

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

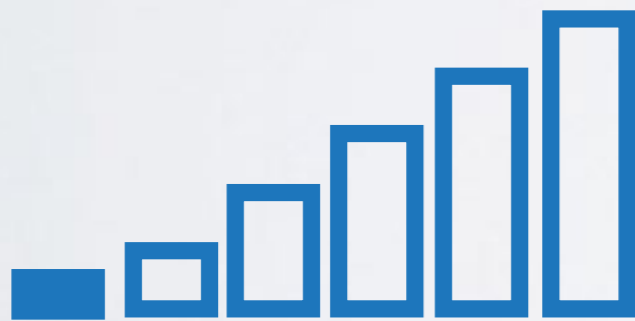
Simon Robinson, Jennifer Pearson, Thomas Reitmaier,
Shashank Ahire, Matt Jones



Imagine...



Imagine...



Would you?





A photograph of two people holding hands over a body of water at sunset. The sun is low on the horizon, creating a bright reflection on the water. The sky is a mix of orange and blue. The people are silhouetted against the bright background.

Emotional Dimension

[1] Karlson, Brush and Schechter: "Can I borrow your phone?: Understanding concerns when sharing mobile phones". CHI '09

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]

[2] Sambasivan, Rangaswamy, Cutrell and Nardi: “UbiComp4d: infrastructure and interaction for international development—the case of urban Indian slums”. UbiComp '09. ACM.

Emergent User Communities and Crime

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

[3] Walton, Marsden, Haßreiter and Allen: "Degrees of sharing: proximate media sharing and messaging by young people in Khayelitsha". MobileHCI '12

APPrropriate

- Small, cheap, portable device that contains a user's mobile content
- *APPrropriate* owners can pick up another mobile device and use it as their own
- No internet connection required
- Designed with and for emergent users

APPrropriate

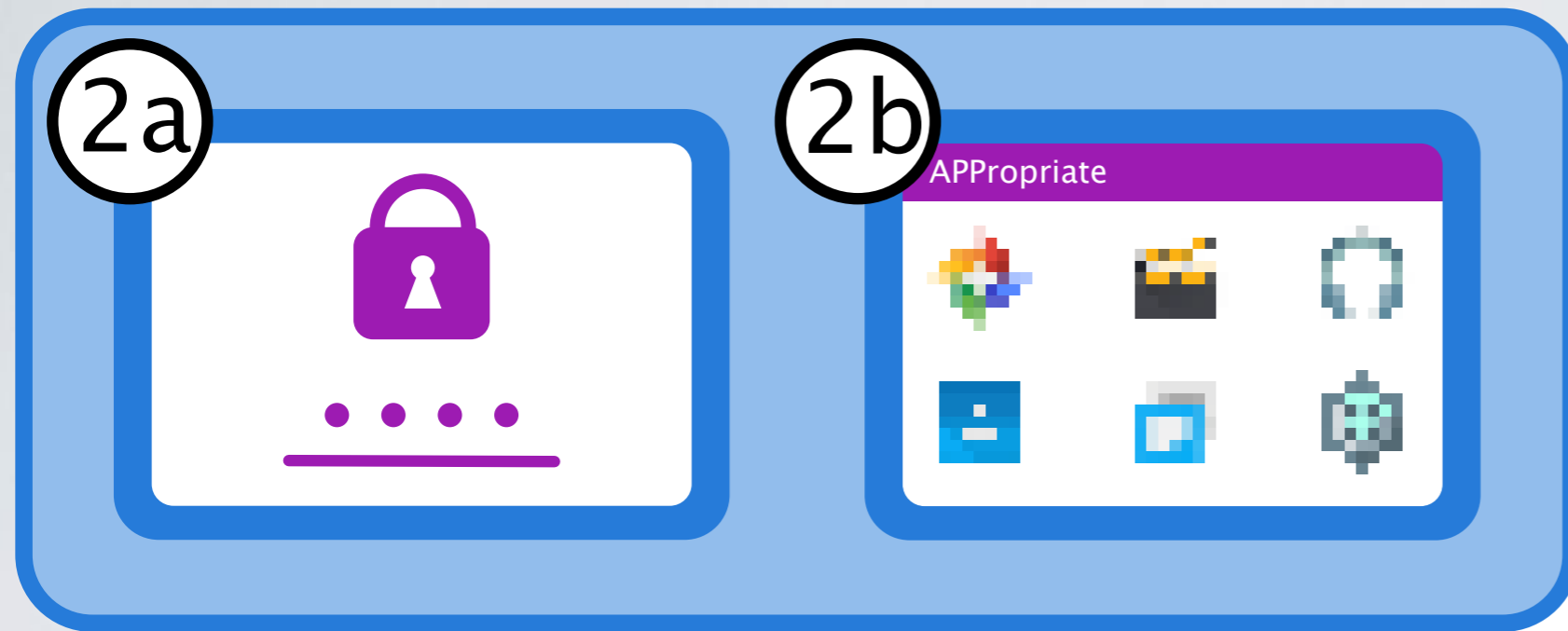


- Security-conscious users need not carry a phone but can access media via other devices.
- Facilitates sharing when resources are limited, or when others are more appropriate.

