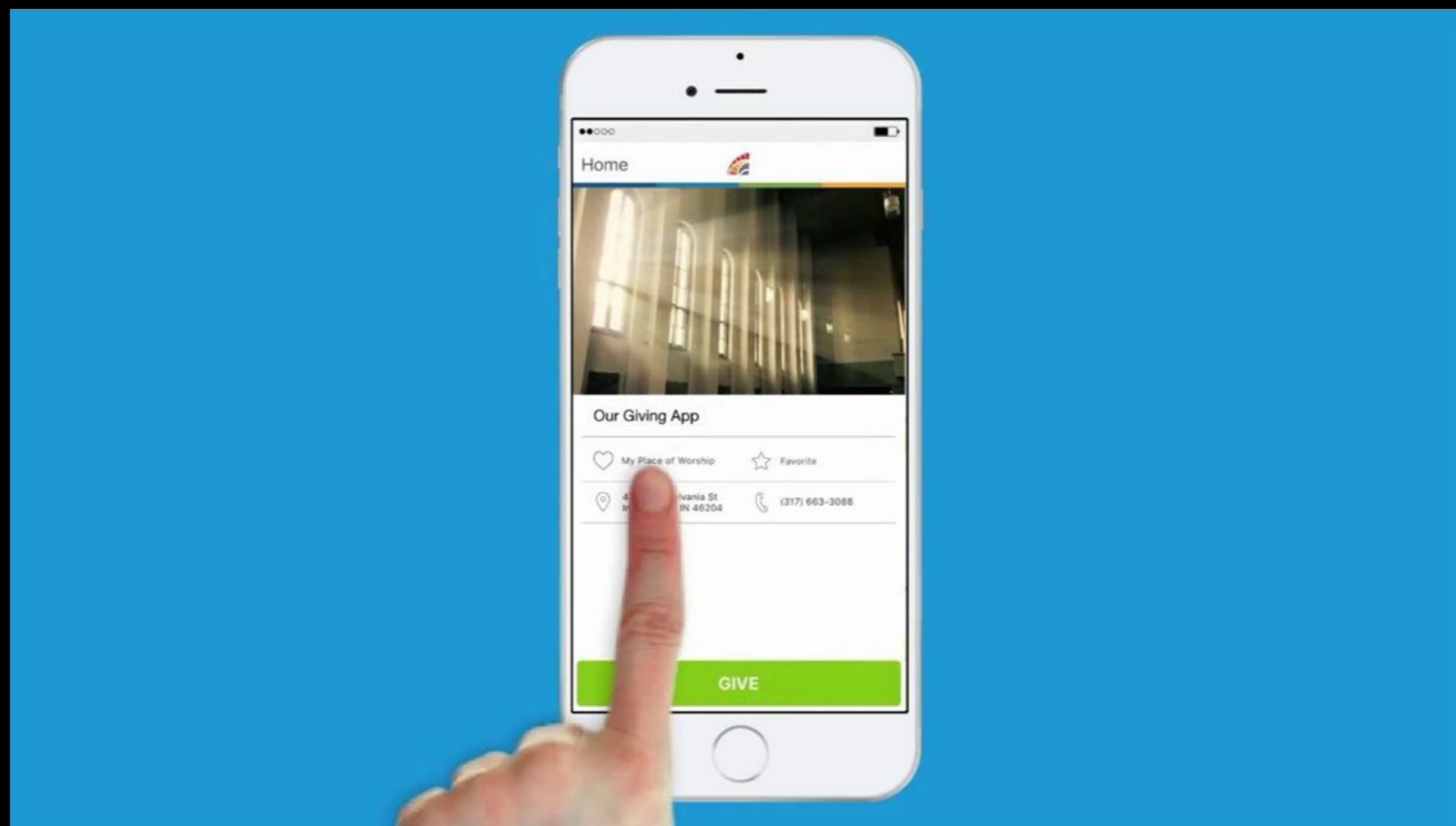


# PROTOTYPING & PROTOTYPES