

A landscape photograph featuring a large, gnarled tree in silhouette on the right side. The background shows a range of mountains under a sky transitioning from orange to light blue, suggesting a sunset or sunrise. The foreground is dark, showing the silhouettes of other trees and the ground.

eKichabi: Information Access through Basic Mobile Phones in Rural Tanzania

Galen Weld, Trevor Perrier, Jenny Aker, Joshua Blumenstock, Brian Dillon,
Adalbertus Kamanzi, Editha Kokushubira, Jennifer Webster, Richard Anderson
CHI '18 – April 22, 2018

Motivation

In Tanzania, phone ownership is widespread (upwards of 90% in study area), but there's no way to look up numbers.

How do unknown (to one another) users find one another?

Phonebook!



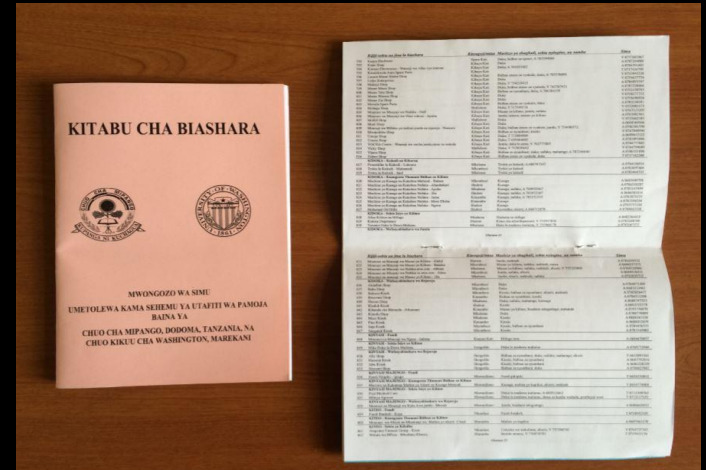
Previous Work

Brian Dillon, Joshua Blumenstock,
Jenny Aker, starting 2014

Survey of ~1500 businesses,
distributed paper phone books

Found positive economic effects of
having access, and of being listed

This project stems from 2 sources...



Research Questions

Develop and deploy a electronic phonebook – eKichabi

Assess:

- **Feasibility – is it possible?**

Is USSD a suitable technology for deploying a search- and browse-based information service in rural Tanzania?

- **Usability – is it usable?**

How well can the target users search for phone numbers, and what are the approaches users take to find a number?

- **Acceptability – is it viable in the long term?**

Does the electronic version of the phone directory meet people's needs, and is it something they will use on a day to day basis?

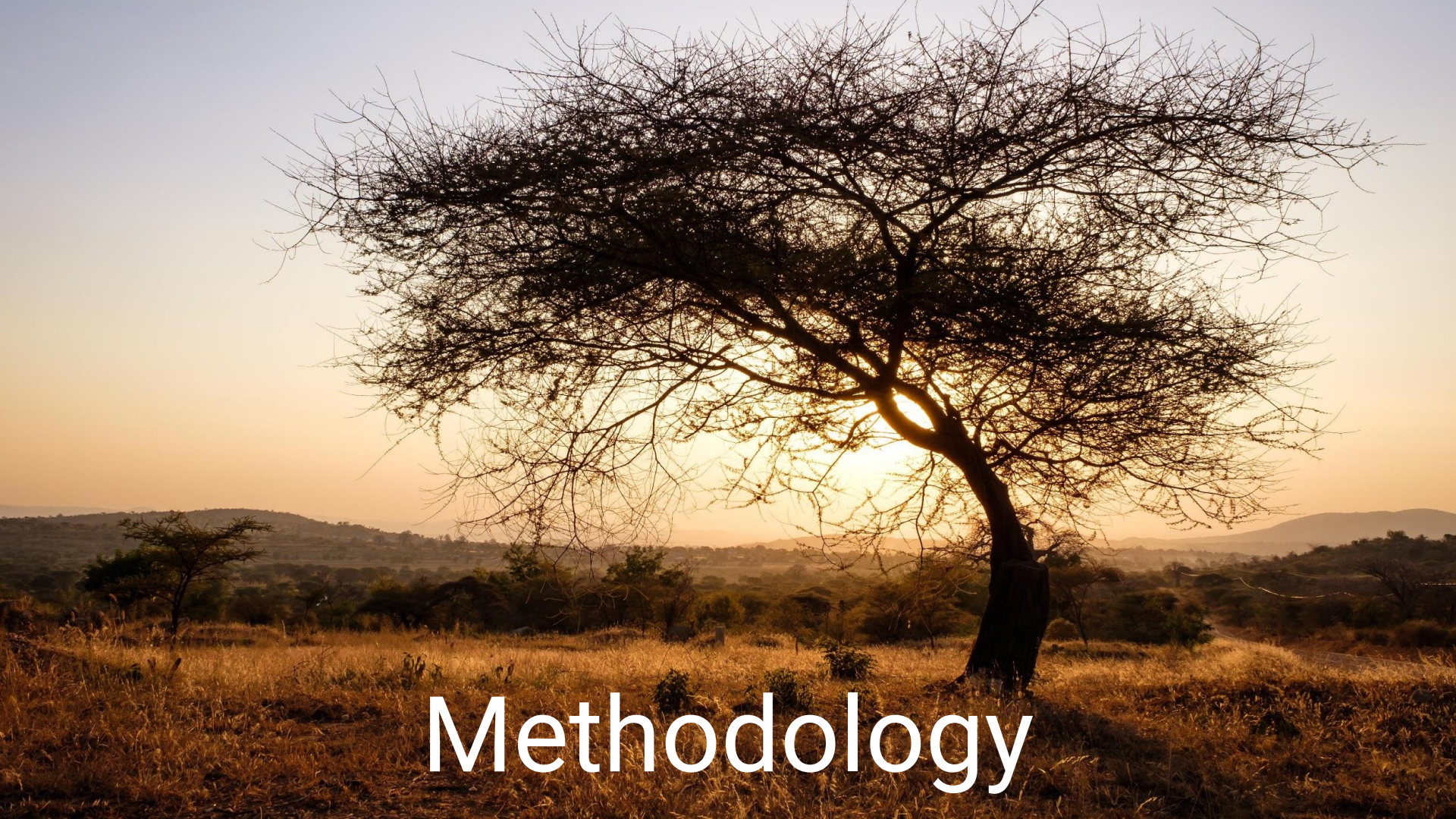
Why USSD?

