



Evaluation of Challenges in Human Subject Studies “In-the-Wild” Using Subjects’ Personal Smartphones

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3 different user studies “in the wild”

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Share lessons learned challenges and solutions



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Pittsburgh (PA, USA)

Carnegie Mellon University



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79 Participants in total

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Own smartphone Android OS



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4 Weeks each participant

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Study methods

general approaches

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Study methods general approaches

- Online Survey (recruiting)

Study methods general approaches

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- Experience Sampling Method (avg. 8/day)

Study methods

general approaches

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- Experience Sampling Method (avg. 8/day)
- Day Reconstruction Method (avg. 1/week)

Study methods

general approaches

- Online Survey (recruiting)
- Experience Sampling Method (avg. 8/day)
- Day Reconstruction Method (avg. 1/week)
- Android app logging context information (AWARE)

Study A

“How far is your phone” (2010)*



- 28 participants
- Bluetooth tag
- Logging app
- DRM

* Dey, A., Wac, K., and Ferreira, D. *Getting Closer: An Empirical Investigation of the Proximity of Users to their Smart Phones*. Ubicomp, (2011).

Study B

“Quality of Experience” (2011)*



- 29 participants
- ESM: application experience
- Logging app
- DRM

* Ickin, S., Wac, K., Fiedler, M., Janowski, L., Hong, J.-H., and Dey, A.K. *Factors influencing quality of experience of commonly used mobile applications*. IEEE Communications Magazine, April (2012), 48–56.

Study C

“Perception of Intimacy” (2012)*



- 22 participants
- ESM: intimacy context
- Logging app
- DRM

* In preparation

Challenges

what we experienced

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Challenges what we experienced



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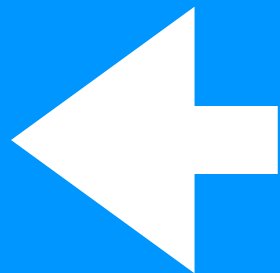
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Challenges

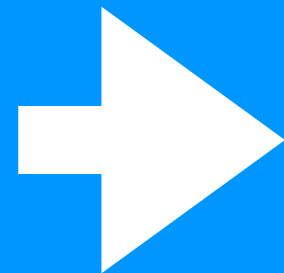
what we experienced



COMMON



PARTICULAR



Method challenges analysis

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Method challenges analysis

- 4 study phases
 - design, development, execution, data analysis

Method

challenges analysis

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 - design, development, execution, data analysis
- Each author listed the challenges encountered in her/his study

Method

challenges analysis

- 4 study phases
 - design, development, execution, data analysis
- Each author listed the challenges encountered in her/his study
- Challenges: clustered and prioritized

General Results

Study Phase	Total	Common (3)	Common (2)	Study Specific
design	13	5	6	2
development	7	4	1	2
execution	9	6	3	
data analysis	3	3		

Common challenges

some examples

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Common challenges

some examples

- **Design:** Ethics consent approval (IRB)

Common challenges

some examples

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- **Development:** Efficiency of the data logger

Common challenges

some examples

- **Design:** Ethics consent approval (IRB)
- **Development:** Efficiency of the data logger
- **Execution:** Participants motivation