IN PARTICIPATORY DESIGN

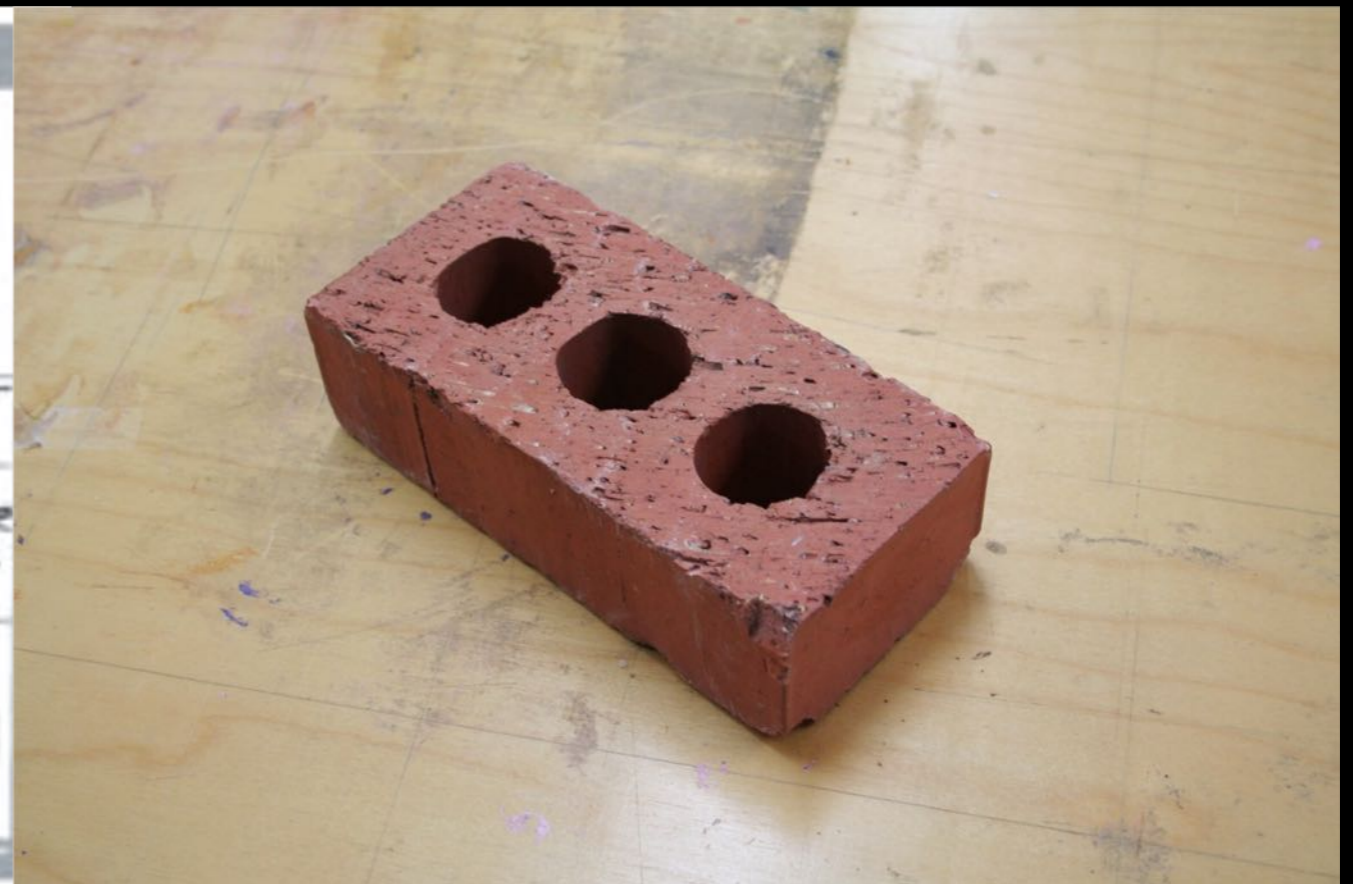
