit, Burt presented Poverty Spotlight to some WPI students and faculty members. He introduced the team and the application during the talk and gave us a chance to talk about it more at the end. This was a chance to share the progress of the application with those in the local area.

## 4.5 Phase 4: Design Overhaul

**Introduction** The results from Phase 3 showed that while the application offered many benefits over the former application, there were challenges needed to be addressed before the application could be formally released. In this phase, we standardized styles throughout the application, improved the survey taking experience and addressed many other usability issues. We also fixed some technical issues, primarily with syncing, to finalize the changes needed to release the application.

**Establishing a Consistent Style** After our first usability study, it was clear that major style changes were needed. As mentioned, users thought the green and yellow colors used in our app were conveying information about the family's level of poverty. Beyond the confusing colors, they disliked the look and feel of the application. Text sizes, buttons, and fonts were inconsistent throughout. To solve this, we created a style guide and established a consistent theme for the application (Appendix N). A style guide is a document which defines typography, colors, and common components like buttons and informational dialogues, to ensure that all of the styles throughout the app are consistent. During the process, we picked new colors with a bluish/purplish hue, to replace the colors in the old designs. The style guide also specifies that red, yellow and green can only be used to represent levels of poverty.

Along with this style guide, we implemented reusable components and themes in code and changed the application to use only these components. This makes it easier for developers to adhere to the established style guide.

**Addressing Usability Results** In the previous usability test, users mentioned that they couldn't tell how many questions were left and what section they were on. In response, a progress bar was added which displays the number of questions left and a timeline-like view showing all of the steps in the survey. Users also mentioned that they disliked specifying a particular date for a priority. The previous selector was replaced with a simple control that allows the user to select the number of months (e.g., two months, three months, etc.). Additional instructions and helpful messages were added throughout the application to help familiarize users with the application. One example is series of slides that give

the users an overall idea of what the application does. A search bar was also added to help users more quickly locate a family by name.

**Improved Syncing and Bug Fixes** Some technical issues that arose during user testing were also resolved. Notably, the syncing process required for offline use was taking too long and required too much memory. Reducing the complexity of this process required a joint effort with Sodep to change how the application connects to the Poverty Stoplight Platform server. Ultimately, syncing was modified to only download what was needed, reducing the process from minutes to mere seconds in most cases. Additionally, the application was changed to download indicator images during the first sync so they could be loaded immediately while taking a survey. We also fixed miscellaneous issues related to compatibility, including missing icons and buttons on older tablets.

**Other Added Features** Lastly, there were some still some small features that we added to prepare it for real use. We added support for a location survey question which would give families the ability to record where they live, and improved surveys so that required questions could no longer be skipped. We improved the Spanish translations using suggestions from both an expert at Sodep and a certified translator and added the ability to pause and resume surveys. Lastly, we created a detailed instruction manual with guides for all major features of the application.

**Results** The application came closer to fully satisfying the functionality that it would need to be useful for Poverty Stoplight. To assess our progress and understand what else was needed, another round of usability tests were conducted with a new group of participants. Martinez ran the tests once again and, in addition to videos, wrote down verbal comments.

The application was very well received during these tests. Participants commented that the user interface was extremely simple and well designed. One user pointed out a feature where, upon selecting an indicator, the survey proceeds to the next indicator automatically. This user said they liked the feature a lot, but said a longer delay might help reassure the user that their response was recorded.

The application performed well with few challenges. The changes to syncing were successful, and users commented that the application felt extremely fast.

Changes to the priority page were also successful. Multiple users said they appreciated how easy it was to add a priority, and specifying how many months it would take was very useful and intuitive. One user commented that selecting the number of months reflected the fact that a priority is a *goal* rather than a task (Figure 4.11). The only complaint received about the life map is that green indicators couldn't be selected as something the family is proud of, a feature we didn't have time to implement in this phase. Users also mentioned that the ability to search for families was extremely straightforward and useful.



**Figure 4.11:** The priority form where a family can explain its priority and decide on a goal for improving it.

One common problem that came up throughout the tests was the inability to specify a currency for income. Without a specified currency, users said that answering those questions would be very difficult in the real world. Also, there was still a difficult to solve the bug where syncing didn't automatically occur when logging in to older devices. This bug confused some users at first, but most quickly discovered the syncing button and syncing worked normally.

With these results in mind, it seemed that some of the newly added features needed to be improved but that there were many issues fixed from our last test. The social service workers who used the app noticed that the application was running more smoothly after the first test and found that overall the features were easy to use. We learned that difficulties with the new location question and automatic syncing would need to be improved before the application could be fully used.

## 4.6 Phase 5: Application Release

**Introduction** Before the application could be successful in aiding the fight against poverty, it needed to be available to social service workers. The main focus of this phase was distributing the application to organizations both by spreading the word about it and electronically releasing it. Along with this main focus, we also made the project open-sourced during this final phase to set it up for future success.

**Release Process** After making some additional issue fixes, we published the application to the Google Play Store to make it widely available. With this publication, social service workers anywhere in the world were able to download and install it on their own devices. This was only the beginning of the application's deployment though. An application manual was written and released in both English and Spanish (appendix U). Furthermore, with help from the foundation, webinars were hosted to demonstrate the application to organizations interested in Poverty Stoplight. The results of this release and the webinars will be discussed in Summative Research.

**Maintaining the Project's Success using Open-Source** With the application released and the project soon ending, the future of the project was in the hands of interested developers (e.g. us, future WPI project teams, volunteers). Making improvements to a large project is difficult. A potential developer needs an understanding of how the project is organized, the project vision, and project conventions. To help interest future developers to advance the application towards our vision, full public documentation all of the decisions made were needed.

With full documentation about how the project started and has been developed, developers can more easily create their own improvements that will fit into what already exists. It informs interested users and developers about whether proposed features fit into our project. With documentation of

our processes, teams and developers will be able to start creating improvements with little time spent on understanding how everything works and how to get set up. Providing this assistance will encourage interested developers to make contributions and maintain the success of the project.

To fully document the project, all information shared in this report along with other decisions made were formatted and included on *GitHub*, our open-sourced tool. To list all of the project's history and vision, we used GitHub's document-style Wiki feature, and to explain our current progress and future work, we used GitHub's issue system.

There are also technical challenges to make the project open-sourced. With a small team who can communicate face to face, it is easy to enforce common conventions and processes so far. However, accepting improvements by other developers requires a more automated solution which can both run custom quality checks on their code and publish new versions of the application automatically. This serves two purposes. The first is to any wasted time between when a contribution is submitted and when approved. Another purpose is to ensure that the project continues to be developed in a maintainable way, ensuring that no human error by future contributors will introduce major issues in the project.



## Chapter 5

# Summative Research

**Purpose** To understand and evaluate our released application, we collected summative user research from social service workers. The purpose of the research was to determine the success of the implementation completed thus far and aid future development.

## 5.1 Methodology

Creating a Research Plan First, a research plan was created. The full research plan can be found as Appendix Q, but the goals and methods performed will be discussed here. Our six research goals are as follows:

1. Efficiency
2. Learnability
3. Satisfaction
4. Stability
5. Aesthetics

Performance relative to the previous platform Two methods of gathering information were identified: surveying and usability tests.

**Surveying** To formulate the survey questions, we began by researching existing surveys commonly used to measure usability of new platforms. Two applicable surveys were found. The first survey was the USE Questionnaire (Usefulness, Satisfaction, and Ease of Use). The questions in the USE Questionnaire fulfilled the first four goals of our research plan. For the fifth goal, aesthetics, questions from the SUPR-Q (Standardized User Experience Percentile Rank Questionnaire) were integrated. Questions



**Figure 5.1:** A photo of a member of Fundación Paraguaya using the application.

for the last goal, performance relative to the previous platform, were mostly derived from those two surveys as well. All survey questions are listed as Appendix R.

**Survey Audience** A link to download the application from Google Play Store was sent to a select group of testers from Paraguay, Sierra Leone, Argentina, and the UK. Their progress and usage were monitored over the course of seven days, and the group was then sent a survey.

**Usability Tests** Usability tests, much like those performed throughout implementation, were once again conducted. To reach a more rural audience, we recruited the help of WPI students on IQP in Cerrito, Paraguay. The students, Andrew Gringeri and Liana Nguyen, were interested in continuing the project as an MQP and wanted to see the application in action. We sent the students the user manual for the app, asked them to download the app, and arranged for tablets to be delivered to them from Fundación Paraguaya's headquarters in Asuncion, Paraguay.

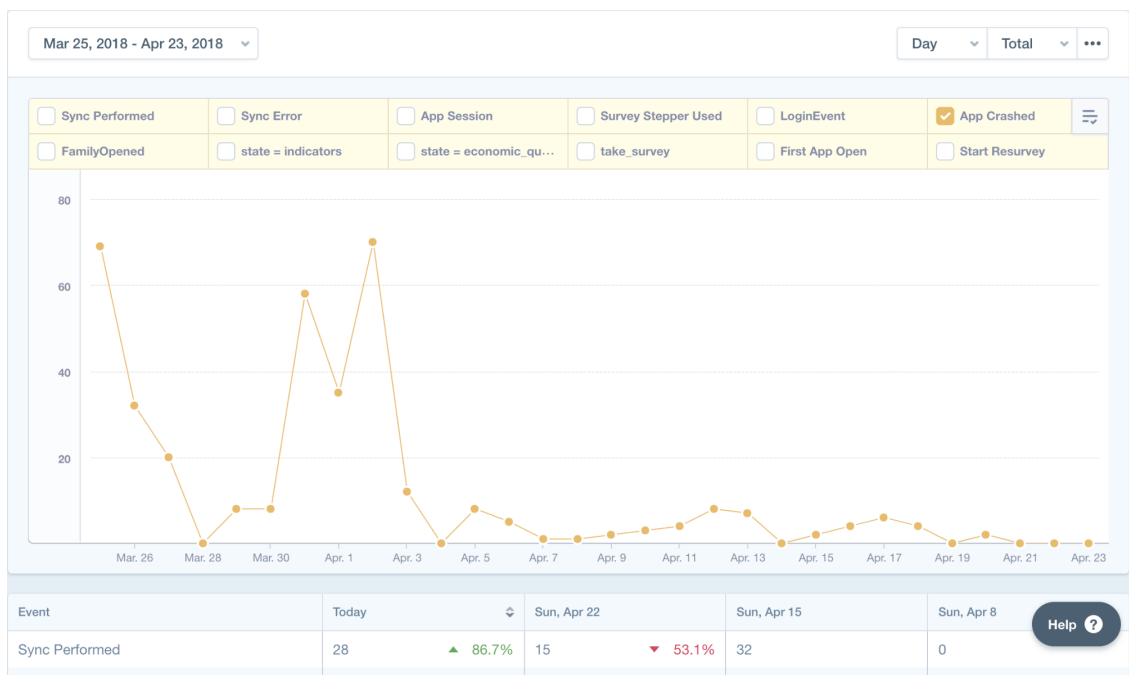
## 5.2 Results

**Introduction** The results of the surveys and usability tests helped evaluate the success of the project. The foundation's feedback was also essential to the evaluation process. The success of the application is mainly defined by its readiness to replace the previous Poverty Stoplight platform.

**User Test Results** User feedback helped judge the readiness of the platform and indicate what could be improved moving forward. All of the survey results are available as Appendix S, and pictures from our final usability tests can be seen in Figure 5.1. Overall, social service workers thought the application was extremely easy to use. They strongly agreed with statements like "the app required the least number of steps possible in order to accomplish any given task" and "it is easy to use" (mean of 4/5). They also thought that the application was easy to learn: "I learned to use it quickly" had a median response of 5/5. Many survey takers praised the stability in the free response section, noting that it was one of their favorite aspects of the new application. Many social service workers said that their favorite aspect of the application was how it was divided into families (a difficult design choice we made early during implementation). Respondents also indicated that they loved the summary feature at the end of each survey, and wished to see the same implemented on the web client. Comparing the new application to the old one yielded the most positive results. Users thought that the new application looked more pleasant than the previous one. A user included in the usability tests said that "the app is more streamlined' than previous versions." Usability testers were able to complete all of the required tasks without any major difficulty. The only usability issue that came up was that some users would accidentally skip the priorities section, not realizing that they survey would be submitted after. Some users reported minor bugs while using with the application, but others said that the stability was their favorite part of the application. Despite this discrepancy, all social service workers said that it was more stable than the old application. Stability of the application was also shown by the significant drop in the rate of crashes throughout the development process, as reported by our analytics platform.

**Replacing the Previous Platform** The foundation accepted the new mobile application to be their next generation Poverty Stoplight platform. Eduardo Gustale's feedback was positive, and he showed great enthusiasm for using the application in the foundation. Gustale gave valuable suggestions for future development with great optimism of the future of the application. The foundation's acceptance of the new application was also conveyed through their efforts to spread it among Poverty Stoplight users. The foundation hosted two webinars, one in Spanish and the other in English to introduce the application to users from all over the world. Fifteen people from multiple countries showed up to each of the webinars. The foundation also presented the application to seventy officials from government and non-government organizations in Argentina.

**Application is being used around the world** Users met the application with great enthusiasm. The application is being used all over the world in several countries including Paraguay, Sierra Leone, Mexico, Colombia, South Africa, United Kingdom, and Argentina. Moreover, the foundation's efforts to spread the use of the new application persist.



**Figure 5.2:** A snapshot from *Mixpanel* visualizing the application usage over time.

## Chapter 6

# Conclusion and Future Work

### 6.1 Conclusion

**Summary** We set out to understand how technology can be utilized to address poverty and develop a field ready, a mobile application that serves as an example of our findings. The research performed has met both objectives.

**Objective 1: Technology to Eliminate Poverty** The area of using technology to address poverty is under-explored. Just in our research, we already discovered new ways technology could optimize the job of social workers. An example of that is using pictures to motivate social workers to share success stories with peers and families. More research in this area will undoubtedly create opportunities for more innovative ways of utilizing technology to eliminate poverty. Both the success of our mobile application and the excitement expressed by social service workers shows they are welcoming to new technologies.

**Objective 2: Poverty Elimination Application** Our mobile application is currently being used in Paraguay, Sierra Leone, Mexico, Colombia, South Africa, United Kingdom, and Argentina. Social service workers use the application to perform their job with less technical complications than the previous platform. Consequently, social workers can more efficiently help families step out of poverty. Over one hundred social service workers have installed and started using the application. Our software application, combined with the power of the Poverty Stoplight methodology, is revolutionizing how poverty is treated.

Poverty Stoplight operates in twenty countries and fifty locations, and even more social service workers will soon be using the platform. And as Poverty Stoplight is implemented in more communities, such as Worcester and New Orleans, the mobile application will continue to grow in usefulness. Furthermore, we think that with more data being collected by the platform, it will be possible to explore technological innovations, like machine learning techniques, to even further enhance the capabilities

of the application.

## 6.2 Future Work

Our research suggested many more tools than what we could have added to our platform in our short time with the project. We'll summarize our recommendations for potential next steps with the project. Each of these recommendations is based on the information we collected during research and user feedback; however, more in-depth research on their impact and potential implementations should be considered.

- **Solution Recommendation System:** Once enough data is collected, machine learning could be used to recommend appropriate solutions for a given problem, based on the family's location, level of poverty, and other factors. This would enable social service workers to research alternative solutions, even without an internet connection.
- **Social Network:** Social service workers take pride in their work and enjoy sharing their successes with peers. Incorporating a social aspect would unlock proven tools such as social reward and electronic communication, tools that could make their work more enjoyable and effective.
  - **Social Reward:** Poverty Stoplight has used social reward as a motivator for eliminating poverty, such as the "My Bathroom, My Kitchen, My Pride" contest. Further incorporating social reward to encourage either social workers or families towards resolving poverty will make the application more effective. Our research also showed that before and after pictures are strong motivating factors for social workers, especially social service workers in Paraguay.
  - **Sharing:** Giving social workers the ability to share the status of the families they are working with to either demonstrate their success or ask for help. This would help social workers better communicate to solve difficult situations.
- **Data Visualization:** Visualizations of poverty could be helpful tools in understanding poverty on both a family and regional level.
  - **Geospatial View of Poverty:** A view showing all of the poverty data for a region, overlaid on a map, would enable social service workers to identify geospatial trends within communities, cities and even regions. Ideally, social service workers would be able to filter by an indicator name or color.
  - **Family Progress:** Understanding how a family has progressed over time is an important measurement for the family, the social worker, the organization and even interested future

families. Adding visualizations which better indicate a family's progress over time and current level of poverty would help accomplish this.

- **Note Taking:** A place to enter unstructured notes will add a significant amount of value to this platform.

## Chapter 7

# Glossary

**(Mobile) Application** The Android app discussed in this paper

**Asesora** A social service worker in Paraguay

**Class (Programming)** A part of an object-oriented computer program used to act as a placeholder for something a computer could not otherwise understand. Classes consist of fields (attributes) and methods (actions)

**Class Diagram** A type of static structure diagram which follows the Unified Modeling Language (UML) that describes an application by showing the classes used and their attributes, methods, and relationships among other objects

**Client** The individual who is being helped by a social worker

**Family** The client of an Asesora

**Foundation** see Fundación Paraguaya

**Fundación Paraguaya** The foundation in charge of developing and running Poverty Stoplight

**Poverty Stoplight Platform** The software platform consisting of the Web Client, the REST Server, and the Mobile App

**REST Server** Database system using Representational State Transfer (REST) which allows for interoperability for different operating systems



**Social Service Worker** A person who helps individuals or families with social problems, particularly poverty

**Social Worker** A certified person who helps individuals or families with social problems, like poverty or welfare

**Sodep** The software development company working on the Poverty Stoplight Platform, namely the REST Server and the Web Client

**Web Client** Sodep's website front end used to manage families and the REST Server  
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# Appendix A

## Formative Research Plan

### A.1 Goals

(what do we need to know when we're done)

1. Understand social worker's journey in helping a family
  - (a) Steps the social worker takes to complete task currently
    - i. Both in context of poverty stoplight and in general
  - (b) How they assess a family's situation? How do they prioritize problems?
  - (c) Average time it takes to assess a family's situation and assign solutions?
  - (d) Where do social workers look for solutions? (Past experience, coworkers, government)
2. Discover various personas of social workers
  - (a) Are there specialized social workers?
  - (b) How do work styles differ between social workers?
3. Find pain points in the current process
  - (a) How much do they interfere with your work? (Enough to use our program?)
  - (b) How much more efficient would they be without these pain points
  - (c) Is their work ever repetitive? (Duplicated between families)
4. Understand how information is stored/kept
  - (a) How do they organize their information? Where do they keep their records?
  - (b) Privacy regulations (HIPPA?)
  - (c) Can they share information with other social workers anonymously?
5. Understand social workers technology situation (e.
6. in daily work)
  - (a) How much do they use technology today?
  - (b) What technology do they use?
  - (c) Where do they do their work? (e.
  - (d) Internet access, office/in the field, desktop/mobile)
7. Understand family's technology situation
  - (a) Family's access to the internet, computer vs mobile
8. Understand how social workers interact with family
  - (a) How often do they meet with family(timeline)?
  - (b) Are the meeting scheduled usually or emergency calls? How often do they communicate with the family?

- (c) How do they communicate (text, email or phone)?
- (d) How long do they work with a family for? Why do they stop working with a family?
- (e) How many families do they work with at the same time? How many hours per week for each family?

## A.2 Process

1. Semi-structured interviews
  - (a) Social workers in the U.S. (even if they're not familiar with poverty stoplight)
  - (b) Poverty stoplight folk in countries most similar to the U.S.
  - (c) Poverty stoplight folk in Paraguay
2. Literature Review Goals
  - (a) Information storage
  - (b) How tech is used to help the impoverished today?
  - (c) How machine learning is used to help the impoverished today?
  - (d) How social workers interface with families?
  - (e) Family's access to the internet, computer vs mobile
  - (f) Social worker burnout
  - (g) How many different types of social workers?
3. Recruitment
  - (a) Call local church groups
  - (b) Find professors in local area that used to be social workers
  - (c) Cold call other social work places
  - (d) Email fundacion Paraguaya
  - (e) Find contacts to the UK
  - (f) Reddit

## A.3 Deliverables

1. Designing for quotes (memorable quotes)
2. Personas
3. User Journeys
4. Summary of Research Document

## Appendix B

# Douglas Interview

**When:** 1:00PM, 11/3/17

**Where:** Worcester, MA

**Who:** Ben, Mona, Alex

**With:** Emily Douglas, Director of Social Sciences, WPI

**Memo Written:** 11/4/2017

### B.1 Summary

We started by introducing her to the Poverty Stoplight. She was not previously familiar with Martin Burt or the Foundation. We showed her some of the indicators for Worcester and Paraguay. She seemed to like the idea and she reaffirmed many of the core beliefs (like the data provided by the poverty line being inadequate).

We then moved to introduce our project. We described it as a software portal where social workers will receive a family's results, see the identified problems, and be able to assign solutions. We also mentioned that the portal will have a solution recommendation system that pools from all social workers within a city/state/country as applicable. She said that she liked our idea, and said that a large part of some social worker's job is connecting people with solution. (More on that later)

She commented that 45 minutes, the amount of time we planned to allot for each interview, was far too long. She said that the most we could expect is 20-30 minutes.

She suggested that we group questions thematically.

She mentioned that in the United States, social workers are usually intervening for a reason. For example, child neglect or drug abuse. She said that in a perfect world, these social workers would be doing a holistic assessment of each patient's background, but that rarely happens when they're helping individuals with pretty clear problems.

Instead, we should focus on social workers who provide what she defined as "wrap around services." Neighborhood health centers, bereavement counselors, social workers working with immigrants and refugees.

predictive analytics austin texas, care providers realized they weren't covering the places they thought they were

CSWE (Council on Social Work Education) just introduced technology requirements.

PIE (Person in Environment) and Ecological perspective diagrams: highlights the importance of

understanding the behavior of an individual in the context of the individual's environment in order to assess their situation

She suggested that we use a 4-point scale instead of a 10-point scale on the question about evaluating poverty stoplight

She mentioned that we need to look for social and human service workers to find people that assess all the aspects of families' problems

Project is timely, and important

No single bank of solutions that she knew of and finding solutions can be quite difficult. Solutions are formed from the experience of social workers as well as the experience of the social workers' co-workers.