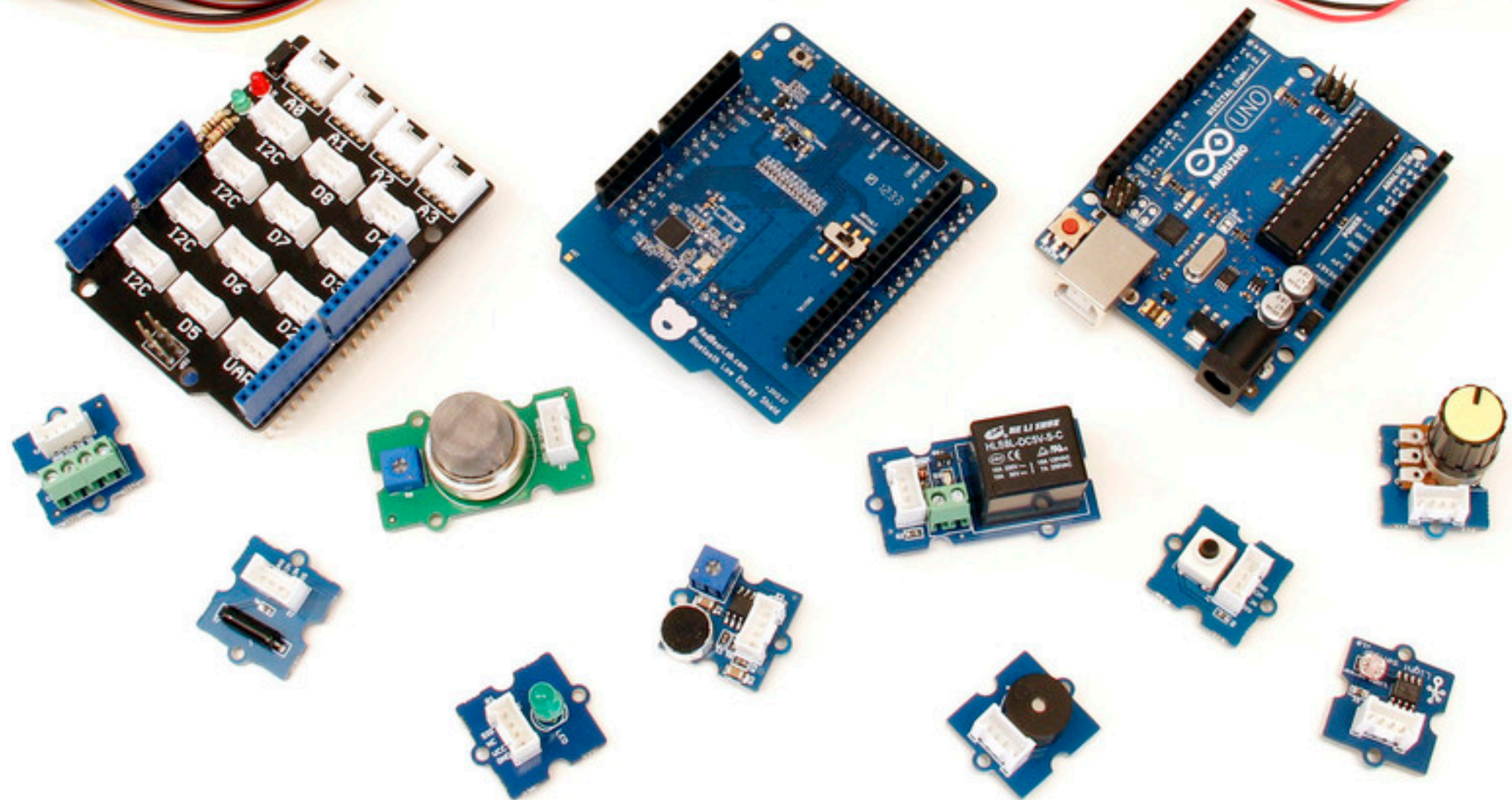
Common challenges

some examples

- **Design:** Ethics consent approval (IRB)
- **Development:** Efficiency of the data logger
- **Execution:** Participants motivation
- **Data Analysis:** Data synchronization

Use of external sensors

Design: Study A



Use of external sensors

Design: Study A

Educate the users

- design weekly meetings to answer questions and give explanations

Use of external sensors

Design: Study A

Educate the users

- design weekly meetings to answer questions and give explanations

Remember users to wear them

- automated reminders on their smartphones (following users habits)

QoE instrumentation Development: Study B

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QoE instrumentation

Development: Study B

Make ESM questionnaire transparent

- take care of UI
- don't interrupt the flow (context-aware)