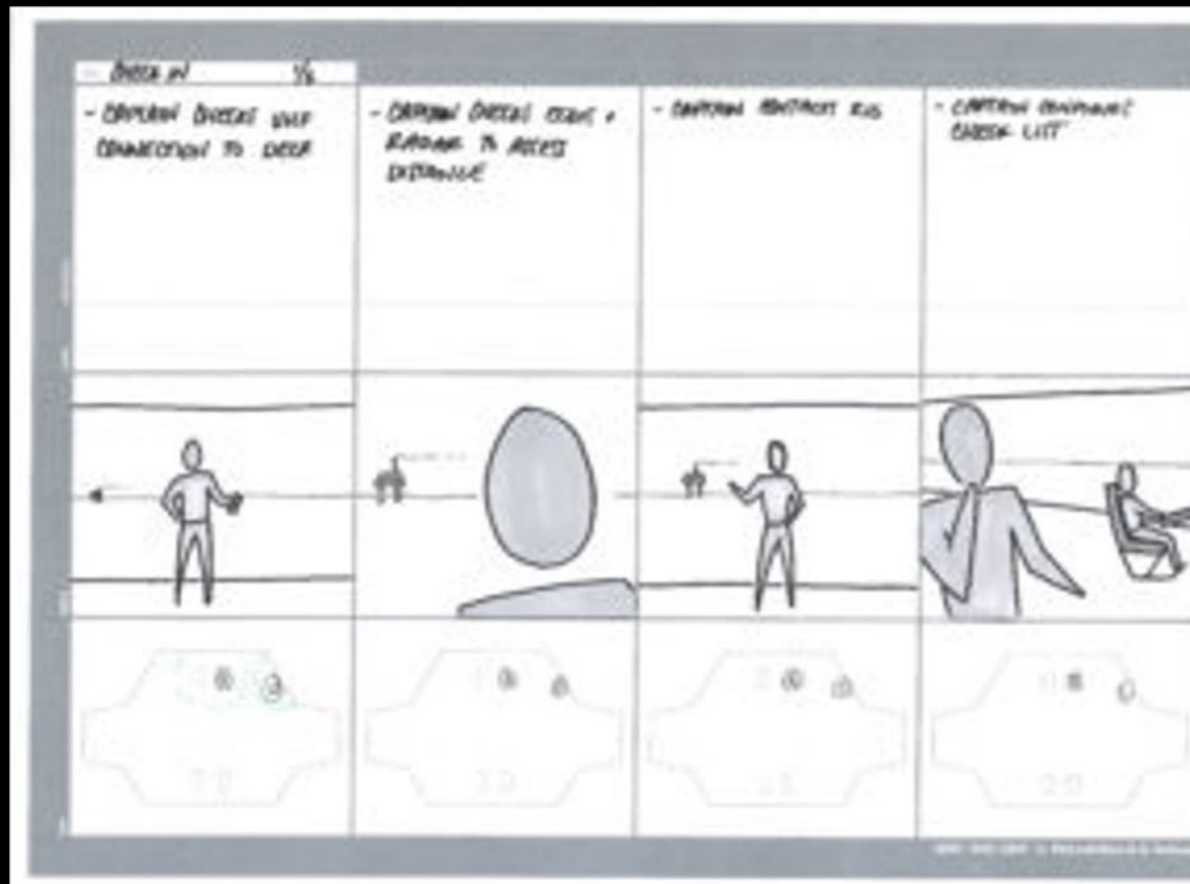
# PROTOTYPES