She answered "absolutely yes" to many of our questions. For example, she said that social workers absolutely discuss their work with other social workers. Information about other cases is also often shared through their supervisors/upper management.

She said that she could connect us with a lot of social workers – she just wanted to know how many and in what capacity.

## Appendix C

# Mongues Interview

**When:** 3:00 PM, 11/14/17

**Where:** Skype

**Who:** Ben Hylak

**With:** Cecilia Mongues, Field Director for Fundacion Paraguaya

**Transcribed:** 11/14/2017

## C.1 Summary

### C.1.1 General

- Use the Poverty Stoplight criteria to identify families in need
- Trying to help women specifically
  - Doesn't try to work with the actions of a husband or children
- Social workers meet together once a month
  - Talk about successes
  - Discuss difficult cases and give suggestions
- Once families express interest, their name is put on a list. They are randomly visited each day.

### C.1.2 Workload

- Social workers work with each woman to decide on priorities and build a plan
- Social workers work with 35 women each
- Social workers have 1 monthly visit with their clients, and two other forms of contact
  - Contact may be call, message, a meeting, etc.

### C.1.3 Solutions

- One complication is when a situation doesn't depend on the family alone
  - E.g. waiting on security, transportation or environment
- One solution for families to help them start a business
  - Train a family in budgeting, saving, etc.

- They give them the means, the family just has to do it
  - \* E.g. sell ice cream to family so they can start selling it
  - \* E.g. provide family with cleaning kit to be able to work

### C.1.4 Record Keeping

- All actions are recorded in an information system
- Each social worker keeps a folder with family activities
  - Includes photos, documents, etc.
- Photographs are used heavily as evidence of what social workers are doing
- They have an app which is used to fill out Poverty Stoplight survey
  - Information is exported to information system
- Information system has option to upload activities
  - Used as record keeping for the organization

### C.1.5 Application Idea

- Thinks that our application idea would be helpful
- Would appreciate being able to upload family testimonies (how their problem was solved)
  - Including pictures
- Every family plan is unique, but it would be helpful to have solutions to build off of
- A history for the family should be available
- Social workers would have four hours to learn a new software
- Talk about sharing contact information with other social workers

## C.2 Transcript

I asked her to walk us through the process of helping people. She said that they have a list of women who are interested in their services from throughout the region. Each day, they randomly pick families off the list and visit them. They survey them and then apply the poverty stoplight methodology.

**Interviewer Note:** Prior to the written transcript, we initiated the call over Skype. Unfortunately, we faced a lot of technical difficulties with Mongues's internet connection. We then switched over to chat, but in real time. I would communicate in English and our translator would write my questions/-comments in Spanish. Below is the transcript in English.

### C.2.1 Transcript

**Interviewer:** You mentioned that you have a list of families that you choose at random – how do the families names get added to that list?

**Mongues:** Fundación P organizes a committee of women who take care of that, we offer them credit and training. But we also have community projects. There is always one person in charge of working with each family

**Interviewer:** Yes but how do you identify families in need?



**Mongues:** We apply the poverty stoplight criteria.

**Interviewer:** Not identify family's needs, but determine which families are in need how do you find the families?

**Mongues:** One of the requirements for women who participate in the women's leadership committee is that they themselves must be of little means.

**Interviewer:** Ah thanks for clarifying. Pivoting a bit, Can you tell me about a time that a solution worked really well for family?

**Mongues:** A lady and her husband have 3 children, all live together and her husband's salary isn't enough - especially if he gets sick and can't work. so in a case like that, we sit down with her and talk about what she needs to know to start or rekindle a business idea. We help her with a business plan and also do follow-up. We train her in things like budgeting, savings, etc. when the lady manages to start some business activity that's generating income, we continue working with her to improve the other indicators. here we have something called "microfanquicias" which are min-businesses. We give them a key to work with. "key in hand" is a way of saying that we give them all they need and they just need to get started. For example, selling ice cream. They just need to get a freezer, so she pays a certain amount, and we bring ice cream to her so she can get started selling.

**Interviewer:** These solutions are really awesome... can you tell me about a time a solution didn't work well?

**Mongues:** Things don't always work out according to the first business plan. But we continue trying things until something works.

**Interviewer:** How do you measure whether or not something works?

**Mongues:** an example is - the first business plan we offer is our cleaning kit - because it's cheap and you have to start somewhere. The lady may choose not to buy a kit. And later on she winds up selling grilled meat outside her house. Since all the ladies are in a committee, they motivate each other. There's one case in a city near Asuncion - a family of 3: husband wife and daughter. The husband has a good job, and he's able to provide well for his wife and daughter. This lady applied the Stoplight parameters and realized that she needs some side activity to generate income that could help in case her husband gets sick or something similar so she enrolls in a decorating class. And when it's over, she opens her little business and does decorating for events. As a solution for some of the indicators, we also offer courses for the ladies to participate in. and besides improving her own bathroom, kitchen, atmosphere, with the group's help - she can win a prize - and her group also can win.

**Interviewer:** There a ton of different solutions available for different problems... How do you keep track of all them? Do you document what works and what doesn't somewhere?

**Mongues:** We record everything in our system, like the various activities that we undertake. And each lady keeps a folder with photos, documents, etc. We use the photos a lot, as record/evidence of what we're doing. We have training records.

**Interviewer:** Ah I see - if one asesora has to stop working, does she pass off the folder to whoever is taking over?

**Mongues:** exactly. We also work by zones.

**Interviewer:** Do the asesoras communicate with each other about what they've tried and what works well? How do they do that?

**Mongues:** We have monthly meetings with them. And we talk about successes, and if they have a difficult case, they share it and we give suggestions.

**Interviewer:** Ah that's great, I'm glad there's a form for everyone to communicate what works and what doesn't. What's the typical caseload like for the asesoras? How many families are they working

with at the same time? How often do they communicate with those families?

**Mongues:** Now, they are working with 35 ladies, and they have a monthly visit and two contacts. The contacts can be phone calls, messages, a meeting with the committee, etc.

**Interviewer:** Ah I see – that’s really helpful. Can you tell me about a time you felt a little overwhelmed at work? What factors caused that?

**Mongues:** It gets complicated when the situation does not depend on the family alone. For example the environment or security or transportation (roadways). And to solve the problems, we have to wait for those solutions and that takes more time. To get the city or governing body to respond, a written communication can be too late - or to get the electric or water company to do their part. Things also get complicated when there is violence in the family.

**Interviewer:** Yeah, from past conversations I’ve heard how frustrating it is when things are outside your control. Can you tell me a bit about how you use technology at the foundation today? Like when the family fills out the survey, how do you get those results and then look at them?

**Mongues:** Our Foundation has an app that can be used on cellphone or tablet. One of the ladies does the self-evaluation questionnaire with them, and it can be exported over to our info system. In the app, you can also load (upload) the various interventions, and once this info is migrated over to our system, you can preview or print it.

**Interviewer:** Can you tell me a little bit about how you create the roadmap for the family? (I think that’s the term they use). Like, beyond the top 5 priorities, do you create a plan for the future

**Mongues:** At the end of the self-evaluation, we talk to the family about its strengths. And that’s the info we use to figure out what their priorities are to get to work on afterward, the training activities commence

**Interviewer:** But is there any plan beyond the monthly priorities? (like plan for future months) also, which lady? is that the asesora or the mother?

**Mongues:** Every woman builds their own plan step by step. The lady in the family.

**Interviewer:** Ah okay – great to know. I’m going to pivot a bit to our solution to get your feedback. \*feedback on our project We are creating a computer program that will enable social workers to more efficiently help impoverished families. After a family completes their Poverty Stoplight survey, the results will show up in their social worker’s web portal. The social worker will go through the family’s problems and assign each a solution. Depending on the problem, a solution could be a government service, a family budget, or implementing weekly chores. For each problem, there will be a set of recommended solutions. The recommendations are solutions that have worked for similar families. For example, if a family is having trouble with literacy, and other social workers in the area have found great success with a specific government program, that program will be recommended for the family. Or, if the family needs immunizations, a clinic that is just a mile away from their house could be recommended. The recommendations are based on the input of all social workers in a certain city, state, or country (as applicable).

**Mongues:** Excellent! That is really going to help so much! And also it would be good if they could upload testimonies. Wow - this is really great - extremely useful really good - we don’t have a tool like that. It would be really useful to be able to use that program.

**Interviewer:** What do you mean by testimonies?

**Mongues:** Stories about successful cases. How different families managed to solve their problems.

**Interviewer:** Ah perfect – yes. But the social worker would input that?

**Mongues:** yes they could upload it. Upload pictures (they use pictures as like documentation/evidence... quick and easy solution)

**Interviewer:** Thanks so much for that feedback – especially that pictures are helpful. That’s definitely something we will incorporate. How do you feel about the list of recommended solutions for each of the family’s priorities? How helpful would that be to you? \*How could you see yourself using that?

**Mongues:** Though every family has its own (unique) exit plan, it really helps to have a variety of possible solutions - so they can take advantage of some (of the ready-made suggestions) and generate other (solutions). I think the listed solutions would be used.

**Interviewer:** Awesome glad to hear that would be helpful. Okay lastly two more things do you have any concerns or things you think could go wrong? And is there anything else we should add? Oh also how much time would you and your reports have to learn this new platform?

**Mongues:** Would there be any limit on the number of women who could upload the data?

**Interviewer:** Nope! It should have some area to put in a history of everything that was done [implied: by PS for the family]

**Mongues:** And as for time - hours in a day? Or days in a week? (how much time to learn the new program)

**Interviewer:** Just hours – doesn’t matter whether it’s in the same day. Just a rough estimate.

**Mongues:** I think 4 hours.

**Interviewer:** Great – okay well I don’t want to take too much more of your time. I’ll follow up over email just to see if we missed anythings. Cecilia thank you SO much for all of the time – this was extremely helpful to us and will definitely shape where we go with the project. We’d love to talk to as many asesoras as possible, so if you know anyone who would have 40 mins this week (actually 40 mins this time – we’ll do a phone call) let me know! I’ll mention that in the email as well. Thanks again for your help – I’m sure we’ll be in contact again soon. And sorry for all the technical difficulties.

**Mongues:** Fine - how should we do it? Should I give you their numbers? And thanks to you also - we are happy to be a resource for anything you need.

**Interviewer:** Yes that would work just fine. You can also pass along my email so we can schedule a time.

**Mongues:** I’ll talk to them and pass on the information.

## Appendix D

# Asesora #1 Interview

**When:** 11:00AM, 12/11/17

**Who:** Ben Hylak and Mona Elokda

**With:** Asesora #1

**Transcribed:** 12/11/2017

**Summarized:** 12/11/2017

## D.1 Summary

- Job nature
  - Family selected randomly
  - Visit the family and give them the survey
  - Follow up through text or in person to talk about areas that need the most help
  - The families become a part of the foundation when they request microfinance credit and they select the families from those people who receive credit
- Caseload: 45 families as an annual goal
- First contact
  - Usually scheduled by phone. Sometimes they just go straight to their homes
  - There's always at least one family member that has a phone
- Interventions
  - Interventions that worked really well
    - \* Dental checkups for everyone in the family. They have contracts with dentists that give clients discounts. One visit usually makes a difference. They use pictures as evidence for that.
    - \* Gynecological tests and checkups for women
  - Evidence
    - \* Usually before and after pictures
    - \* Sometimes other forms like doctor's orders or results of medical tests.
    - \* They take a picture of them usually with their personal phone (sometimes the tablet)
- Record keeping
  - Folder that includes handwritten notes, test results, and signed documents by families.
  - Notes are both in app and paper notes

- \* The app is just to record what steps they're taking with the family.
- Follow-up form
  - \* Registration form and monitoring of interventions"
  - \* It's a follow-up form for until they pass to the green
- Access to internet: Always on her cell phone but not the people she visits.
- Project-specific
  - What would be good
    - \* Uploading evidence instead of just notes
    - \* Proposing solutions would give them heads up for solutions to use with the family.
  - When and where solutions are given
    - \* There aren't many solutions to be given then and there
    - \* Government related interventions take the longest because paperwork takes a long time
  - Follow-up
    - \* The app would be great to interest people to be more willing to drive themselves out of poverty
    - \* Would be great to be able to show them successful stories in colors on the tablet

## D.2 Transcript

- General
  - We begin by selecting a family randomly.
  - They go to the house of the family and talk to the woman of the house and talk about the program and the family's situation
  - Give them the survey
  - After getting the results they follow-up with her with the areas that needs most help.
  - Follow-up through texting or in person.
  - Depending on their needs they do training for them to make steps towards solving their problems.
  - The families become parts of the foundation by requesting microfinance credits.
  - They make the random selection from these people who receive credit.
- Caseload
  - 35 women who represent 35 different families (annual goal).
- First contact
  - First visit: they know where some of them live already. They know their phone number and address. Sometimes they go right there for the first visit. In other cases, they call them first and schedule a visit.
  - Usually scheduled by phone.
  - Never worked with a family who doesn't have a phone (one member usually at least has a cell phone).
- interventions
  - Intervention that worked really well
    - \* Dental checkups for everyone in the family
- Contracts with dentists that give clients discounts and service

- After one visit they could move up to green from yellow or red in the dental area
  - Evidence: Taking pictures. Especially with older people. Example, missing several teeth, and in the after, they have their new teeth.
    - \* Gynecological tests and checkups for women
  - Before and after pictures
    - \* Not always pictures
    - \* Other forms of evidence
- Doctor's orders
- Or results of medical tests
- They take a picture of them with the personal cell phone or their tablet (more the cell phone)
- Record keeping
  - Folder that has separate sections in it
    - \* Hand written notes
    - \* Results of tests that moved a family from yellow/red to green
    - \* Have the document signed by the family affirming that it's theirs
  - There's both notes in the app and also paper notes
    - \* Written documents can become a part of the file in the app
    - \* The app is just to note what they're doing in real life. Example, today I met so and so and encouraged them to go see a doctor.
    - \* In her case, the app actually tracks what they're actually doing with the families
  - Two paper forms
    - \* A progress form and the second one.
    - \* Tracking or monitoring the interventions.
    - \* It's one long name Registration form and monitoring of interventions"
- They keep this form from the start to follow-up to finalizing the intervention
- It's a follow-up form
- Follow-up until they pass to the green level (average 9 months)
- Access to internet
  - She has internet on her cell phone
  - But not usually the people they are working with
- Project-specific
  - Sounds good. Would really make her happy
  - What would be good
    - \* A way to document the evidence of successful project through an intervention
    - \* Better than Having just notes
    - \* The ability to upload the evidence would be really helpful
    - \* Proposing solutions would be really helpful because that would give them heads up for solutions to use with the family.
  - When and where solutions are given
    - \* Right now there's a lot of solutions they can give them immediately
    - \* A lot of the women are kind of lazy, so sometimes you don't know immediately if they need health care, so in this case they will need to be followed up on.
    - \* The ones that take longer are the ones that include government program like water problems where they have to write a note to a higher authority. These things need to be done by the family and cannot be directly affected by them. So they would need to

follow up on that.

- Follow-up
  - These ways of looking at the needs and coming up with possible solutions after looking at their needs would save them a lot of time.
  - They really can't do anything for the family if the family is not willing, so anything that might help them interest her to help her reach her goals would be great.
  - One thing she finds useful is to tell her a success story of a woman who moved to green. That helps motivate people who can't motivate yourself.
  - It would be a great idea. It would be really awesome because they would be able to show the people what they could do in a very dynamic way. It's great to have a way to show them that on a family.

# Appendix E

## Asesora #2 Interview

**When:** 11:30 PM, 11/24/17

**Who:** Ben Hylak, Bridget Hylak (Interpreting)

**With:** Asesora #2

**Summarized:** 11/24/2017

### E.1 Summary

- Each person is working with around 35 families per year
  - Depends how fast people graduate out, but they work with 5 different committees and 7 women randomly selected (no selection process) from each group
- They meet with all 7 women at the beginning of the year
  - They don't meet with all of them together again
- Then they do follow up meetings, once per month, and have two other contacts. (Phone call, email)
- When asked how they record progress
  - "Certified" out of green
  - They provide "evidence" that they made progress
    - \* evidence includes invoice of something they purchased
    - \* Proof client paid for something
    - \* Photos
    - \* Proof of purchase of things to help them do their job
    - \* Certificate from city that they have permission to do this business
  - Asesoras take the pictures
- They give every family a notebook and folder
  - Every asesora does this
  - Family records progress throughout the month in the notebook/folder, any documents, and then the asesora scans it all and puts it into the foundation's database
    - \* Note from Ben: does she mean google drive? We need to clarify exactly where this data ends up
- Access to Internet (this came up multiple times)
  - She said that access to internet really varies and it's nonexistent where it is needed the most,



- What she liked about the survey app is that it can be used offline, but it syncs to the database the next time they connect
- When asked about the recommended solutions, she answered that she really liked it because sometimes they don't have the internet to look up what the solutions might be. (She didn't know that we were planning on needing internet connection for this)
  - \* So, we would have to design it such that the recommended solutions sync whenever the tablet is connected to the internet but can still be used offline
- Seems like the asesoras primarily use tablets in the field. We will need to verify this. It seems like they come up with solutions in the field as well. We will need to clarify this.
- Ben's Notes
  - How they access the survey records? (Like how do they look up someone's records)
  - "Creditos" – is this in an academic sense?
  - We need to learn more about the notebook/folder system that they give to the families and how they digitize that into the system
  - We need to learn more about the tech that they use in the field, particularly whether or not they ever have a laptop or if they're just using a tablet. We also need to think more about how they come up with the solutions
  - What about the automated scheduling system?

## Appendix F

### Asesora #3 Interview

**When:** 3:00 PM, 12/04/17

**Who:** Ben Hylak and Mona Elokda

**With:** Asesora #3

**Transcribed:** 12/04/2017

**Summarized:** 12/06/2017

#### F.1 Summary

- Job nature
  - Families are randomly selected from a database of 1390 families.
  - Schedule visits over phone calls, text, Whatsapp, give them the survey, explain the situation and classify elements in red, yellow, and green.
  - Come up with a starting plan and discuss it with the family.
  - Shes in charge of one specific area in a city.
- Database
  - 1390 families in the database.
  - Have an electronic portfolio for each family, but sometimes its both paper and electronic.
  - The portfolios are saved in the poverty spotlight system
- Solutions
  - Solutions that worked really well
    - \* Updating bathrooms.
    - \* Routine health care solutions.
    - \* The foundation also provides a basic health care plan that is accessed using the credit system.
  - The credit system
    - \* When a woman works with the foundation, she gets access to small loans that she can use in different areas.
    - \* The foundation helps her figure out where to spend the loans best
  - How they come up with solutions
    - \* Database of previously prepared solution that worked with families before, or look on-line.

- \* Come up with a plan right there and then with the family, and go to work on it in the foundations office the next morning.
- \* Use tablets (provided by the foundation), personal cell phones, and personal cars to get there.
- Kinds of interventions
  - \* Training people to manage their income
  - \* Never use government programs
- Caseload
  - \* 7 families at a time
  - \* Contact with family (Same as mentioned by Cicilia) 1 per month, 2 other contacts
  - \* It feels overwhelming a little because Its like 2 jobs in one (Poverty stoplight and bureaucratic). Also, need to receive training.
- Record keeping
  - \* Pictures and text (Only the texts are uploaded to the system.
  - \* Have a folder for each family with before and after photos and notes.
  - \* The system passes the data to the boss and they validate the information through random checks
  - \* The families could also take notes and pictures, and they verify it later on.
  - \* They lack color printers to prints good quality pictures of their work to show them off.
  - \* System works pretty well at the moment
- Project-specific
  - \* Recommended solutions would be helpful
  - \* Concerns include the data not being updated constantly or not area-specific.
  - \* A recommendation is for the system to enable the asesoras to give the family a working plan right there and then. Would save a lot of time.

## F.2 Transcript

- Job nature
  - Theres a random selection of a family and theres a database of families where they draw it from
  - 1390 families in the database
  - Select 7 families
  - Go to the home of one of them at a time
  - They schedule these visits using phone calls, texting, or Whatsapp
  - Give them the survey
  - Explain the situation to them
  - Decide what elements are in yellow, red, green
  - Gives them a start
  - From there they come up with a plan to help the family in need
  - The families come from the committees in cities and shes in charge of an area in the city
- Database
  - They work with a portfolio (electronic) but in some cases it could be both paper folder and electronic

- The electronic portfolio is in the Poverty Stoplight system
- Solutions
  - A solution that worked really well
    - \* Modern updated bathrooms
- Many family had to do their hygiene duty in dangerous ways. Its a health risk and safety risk.
- If a family has a bad and old bathroom they consider that in the red zone and there has been a lot of successful solutions regarding that.
  - Routine Health care
- Checking up with women whether they had a gynecologist
- Sexual hygiene is one of the indicators and there would be so many cases where women never had gynecologist
- They give them training in the sexual hygiene area
- Also, the foundation provides a basic health insurance plan. If the woman has credits with the foundation, she will have access to the basic health care.
  - The credit system
    - \* The credits are loans of actual money (microfinance program)
    - \* Each woman would first work with the foundations to access small loans from the foundation
    - \* When she acquires the credit she can use it in the different areas they had
    - \* They help her figure out the best ways to use her credits
  - Database of previously prepared solution that worked with families before, or look online.
    - \* She comes up with the solutions then and there in the families houses
    - \* Next morning they go and work on it in the foundation's office
    - \* Use tablets provided by the foundation and she also uses her personal cell phone
    - \* She uses her car to get there
  - Kinds of interventions
    - \* Family budgeting
- Provide a training where they give people skills to manage their income.
  - Individuals vs. family
- Would consider a trip to the gynecologist would be a family solution
  - Government programs
- Never. As far as [asesora #3] knows
  - Contact with family (Same as mentioned by Cicilia) 1 per month, 2 other contacts
- Caseload
  - 7 families at a time
  - It feels overwhelming a little
    - \* Its like 2 jobs in one.
- Poverty stoplight side. Puts a lot of time in, and also socially and emotionally draining
- Bureaucratic side. Teaching them and giving training
  - The advisers also need to receive training
- Record keeping
  - Types of documents
    - \* Receipt from doctor
    - \* Indicators like the bathroom
  - Folder for each family

- \* A sheet/ overview/ checklist where they note things like: They gave them training or went to the doctor
- \* Before and after photos of the progress
- \* They only upload the notes to the system. Not the pictures
- \* The boss in the foundation are in charge of validating that the improvements recorded in the folder actually occurred
- \* The system passes the data to the bosses. Through a random selection of the families and validate their solutions (random checks)
- Both hardcopy and electronic copy
  - The families could also take notes and pictures, and they verify it later on
  - They lack printers to make better copies of the pictures
    - \* The printers they have are only in black and white
  - They need the paper pictures to just show off and prove their work and theyre not really impressive in black and white. They present the folders to the higher-ups.
  - The system works pretty well for her at the moment.
- Project specific
  - Recommended solutions would be helpful
  - Really good idea, but we went over so much that she didnt really remember everything.
  - Concerns
    - \* If they were really updated constantly in the country or the area theyre working in
    - \* For example, for a government program, it should be updated that it works in the area
  - Recommendations
    - \* An example is voting. So if it would show her that they never voted and need training on that, that would be helpful
    - \* She would need something she could hand the information for a solution to the family right there and then
    - \* Ordinarily, they go back to their offices to come up with solutions and get back to the families. It would make it faster if they could hand the solutions right there and then.