QoE instrumentation

Development: Study B

Make ESM questionnaire transparent

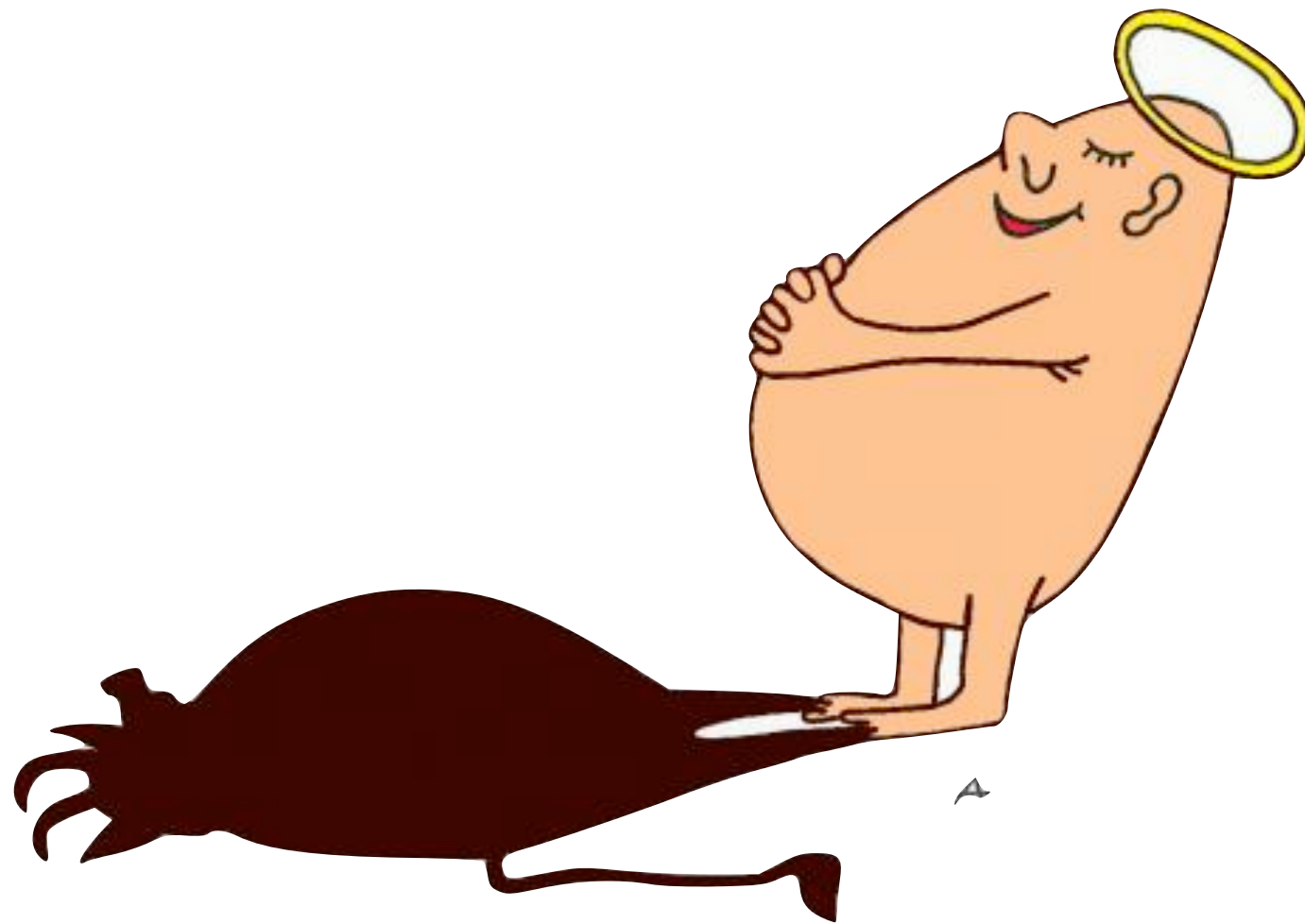
- take care of UI
- don't interrupt the flow (context-aware)

Oversample (shortly)

- before/after questions capture as much variables you can

User cheating vs tech. issues

Execution: Study B and C



User cheating vs tech. issues

Execution: Study B and C

Keep track of “everything”

- ESM notifications timestamp
- Any button pressed to dismiss dialogs



User cheating vs tech. issues

Execution: Study B and C

Keep track of “everything”

- ESM notifications timestamp
- Any button pressed to dismiss dialogs

Be aware of battery saver apps

- ask the users when installing the app
- check it first in case of missing data

Conclusions

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Conclusions

- Share with other researches
 - the challenges encountered
 - the solutions adopted

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- Highlight critical study phases

Conclusions

- Share with other researches
 - the challenges encountered
 - the solutions adopted
- Help to anticipate problems
- Highlight critical study phases
- Hope to hear about the experience of others

Thank You!

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