ISO Standard definition: A preliminary type, form, or instance of a system that serves as a model for later stages or for the final, complete version of the system. A prototype is a **usable product**.



# PROTOTYPES

HCI: A tool for testing and evaluation



# PROTOTYPES

Any representation of a design idea, regardless of medium (Houde & Hill 1997)

# COMMUNICATION



# Learn & Explore

Experience with technology

Open up design space,  
dismantle limitations, Generative



# PD & Prototypes

Tools for **exploration and assessment** (Bødker & Grønbæk, 1991)

**Power** relations and **political** views (Hillgren et al. 2011, p. 174).

Prototypes to expand the **space and time of the participation** (Björgvinsson et al. (2010) and Joshi (2017))

Low-tech and collaborative prototyping has been used as a means to **enable participants directly** in design activities (Muller et al. 1993, p. 27)

Beyond the experimental role, prototyping can also be seen as a **means of inquiry** without necessarily considering it an early manifestation of a product (Wensveen & Matthews, 2014).

# PD & Prototypes

Expected results of a design project (Kensing, Simonsen, Bødker, 1998)

Essential metric of a project outcome in PD should ideally be its ability to be evaluated in representative everyday situations (Bratteteig & Wagner, 2016, p. 142)

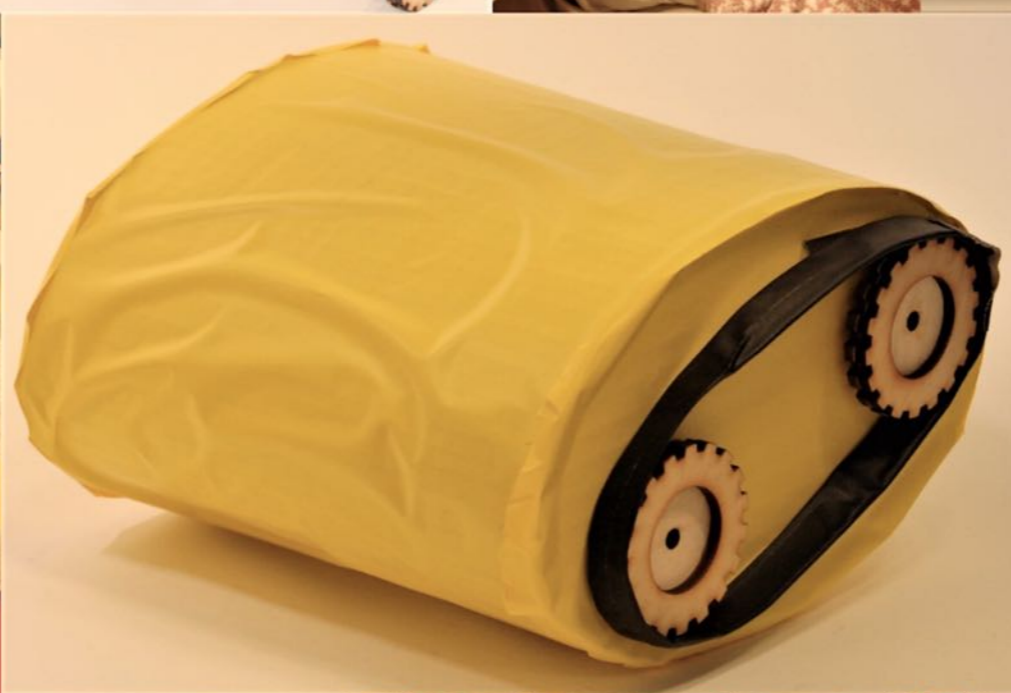
Co-designing working prototypes that can be deployed as part of PD initiatives continue to be among the concerns raised by Bødker & Kyng (2018) as they discuss crucial criteria for success in PD