## Appendix G

# Social Worker #1 Interview

**When:** 1:00 PM, 11/21/17

**Who:** Mona Elokda and Ben Hylak

**With:** Social Worker #1

**Transcribed:** 11/21/2017

**Summarized:** 11/22/2017

## G.1 Summary

### G.1.1 General

- A client is referred out of juvenile justice by a probation officer or non profit person.
- Social worker's job is to match the kid with an appropriate school setting after going through a 30-45 minute assessment asking about their last grades, the credits they have, where they live, and what their last school was.

### G.1.2 Solutions

- A successful solution for a person coming out of jail is finding a school they can tolerate. For example, if the kid was good at sports, a big success would be getting them into a school that has football teams.
- Talking to peers to get help with solutions:
  - Sometimes brainstorming with coworkers helps.
  - Tapping into resources with other allied resource providers. For example, if she is trying to place a kid in New York city and the kid gets into fights, they would call a colleague in another organization and ask if they heard about a school's football program and whether or not they tolerate fighting.
- Eligibility for solutions:
  - A kid is entitled to go to school (up to 18), some up to 24 if special education plan.
  - If a kid is 18/19 and s o high school credits, going back to 9 credits might be a good option, but 9th graders will be afraid of them, the school won't want them, they'll feel out of place, and they'll be at a greater risk of not attending.

### G.1.3 Workload

- 10-15 who need an active school placement and 20 who need follow ups (3 months)
  - Follow ups are once a week including home visits if the kid is not showing up to school. And less contact for the kids are doing what they're supposed to do.
  - Losing track of people is overwhelming.

### G.1.4 Record Keeping

- Used a database that was custom designed for the program. 75% successful.
  - Advantages: Helpful to keep record of the kids who get out and in again in juvenile justice. One continuous record with multiple entry points.
  - Disadvantages:
    - \* Cumbersome to keep track of all the follow ups and try to automate the process.
    - \* When naming the activity (called, visited, etc.) sometimes they don't find suitable options.
    - \* was too structured and the real world isn't always structured.
  - everyone in the office had access to the same database.
  - Hindsight is useful mostly on the individual kid level. For example, if a kid has been in and out of jail multiple times, it's good to look back at the schools they were placed at before and see what worked and what didn't.

### G.1.5 Application Idea

- The quality of the recommendations that go into the system matter so much. There has to be some kind of quality control.
- Social workers get asked to try a lot of things and they're not so intellectually curious.
- It should be user friendly (from a UX perspective), standardized and friction-less.
- recommended solutions should have whether or not these are available: translation services, youth services (is there equipment available), or if there is any fee.
- It should be web application that is mobile optimized or just mobile.
- When testing, use live focus groups because they are under resourced with big caseloads.

## G.2 Transcript

- Q: "Walk me through your job"
  - Current a social work professor but will walk us through from her experience in the field
  - Someone would get referred - a lot of times out of juvenile justice
    - \* referred from probation officer or non profit person
  - The worker's job is to try and match that kid with an appropriate school setting
  - Sometimes people coming out of the justice system don't want to go to school at all
  - Ask questions from
    - \* What were your last grades?
    - \* How many credits do you have?

- \* Who do you live with? Where do you live?
  - \* What was your last school?
- Then try to make some suggestions for that kid.
- That assessment takes place over 30-45 minutes
- Q: "Really successful case"
  - What part of the solution?
  - For a young person coming out of jail, solution is finding a school that they could tolerate
  - Imagine a young person who had a very violent charge, was in correction facility for 18 months. He had a lot of academic ability and was good at sports.
    - \* A big success was getting that kid into a school where they had a football teams.
  - They continue to keep in contact for around 3 months after placement
- Talking with peers
  - Brainstorming
  - Tap into resources with other allied resource providers
  - "If I'm trying to place a kid in New York City, and he really wants to play football, but I also know he gets into fights, I might call a colleague in another organization and ask 'Hey what do you think about this school's football program, because I heard they're not that tolerant with fighting and I want to know if you've heard the same thing"
- Eligibility
  - Criteria
    - \* School is really clear. You're entitled to go to school (up to 18), some up to 24 if special education plan.
    - \* Choices are different. Is there a good fit in between a kid and a particular school setting?
    - \* If you're 18/19 and you have 0 high school credits, going back to 9 credits
- 9th graders will be afraid of you. The school won't want you. Socially you'll feel out of place. They'll be at a greater risk of not attending
- 10-15 who need an active school placement and 20 who need follow ups
  - Follow ups are once a week
  - If they're not showing up at school, workers can do a home visit or a school visit
  - For kids who are doing what they're supposed to, there's less contacts.
  - Before the initial appointment, it takes a lot of calling to get the young people into the office
- Overwhelming
  - "It's really overwhelming when you can't find someone" (after a referral)
  - It's not the caseload itself that's overwhelming, "losing track of people" are overwhelming
- Document and Recording progress
  - "There's a database that was custom designed for the program."
  - 75% successful
    - \* Good
- What was interesting/useful, for young people that go into juvenile justice, they tend to go in and out. One thing that was great
- One continuous record with multiple entry points.
  - "Really cumbersome"
- For people that had to do case records and try to automate the process, it's cumbersome. If you have to keep track of 20 people just in follow ups. This one's not in school, this one went back to jail, this one is fine. It was cumbersome to both take all of the notes.



- Efforts to Outcomes (it's a data management database)
  - "ETO"
  - Name every activity
    - \* I called, I visited, I skyped
  - If you didn't have that activity, it was hard to name the activity
  - If you had a family member come by, how do you name that activity?
  - A lot of steps that don't seem useful to the people who are expected
    - \* Sounds like it was too structured and the real world isn't always structured like you might think
    - \* Interesting because
- Salesforce is pretty much giving away licenses
  - It's a trick, gives it away and then a thousand dollars to customize it.
  - Under the umbrella of the one office, everyone in the office had access to the same database
- Looking back at records
  - Hindsight is useful.
  - They did it the individual kid level
  - Knowing what we know now about what we could've done.. I don't think we ever went back and said, hey what are the schools we placed kids in and how did they do.
  - What if instead of looking at a kid by kid basis, Mona comes back because she's been in jail 17 times. She comes back and now she wants to go to the football school. Now I can look and see if I put you there before.
    - \* In the last 6 months, we had a 100 placements, the kids who have flamed out the most have come from these three schools.
- Our idea
  - Poverty solutions are evidence based outside the US
  - "Little bit of a cynical answer"
    - \* A system like that is only as good as the quality of the recommendations that are going into it
    - \* So, it's funny I think about the googling skills of the people that I'm talking about because these are your people.
    - \* You believe that you are getting people who are a little digital illiterate who can write a coherent recommendation in a constrained geographic region
    - \* there has to be some quality control
    - \* Note from Ben: marking solutions outdated or reviewing them
  - Workers are kind of overwhelmed and they get asked to try a lot of things. "They're looking for reasons for it not to work" "They're the not the most intellectually curious group of humans"
- Time to spend
  - "I don't think any web portal would take me that long to work"
  - You want to make things really user friendly from a UX perspective
  - You want to make things really standardized and frictionless
- recommended solutions should have whether or not these are available:
  - what language is it offered for, Translation services, youth services (is there equipment available), is there any fee
    - \* Note from Ben: Kinda like on yelp, is there parking available

- \* particularly talking about after school activities here
- Recommendations
  - You should do a live focus group, because those are your people
  - They're under resourced, big caseloads, no time
  - As a side note, I think community action councils
  - If you get it past the pilot stage, there's a national network so you can do testing across regions.
  - They have a network infrastructure
  - I think you should do some focus groups, or a focus group or two.
  - Maybe give them a paper interface of what they're
- "All mobile" from her perspective
  - Can't see using it from a desktop
  - Web + mobile optimized or just mobile
  - Some people in community action councils a year ago didn't even have computers at their desk. They were using their personal cells to do client services.

# Appendix H

## Social Worker #2 Interview

**When:** 3:00 PM, 11/30/17

**Who:** Kodey Converse and Mona Elokda

**Transcribed:** 11/30/2017

**Summarized:** 12/04/2017

### H.1 Summary

- General
  - She works as an Education advocate
    - \* Focused around educational access
    - \* On our way program: to help single young parents continue education
    - \* Case manager to assess what they need. Her role changes depending on the student's situation
- Solutions
  - If someone just found out they're pregnant and need help, they get connected to programs like healthy families in MSPCC who teach the students about pregnancy and emotionally support them.
  - They get referred to other places because sometimes they need more than one resource depending on what they need.
  - She connects with clients after referral through text or email until they decide to stop.
  - In general, she checks on how their classes, grades, and attendance are going.
  - She makes sure they get letters from the doctors to have excused absence.
  - There are more specific ways to help. Example: The student has to notify the school nurse when they're going on 5-week maternity leave which includes a lot of paperwork that she helps with. The student also gets a tutor who just takes their work and drops it off at school.
  - She follows up when they apply to college and helps them with applying.
  - The transition from high school to college is challenging for single parents because they're used to having people help them in high school and that doesn't happen in college. Also, some immigrant students have language issues.
  - Following up in college gets harder because she doesn't have connection to check on the student with anymore.

- As she works on more cases the solutions become more familiar.
- Caseload
  - About 50, but they're not all active. A dozen is usually active, and the rest are check-ins.
- Contacting clients
  - Majority prefer text. Problematic when they change phones.
  - They contact her as the need arises.
  - If they don't contact her for a couple of weeks she checks in.
  - She doesn't go to their homes. Meets at the office, school, and restaurants.
- Keeping records
  - Keeps a paper file on each student.
  - Keeps a spreadsheet full of programs and their contact information in Worcester.
  - Looks back at the data for students that had similar problems when she tries to come up with solutions for the new student she's working with.
- Application idea
  - The app would be helpful to have the range of problems and resources in a database.
  - She's not from Worcester so it would be helpful to her to get more information about available.
- Follow-up
  - Mentioned WCAC and the poverty cliff effect.

## H.2 Transcript

- Talked about the web seminar on homelessness she did today. One of the people there didn't know they were homeless because her mom made sure she had free food and shelter and she thought that was how everyone else lived.
- More about her job: Education advocate.
  - Function is around educational access.
  - On our way program for young parents. Was for teens but changed to young because they're not all teen.
  - She works with them so that the single parents keep getting their education.
  - Her role changes depending on where a student is in their journey
  - Functions as a case manager to assess what they need.
  - Example, if someone just found out they're pregnant, they might need health care and need support. She connects them to programs like MSPCC who have healthy families program that assigns home visitors until the baby is under a year.
  - She doesn't go to their homes. Meets at the office, school, and restaurants, but she doesn't do home visits.
  - Healthy families visit students and teach them about pregnancy and support them emotionally.
  - Sometimes they need more than one resource depending on what they need and that's why she refers them to other places.
  - She stays connected with the clients even after referral (through text or email) to see how they're doing until they decide they don't want it anymore. Typically they get connected in high school and then she checks on how their classes go and attendance. Makes sure they

- get letters from the doctors to have excused absence.
  - She keeps track of grades and attendance and school work in general.
  - When they go on maternity leaves they get 5 weeks where they have to notify the school nurse when they're going on leave and there's a lot of paperwork going on. They get a tutor who just takes their work and drops it off at school.
  - Frequently, the year where they have the baby gets complicated
  - She follows up when they apply to college and helps them with applying
  - The transition from high school to college can be overwhelming to the single parents. Because they have a lot of people helping them in high school but in college they're on their own.
  - Some are immigrants so sometimes there are language issues
  - They have many programs at the different high school so she can check with them on how they're doing, but follow-up gets harder when they go to college because she doesn't have these connections anymore.
- Connection methods vary from student to student
  - Majority prefers text
  - Only a few said they didn't like it
  - They change phone sometimes so it can be a problem
  - How often varies from student to student
  - As the need arises they contact. Example, if the single mother needs a free car seat she connects them to where they get that from
  - Every couple weeks if no contact happens she checks in, because she wants them to know she's available. If they don't respond she just lets it go.
  - Gave an example of a student she just got into a scholarship program and went with her to the orientation in Boston, because she did that with a student before.
  - It gets easier when she works on more cases
- Caseload
  - About 50, but they're not all active. A dozen is probably active right now, but more she checks in with
- System to record data
  - She keeps notes. A file on each student. She has a note sheet that's just for her. So no software.
  - Keeps a spreadsheet full of programs available to help in Worcester along with contact information for them
  - Looks back at the data for students that had similar problems when she tries to come up with solutions for the new student she's working with.
  - Uses paper notes mostly
  - The app would be really helpful to have the range of problems and resources in a database.

# Appendix I

## Social Worker #3 Interview

**When:** 10:00 AM, 11/30/2017

**With:** Social Worker #3

**Interviewers:** Ben Hylak and Mona Elokda

**Summarized:** Ben, 12/04/2017

### I.1 Summary

- Software
  - "Simple practice software"
    - \* It handles billing, automatic rescheduling, Offers automated confirmations (no-show rates decreased), and has a place for her notes. (Comprehensive)
    - \* She loves how easy it is to use and particularly appreciated how cool it is to have clients in control of cancelling or rescheduling their appointments, although she has yet to enable that feature of the software. (But she plans to soon)
- Treatment Plan
  - Initial meeting with parents to identify problems and she starts giving them some ideas.
  - Then plans therapy and picks appropriate solutions.
  - Each session is 45 minute. The parents wait outside, and after the meeting she gives the parents some broad details to have them be involved. Schedules for the next session and figure out payments.
  - Parent consultations every 2 or 3 months. Some come in more often, where they review the child's situation. She writes the plan out in her software system.
- Workload
  - 20-25 clients a week.
  - Sometimes she feels overwhelmed because she's independent (she's a clinical social worker)
  - She does a lot of things that are not exactly her job
- Record Keeping
  - Notebook and pen during the initial meetings where there is a lot to write down
  - Blocks of text inputted into the software after every appointment. The longest is the first meeting. Then progress and description of what happened in the sessions.

- She does look back at the notes from the last meeting just to refresh her memory and make sure the treatment plan is accurate and see if any changes are needed.
  - \* But just on an individual level
- Solutions
  - She calls them "behavioral modules"
  - Mindfulness and relaxation and work on their coping skills to decrease the symptoms.
  - Start with examining feelings. She has kids identify where on their body they feel their emotions
  - Depends on who the child is and what they gravitate towards. Some kids are more artistic, some might like the doll house and some might like the sand therapy or puppets.
  - Have the kid talk about their feelings and what they're going through
- Our software
  - "The idea would be wonderful."
  - She said the field is moving towards integration and that it is good to integrate mental health with primary care
    - \* For example, if someone has a specific problem not in the social workers specialty so they recommend another social workers or resources
  - Its hard to narrow down recommendations
  - Geographical data isn't as useful in well defined areas like —, Boston
    - \* usually easy to predict what someone will be struggling with
- Learning the software
  - New software in this field is often presented at a conference where social workers will get credits for attending. That is how she'd want to learn the software.

## I.2 Original Notes

- asked questions about IQP and FP
- General
  - Works with kids, teens, and families. Meet with parents and got over family history and see why they're bringing their child to therapy.
  - Second meeting the kid is there with their parents because at first they're shy and worried. Talk about introductions and confidentiality. There are toys for the kids and they just go over the overall plan.
  - Builds trust with the child to have them feel more comfortable to open up to her. Then the meetings are with the child only.
  - Each session is 45 minute. The parents wait outside, and after the meeting she gives the parents some broad details to have them be involved. Schedules for the next session and figure out payments.
  - Most of them use their health insurance. Some prefer privacy so they pay privately, and some don't have compatible health insurance with her.
- Treatment plan: Starts at the first meeting with the parents when they talk about the problems and she starts giving them some ideas. Move on to therapy, and then use mindful and relaxation and work on their coping skills to decrease the symptoms. The parents can agree or disagree. Parent consultations every 2 or 3 months. Some come in more often, where they review the

child's situation. It's an agreement made with the parents. She writes the plan out in her software system.

- Progress:
  - \* measurable goals and objectives.
  - \* Ex: with cognitive behaviour they have a week to week meeting to track the primary symptoms. For example, if the kid doesn't go to school in the morning because they are too anxious. Examine how many times in the week it's happening.
  - \* Then they start looking into triggers, what triggers the symptoms to see what is working with the child and what their behaviours are. The parents are her eyes and they tell her about the child symptoms.
  - \* She tells them if the kid needs medications, but a lot of the time they don't want to have their kid on medication. It can be a lot more challenging because of different circumstances.
  - \* Behavioural modules:
- Depend on who the child is and what they gravitate towards. Some kids are more artistic, some might like the doll house and some might like the sand therapy or puppets.
- Taking all circumstances into consideration she decides what is the appropriate activity
- Start with examining feelings. Color coded and detect on the body of a ginger bread and indicate where they feel the pain in their bodies.
- Have the kid talk about their feeling and what they're going through
- Software:
  - Simple practice software
    - \* Affordable
    - \* Simple to use
    - \* Really loved it
    - \* Functions:
- Keeps schedule
- Allows the client to reschedule
- Offers automated confirmations (no show rates decrease).
- Keeps notes: insurance, progress, billing, etc.
  - How she records it
- Note book and pen during the meeting where they talk about family history and developmental history about the kid and then talk about the child issues and where they live with and what the family dynamic is
- Blocks of text. The longest is the first meeting. Then progress and description of what happened in the sessions.
- Does look back at the notes just to refresh her memory and make sure the treatment plan is accurate and see if any changes are needed.
  - Some other use therapy notes
- Workload
  - 20-25 clients a week.
  - Sometimes she feels overwhelmed because she's independent (she's a clinical social worker)
  - She does a lot of things that are not exactly her job
- Poverty Spotlight



- Ben gave brief introduction
- She doesn't use surveys but there are clinical assessments but they're not really for kids and teens. CANS assessment, but the accuracy of that assessment
- She would like to have an actual tool that is formally utilized would be great because it would be easier to compare the objectivity to the subjectivity
- It might allow families to have better access to services in the community. Example, single mom with three kids and three jobs and kids with special needs, it's hard to make sure that her kids are making all their appointments. It would be great for her to have something to help her find services.
- Looking at a geographical map to see the indicators might be useful to see where they live to know where the low income and impoverished families live. I — and Boston it's clearer to detect.
- Our software
  - Ben gave an introduction
  - She thinks the idea would be wonderful. The field is moving towards integration
  - Good to integrate mental health with primary care
  - Example, if someone has a specific problem not in the social workers' speciality so they recommend another social worker or resources
  - It's hard to narrow down recommendations
  - Generally, it sounds really good but need to narrow down and would depend on the population
  - She doesn't have so much time right now but if it's presented in a conference or something she might spend time on that
  - If she gets more units in her license for learning something new.
  - It's hard to take the time to learn something ongoing

## Appendix J

# Asesora Survey Results

### J.1 Summary

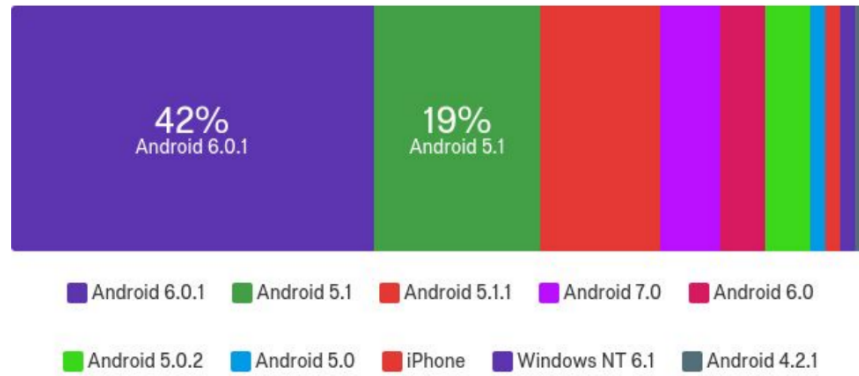
The Asesoras use Android tablets and smartphones as the main systems in their jobs as social workers. The vast majority of them are on Android 6.0, with some being on Android 5.1. This means our target operating system for development should be Android 5.1 and above, at the very least. Most Asesoras are comfortable using their tablets, and have no problem with learning about new technology. However, most of them do not use simple tools like digital note taking and calendaring. This is probably because of the spotty and unreliable internet connections. Instead, they use paper to keep notes and appointments with families. They also do research on their tablet, mostly at the clients house and back at the office, probably contingent of a stable internet connection.

The vast majority of the Asesoras communicate with their designated families through phone calls. Some use instant messaging systems, like cell text messaging and even Whatsapp. In fact, 10% of those who were interviewed stated that they use Whatsapp as their platform of communicating with their designated families. This number can be even higher, since one of the comments mentioned "text messaging through Whatsapp," meaning those who selected "text messaging" may be using Whatsapp. We may look at integrating Whatsapp in our Android application.