The Third Universal App (Perrier et al.)

In designing for *basic* mobile phones, a number of options:

- SMS – stateless, and text based
- IVR – stateful, and voice based
- **USSD** – stateful, and text based – best of both!

Primary considerations: Cost, and Usability



Methodology

June 2017 *Phase 0: Application Prototyping*

early July 2017 *Phase 1: Focus Groups* (n=40)

late July 2017 *Phase 2: Initial Deployment* (n=107)

early Aug. 2017 *Phase 3: Phone Surveys* (n=107)

Phase 0: Application Prototyping

Three usage modes:

- Browse by Location
- Browse by Sector
- Search



Select an option:

1. *Browse by Location*
2. Browse by Sector
3. Search
4. Help

User Input: 1

1. *All Businesses (9)*
or Select Subvillage
2. Kiteo - Marumba
3. Kiteo - Matinga
4. Kiteo - Muya
5. Kiteo - Nkundusi
99. Back

User Input: 1

Select District

1. Babati Mjini
2. Chamwino
3. Chemba
4. Dodoma Urban
5. *Kiteo*
0. Next
99. Back

User Input: 5

Select Business

1. *Ally Kiosk*
2. Amiri Shop
3. Chavai Kiosk
4. Fundi Baiskeli
5. Genge la Mama Mtaa
0. Next
99. Back

User Input: 1

Select Village

1. Busi
2. Keikei
3. Kinyasi
4. *Kiteo*
5. Kwadelo
0. Next
99. Back

User Input: 4

Ally Kiosk

Location:

Kiteo - Matinga

Phone: T653965711

Business Found

Phase 1: Focus Groups

6 villages over 1 week,
several groups per village

3-12 participants per group

Discussed paper and
electronic Kichabi

Iterated on application
design



Phase 2: Initial Deployment

Four villages, 10-30 participants per village – 107 participants total

Diverse range of ages, genders, literacy, experience with phones

Enrollment:

Meeting of ~2 hrs, covering short code, whitelisting, main 3 browsing modes, and plenty of examples

