Make Yourself at Phone: Reimagining Mobile Interaction Architectures With Emergent Users

Simon Robinson, Jennifer Pearson, Thomas Reitmaier, Shashank Ahire, Matt Jones
Imagine...
Imagine...
Would you?
Emotional Dimension

Economic Dimension?

• Some devices are better quality than others
• Some devices are in better states of repair
Emergent User Communities

- Typically from developing regions
- Often resource-constrained
- Phone and resource sharing are common practices [2]

Emergent User Communities and Crime

- High crime rates in some areas mean phones are targets for theft [3]

APPropriate

• Small, cheap, portable device that contains a user’s mobile content

• APPropriate owners can pick up another mobile device and use it as their own

• No internet connection required

• Designed with and for emergent users
• Security-conscious users need not carry a phone but can access media via other devices.

• Facilitates sharing when resources are limited, or when others are more appropriate.
1. Synchronise data to APPropriate module
Borrow a public device

2a

2b

APPropriate

2c Watch content
Borrow a phone

3a

3b

APPropriate

3c Take photo
4 Updated media synced back to own phone
5. View content made on other devices on own phone
Account Switching

- iOS: no account switching ability
- Android: some support, but not seamless
Connect to a guest
Please enter your PIN

Pod

Synchronising your data...
Process

• Design
  • Participatory Design Workshops
  • Future Technology Workshops
  • Prototyping and Refinement
• Evaluation
  • Exploratory Lab Studies
  • Longitudinal Deployments
Process

- Design
- Participatory Design Workshops
- Future Technology Workshops
- Prototyping and Refinement
- Evaluation
  - Exploratory Lab Studies
  - Longitudinal Deployments
Exploratory Lab Studies

• Simulated environments [5]:
  • Home
  • Travel (minibus, matatu or autorickshaw)
  • Public space (coffee shop or spaza)
  • Quiet space (library or study area)

• Range of mobile devices placed in each context

Exploratory Lab Studies

- Comments around security

  “[it is] very useful to me because where I live phones get stolen [often], so moving around without people knowing what you’re carrying is great”

  “I’m worried about pickpocketing on the matatu, but this is good; carrying a phone is dangerous, and this is smaller and easier to carry,”

  “it’s flexible – you can go with it anywhere without anyone recognising it’s a phone, so it won’t be stolen, so you can walk with it anywhere even at night”

  “you can leave your phone at home – good for the criminals, they won’t rob you,”
Exploratory Lab Studies

• Comments around privacy

“I like the security aspect – you have a password to enter and it is secure”

“the best thing is that your privacy is with you – it won’t be accessed by anyone else”.

“It would be useful to save my personal stuff; information I did not want people to see,”

“I liked the concept of entering a code and synchronising [ . . . ] so nobody else can see the data,”
Longitudinal Deployments

- 5-week deployments
- Two groups of 16 emergent users from two countries
  - Cape Town: security focus
  - Mumbai: phone sharing focus
- Recruited in friendship groups of 4-5 people
Longitudinal Deployments

• Each participant was given an APPropriate module, and installed APPropriate app on their own phone.

• Participants asked to “borrow” someone else’s device using APPropriate at least 3 times a week.

• Metrics: qualitative comments from one-to-one interviews, subjective ratings and usage logs.
Longitudinal Deployments

<table>
<thead>
<tr>
<th>Participants who</th>
<th>Study location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share their phone with others</td>
<td>Cape Town 38%</td>
</tr>
<tr>
<td>Worry about privacy when sharing</td>
<td>Mumbai 100%</td>
</tr>
<tr>
<td>Worry about theft of their device</td>
<td>Cape Town 19%</td>
</tr>
<tr>
<td></td>
<td>Mumbai 75%</td>
</tr>
<tr>
<td>Worry about theft of their device</td>
<td></td>
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<td></td>
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</tbody>
</table>
Longitudinal Deployments

<table>
<thead>
<tr>
<th>How useful is APPropriate for</th>
<th>Study location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cape Town</td>
</tr>
<tr>
<td>Allowing you to leave your phone at home</td>
<td>8.6</td>
</tr>
<tr>
<td>Phone sharing purposes</td>
<td>9.1</td>
</tr>
<tr>
<td>Security purposes</td>
<td>9.4</td>
</tr>
</tbody>
</table>
Longitudinal Deployments

• Comments around security

“I can leave my phone at home, the [APPropriate] I can hide and the criminals won’t see it,”

“I’m less prone to criminals and less chance of getting robbed”.

“in the society we live in people would probably take it - [APPropriate] puts me in less danger than a phone, though,”

considering the place I live in, it is stealable – it’s less stealable than a phone though”
Longitudinal Deployments

• Comments around not having a phone

“my phone was at home so I used the [APPropriate] for calling from a colleague’s phone”

“kids were using the phone so I took the [APPropriate] to my brother-in-law’s place and used it for taking pics during festive time”
Longitudinal Deployments

• Comments around resource sharing (photos)

“my phone doesn’t take nice pictures, so I’d borrow one and it would be on my phone later,”

“it was my birthday and I used my sister’s nice phone to take pictures and sent them to my phone via the [APPropriate], so it helped me get good pictures.”
Longitudinal Deployments

• Comments around resource sharing (connectivity)

  “it let me send text messages using someone else’s airtime – it’s easier for me as I don’t normally have airtime”

  “I did not have balance but I called the person by using another cell phone and my [APPropriate]”
• Comments around resource sharing (battery)

“electricity went out for a week during the storm so I couldn’t charge my phone – I could still borrow a phone with charge, though”.

“my mobile battery was not working for four days so I used [APPropriate] on another device to use the camera and for calling”

“my battery was dying […] the number was on my [APPropriate], so I used [P5]’s phone to call”
Longitudinal Deployments

• Comments around device as a back-up

“images from a recent picnic were in my [APPropriate] and next day my mobile was formatted so the data was saved”
Longitudinal Deployments

• 27 of the 29 who completed study opted to continue using the hardware

• Usage: average 5.8 times per week across both sites
Conclusion

• We investigated the concept of separating out the notion of content and device.

• Cheap hardware module that utilises local no-cost wifi: no data connection necessary.

• Illustrated via numerous user evaluations how the approach can be beneficial in emergent user contexts.
Conclusion

• Shown APPropriate's usefulness for:
  • Security
  • Privacy
  • Sharing resources:
    • When consumables are depleted; or,
    • To take advantages of better features
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