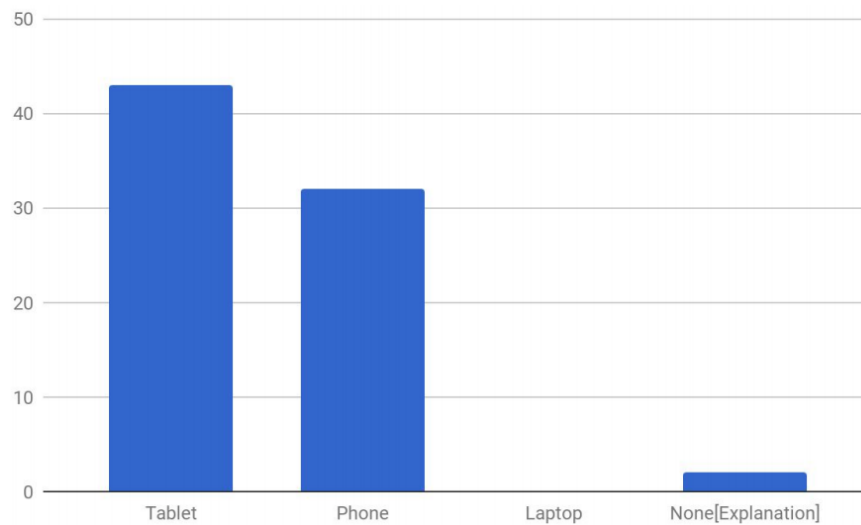
When it comes to communicating new interventions, a follow-up visit was the Asesoras main choice. However, they also used phone calls and text messaging to deliver interventions. The big surprise was the lack of use of email in this process. Another shocking result was the fact that the Asesoras didnt always recommend families to go to government programs. This might be because the government programs in Paraguay are more limited, making them not very useful for some clients. Progress is recorded mostly on paper and through pictures. All of this is stored on two main systems: paper filing and "The JSFI System." We could not find any additional regarding The JSFI System, so we should ask someone within the organization, or potentially Dr. Traver.

## J.2 Responses

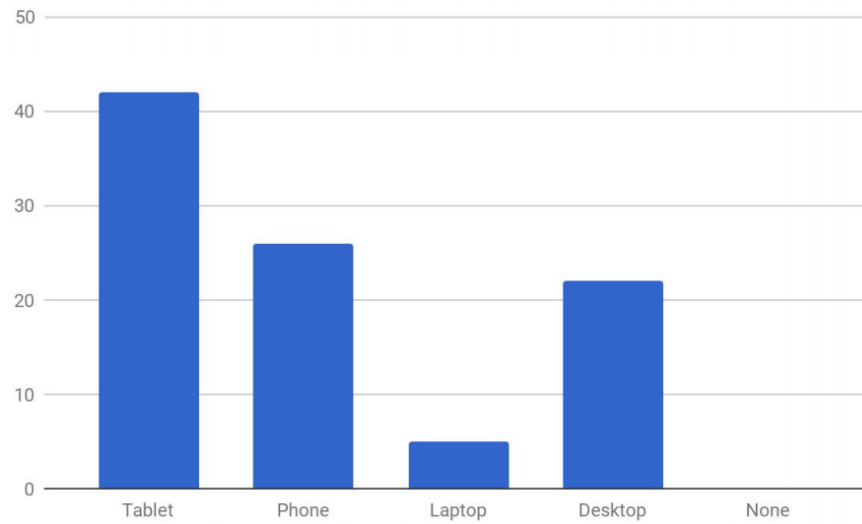
### J.2.1 System used to take the survey



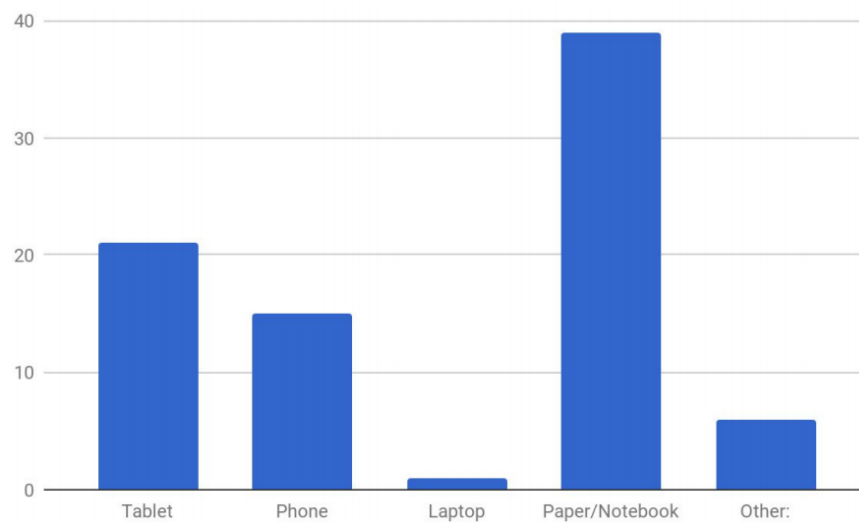
### J.2.2 What devices do you use for work?



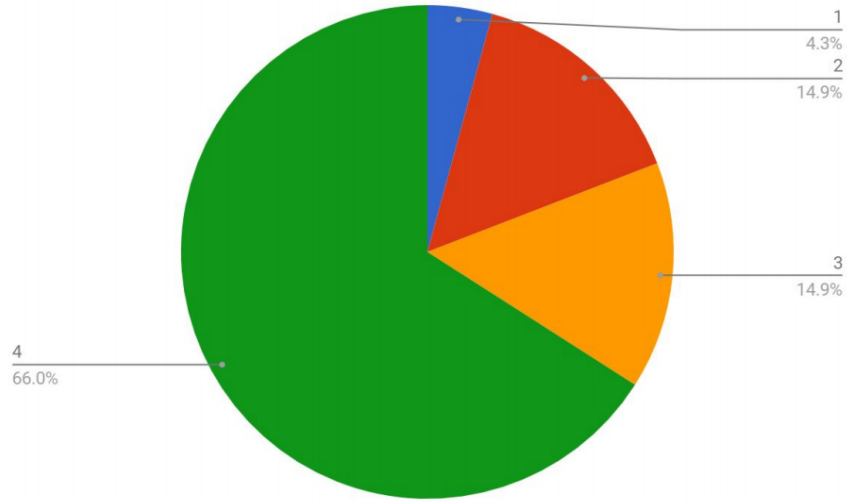
### J.2.3 What devices do you own for work?



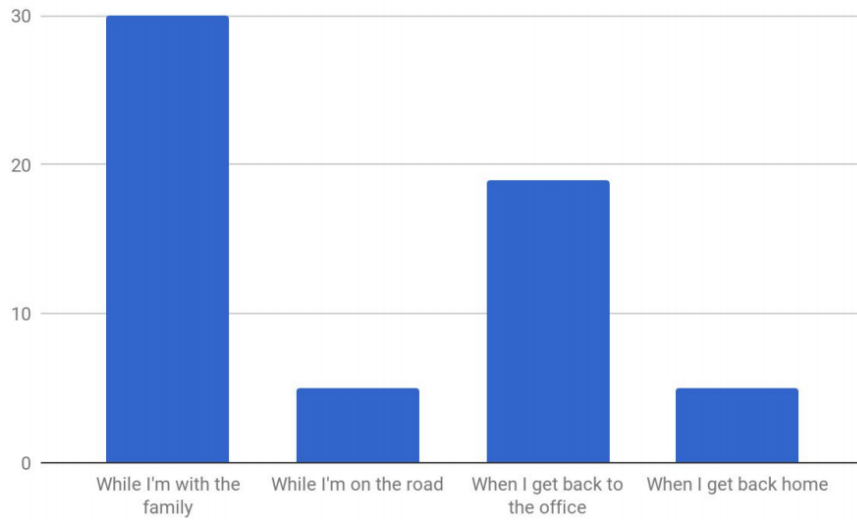
### J.2.4 Where do you take notes when you are visiting a family?



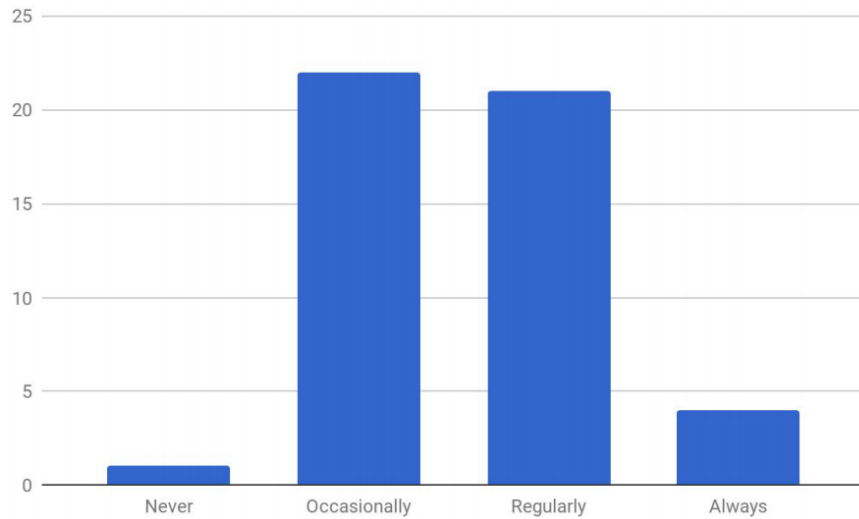
### J.2.5 How comfortable are you with technology?



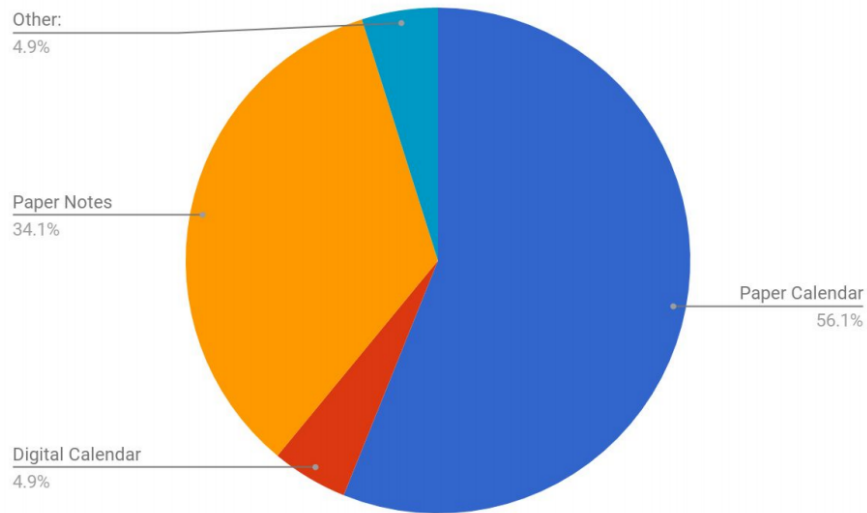
### J.2.6 When do you research potential interventions for the family?



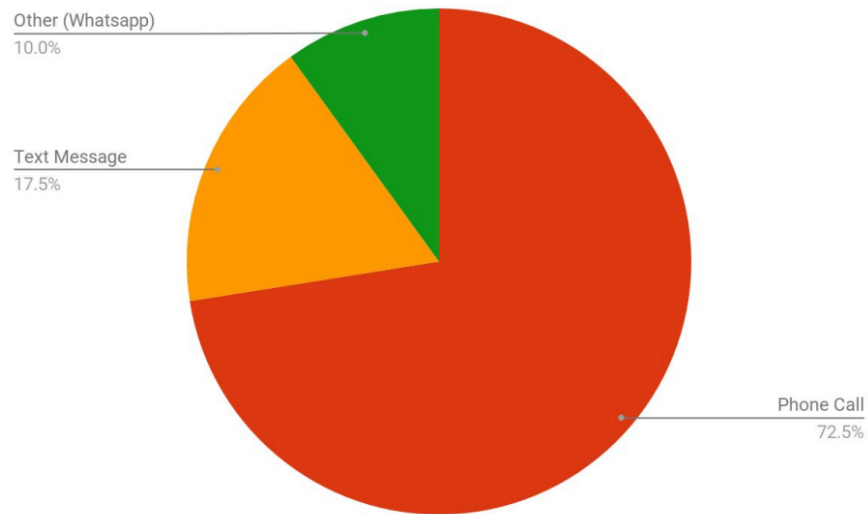
**J.2.7 How often does the lack of internet access impede your ability to research potential interventions for a family?**



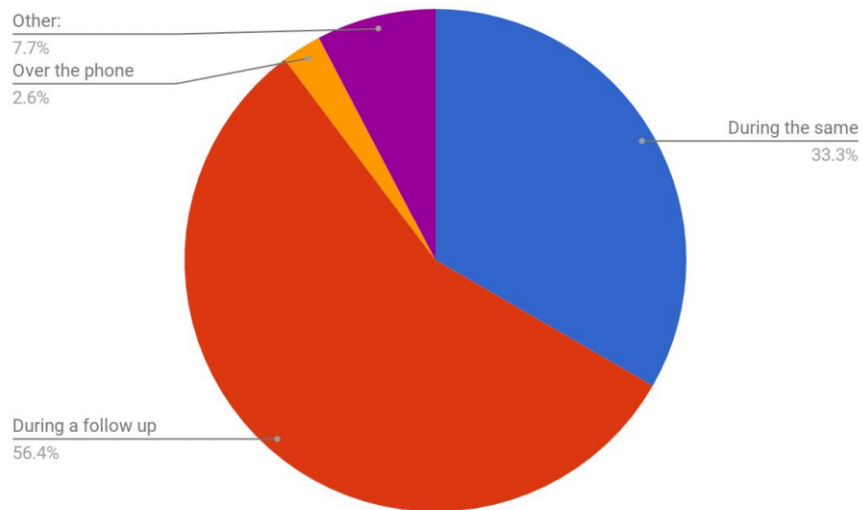
**J.2.8 How do you keep track of your scheduled visits?**



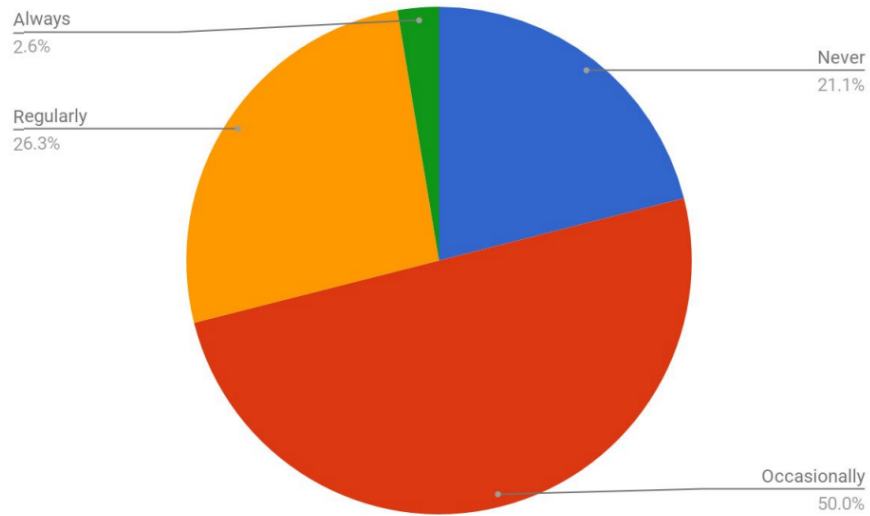
J.2.9 How does a family notify you that they need to reschedule or cancel?



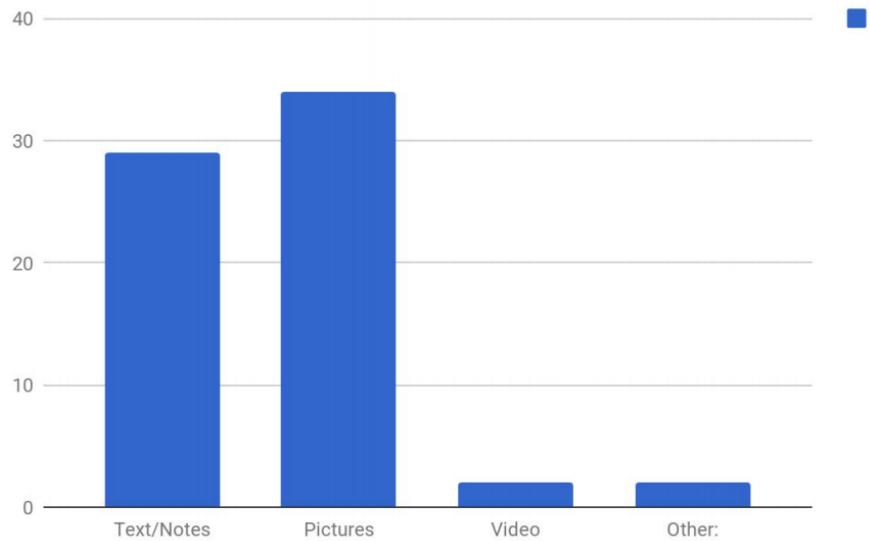
J.2.10 How do you communicate the interventions with the family?



J.2.11 How often do you connect families with government programs or aid?

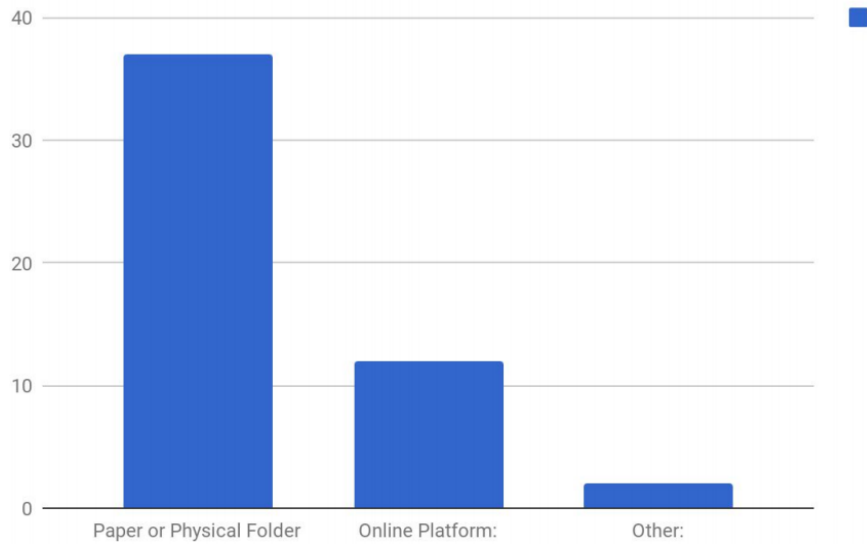


J.2.12 What do you use to record a family's progress?

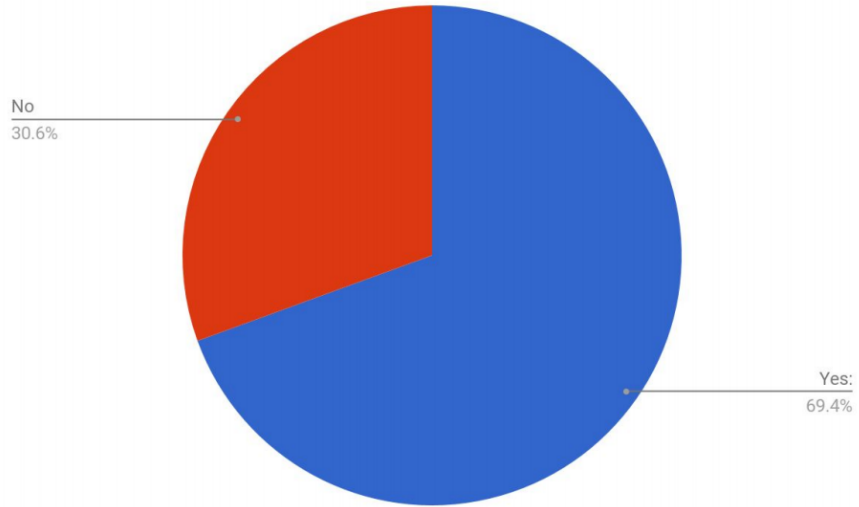




J.2.13 Where do you store your records of a family's progress?



J.2.14 Do you show your family records to other advisers or people within organizations?



## Appendix K

# General Survey Results

### K.1 Summary

The survey results mostly confirmed what we knew, but also led to a few surprises. At the end of this research term, 26 people submitted a survey. However, since all questions were optional, the total number of responses were not equal to 26. In the end, 2 people were from outside the United States - Sweden and the United Kingdom. This ended up being significant, as explained later. Most of the social workers had between 1 and 5 years of experience, with a few having over 10 years! The fields these social workers worked in included family social work, mental health/substance abuse, and general medical and health.

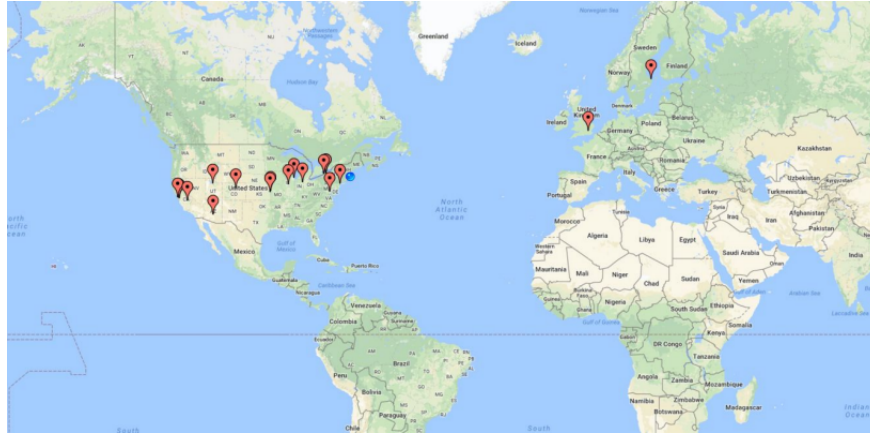
Our first interesting result showed that our surveyees actually provide wraparound care for their clients. This was a surprising result because our interview with Prof. Emily Douglas told us the exact opposite result. Although we had a relatively small group of surveyees, it does show that Poverty Stoplight is viable in the United States. Social workers also will document all progress with a client. They use mostly work computers to get this done; however, some did use their own personal computer for social work. We also found that most social workers see technology as beneficial to their work. More people used a computer and a database than paper solutions. This was different than our results in the Paraguay survey. On top of this, most social workers do use a database for saving work data. We also see that pretty much all social workers have access to data across an organization, even if it is data from a client that isn't theirs.