Study lasted 30 days, participants used their own phones

Phase 3: Phone Surveys

Follow-up with deployment participants

Addressed topics unavailable from logging

Gathered anecdotes

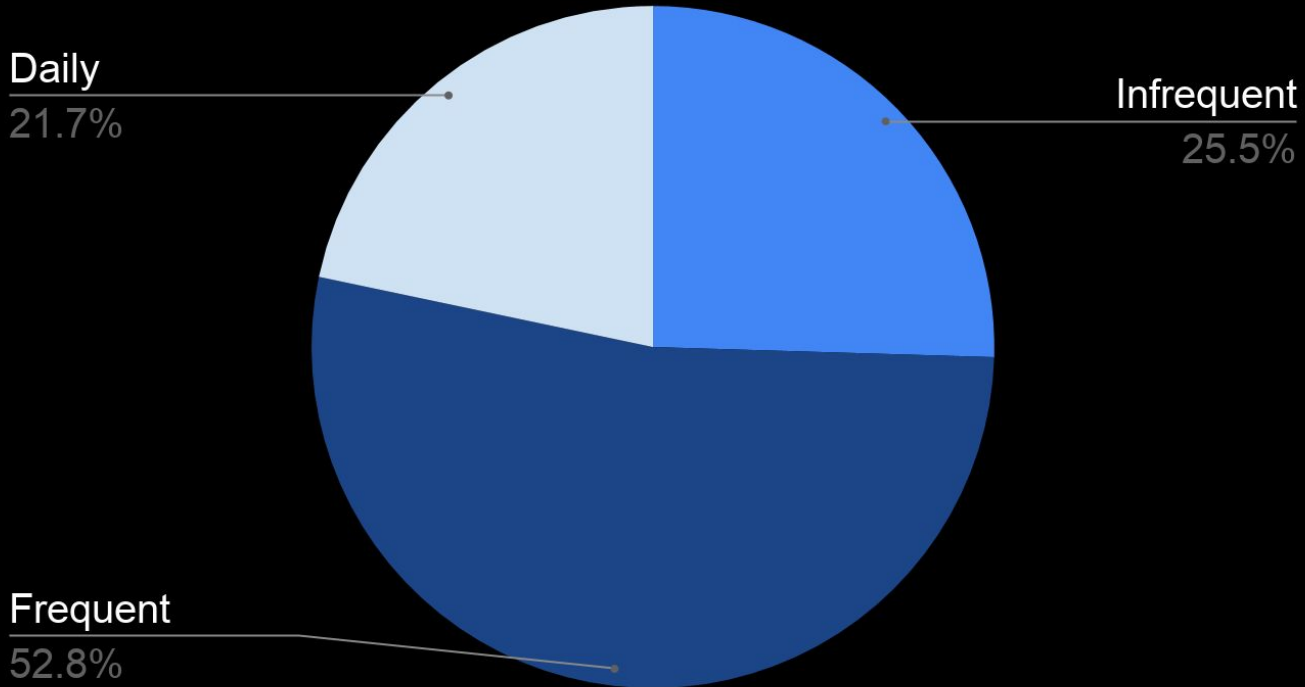




Results

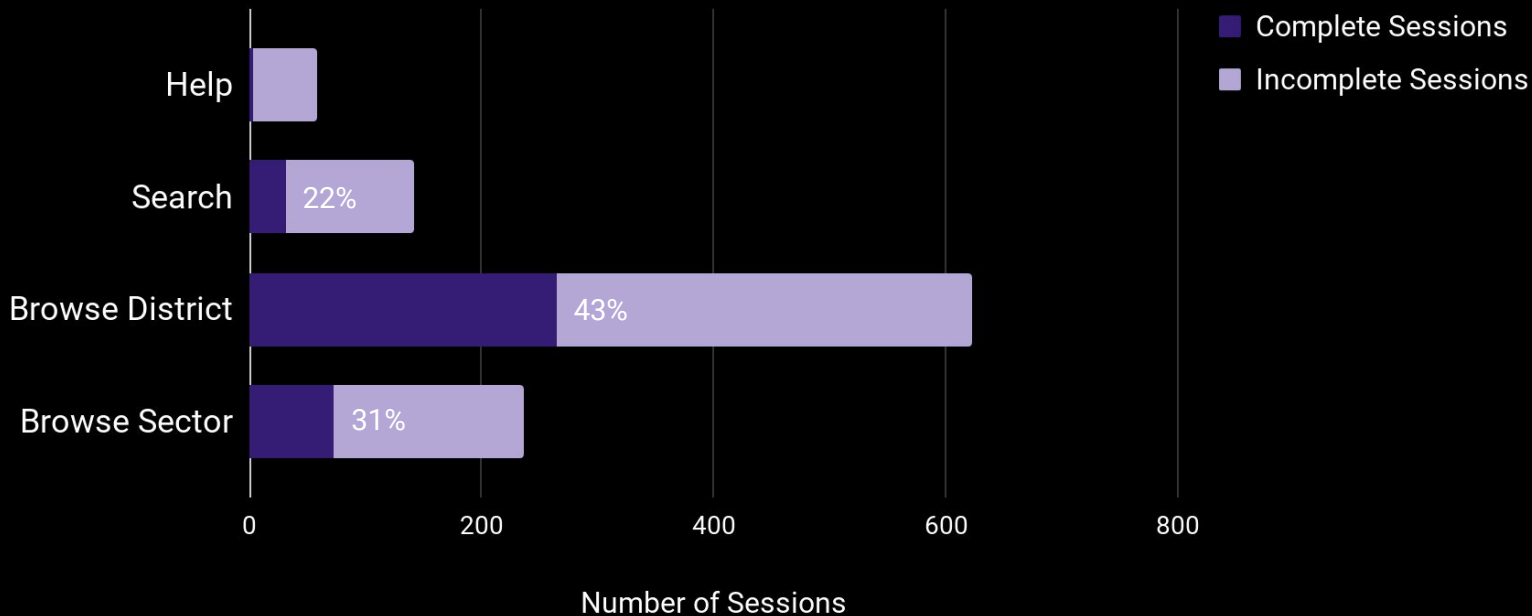
Usage

Session Frequency Per Participant (30 day duration)