# PROTOTYPING

Any activity involving creation or modification of prototypes





Main project from Master thesis



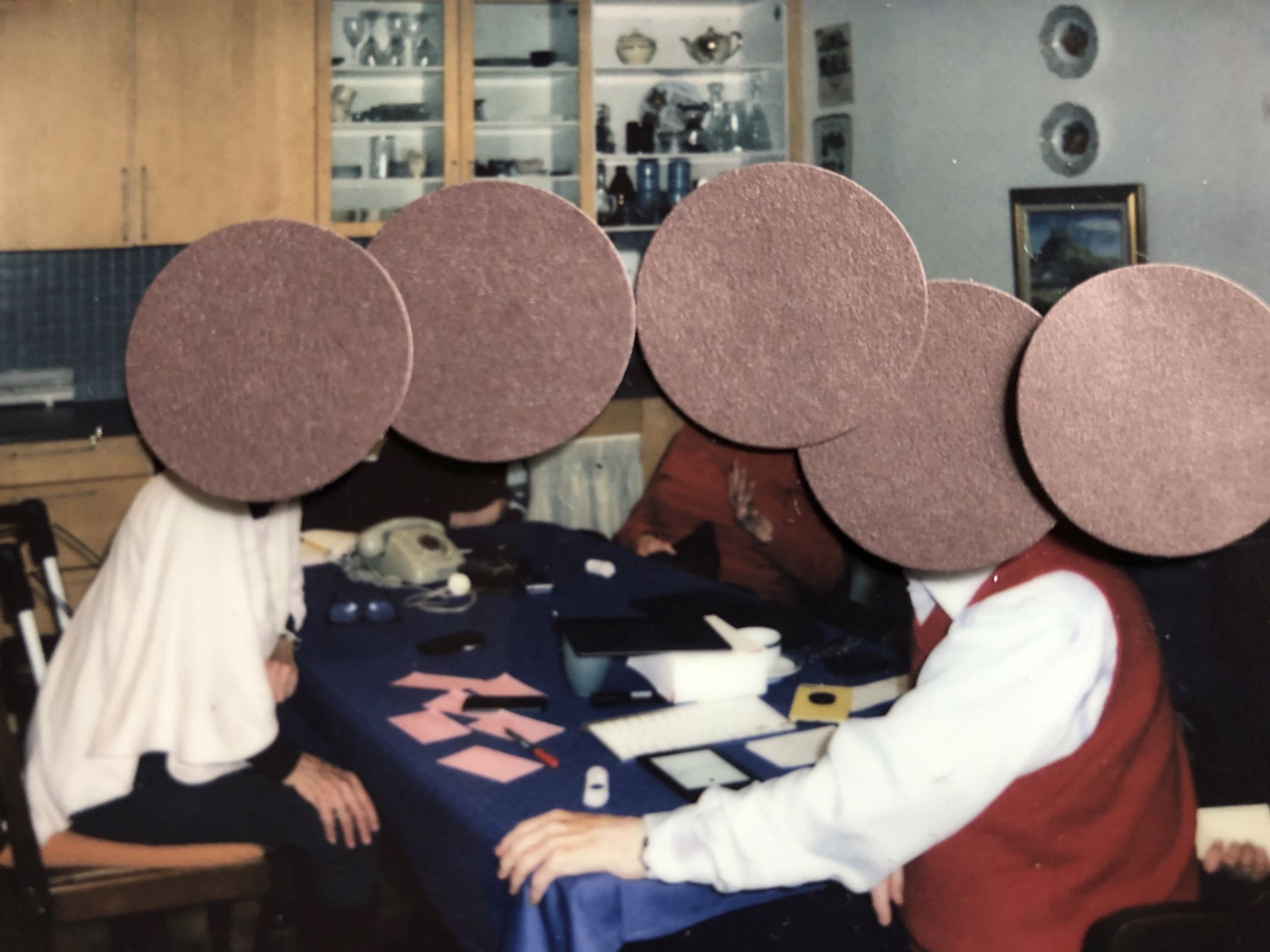


















En av Norges dyreste gater  
rett inn i ulykkesstoppen



Handwritten notes on a piece of paper, including the number '2' and some illegible text.