Over 71% of the social workers surveyed said they used some solutions frequently. These included referrals to resources, certain websites for low cost medical products, and even empathy. Surveyees mentioned that there are a lot of different factors that make their clients eligible for government-funded programs, from diagnosis to level of risk to income level to citizenship level. Since the government programs in the United States are for extreme usage, most social workers recommended their clients to private non-government programs. For the most part, American social workers were working with 20 to up to 80 clients at the same time. However, in the rest of the world, social workers were focused on up to 12 clients at once, including those who worked out of the country and took this survey. Social workers also said they will often contact the client several times a week, but this number depends on the severity and the location of said client. Surveyees also all agreed when asked if they ask for advice: all of them said they do ask for advice. Most will ask fellow social workers and superiors. They will also Google questions and use government official opinions. We did have one person say they use Reddit for advice related to a case. This is usually illegal, because casework is usually

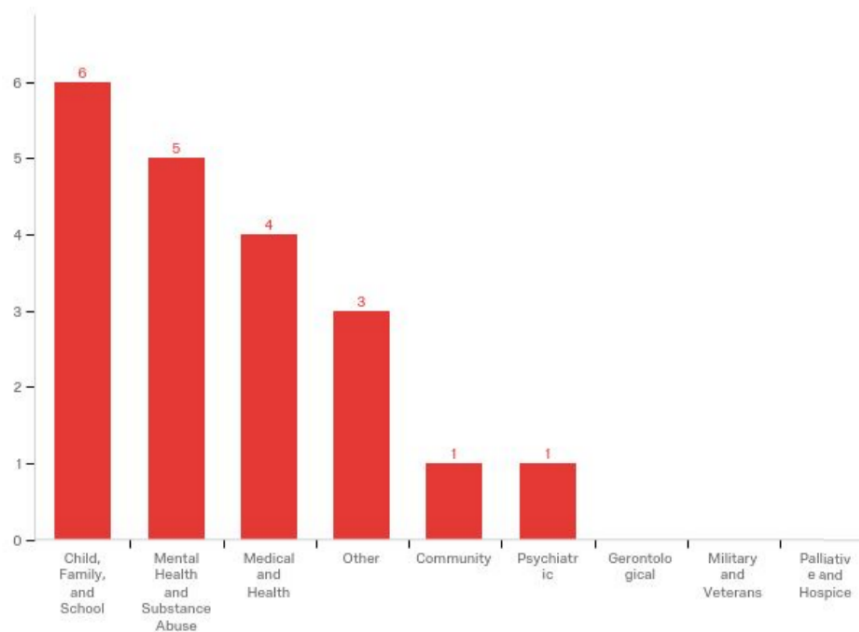
confidential, but we cannot confirm this case. None of them had ever heard of Poverty Stoplight, but several (specifically 4) did use multidimensional poverty definitions. There were no comments on the what those multidimensional poverty definitions were.

## K.2 Responses

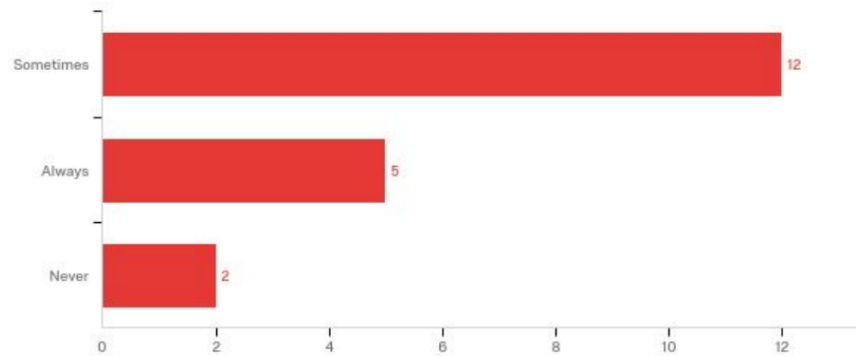
### K.2.1 Where do you practice?



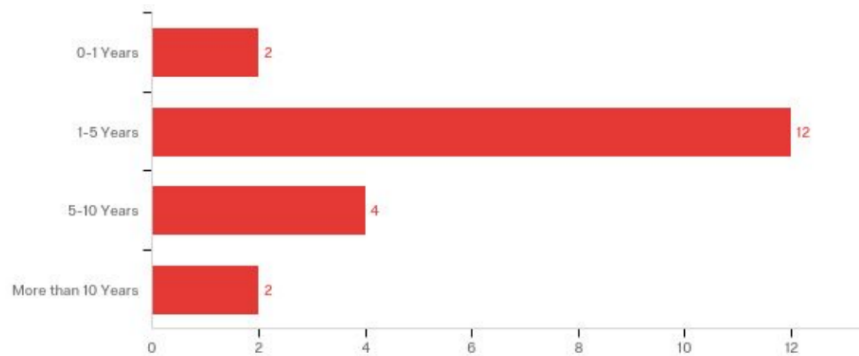
### K.2.2 Which groups of people do you care for most of the time?



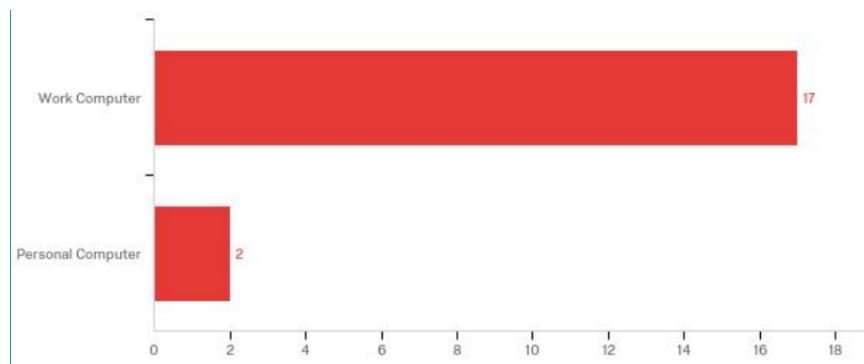
### K.2.3 How often do you provide wraparound services to your clients?



### K.2.4 How long have you been in the social service field?



### K.2.5 Do you have a work computer or do you use a personal computer for your work?



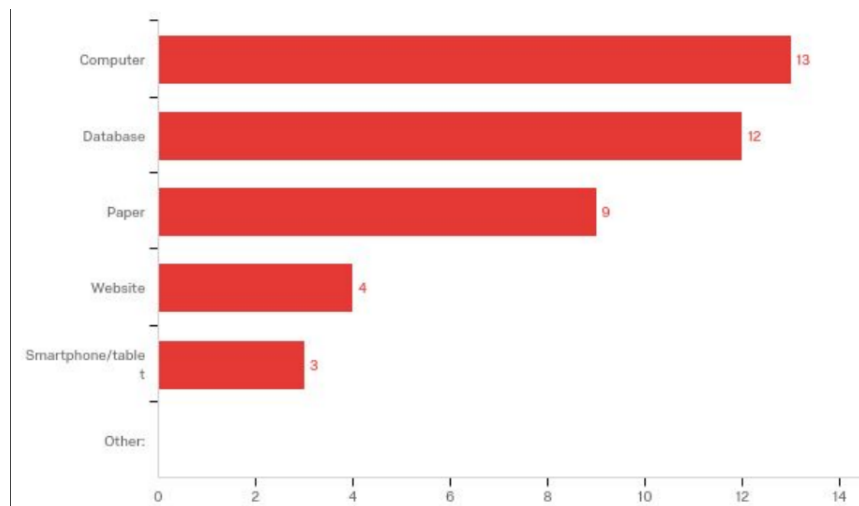
### K.2.6 How useful is technology to your job?

Minimum	Maximum	Mean	Std Deviation	Variance	Count
2.00	4.00	3.68	0.57	0.32	19

### K.2.7 How often do you document your progress with a client?

Minimum	Maximum	Mean	Std Deviation	Variance	Count
2.00	4.00	3.68	0.57	0.32	19

### K.2.8 What technology do you use to record progress?



## K.2.9 What platform do you use for storing information?

Pointcare database/ documentation program

NextGen EHR

Meditech and Meditech Home Care

It's called KVC care, an online and secure platform that allows us to see the list of our families, case plans, family achievement reports, and logs for each session.

Housing Management Information System (HMIS), specific to the state of Colorado and Continuum of Care (CoC). Case notes are NOT kept in HMIS. For case notes, we use a word document that we then print off and place into client files. Previously, at other organizations I've worked with, the agency had a database that typically an intern built.

Excel online, CHILDS

ETO, Clarity, Epic, Ehana, ClientTrack

Essentia (EMR software)

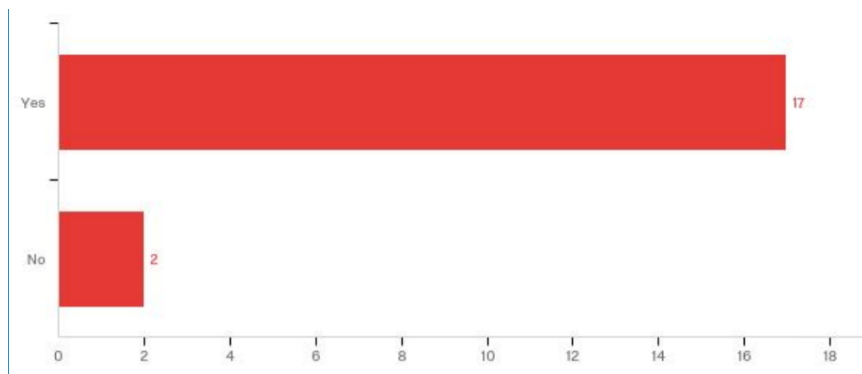
EPIC medical charting system is what I currently used. In the past I have used a custom built platform, cannot recall the name but it was something generic like "SmartCare."

Epic

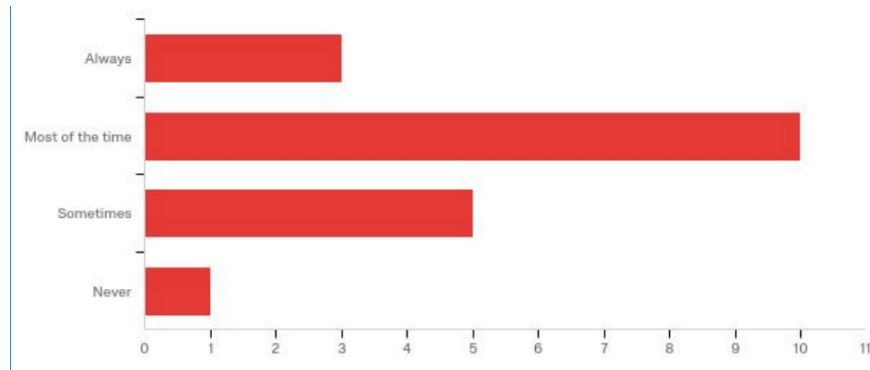
Custom solution. Its your usual database with set entries and standardized forms that are sent into a system.

CPRS VISTA

## K.2.10 Is the information you record visible by your coworkers to some extent?



### K.2.11 How often do you use non-government programs to assist your clients?



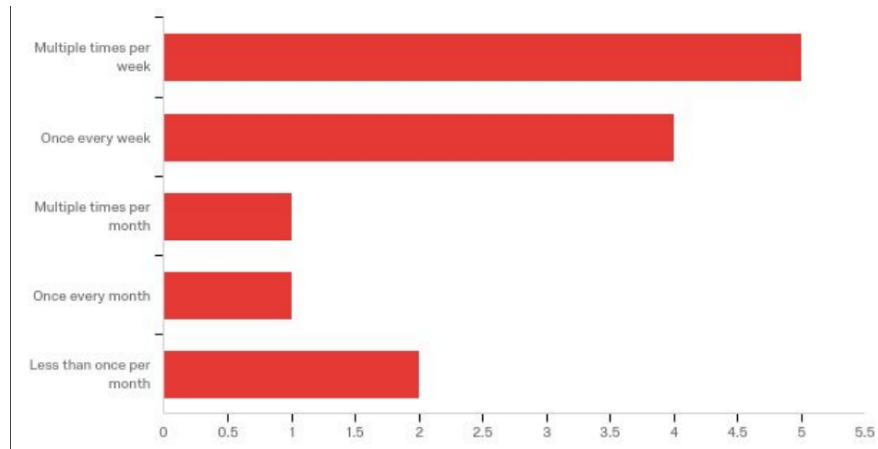
### K.2.12 Are there solutions you use frequently?

- Refer for resources, follow up, schedule appt
- SSA.gov, virtual gateway
- GoodRx website for low cost medication, Florida site for Medicaid application, SNAP application for local transportation, local Meals on Wheels provider
- Family therapy, vocational services, mental health housing
- Rehab, housing, out of county services
- Money, food, empathy

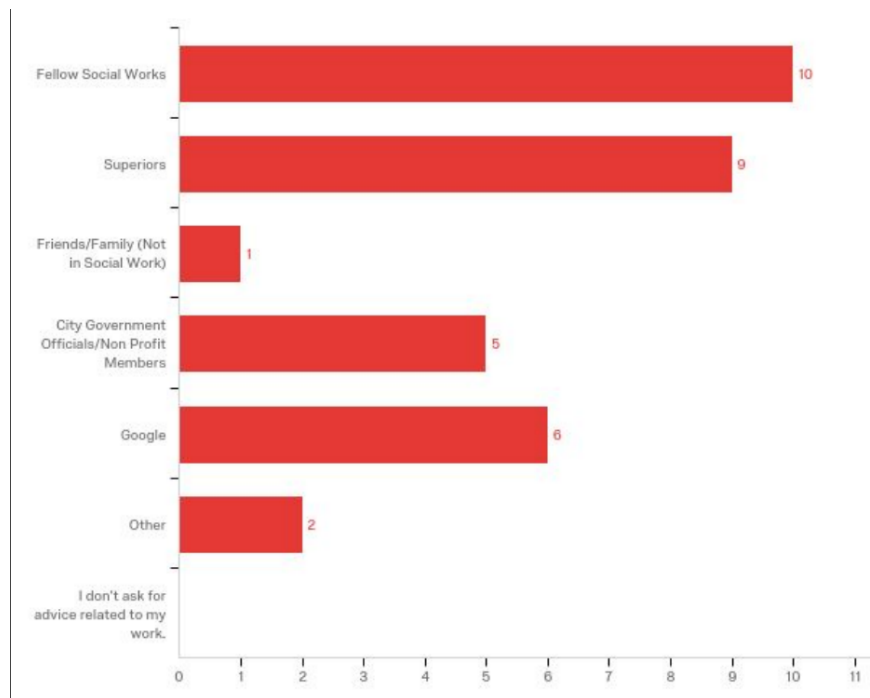
### K.2.13 How many clients are you responsible for at a time?

This result was interesting, because it differed from what we know about Asesoras in Paraguay. For the most part, American social workers were working with 20 to up to 80 clients at the same time. However, in the rest of the world, social workers were focused on up to 12 clients at once, including those who worked out of the country and took this survey.

### K.2.14 On average, how often do you contact a client?



### K.2.15 When you need advice related to a case, where do you look?

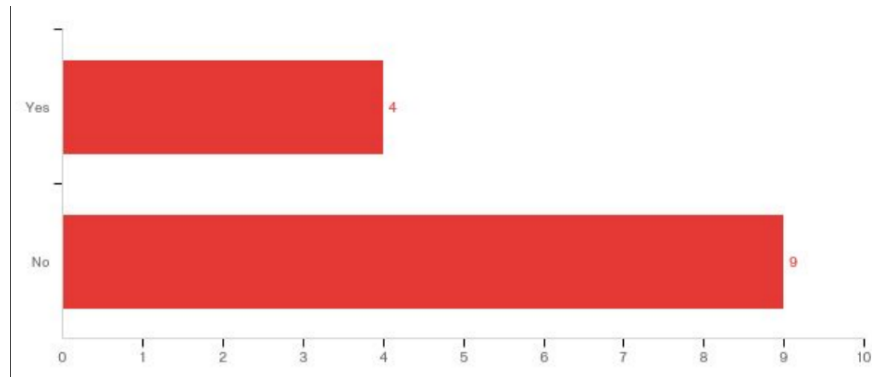


### K.2.16 Have you heard of Poverty Stoplight?

Everyone said they hadn't heard of it before



### K.2.17 Have you ever used a multidimensional poverty definition?



### K.2.18 What situations lead a client to end up in your care?

- Neglect, abuse
- Anything that can lead to homelessness
- Housing instability due to recession, poor economic growth, eviction, criminal history, mental health or substance abuse concerns.
- our patients come to us as freshly discharged from hospitals in my area.
- Hospitalization due to substance use primarily
- Families and children reported for child abuse and neglect and are at risk of being removed from the home.
- School placement or DSS placement
- Establishing care
- Medical event (surgery, fall, illness, etc)
- Trauma

## Appendix L

# Findings and Recommendations Matrix

## Findings and Recommendations Matrix

Category	Finding	Relevance	Recommendation	Remarks
Interventions	8 Social service workers commonly reuse past interventions because some problems show up frequently among clients. This is currently done by looking back at records of similar cases.	High	▼ Provide social service workers with recommended solutions for each of the family's problems.	Fundación Paraguaya has a list of interventions that are frequently
	Social service workers discuss cases with their peers. They exchange information about successful interventions, ask for help regarding difficult problems, and share suggestions.	Medium	▼ Social service workers should have access to their peers' records. If they are recommended an intervention, they should be able to see successful cases where that intervention was used.	Every month, all of the asesoras r together. During this meeting, the their successes, difficult cases an suggestions with one another.
	Not all interventions submitted will be high quality, or applicable to a wider audience.	Medium	▼ Interventions created by a social worker should not be automatically recommended. There should be a quality control process (whether that is hand screening, or a voting system)	
	Lack of materials on hand occasionally prevents social service workers from giving the family a plan during the same visit they take the survey.	Low	▼ Families with internet access should be able to take the survey on their own so the asesora has the results before she visits the family.	
	A family's match with an intervention is based on a number of factors. These factors include the income of the family, whether or not the the intervention offers translation services, and if there's any associated fee.	Low	▼ While creating an intervention, there should be a place to specify these important factors. (If there's not a dedicated field, there should be a prompt of some sort). Recommended solutions should be able to be filtered by these criteria as well.	
	When social service workers aren't familiar with an area, finding solutions for clients can be difficult.	Very Low	▼	The interviewee felt like recomm solutions would solve this proble
	The asesoras' job can be complicated when solving a situation doesn't depend on the family alone. (ex. instances where they have to work with the government to solve transportation or environmental problems.)	Very Low	▼ Records could include a place where they can record if they're unable to make progress with an intervention because of these factors.	
	Families are often introduced to Poverty Stoplight through the foundation's microfinance program. The asesoras help the women determine how to best spend their loans.	Very Low	▼ Family's records could include whether or not they are a microfinance client, show what credits they have available, or show how they've spent their credits	
8 Count				
Record Keeping	5 Asesoras have a physical folder for each family they work with that contains pictures, handwritten notes, test results, and signed documents from the family.	High	▼ We should replicate this structure within our app. Each family should have their own separate records where social workers can save notes, photos, etc	This folder contains most of the ir about a family.
	Currently, most social service workers only use digital systems to record short blurbs of text after each meeting. These notes aren't systematically linked to the family's interventions.	High	▼ Our system should also allow for freeform text entry. Asesoras should be able to write notes for a specific intervention. This enables other social workers to see notes written for an intervention.	Asesoras record their brief notes i app. Interviewee #7 specified tha notes are just what steps she take family (for example, "today I met member} and encouraged them t doctor").
	Case work doesn't always fit into predefined categories, so having a record keeping system that is too structured can cause difficulties.	High	▼ While our records need a degree of structure, we must also consider how our records will handle edge cases and make sure we don't prevent the input of information in these cases.	
	The Foundation uses a form named "Registration Form and Monitoring of Interventions" to track a family's progress.	High	▼ Because asesoras are familiar with the structure of this form, our application should seek to replicate it as closely as possible. We should also request a copy of this form from the Foundation.	The form is used throughout the helping a family (on average, 9 m
	Social service workers often use paper to record their clients' progress.	Low	▼ Our app might have a function that allows the input of paper records.	Part of the reason for this is that t input short text blurbs with their

					system.
	5	Count			
Record Keeping - Evidence	5	Families move out of a red or yellow level by providing evidence of progress. Evidence includes an invoice of something they purchased, proof of a job related purchase, or a certificate from the city that they have permission to do business.	High	Asesoras should be able to take pictures of documents, invoices, proof of purchases, or before and after pictures as evidence that progress was made. At some point, having an option for document scanning could be useful.	This evidence is stored in the fam We could potentially use this doc scanning library.
		When moving out of red or yellow, a family's evidence has to be certified by a manager. Families are randomly screened to verify the certification.	High	Managers must have access to the records of the asesoras. It is also possible for records to be randomly submitted to the managers for verification in the future.	This is critical. If this process can't app would be unusable. Not clear happens for both red AND yellow, green.
		Photographs are used as evidence of what social workers are doing, but it's hard to see the progress that a family is making from black and white photos. (The Foundation only has black and white printers)	High	Asesoras should be able to display pictures taken on the tablet. The pictures should be associated with the family's records.	Because poverty in Paraguay is ex material, the benefit of interventi clearly documented with before a pictures. Bathroom renovations a health checkups are prevalent int
		Before and after pictures are used to convince the mothers in the family their situation is fixable and motivate them to follow through with the intervention.	Medium	Having success stories for different indicators would allow them to show the women relevant success stories for each of their red areas.	Interviewee #7 said she "can't do the family if the mother isn't inter "success stories motivate" Unlike six, this interviewee did not ment or managers as a motivation for v before and after pictures.
		Before and after pictures are used by the asesoras to share their successes with peers and managers.	Low	Asesoras should have access to their peers' before and after pictures. There could be a feed on the home page where they can see what their peers are working on, and see their recent successes.	
	5	Count			
Technology	6	Asesoras frequently lack internet access when visiting families, so family plans are often communicated in a follow up visit.	High	Make recommended solutions sync whenever the tablet is connected to the internet but can still be used offline.	Lucia liked the potential for inter recommendation because they d internet connection to research ir in the field
		Many social service workers do not have desktop computers.	High	A desktop app would not currently be useful to many social workers. We should make sure we are developing for the technology available. (In the case of Paraguay, Android tablets)	
		Asesoras almost always have a tablet with them while visiting a family.	High	Our app should be designed to run on a tablet.	
		Social service workers often use text messages and phone calls to communicate with clients. Most families have at least one phone.	Medium	The family's phone number should be easily retrievable from their records.	
		Mobile phones are extremely prevalent among social service workers and used frequently for work.	Medium	The app should send the asesoras text reminders to the asesoras.	
		The initial visit is usually scheduled over the phone.	Low	The asesoras should be able to add a family to their records before the initial visit, and add scheduled visit to those records.	
	6	Count			
Workload	5	Each asesora works with 35 women over the course of a year.	High	The view of active families should be designed with this in mind. There should be a way to see what families need attention (for example, have an upcoming visit or need a snapshot reviewed) and a way to search for families by name.	
		Social service workers have multiple scheduled contacts with families each month. (3 per month for asesoras, more in the United States depending on the social worker's field)	Medium	An automated scheduling system, with a way for clients to confirm, cancel and/or reschedule visits, would be extremely useful.	Asesoras have 1 monthly visit wit clients, and two other forms of co contact can take many forms, like message, or a meeting.