Usage Modes

Number of Sessions by Usage Mode



Survey Findings

“I looked up the business in Itiso and called a boda boda guy to seek the transport.”

“I am a crop trader, and I called merchants in Dodoma to inquire about prices for my crops. I called several businesses to find who would give me the best prices.”

“I called a seed vendor in Kondoa, and negotiated over the phone, then he drove the seeds [to my village].”

Application Accessibility

Search – surprising that it was popular!

Potentially easier for those with poor eyesight.

Familiarity with other USSD applications improves fluency

Mobile Money

Airtime Top-up



Conclusion

Feasibility – Successfully demonstrated deployment of USSD-based information seeking application with thousands of entries.

Usability – Application was usable. Scrolling through long lists, and text entry for search were all handled.

Acceptability – Fulfilled an unmet need for business information to participants. Useful in many situations...

Future Work

Self-enrollment into the system

Scalability – more hierarchy in menus increases confusion

Cost and business models for expansion



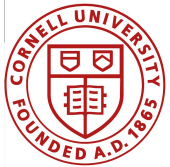
BILL & MELINDA
GATES *foundation*



THE **HITACHI**
FOUNDATION

amazon catalyst

 DIGITAL FINANCIAL SERVICES
RESEARCH GROUP



Cornell University

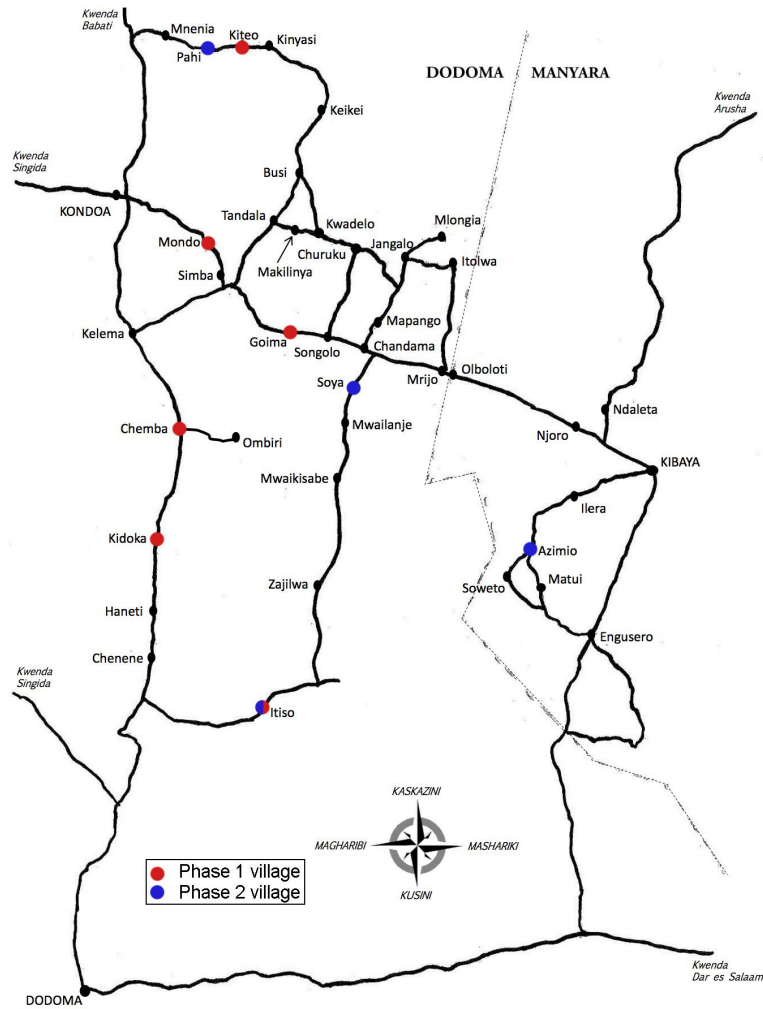
 **change**

W PAUL G. ALLEN SCHOOL
OF COMPUTER SCIENCE & ENGINEERING