① Synchronise data to
APPropriate module



Borrow a public device



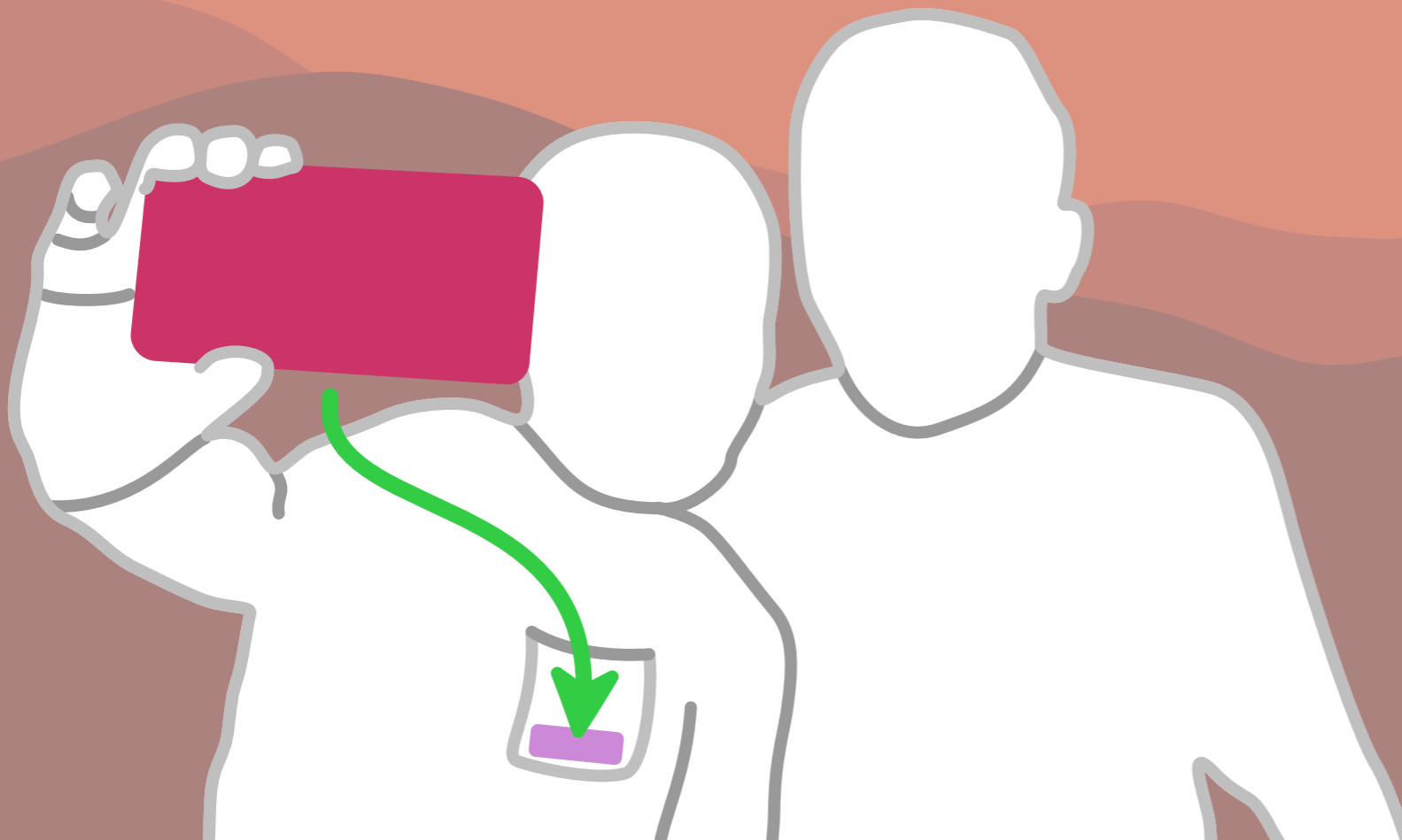
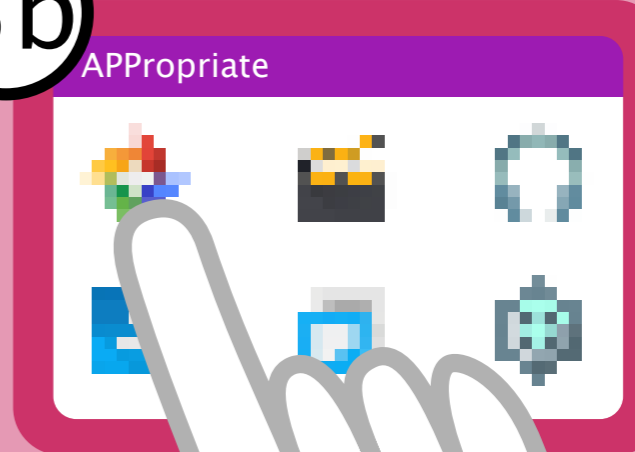
2c Watch content