Social workers are extremely busy and would have limited time to devote to learning our software (est. 4 hours)	Medium	<ul style="list-style-type: none"> <li>Our application should be user friendly and easy to learn. Any onboarding material should be completable in under 4 hours.</li> </ul>	
It can be overwhelming when social service workers often have to do things that are not really their job (handle bureaucratic situations, give and receive training, etc.).	Low	<ul style="list-style-type: none"> <li>Make sure that we don't add any more complexity to their job. We shouldn't expect asesoras to teach other asesoras how to use our platform. Onboarding should cover all of the functionality in our app, and features should be easily discoverable.</li> </ul>	
In the United States, social workers would be more willing to learn the software if it was presented in a conference of some sort because they get credit towards their licences.	Very Low	<ul style="list-style-type: none"> <li>If releasing in the United States, we should arrange to have our software presented at a conference where social workers can receive credit.</li> </ul>	This is in part because social workers are extremely busy during regular hours.
5 Count			

29 Count

29 Count

## Appendix M

### User Stories

- As a Family, I want to take a survey so I can determine my level of poverty:
  - As a Family, I want the application to accommodate my disability so that I can use it to its full extent.
  - As a Family I want to resume a survey that is in progress so I can avoid starting over if I don't have time to finish the entire survey in one sitting
- As a social worker, I want to be able to see all of the Family's priorities:
  - As a Social Service Worker I want to be able to see past priorities a Family has had so I can evaluate their entire progress and maintain a comprehensive record.
  - As a Social Service Worker I want to see priorities a Family is currently working on so I can determine what is and isn't working, what has been completed, and continue to guide the Family out of a red or yellow level in that area.
  - As a Social Service Worker I want to see families that have an upcoming visit, need a visit scheduled, or have new survey results so I can see which families need my attention.
  - As a Social Service Worker I want to share before and after pictures with my peers and managers so I can take pride in my successes.
  - As a Social Service Worker I want the pictures to be colored and stored with high quality so I can fully communicate the progress a Family made using before and after pictures.
  - As a Social Service Worker I want before and after pictures for all families that have tried a specific intervention so I can motivate other families to succeed with that intervention
- As a Social Service Worker I want see all of the notes that I've entered for a Family so I can recall all of the steps that I've gone through to help a Family:
  - As a Social Service Worker I want to enter unstructured text notes about meetings.
  - As a Social Service Worker I want to add pictures to each intervention in progress in the monthly note so I can so I can look back at all of the pictures taken during a monthly visit
  - As a Social Service Worker I want to see the last time a note was edited so I can verify the integrity of notes that I've taken
  - As a Social Service Worker I want to have an edit button on a monthly note so I can so I can make changes.
  - As a Social Service Worker I want to be able to view a read only version of the note I took for a month so I can avoid accidentally making changes.
- As a Social Service Worker I want a view that shows all of the families that I am working with so I can easily access all of the records for a Family:
  - As a Social Service Worker I want to search all of the families that I am working with so I can

- find a Family by their name.
- As a Social Service Worker I want the Family's location to be stored in their records so I can remember where they live for in person visits:
  - As a Social Service Worker I want to share a Family's location, including address, latitude and longitude, pictures and description via text or whatsapp so I can help other asesoras or managers check up on a Family.
  - As a Social Service Worker I want to add pictures and a description to the Family's address so I can locate families in rural areas.
- Recommended Solutions:
  - As a Social Service Worker I want recommended solutions for each of the Family's problem-s/priorities so I can more efficiently come up with a plan for the Family.
  - As a Social Service Worker I want solutions to be screened/approved before being recommended so I can avoid sifting through solutions that aren't relevant
  - As a Social Service Worker I want recommended solutions for the Family's problems stored locally so I can view them in the Family's home when I don't have internet access
  - As a Social Service Worker I want to filter recommended solutions by criteria like income, cost, or language so I can decide which intervention would be the best fit for the Family.
- Others
  - As a Family I want to identify the indicators I am the most proud of so I can make sure our asesora considers our favorite accomplishments when creating our life map.
  - As a Developer, I want a well architected program so I can maintain it easily in the future.
  - As a Manager I want access to the cases of each asesora so I can certify families out of a red or yellow level of poverty
  - As a Family I want a way to archive families data, but still be able to go back to it so I can more quickly find families that I am currently working with.
  - As a Social Service Worker I want easy on boarding that includes a walkthrough of the app so I can learn how to use the platform.
  - As a Social Service Worker I want access to my peers' cases and records so I can exchange information about successful interventions and see problems they've experienced
  - As a Social Service Worker I want to scan paper documents and upload them to the system so I can keep copies of paper notes with the rest of the Family's digital records
  - As a Social Service Worker I want text message reminders for upcoming appointments so I can be reminded on a device that I always have with me.
  - As a Social Service Worker, I want a summary of differences between the current snapshot and the previous snapshot so I can easily identify how the Family's level of poverty has changed.

Appendix N

Style Guide



Primary Action	Confirmation of Destructive Action	Confirmation of Potentially Destructive Action	Button over colored area (such as a header)	Disabled State (10% Opacity)
Used for standard primary actions the user can take. Like moving between survey sections.	Used for actions that have permanently negative side effects.	Warning Button. Used for actions with potentially negative side effects.	Used for standard primary actions the user can take just like the primary button but when it is over a dark background.	Used for buttons for which actions are not yet enabled due to depending on another action.

### Alternative Buttons



Navigate backward



Navigate forward

Used for parts of the app where the navigation buttons are on the sides of the view and centered vertically. For example, the survey personal and economic questions.



Exit

Used for exiting a section of the app. Mainly, exiting the survey.



Add Family

Used for adding a new family by starting a new survey.

< Familias

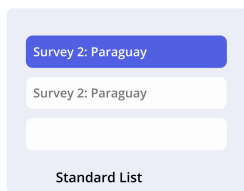
Navigate backward on Top bar

Used for backward navigation between different sections of the app from the top bar.

### Loading



### List



Used for standard vertical lists that only include text

Primary Action	Confirmation of Destructive Action	Confirmation of Potentially Destructive Action	Button over colored area (such as a header)	Disabled State (10% Opacity)
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Used for backward navigation between different sections of the app from the top bar.

### Loading

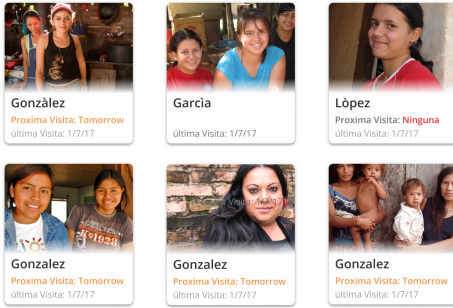


### List



Used for standard vertical lists that only include text

### Grid Lists



### List Item

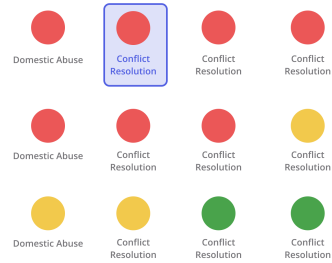


### Grid list of profile cards

Used for a view of a list of family profiles with a picture

### Indicators

#### Viewing Collection



#### List Item



### Grid list of indicator cards

Used for a view of indicator lists with colors (green, yellow, or red)

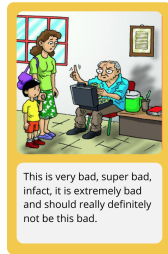


### Vertical list of indicator cards

Used for a view of the prioritized indicators on

the family's priorities page where clicking on the right-side arrows would open up a detail page about the single indicator

### Indicator cards



#### Vertical view

Used for the survey questions or a horizontal list of indicator cards



#### Horizontal view

Used for the indicator description or a vertical list of indicator cards

### Progress bar

5 Questions Remaining

#### Survey progress bar

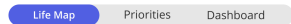
Used for displaying questions progress on a survey or a form

### Tabs

#### General App Navigation (vertical)



#### Family page navigation



Used for navigation between different views/fragments in the same sections of the app, such as the family page.

#### Top bar





Used for navigation between the different main sections where the tab bar is vertical.



Used for displaying user information, syncing, and backward navigation throughout all sections of the app.

General App Navigation (horizontal)



Used for navigation between the different main sections where the tab bar is horizontal.

Text Input

Your Response

Short text input

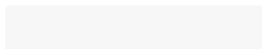
Used for short text inputs, such as answers to the personal and economic questions in the survey.



Text field with icon

Used for text boxes that contain icons, such as login information and searching.

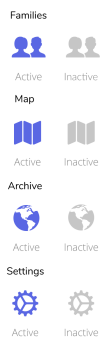
What will you do to get clean water?



Text area (long text)

Used for long text inputs, such as answering priority-related questions.

Icons



## Appendix O

# User Study 2

The first user study revealed a lot of user experience issues as well as a few bugs that impeded the usability of the application.

Pretty much all 3 users agreed that the size of the text and pictures is really small, making it hard to use for both optically able and disabled people alike. When it came to the survey, users had trouble with the software keyboard covering questions. The plus button dedicated to start a new survey was "uninviting" and didn't make sense. They also disliked the color combination of the application as a whole, even making a comment about the yellow during the background survey. When it came to the Indicator Survey, many of the users tested noted that loading times were faster than the current application, but still slower than they would like. This is because the pictures are currently being loaded as the user takes a survey, and the Paraguayan internet connection is less than ideal for this. One of the users also recommended we used a month countdown instead of a specific date picker for the priorities, since families are often not given strict deadlines, but rather loose deadlines so it fits easily with their schedule. A search for families (possibly by phone number, name, or id) was a highly requested feature not yet implemented in the version. Finally, a good recommendation given by a user was to add "help" buttons for each question, explaining what they need to do. Most of the families the asesoras are working with are not familiar with technology, and something like this would allow the members of the families to better understand what to enter in the question. Although there were a lot of problems and feature requests, all users exclaimed that this app was better than the current one. They liked the focus on pictures over the focus on text, making the application easier to read and more inviting for families. One user saw the family picture placeholder, and was excited to see her families' pictures there.

## O.1 User 1

### O.1.1 User Test

1. Enter the app/login (She made a gesture of approval)
2. After logging in, she wasn't sure what or how to choose.
3. Default value for currency or a list of set options.
4. The survey color isn't interesting to her, seems tacky, wants it to look cleaner.
5. There are too many options for secondary activity and occupation

6. There should be a search option for finding the occupation more easily; dropdowns should be searchable
7. Separator for currency
8. She gets lost when she doesn't answer a required question (she wasn't sure what action to take)
9. There should be more personalized questions when talking about the family
10. She doesn't know what one of the questions is about, maybe it is for the asesora not the family
11. Wants a location picker
12. She wasn't sure how to handle if she made a mistake
13. Bigger text for the indicators
14. When she was choosing the indicators, the survey quit.
15. So, she went back through the flow.
16. The last survey in the list can't be chosen (BUG)
17. She didn't manage to finish prioritizing 3 indicators. She finalized the survey without prioritizing the indicators, so she indicated it wasn't clear how to select priorities.

## O.1.2 Feedback

- The images and text are very small.
- The images don't download or take too long to download.
- She would prioritize the images and the letters optimize on the screen. Take better advantage of available space.
- Add complete options.
- It should be really clear where indicators are prioritized.
- Next step guide so you know what's next
- Where do the results go? (it doesn't redirect to the new family)

## O.2 User 2

### O.2.1 User Test

No information; Sodep wasn't able to provide any video of the actual test.

### O.2.2 Feedback

- She didn't find how to put the underline for the home/case/family. Search option for the family list
- She had trouble finding the button for starting a new family. She thought it was a decoration.
- Keyboard was covering questions
- Make the language more familiar to the users
  - Maybe too technical
  - Some language was google translated
- It's awesome that it allows you to correct questions that have already been answered (something that wasn't available in the previous app)

- It was pretty quick, the method of choosing an indicator, without having to press the next button. She liked not having to press anything.
- The yellow background didn't go with the white background.
- Even though the text didn't fit, she did notice that she could scroll to use more text
- She got an error message when taking the survey, she would like to be able to resume from where she left off
- She really liked the summary at the end of the survey
- The images take too long to load, it is faster than the current app but it could be still be better.
- Size of the images and text are fine while taking the survey, it's better than their current app. The current app actually takes the whole screen up with text and it can be very tiring.
- Did not like that yellow/green are used thematically in addition to their meaning as they relate to the indicators
  - Most importantly, the survey background
- Confused about ellipses
  - My mom said that they really aren't very common in spanish. Mostly use dash.
- Survey progress isn't visible enough. Should be on top not on the bottom
- App froze during the user test
- Wants "an information button" on "every question"
  - if you receive money, you have to be able to specify amount. If the user says no, it jumps to the next question. If the user says yes, then they fill out the question.
- "Other relevant information" required on the survey, and it doesn't let you skip the question.
  - Potential bug: make sure all skippable questions are enforced
- Priorities Screen
  - "We invite you to begin your new life."
    - \* Motivation and congrats page.
  - Doesn't have any instruction to choose priorities either.
  - It's not "friendly"
    - \* not "user friendly" - "friendly"
  - "Why I don't have it"
    - \* "Write your answer here"
    - \* Remove icons in text fields
    - \* Date picker is optimized for a week
  - She liked that you can see the priorities on the side as you add them, and continue looking through the lifemap to compare
- She likes that there is a way to report errors, but the button doesn't look inviting.
- She loved that she could report suggestions.
- She likes the list of families and she asked if there would really be a photo there of the family (she was enthusiastic about that)
- She would like a family search option
  - Search by cell phone number
  - Or ID number
  - or other ways.
  - Note: Search by families that have a certain indicator as red
- Needs title that says "Choose Survey" on the survey selection screen
- Didn't realize the plus button was there, meaningless to her, didn't understand that you could



add a new family with it.

- Should be used, not tu
- Searchable options
- She liked the app \*a lot\*.
- For someone who isn't as familiar with tech/apps, the app might need more texts/prompts for the next action.

## O.3 User 3

### O.3.1 User Test

No information; Sodep wasn't able to provide any video of the actual test.

### O.3.2 Feedback

- Login
  - Took a long time to load
- Survey
  - Was set to english, which is confusing
  - The pictures are just as important as text. Remember that in the poorest areas, the pictures have more of an impact with people
  - Cecilia asked "How many times is she allowed to go backwards"
  - Images took a long time to load
    - \* Some seemed bigger and/or cropped then in other questions.
  - The name of the indicator isn't visible anywhere
- Life Map
  - Can't see what I'm writing because of the keyboard
  - Should have a period of time there like "2 months, 3 months" instead of an actual date
    - \* Don't like deadlines
- Easily found everything she's looking for
- Likes to be able to move backwards
  - A lot of times, they get the info through conversation, and then later in the conversation they better understand previous questions.
- thought the survey was very quick.
- At the end of the survey, they take photos of the family with their stoplight calendar so they can make a before and after comparison with the entire stoplight
- Another complaint about being in english (!!!)
  - Note: she found it easy to use even though it was in english! which is cool.

## Appendix P

# User Study 2

The second user study revealed that our work on user experience was not in vain. A lot of the user experience issues in the first user study were no longer problems. However, users did notice small details that made the app less usable. One of the tested users also mentioned the application was slow at first (during first sync) but became significantly faster and smoother. After logging in, users had a hard time figuring out that they needed to sync the tablet. This caused one of the users to even spend about 8 minutes just clicking through the application, before being told that he needed to sync the application. All three users, however, discovered how to sync rather quickly. Syncing is supposed to be automatic at the start of the application given an internet connection. However, a known bug prevented auto-sync on Android 4.4 (API 19) devices.

The majority of usability issues showed up during the survey period. One of the biggest problem faced by all users while administering a survey was the question on annual income: everyone was confused as to what currency to use to input the answer. On a similar note, it was interesting to see that all users entered the same country differently. One of the users never figured out that questions were scrollable. The location picker also brought a bit of trouble to the users. After selecting a location (a process the testers liked), they were brought back to the initial question, without indication if the location had been correctly saved. It would be smart to display the selected location after selection. Another detail we noticed was how tiny the survey stepper is on the Asesoras' 7" tablets. It would be useful for future users to increase the size of the survey stepper if space allows for it. User 1 also tried touching questions on the review page, before realizing it wouldn't take him back to the question he clicked on. He also didn't notice that the question list was scrollable, which may have confused him. It would be smart to implement clickable questions on the survey review page, so that users can fix any questions they might have made a mistake on.

There were also some other general problems noticed. In one case (User 2) the software keyboard persisted throughout the entire survey. Another small unexpected event was when the tab bar moved when the keyboard came up.

## P.1 User 1

### P.1.1 User Test

1. Started the application

2. He noticed that some words were incorrect in Spanish (ex
3. Iniciar instead of Initiar)
4. Did not understand he needed to sync to see the families (expected an automatic sync)
5. When he figure out about the syncing, he tried the syncing and the app did not return any families available.
6. Did not know what "Referencias Personales" [Translated to Personal References] meant
7. Entered a numerical value in the currency question (didn't know what kind of value to enter)
8. "Actividad económica principal" [Translated to Job] doesn't have an option to be private
9. Looking for his address on the map, when going back, the marker was not saved
10. Place picker does not allow you to scroll on the map once you have marked a location (to give a more precise location)
11. "Tu Respuestas" [incorrect Spanish in the application]
12. Noticed that the summary didn't show the previously selected and doesn't show if the selection was made
13. Went on to indicators
14. The questions passed automatically, he liked that
15. He liked that you could skip and go back when surveying indicators
16. The image sometimes didn't match the name of the indicator
17. Mentioned that he didn't understand what "48 plus" meant but eventually noticed that it was decreasing and assumed it meant he had 48 remaining indicators
18. He loved that it showed how many questions were skipped
19. He would have liked to see a feature that would allow the user to look only through the unanswered questions instead of going through the entire survey again

## P.1.2 Feedback

- The UI very simple, design too, if could have more colours will be better
- It's fast
- He is not so sure that going to next question automatically is a good approach since you couldn't know if you really marked or not
- Visualization of the indicators, the image is very small, the blank spaces of the tablet could be better used
- The main screen could say more about the Poverty Stoplight
- He could not conclude the survey so he was left with many questions
- It was interesting
- The languages were very mixed
- The synchronization is not known when it ends

## P.2 User 2

### P.2.1 User Test

1. Opened application and logged in
2. Waited for families to appear (it didn't happen)

3. After a few seconds he noticed the syncing option
4. Mentioned that it took a long time to sync
5. Spanish translation error "Libertal condicional"
6. Opened a new survey
7. Didn't know what currency to enter when asking for income
8. The location picker should be a list, not a map where you enter it manually
9. Went on to the indicator questions
10. Loved the sharpness of the pictures [shows the appreciation of pictures in their culture]
11. Likes how easy it is to add a priority at the end of the survey
12. Thought it was a little slow at the beginning but then noticed that it got faster
13. Mentioned that he wouldn't know how easy it would be for a colorblind person to use the app, but he liked the colors

## P.2.2 Feedback

- At first was slow but then went faster
- The family photo on the homepage would be nice
- The synchronization at the beginning is not intuitive but it is finally understood and is well located
- He likes the priorities in the life map with drawings etc
- Place the identifier of the family, with the name
- Compress the number of families, reduce / enlarge

## P.3 User 3

### P.3.1 User Test

1. Started the application
2. Picked a family and started a survey
3. Doesn't show street names in the location picker, trying to find the address was hard for her
4. Didn't know how to go on after selecting a location (within the location picker)
5. Thought it was complicated to set a location
6. Went on to the Indicator survey
7. Mentioned that there are a lot of words in the indicator area, which makes you lose focus on the indicators themselves
8. After going through the indicator survey, she went on to the priorities editor
9. Loved the idea of setting a time goal
10. She tested how many months you can enter (max is 48)
11. Loved how priorities looked!
12. Saved the survey and looked at the lifemap
13. Clicked on the priorities view
14. Opened a new survey for the same family
15. Started the survey and closed it immediately
16. Opened a new survey to test the resuming capability
17. Didn't get the resuming option

## P.3.2 Feedback

- "In general, pretty good"
- When the survey is in english I can see the skip option over indicators but in the spanish versión you can't
- Instead I see Necesario - Seguir (?) and when I try to jump the indicator is getting mark anyway
- Place the indicators names above instead of below
- You can take the name indicators from above
- When surveying, it's not clear that you can return (resume) a survey

## Appendix Q

# Summative Research Plan

## Q.1 Goals

Measure quality attributes, including:

1. Satisfaction
2. Efficiency
3. Learnability
4. Stability
  - (a) Bugs/Crashes affect learnability
5. Aesthetics
6. Performance relative to the previous platform

## Q.2 Measurement Methods

1. Satisfaction
  - (a) Individual tasks
    - i. After scenario question
  - (b) Overall
    - i. Usefulness, Satisfaction, Ease of Use
2. Great questions, but 7 point scale is sketchy.
  - (a) SUPR-Q
3. 5 point scale is nice, but there's a big focus on loyalty and credibility which isn't an issue here.
4. Efficiency
  - (a) Covered by Usefulness, Satisfaction, Ease of Use
5. Learnability
  - (a) Covered by Usefulness, Satisfaction, Ease of Use
6. Stability
  - (a) Analytics
    - i. Crashes
    - ii. Sync Errors
    - iii. Bugs reported
  - (b) Questions from Usefulness, Satisfaction, Ease of Use

- i. Inconsistencies
  - ii. I can use it successfully every time.
  - iii. I can recover from mistakes quickly and easily.
- (c) Additional Areas
- 7. Aesthetics
  - (a) <https://measuringu.com/visual-appeal/>
  - (b) Lindgaard et al., study
    - i. A combination of the following five items predicted 94% of visual appeal ratings for the 100 website homepages:
      - 8. interesting boring
      - 9. good use of color bad use of color
      - 10. well designed poorly designed
      - 11. good layout bad layout
      - 12. imaginative unimaginative
      - 13. Simple - Complex
      - 14. Clear - Confusing
        - (a) 7-11 point scale (and fewer points are necessary when rating multiple items)
        - (b) Beauty is correlated with trust and usability
- 15. Performance relative to the previous platform
  - (a) Compare quality metrics between new and old platform (satisfaction, learnability, efficiency, etc.)