 **ICTD**Lab

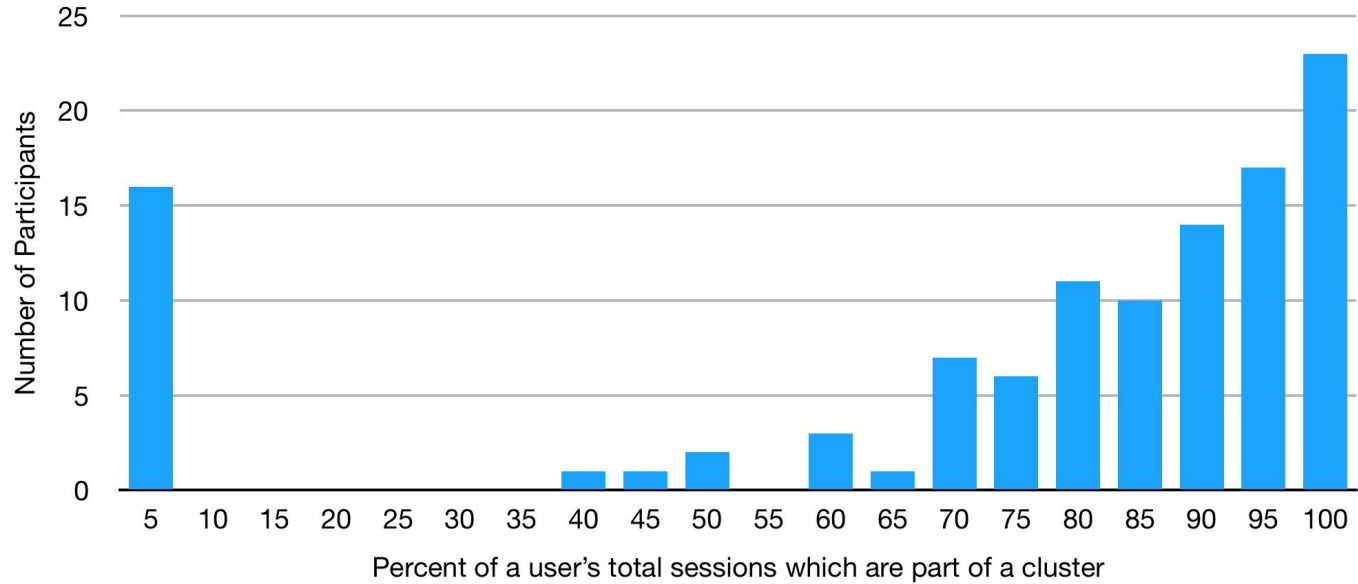
Thank You





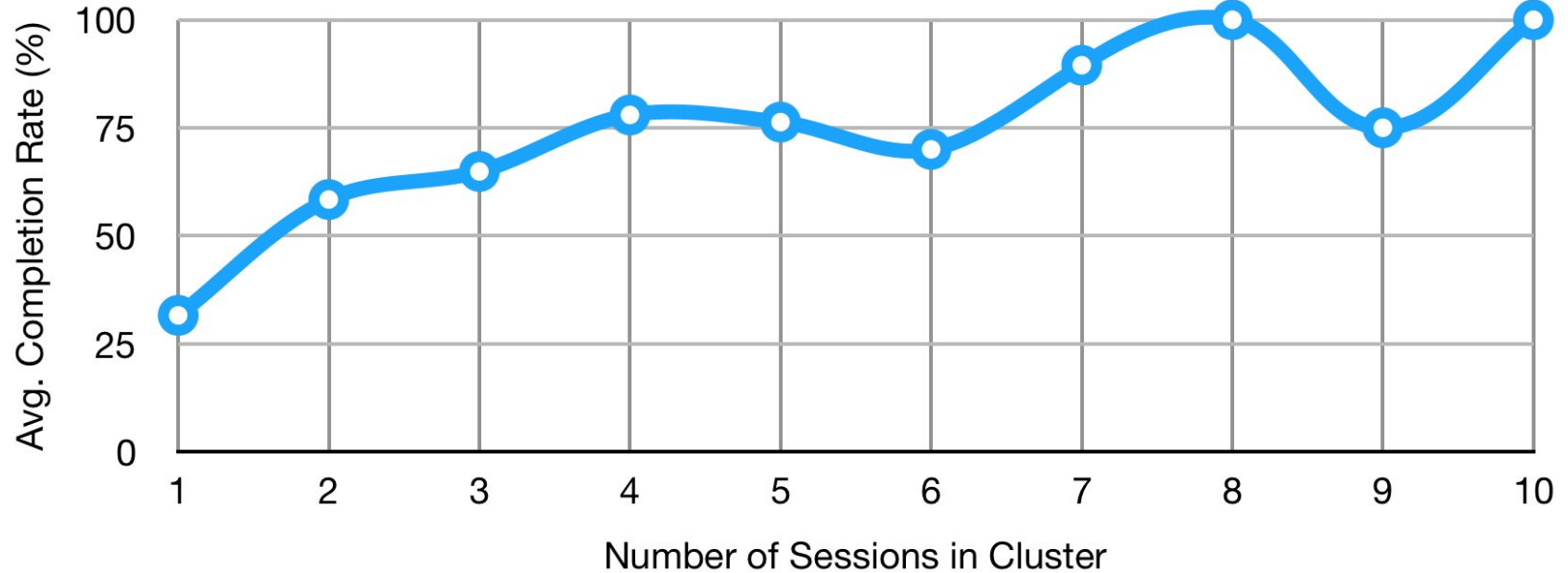
Clusters

Histogram: Percent of Sessions in Cluster



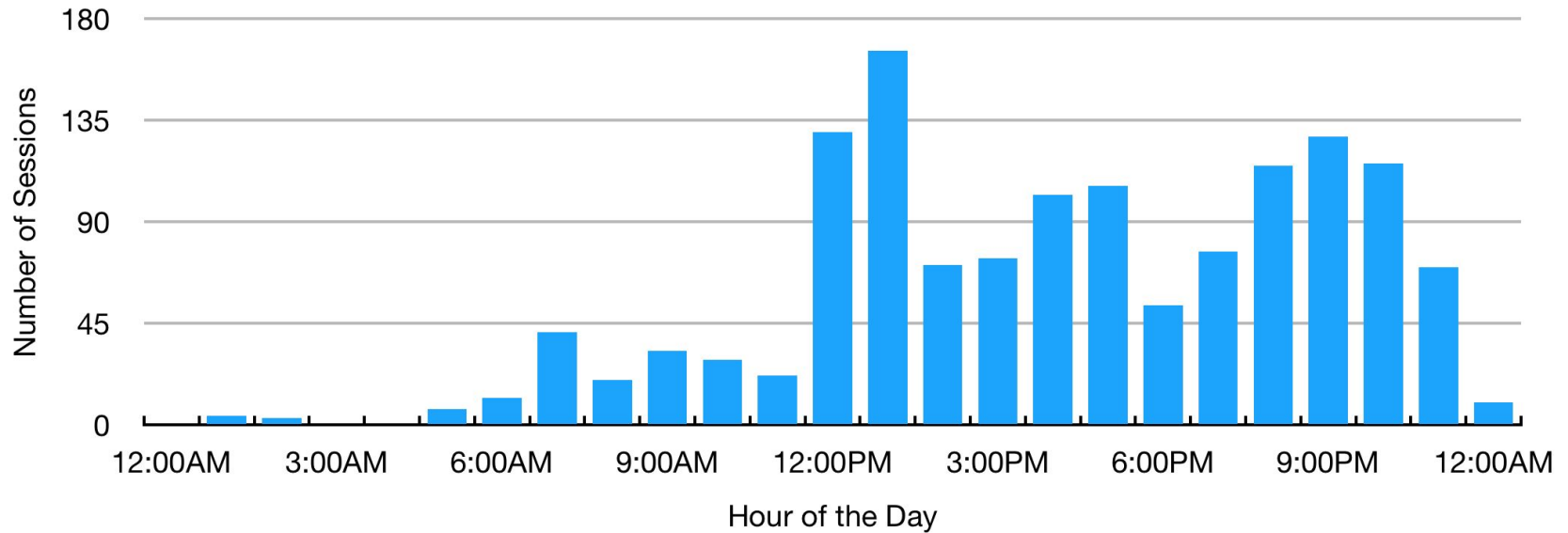
Clusters

Completion Rate by Size of Cluster

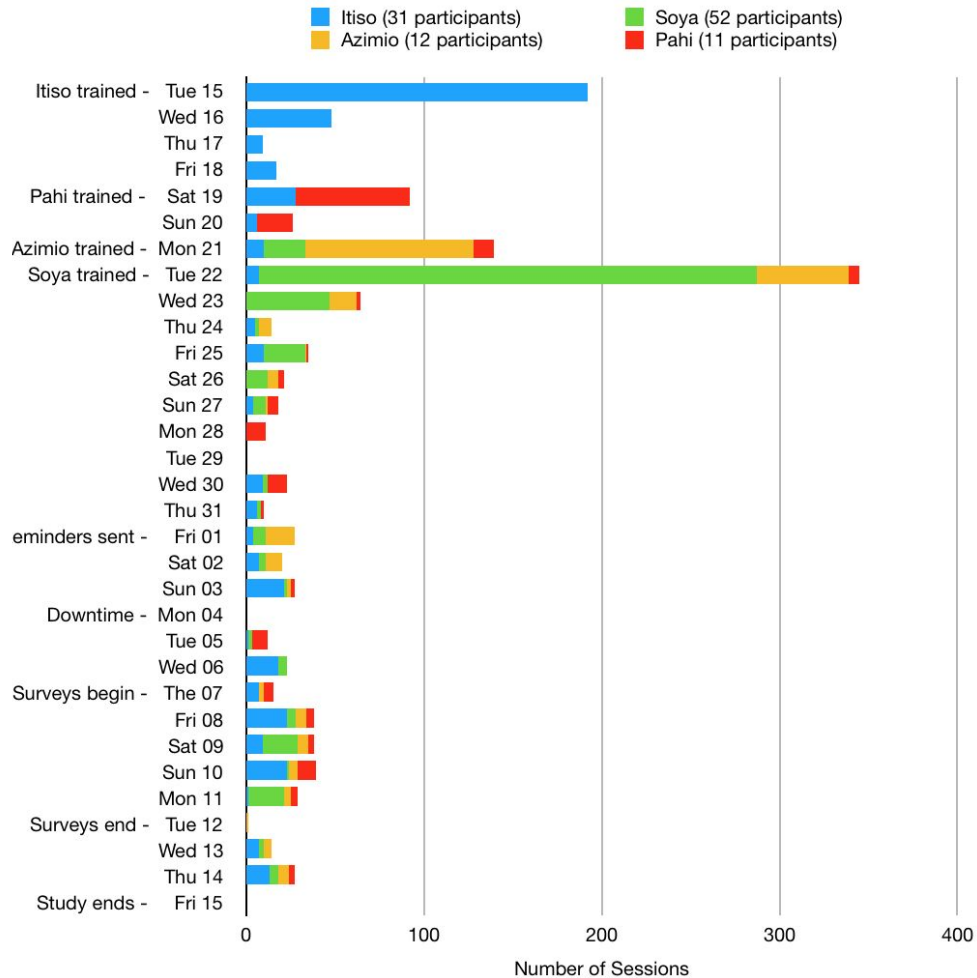


Usage

Histogram: Sessions per Hour of Day

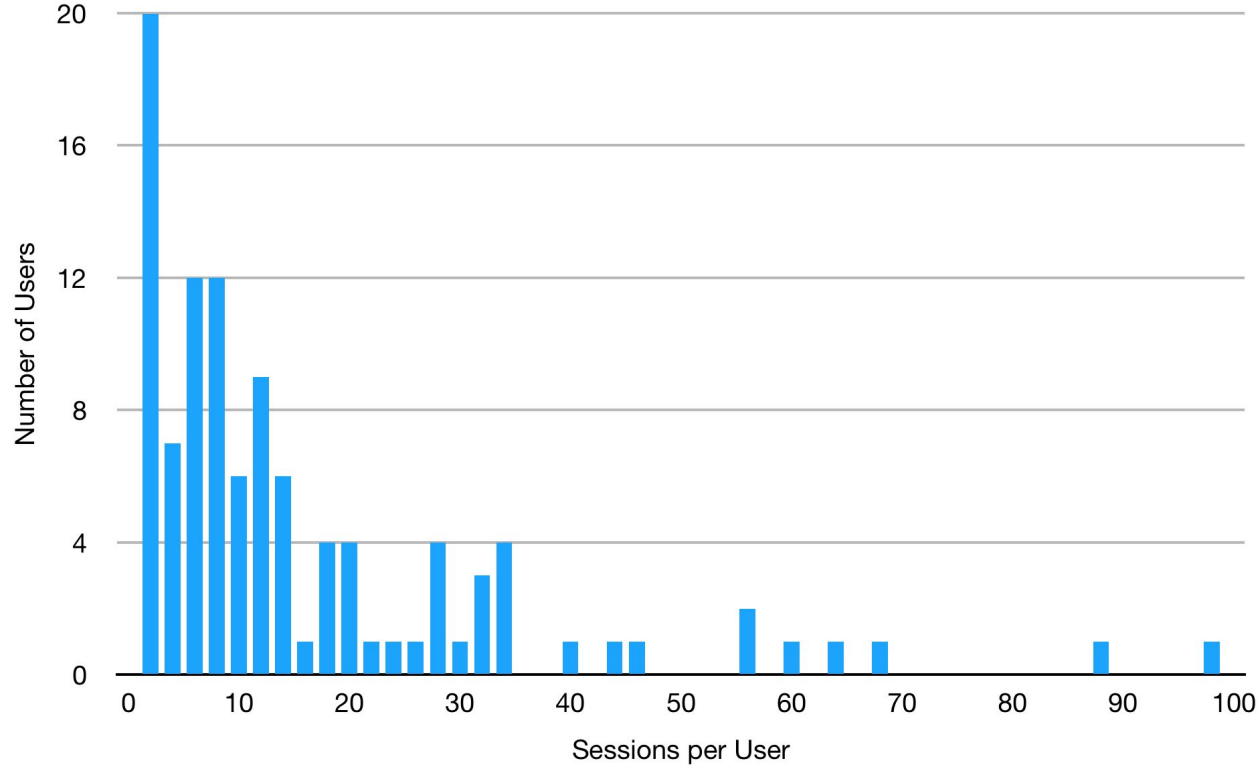


Usage over Time



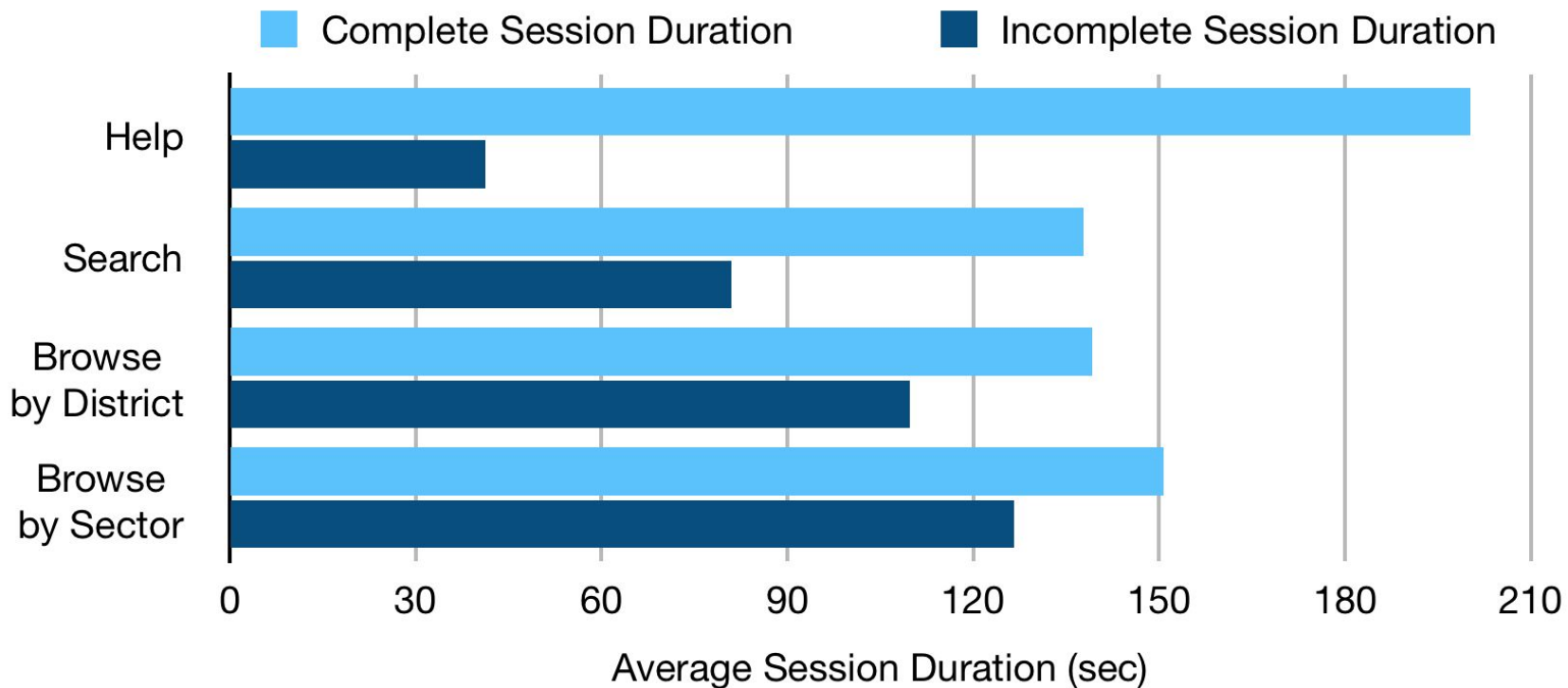
Usage

Histogram: Sessions Per Participant



Usage

Average Session Duration



Context

Two sources of collaboration for this project...

Technologists interested in infrastructure appropriate implementations

Work on studying existing apps, and barriers to usage

Interest in building accessible mobile apps *for all*

Development economists interested in the impact of information

Extension of previous work developing a paper phonebook, with more publications on the impact on the way