Borrow a phone

3a

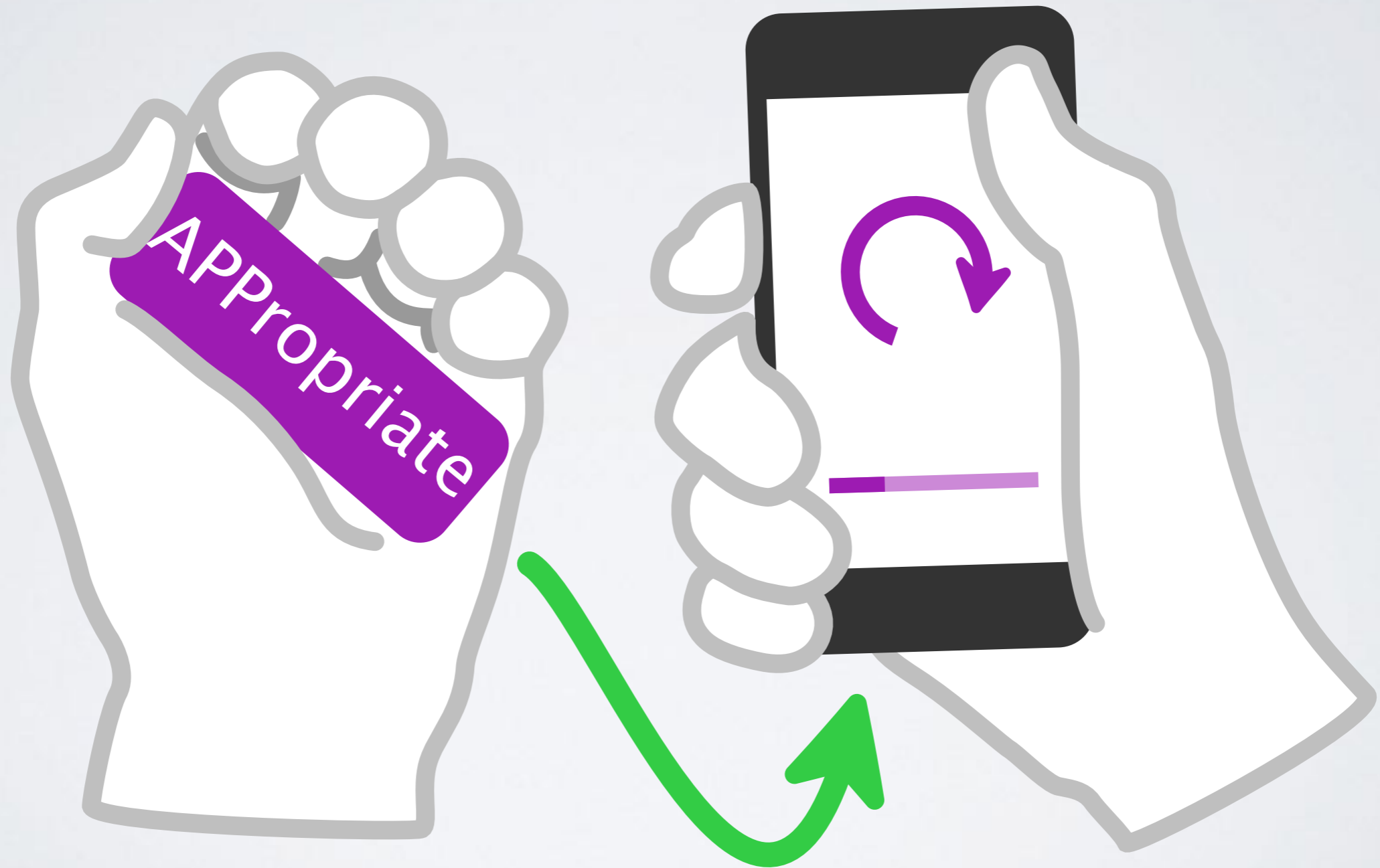


3b

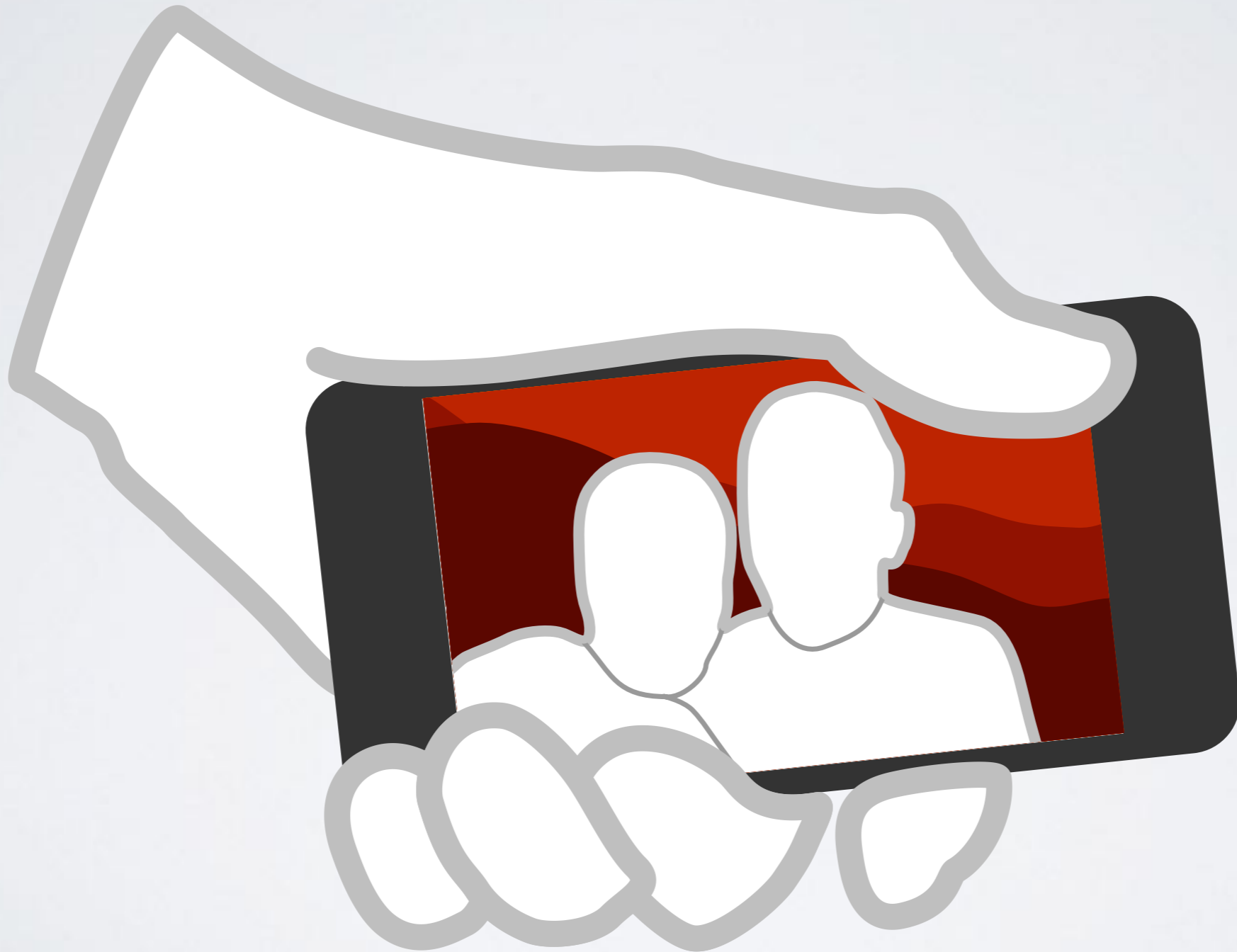


3c Take photo

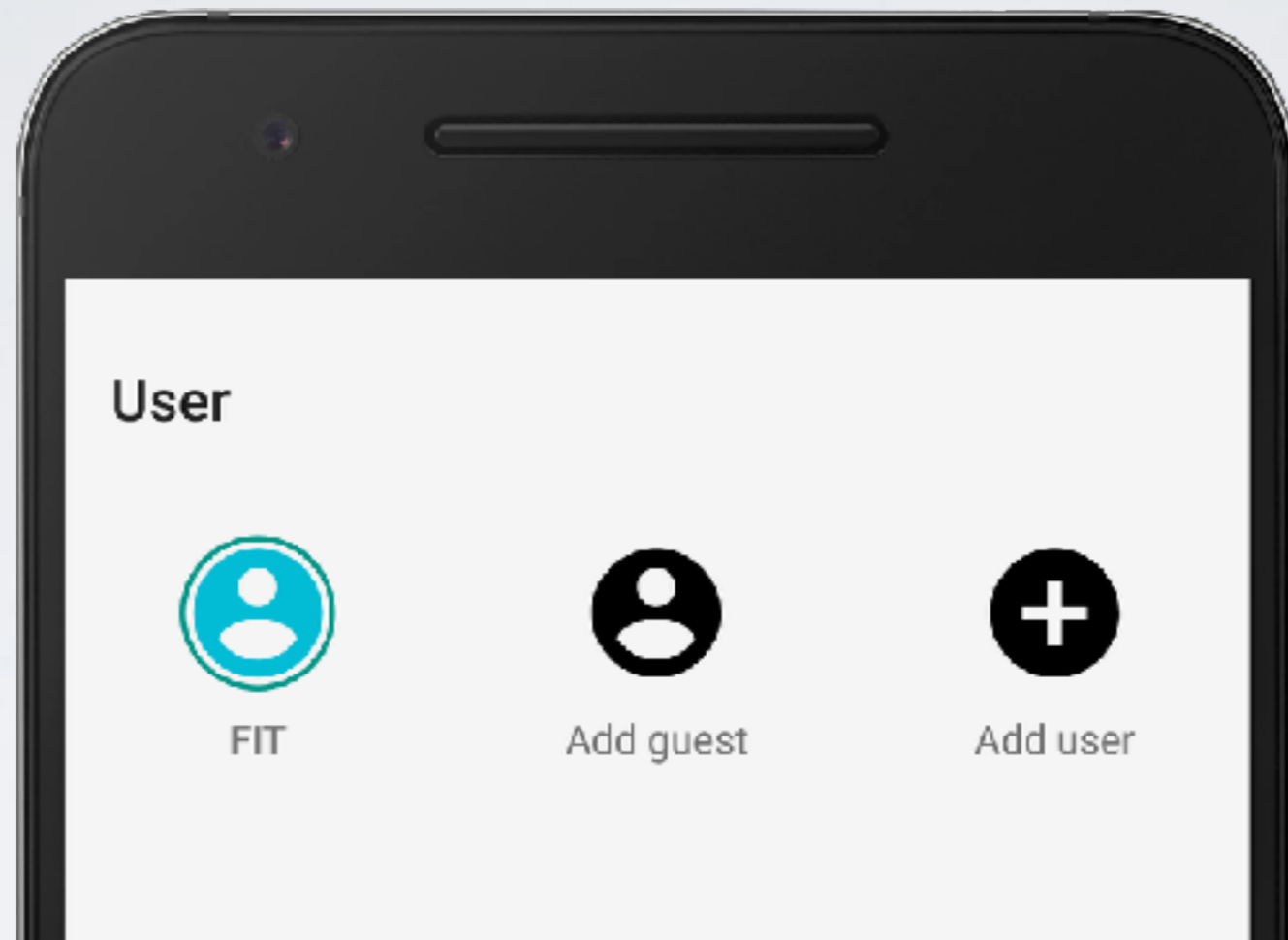
- ④ Updated media synced back to own phone



- ⑤ View content made on other devices on own phone



Account Switching



- iOS: no account switching ability
- Android: some support, but not seamless

APPropriate





Connect to a guest

Please enter your PIN

Pod



Synchronising your data...

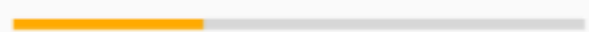


Photo gallery



Text messages



Contacts



Pod settings



Finished



Process

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

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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

[5] Kray, Olivier, Weihong, Pushpendra, Ha and Blythe: "Taming context: a key challenge in evaluating the usability of ubiquitous systems". *USE '07: Workshop at Ubicomp 2007*.





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

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

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

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

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

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

Participants who	Study location	
	Cape Town	Mumbai
Share their phone with others	38%	100%
Worry about privacy when sharing	19%	75%
Worry about theft of their device	93%	38%

Longitudinal Deployments

How useful is APPropriate for	Study location	
	Cape Town	Mumbai
Allowing you to leave your phone at home	8.6	8.5
Phone sharing purposes	9.1	9.0
Security purposes	9.4	6.4

Longitudinal Deployments

- Comments around security

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

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

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

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]”

Longitudinal Deployments

- 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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