## Q.3 Strategy

### Q.3.1 Survey

- Recruit at least 20 Poverty Stoplight Advisers from Paraguay, Argentina, and Sierra Leone
- Provide them with link to Play Store and an Instruction Manual for reference if they get stuck
- Email them a survey
  - Primarily questions from Usefulness, Satisfaction, Ease of Use and aesthetic questions from Lindgaard et al., study, and questions comparing the old app to the new app
- Focus on defining current quality metrics

### Q.3.2 Interview

- Recruit and interview at least 2 asesoras, either by:
  - Asking Traver if we could have WPI people in Paraguay conduct the interviews (maybe take videos)
  - Scheduling Skype interviews with the 2 asesoras
- Similar to survey questions, but more open ended (more what questions)
  - Example: Did you find the new app useful? What did you find most useful? What are some concerns you have about it?
- Add questions about our future work
- Get more general comments and quotes

### Q.3.3 Analytics

- Calculate crash rate

## Q.4 Notes

Source: Grossman, T., Fitzmaurice, G., & Attar, R. (2009). A Survey of Software Learnability: Metrics, Methodologies and Guidelines. In Conference on Human Factors in Computing Systems (pp. 649658).

1. Value added compared to the old app
  - (a) Did the app ever crash?
    - i. If the app crashed before, how would you feel?
2. How they value the various functionality that was added
  - (a) "What's the favorite feature that was added?"
3. Style
  - (a) Is it visually pleasing?
4. Features
  - (a) multiple choice
    - i. Didn't notice
    - ii. Confusing
    - iii. Not Valuable
  - (b) Valuable
5. Is there anything that worries you about the app? (unsure of)



## Appendix R

# Summative Research Survey

## R.1 Introduction

Now that you've had a chance to use the first version of the new Poverty Stoplight Survey Platform, we'd like to hear what you think. This feedback will help us understand what we did well, what we can improve, and what matters the most to our users (like you!). Please answer these questions about the new Android platform only:

## R.2 Usefulness

1. It helps me be more effective.
2. It helps me be more productive.
3. It is useful.
4. It makes the things I want to accomplish easier to get done.
5. It saves me time when I use it.
6. It meets my needs.
7. It does everything I would expect it to do.

## R.3 Ease of Use

1. It is easy to use
2. It is simple to use
3. It is user friendly
4. It requires the fewest steps possible to accomplish what I want to do with it
5. It is flexible
6. Using it is effortless
7. I can use it without written instructions
8. I don't notice any inconsistencies as I use it

## R.4 Ease of Learning

1. I learned to use it quickly
2. I easily remember how to use it
3. It is easy to learn to use it
4. I quickly became skillful with it

## R.5 Satisfaction

1. I am satisfied with it.
2. It is fun to use.
3. It works the way I want it to work.
4. It is wonderful.
5. I feel I need to have it.
6. It is pleasant to use.

## R.6 Stability

1. I can recover from mistakes quickly and easily
2. I can use it successfully every time
3. The app crashes less than I expected.

## R.7 Aesthetics

"For these reasons, the validated technique of providing an unmarked line (Levin 1975, 1976, Lockhead 1992) anchored at each end by appropriate expressions by very unattractive and very attractive was used to collect opinions instead of conventional rating scales"

The app is...

1. Complex ----- Simple
2. Boring ----- Interesting
3. Confusing ----- Clear
4. Bad use of Color ----- Good use of Color
5. Poorly Designed ----- Well Designed
6. Bad Layout ----- Good Layout
7. Unimaginative ----- Imaginative

## R.8 General

1. List the most negative aspect(s) of the new platform
2. List the most positive aspect(s) of the new platform

## R.9 Previous Survey Platform

Only complete this section if you have used the old platform.

1. Compared to the previous app, it is easier to survey a family on the new app
2. Compared to the old app, I face less technical difficulties with the new app
3. There are features in the previous platform that I like but didnt find in the new app
4. Compared to the previous app, it is easier to learn how to use the new app
5. I often lost family data due to crashes on the previous app
6. The previous app sometimes didnt function the way I wanted it to
7. Compared to the previous app, the new app is more visually appealing
8. Compared to the previous app, the new app is more user friendly
9. The new app is more pleasant to use than the old app
10. The new app has a better layout than the previous app

### R.9.1 General

1. List the most negative aspect(s) of the previous platform
2. List the most positive aspect(s) of the previous platform

Appendix S

## Summative Survey Results

# Report 2

Quality Assurance Survey

April 30, 2018 4:50 PM MDT

## Q1 - Browser Meta Info

### Navegador

#	Field	Choice Count
1	Chrome	63.64% 7
2	Firefox	27.27% 3
3	Edge	9.09% 1

11

Showing Rows: 1 - 4 Of 4

### Q1\_Version - Versión

#	Field	Choice Count
1	65.0.3325.109	18.18% 2
2	65.0.3325.181	36.36% 4
3	59.0	27.27% 3
4	56.0.2924.87	9.09% 1
5	16.16299	9.09% 1

11

Showing Rows: 1 - 6 Of 6

### Sistema operativo

#	Field	Choice Count
1	Macintosh	18.18% 2
2	Ubuntu	18.18% 2
3	Windows NT 10.0	18.18% 2
4	Linux x86_64	18.18% 2
5	Android 6.0	9.09% 1
6	Android 5.1.1	9.09% 1
7	Android 6.0.1	9.09% 1

11

Showing Rows: 1 - 8 Of 8

Resolución

#	Field	Choice Count
1	1280x720	18.18% 2
2	1280x800	18.18% 2
3	320x534	9.09% 1
4	320x570	9.09% 1
5	360x640	9.09% 1
6	1920x1080	27.27% 3
7	1536x864	9.09% 1

11

Showing Rows: 1 - 8 Of 8

### Q3 - Usefulness

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	It helps me be more effective.	3.00	5.00	3.64	0.77	0.60	11
2	It helps me be more productive.	3.00	5.00	3.82	0.72	0.51	11
3	It is useful.	3.00	5.00	3.73	0.75	0.56	11
4	It makes the things I want to accomplish easier to get done.	3.00	5.00	3.36	0.64	0.41	11
5	It saves me time when I use it.	3.00	5.00	3.64	0.64	0.41	11
6	It meets my needs.	2.00	4.00	3.20	0.60	0.36	10
7	It does everything I would expect it to do.	2.00	4.00	2.82	0.57	0.33	11

## Q4 - Ease of Use

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	It is easy to use	3.00	5.00	3.91	0.67	0.45	11
2	It is simple to use	3.00	5.00	3.91	0.67	0.45	11
3	It is user friendly	3.00	5.00	3.91	0.51	0.26	11
4	It requires the fewest steps possible to accomplish what I want to do with it	3.00	4.00	3.45	0.50	0.25	11
5	It is flexible	2.00	4.00	3.09	0.51	0.26	11
6	Using it is effortless	2.00	5.00	3.30	0.78	0.61	10
7	I can use it without written instructions	1.00	4.00	3.09	1.00	0.99	11
8	I don't notice any inconsistencies as I use it	3.00	5.00	3.40	0.66	0.44	10



## Q5 - Ease of Learning

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I learned to use it quickly	3.00	5.00	4.09	0.90	0.81	11
2	I easily remember how to use it	2.00	5.00	4.18	0.94	0.88	11
3	It is easy to learn to use it	3.00	5.00	4.18	0.83	0.69	11
4	I quickly became skillful with it	3.00	5.00	4.00	0.85	0.73	11

## Q6 - Satisfaction

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I am satisfied with it.	2.00	4.00	3.27	0.62	0.38	11
2	It is fun to use.	2.00	4.00	3.40	0.66	0.44	10
3	It works the way I want it to work.	2.00	4.00	2.91	0.51	0.26	11
4	It is wonderful.	2.00	3.00	2.73	0.45	0.20	11
5	I feel I need to have it.	3.00	4.00	3.10	0.30	0.09	10
6	It is pleasant to use.	3.00	4.00	3.09	0.29	0.08	11

## Q7 - Stability

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I can recover from mistakes quickly and easily	2.00	4.00	2.91	0.51	0.26	11
2	I can use it successfully every time	2.00	4.00	3.00	0.45	0.20	10
3	The app crashes less than I expected.	2.00	4.00	2.91	0.67	0.45	11

### Q8 - Esthetics I think the app is...

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Esthetics I think the app is...	3.00	5.00	3.55	0.66	0.43	11

### Q9 - I think the app is...

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I think the app is...	2.00	5.00	3.55	0.78	0.61	11

### Q10 - I think the app is...

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I think the app is...	3.00	4.00	3.55	0.50	0.25	11

### Q11 - I think the app makes...

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I think the app makes...	1.00	5.00	3.27	1.21	1.47	11

## Q12 - I think the app is...

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I think the app is...	2.00	5.00	3.55	0.78	0.61	11



### Q13 - I think the app has a...

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I think the app has a...	2.00	4.00	3.27	0.75	0.56	11

### Q14 - I think the app is...

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I think the app is...	2.00	4.00	3.27	0.62	0.38	11

## Q15 - List the most negative aspect(s) of the new platform:

List the most negative aspect(s) of the new platform:

It still crashes and has some features that are not available yet.

- Lo colores. - Mejor indicador de cómo realizar las operaciones. - Debe tener algun fondo distinto al color blanco. - Falta internacionalización.

...

Algunos textos todavía no están traducidos o mal traducidos

Synchronization process is cumbersome.

is still unstable, syncing issues

The home page should not immediately show families, it should be a navigation bar to chose whether you want to take a survey, view past surveys, or view households, etc.

1- requiere imágenes más detalladas 2- requiere preguntas más explicativas

-Falta de la opción para colocar la foto de cliente-familia -Mejoramiento en el diseño estético de la app -Faltaría una opción para colocar las intervenciones realizadas con las clientas-familias

Showing Records: 1 - 9 Of 9

## Q16 - List the most positive aspect(s) of the new platform:

List the most positive aspect(s) of the new platform:

I really like the Poverty Stoplight survey part, because of how each question flows. I think that it is pretty useful to have it divided by families.

- Rápido. - Los componentes visuales utilizados.

...

Facilidad en la toma de encuestas Colores divertidos

Question with images during survey

the whole UI and flow, very well design, team work

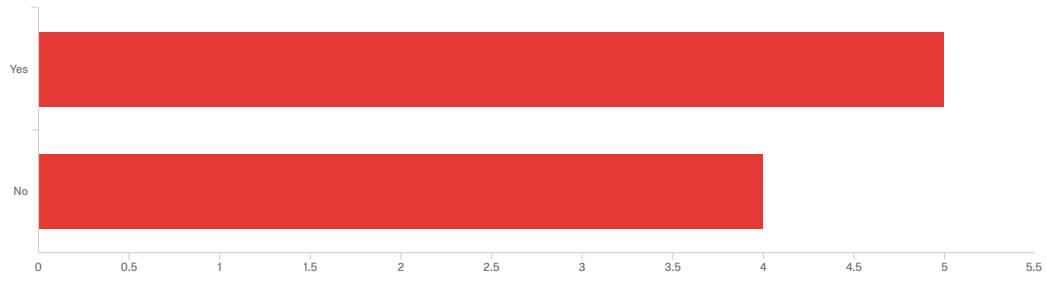
Stability. Good work!

1-mucho más práctico 2- sencillo 3- fácil de aplicar

-Facilidad en el acceso -Practicidad en la utilización -Innovación

Showing Records: 1 - 9 Of 9

### Q17 - Have you used the previous platform?



#	Field	Choice	Count
1	Yes	55.56%	5
2	No	44.44%	4
			9

Showing Rows: 1 - 3 Of 3

## Q19 - Previous Survey Platform

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Compared to the previous app, it is easier to survey a family on the new app	3.00	4.00	3.80	0.40	0.16	5
2	Compared to the old app, I face less technical difficulties with the new app	4.00	5.00	4.25	0.43	0.19	4
3	There are features in the previous platform that I like but didn't find in the new app	1.00	5.00	3.20	1.33	1.76	5
4	Compared to the previous app, it is easier to learn how to use the new app	3.00	5.00	4.00	0.63	0.40	5
5	I often lost family data due to crashes on the previous app	3.00	4.00	3.80	0.40	0.16	5
6	The previous app sometimes didn't function the way I wanted it to	3.00	5.00	3.80	0.75	0.56	5
7	Compared to the previous app, the new app is more visually appealing	3.00	5.00	4.20	0.75	0.56	5
8	Compared to the previous app, the new app is more user friendly	3.00	5.00	4.40	0.80	0.64	5
9	The new app is more pleasant to use than the old app	4.00	5.00	4.60	0.49	0.24	5
10	The new app has a better layout than the previous app	3.00	5.00	3.80	0.98	0.96	5

Q20 - List the most negative aspect(s) of the previous platform:

List the most negative aspect(s) of the previous platform:

---

It crashes a lot. Wasnt easy to connect to the web version of the app.

unstable and lack of well design

Instability

1-Muy larga

Showing Records: 1 - 4 Of 4

Q21 - List the most positive aspect(s) of the previous platform:

List the most positive aspect(s) of the previous platform:

---

The previous platform had more features.

show graphics about asesoras activities

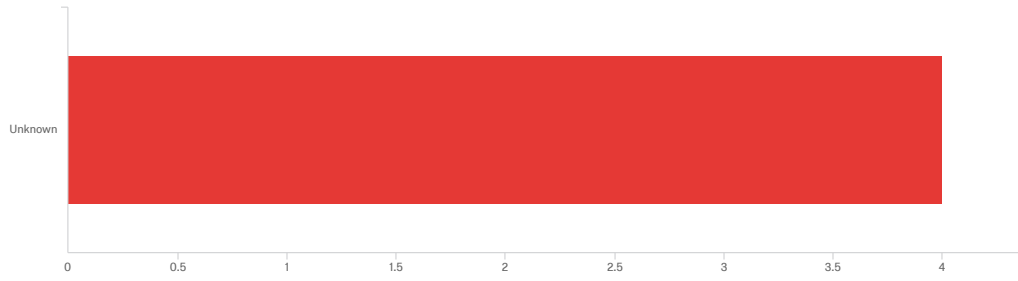
N/A

1-muy explicativa y catacterizada

Showing Records: 1 - 4 Of 4



## Q11 - Topics



#	Field	Choice Count
1	Unknown	100.00% 4

Showing Rows: 1 - 1 Of 1

**End of Report**

## Appendix T

# Preflight Checklist

## T.1 Release Process

- Create Release Branch from develop
  - No additional features can be added to this branch – fixes only
  - Make release branch protected
- Create Release Milestone for any problems on Github
- Change version in gradle file for Release Candidate (append RC on the end)
- Review new issues on Github, close solved issues
  - Identify existing issues that must be solved
- Begin preflight checklist
- Solve problems that arise
- Finish preflight checklist
- Stop all changes
- Remove RC from version
- Tag and Bag
- Create signed AP
- Check version in settings – make sure it is just the release number (not dirty or snapshot)
- Final cursory run through preflight checklist.
- Create change log with known issues
- Merge changes into master
- Retrospective, next steps

## T.2 Preflight Checklist

### T.2.1 Final Test

1. General
  - (a) The application should have a unique version, incremented from the previous release
2. Login
  - (a) Functionality
    - i. Login is successful when username and password are correct

- ii. Error message for wrong username or password works properly
  - iii. Has a dropdown to choose server
- (b) Layout
  - i. looks good on all three resolutions
    - A. 7 inch
    - B. 8 inch
    - C. 9 inch
  - ii. Looks good on different orientations
    - A. Landscape
    - B. Portrait
- 3. All families page
  - (a) Syncing works correctly
    - i. Does not lag
    - ii. Shows the right time for Last synced
  - (b) Families cards
    - i. Functionality
      - A. Each family card should show:
      - B. A picture placeholder
      - C. A family name
      - D. A phone number
    - ii. Layout
      - A. Number of cards is responsive to different resolutions and orientations
      - B. Spacing between cards is appropriate for different orientations and resolutions
      - C. View criteria for each card
      - D. Text views shouldnt overlap
      - E. Card dimensions are fixed for different resolutions and orientations
  - (c) Tab bar
    - i. Smooth navigation between all tabs
    - ii. Proper under construction pages
  - (d) Add button
    - i. Should start new survey
- 4. Survey
  - (a) Layout
    - i. Choosing survey view
      - A. Has a list of surveys to choose from
      - B. Has a continue button
    - ii. Personal and economic questions
      - A. Smooth horizontal navigation between questions
      - B. Ability to see the question while entering answer
      - C. Show proper hints in the right language
    - iii. Indicator questions
      - A. Pictures are of fixed size
      - B. Ability to scroll through the text description for each option
      - C. Skip button changes to next when answer is selected
      - D. Has a save button

- iv. Survey review page
    - A. Unanswered questions list should be smoothly scrolled through
    - B. There is back button
    - C. There is submit button
    - D. The number of unanswered questions is displayed
    - E. There is exit button
  - v. Life map page
    - A. Contains a view of all the answered indicators color coded
    - B. Each indicator is a circle of the color of the answer
    - C. Each indicator has a description under it
    - D. Has a view of the priorities list on the right
    - E. The priorities view has a save button
    - F. Each priority has
      - G. Description of the problem
      - H. Initial plan to solve it
        - I. Goal date to solve it by
  - vi. Priorities view
    - A. Has a list of priorities that contain
      - B. The name of the indicator
      - C. The color of the indicator
      - D. The details of the answers to the three questions
      - E. Has a save button
- (b) Functionality
- i. General
    - A. Functional progress bar
    - B. Exit button gives a pop-up to check the decision
    - C. Next and back buttons navigate between questions
    - D. Swiping right and left is disabled
    - E. Functioning Dropdowns that have the progress bar properly updated
    - F. Functional progress bar that gives the correct number of remaining and skipped questions
    - G. After survey, family detail page is opened for the new family
  - ii. Choosing survey
    - A. Clicking on a survey should indicate that it was selected
    - B. Clicking on continue should start the right selected survey
    - C. Choosing survey page is only shown for the first time surveys but not resurveys
  - iii. First time survey
    - A. Creates new family
    - B. Contains personal questions
    - C. Contains economic questions
    - D. Contains indicator questions
    - E. Selecting a card indicates that it was selected
    - F. Gives a few seconds after selecting before moving to the next question
  - iv. Resurveys for a pre existing family
    - A. Contains economic questions

- B. Contains indicator questions
- C. Selecting a card indicates that it was selected
- D. Gives a few seconds after selecting before moving to the next question
- E. Is properly added to the existing family
- v. Survey review page
  - A. Clicking on an unanswered question takes the user back to that question
  - B. Exit button gives a pop-up message to confirm decision
  - C. Back button takes the user to the last question in the survey
  - D. Clicking on submit button goes to the life map page
- vi. Life map page
  - A. Exit button gives a pop-up message to confirm decision
  - B. Clicking on an indicator opens up a dialog that contains the following
    - C. A question about the reason of the problem with a text entry for answer
    - D. A question about the initial plan to solve it with a text entry for answer
    - E. A question about the goal date with a date picker for answer
    - F. A button that adds the indicator to priorities when clicked on
- vii. Priorities view
  - A. Shows list of priorities with details in the order the family set them
  - B. Clicking on the save button opens up the family detail page for that family
  - C. The family detail page contains the snapshot that was just taken
- 5. Family detail page
  - (a) Family Information card
    - i. Functionality
      - A. Has family picture placeholder
      - B. Has family name
      - C. Has family phone number
  - (b) Priorities Page
    - i. Contains a list of the all the priorities the family indicated
  - (c) Indicators fragment
    - i. Add button
      - A. Starts a resurvey
      - B. Does not include personal questions
      - C. Includes all indicator questions
    - ii. Dropdown
      - A. Shows the right dates for snapshots
      - B. Smooth scrolling and selecting
    - iii. Indicators
      - A. Grouped by red, yellow, or green
      - B. Red on top, then yellow, then green
      - C. Shows the questions associated with each indicator
      - D. Shows a description for the familys answer

## T.2.2 Final Steps

- Sign APK

- Install signed APK on API 19 and 27

Appendix U

Application Manual

# *Poverty Stoplight* Mobile Platform

Manual for Android Tablets

Revision 1.0 - April 9th, 2018



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## Foreword

This manual was written for App Version 2.0.2. Later versions may add new features or modify previous functionality.

If you find a mistake in the manual or have any questions, you can contact the authors at [poverty@wpi.edu](mailto:poverty@wpi.edu).

## Quick Start

### Requirements

In order to use the app, the following requirements must be met.

- Android Tablet
- Screen size at least 7 inches or 17cm
- Connected to the Internet (for setup)
- Google account (for setup)

### Setup

#### Setting the Language

The application supports both Spanish and English. Follow these steps to set your preferred language.

1. Go to the tablet's settings.
2. Tap on *Languages & Input*.
3. Tap on *Languages*.
4. Tap *Add Language*.
5. Add the language that you prefer.
6. Reorder the languages so that your preferred language is listed first.

#### Login

In order to use the app, you will need to download it and login.

1. Download the *Poverty Stoplight Adviser Platform* app from Google Play store.
2. Open the app once it has downloaded.
3. Enter the username and password provided by your administrator.
4. In the lower right hand corner, select the server that was provided by your administrator.
5. Tap [LOGIN].

## Adding a New Family

One of the first things that you might want to do with the app is add a new family. To do this, you'll need to fill out a survey using the family's information.

1. Press the [+] button from the Family Dashboard.
2. Select the survey that you'd like to fill out. *Note: If there are no surveys available, you may need to sync the app (page 6).*
3. Press [CONTINUE].
4. Fill out all of the questions that are shown with the family's relevant information.
  - a. If a question is not required, an arrow [→] button will allow you to continue without entering any information.
  - b. There are many different types of questions; some will have different input methods.
5. Once all of the questions have been answered, a life map for the new family will show up. You can select priorities by tapping on the indicators that are shown and filling out the form that pops up.
6. Finish the survey by pressing submit.

## Survey an Existing Family

Eventually, the results that were collected when a family was initially created may no longer be accurate. To update a families life map, a survey can be retaken.

1. Open the family that should be updated.
2. Press the [+] button from the Family Report.
3. Select the survey that you'd like to fill out; most likely, you'll want to use the survey that the family used last.
4. Press [CONTINUE].
5. Fill out all of the questions again. *Note: The questions relating to the family's information cannot be retaken, so they will not be available.*
6. Once all of the questions have been answered, a life map for the new family will show up. You can select priorities by tapping on the indicators that are shown and filling out the form that pops up.
7. Finish the survey by pressing submit.

## **Syncing the App**

All of the information about your families is stored on your tablet, allowing you to view or add to it even without an active Internet connection. This means that the information that you see in the app isn't always up to date though. Periodically, the application will use the Internet to update itself with any new information that is available in the Poverty Stoplight Platform.

To see whether the information on the app is up to date, look at the Sync dialog in the upper right portion of the application. This will report when the app was last updated. Tapping on this dialog forces the app to update immediately, if it has Internet access.

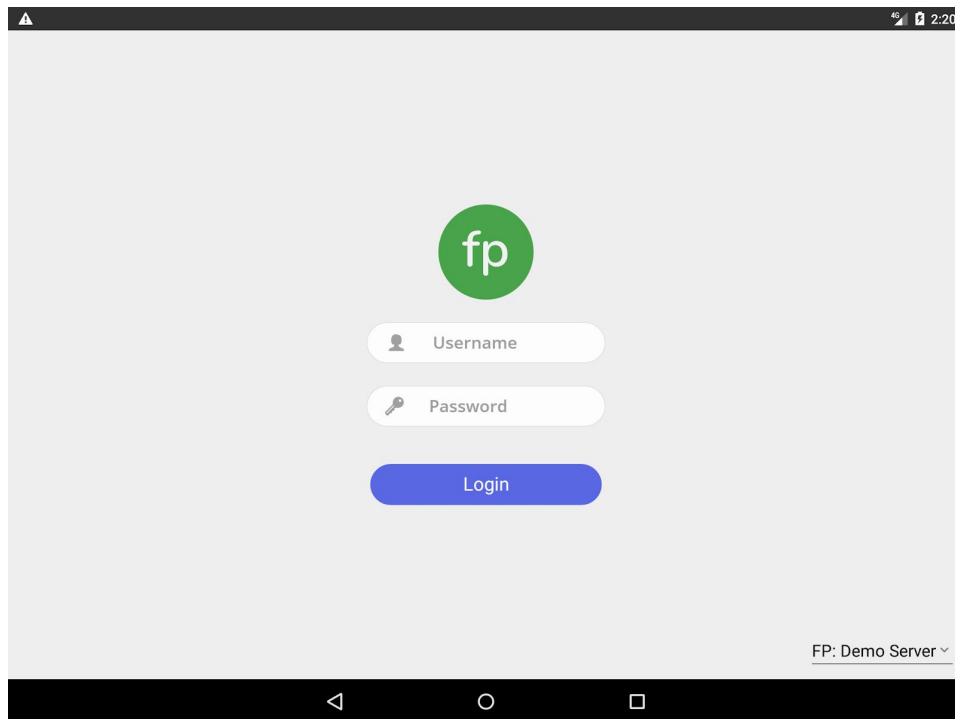
If you experience any issues with Syncing, see the Troubleshooting guide on page [16](#).

## Contents

This app has a few important pages. These pages are the Login, Family Dashboard, the Family Report, the Survey and the Settings.

### Login

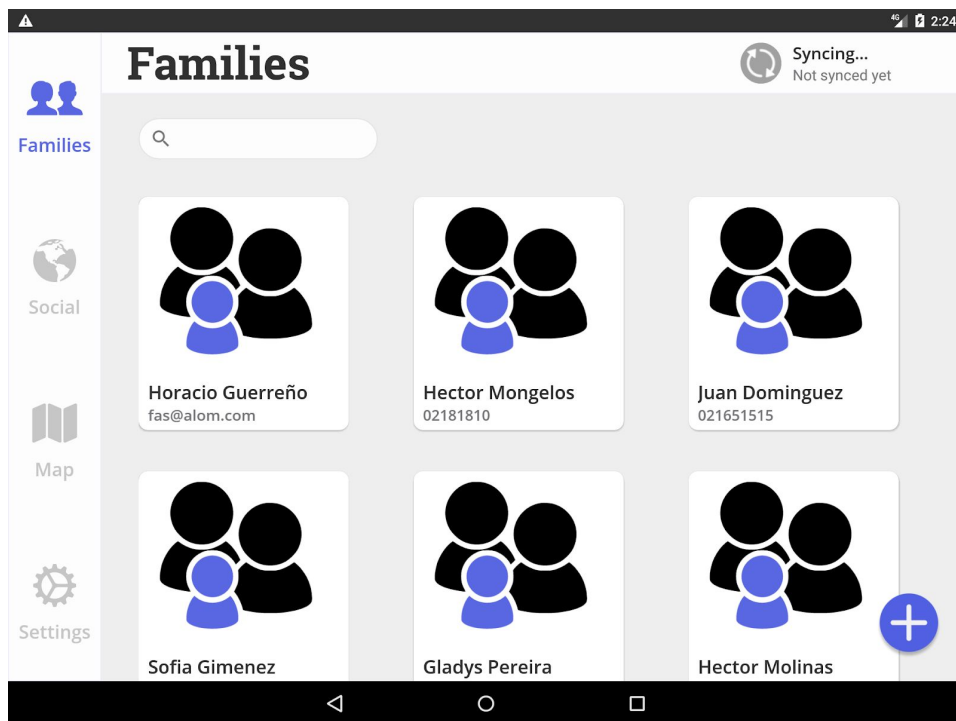
This page is used to authenticate yourself. It has options to enter a username, password and to select the Poverty Stoplight Platform server to use.



## Family Dashboard

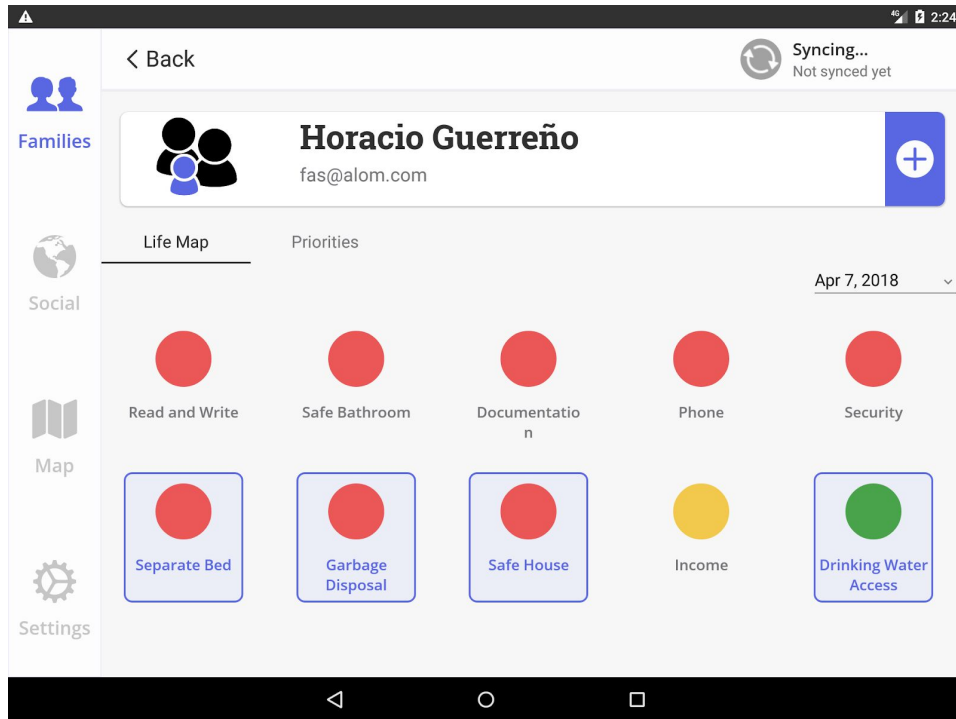
This page is the first that you will see after the application has been opened. This page will show all of the families that you have access to.

(If you don't see any families, make sure that you tap "Sync" in the upper right corner. If you have synced and still don't see any families, please take a look at the FAQ)



## Family Report

This page shows details about a family, and can be opened by tapping on a family in the Family Dashboard. This page shows family information, such as the family's name, the family's life map, and the family's priorities.





## Survey

This section has many elements to it. There are four different parts in a survey that each contain questions that family can answer.

**Indicators** 1 Skipped, 52 Remaining

**3. Access to Credit**

**Indicator 1 (Red border):** In our household, we have no access to credit, or lack information about accessing affordable credit, or we borrow from loan sharks.

**Indicator 2 (Yellow border):** In our household, someone has bad credit scores, and we do not understand the financial information available to help us make good borrowing choices.

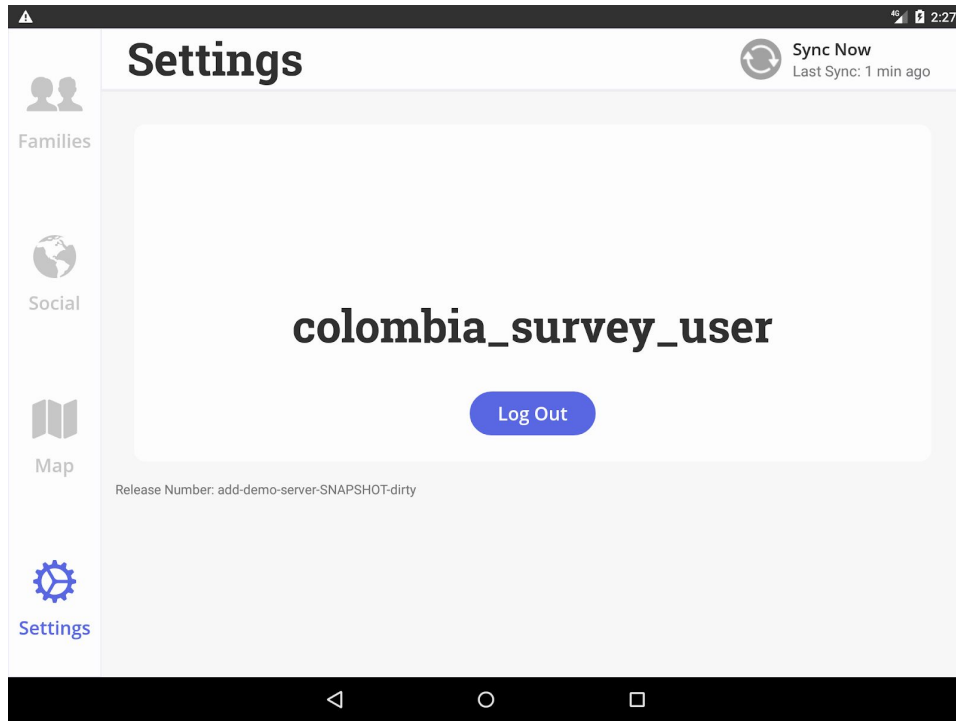
**Indicator 3 (Green border):** In our household, everyone has good credit scores, or has access to safe and affordable ways to borrow money (e.g. through a bank).

Back Skip

Family Record Economic Questions Indicators Life Map

## Settings

This page is simple and is mostly only helpful for troubleshooting. This page contains your user name, the app version and a button to logout and clear your information.



## Working with a Family

The application is intended to be mainly useful for reading a family's information and adding information both online and offline. Following are some of the tasks that this app was designed to do.

### Finding the Family

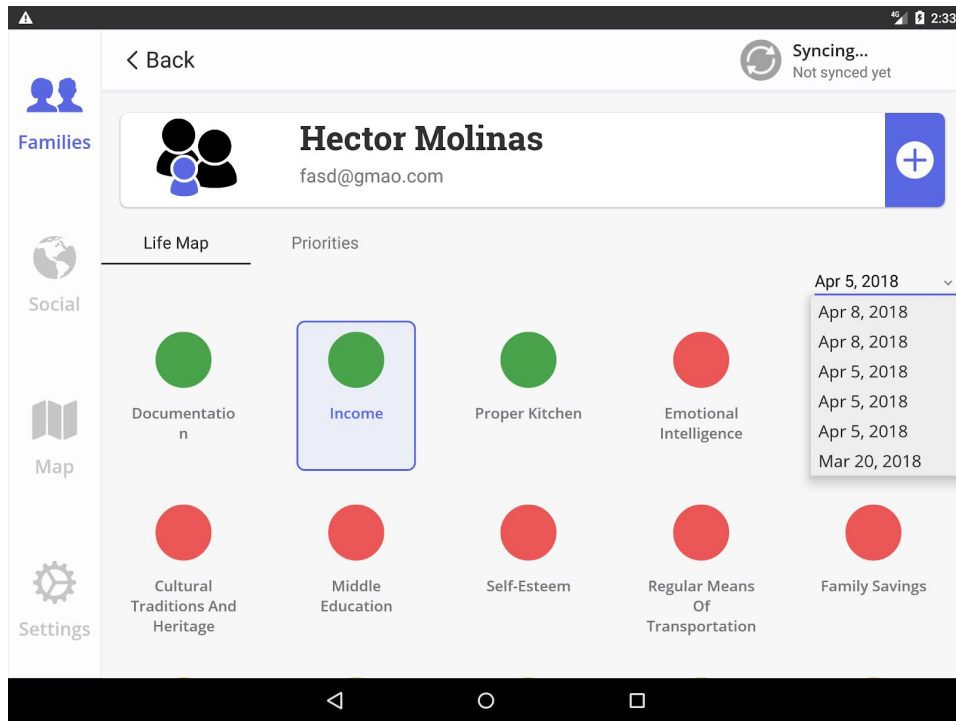
When you want to work with a family, you will be able to open its report from the Family Dashboard (the first page that opens when the app does). This page will list all families that you have access to. There is a search bar near the top of the page, which will allow you to search through your families for a particular one by name. Once you have found the family, tap on their picture to view the Family Report.



## Viewing Recent Snapshots

From the Family Report page, you can view the most recent life map of a family; the date that the life map was recorded is displayed in the top right portion of the life map.

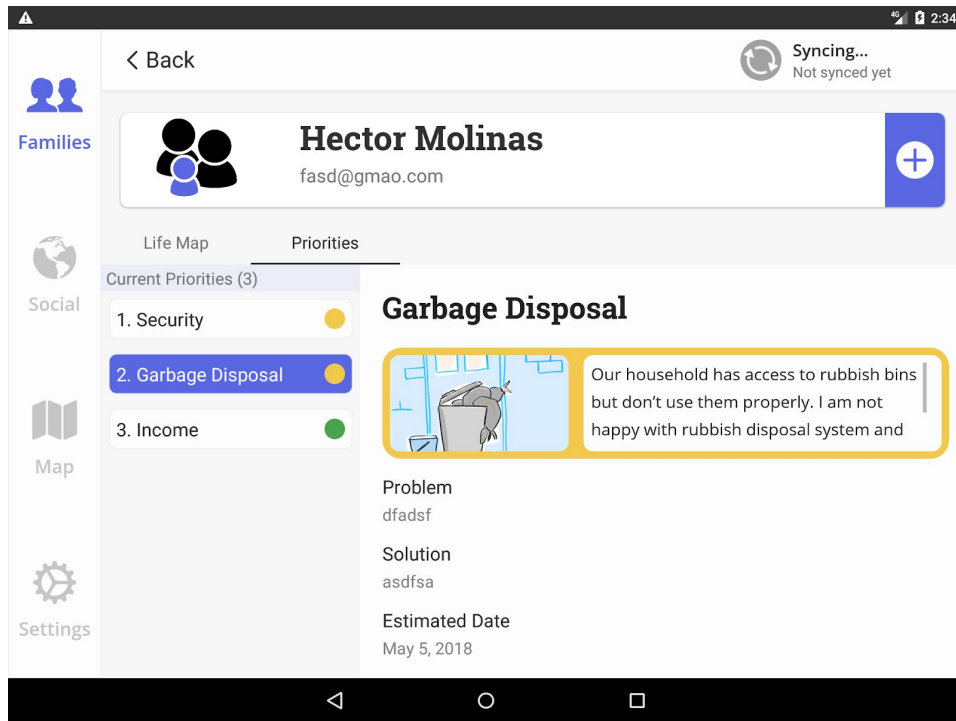
To view previous life maps, tap on the life map date and choose the date of the life map you'd like to open. If there is only one date, then there are not any other life maps that can be opened besides the current one.



## Inspecting Priorities

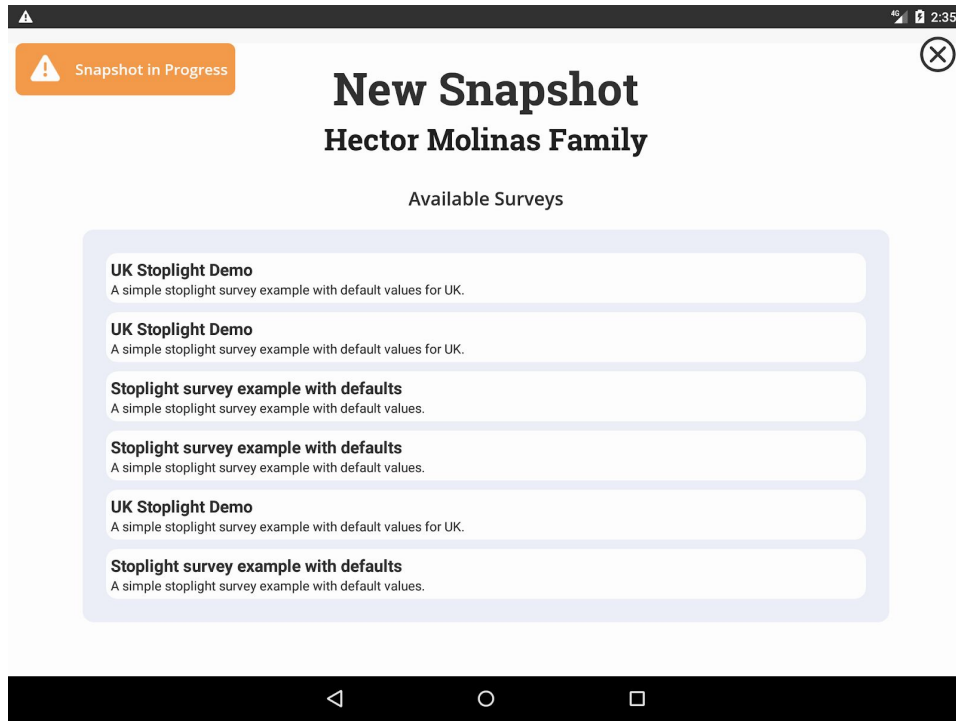
From the Family Report page, you can also view the priorities that a family has indicated. First, you can see which indicators have been marked as a priority by a blue outline. If there outline around any of the displayed indicators, then the family did not select any priorities.

The app allows you to view more details for a life map. To do so, open the life map that you would like to inspect (by selecting the correct date) and tap on the [PRIORITIES] tab below family name. If there are any priorities that have been selected by the family, they will be listed. Tap on each priority to open additional information.



## Resurveying a Family

Occasionally, the family's situation might change and you will want to update their life map. The app gives you the ability to re-survey a family at any point. To do so, open the Family Report of the family you would like to re-survey, and tap the [+] button near the family's name. Select the survey you would like to collect information using, most likely the same survey that was last used for the family, and tap [CONTINUE]. From here you can allow the family to update their life map.



## Troubleshooting

**"The app's information won't sync."**

**"The app is blank."**

**"The app crashes when I tap [Sync Now]."**

**"The "Last Sync" time will not change."**

**"There is a warning icon in the Sync area."**

The process of updating the app with information from the Poverty Stoplight Platform is a complex system, and can sometimes fail. If you have surveyed a family and the app hasn't synced since, *be sure to record the new information using paper*. Here are some tips for trying to make the application sync again, in order from easiest to most difficult.

- Close the app and re-open.
- Open the Settings page, tap [LOGOUT], and then login again. *Note: Only attempt if the app is connected to the Internet.*
- Uninstall the app, and reinstall it from the Play Store. *Note: Only attempt if the app is connected to the Internet.*

**"I cannot login."**

**"It says my password is incorrect."**

There are a few different reasons that the login might not work. Try these tips.

- Ensure that the application is connected to the Internet.
- Ensure that the correct Poverty Stoplight Platform server is selected in bottom right.
- Check with an administrator that your username and password are correct.

**"The application froze."**

**"The application stopped during login."**

**"The application crashed."**

There are many reasons why the application may stop working. Unfortunately, most of these issues can't be solved without administrator help. Here are some tips that may help.

- Ask a colleague whether he or she experiences the same problem.
- Try to free up space on the tablet by uninstalling unneeded apps.
- Use the Play Store to ensure that you have the latest version of the app.

**"The survey pictures are not loading."**

**"The indicators don't have any pictures."**

The most common reason for the indicator pictures not loading is the app not being connected to the Internet. The app can store a limited number of pictures, so it may not always be able to show every picture while offline. Here are some tips for solving this.

- Connect to the Internet while taking the survey. After doing this once, the photos should be available later.
- Ensure that the "Last Sync" shows a recent date.
- Try to free up spaces on the tablet to make room for more pictures.

**"The survey questions are not in the right language."**

**"The survey questions are in a different language than the rest of the app."**

Unfortunately, we don't yet support surveys that have multiple languages. Here are some tips that might be helpful.

- Attempt to use other surveys that you have access to; these might be in a different language.
- Contact an administrator to report the problematic survey.



## FAQ

### Can I report a problem?

Yes! The app has a built-in feature that will allow you to submit feedback directly to administrators. To activate this feature, shake the tablet while the application is open. This will send us a picture of the app, along with any message that you enter.