Du kan prøve å si  
noe nå Kan jeg få  
kaffekopper Ja men  
fikk skrevet ned en





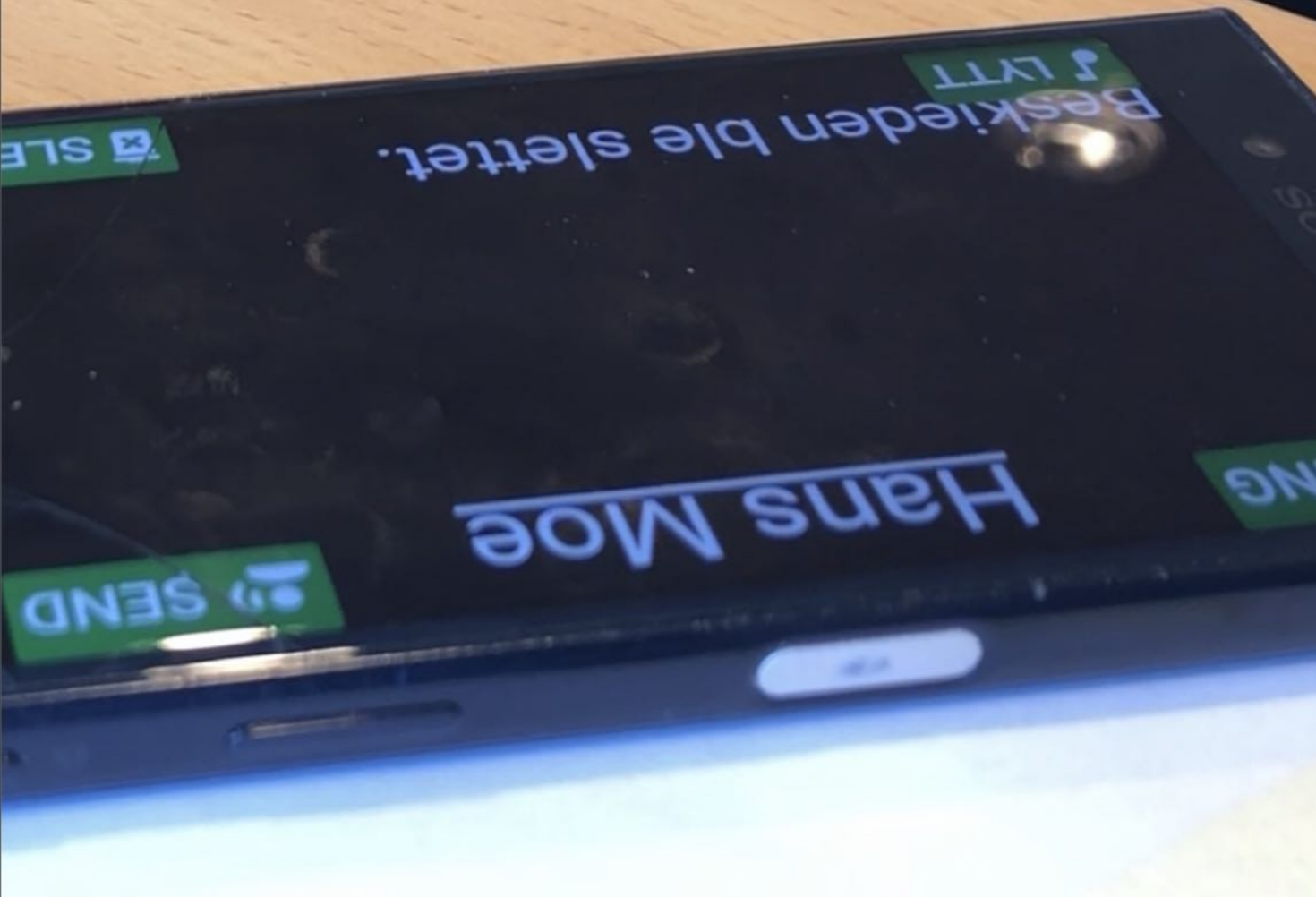
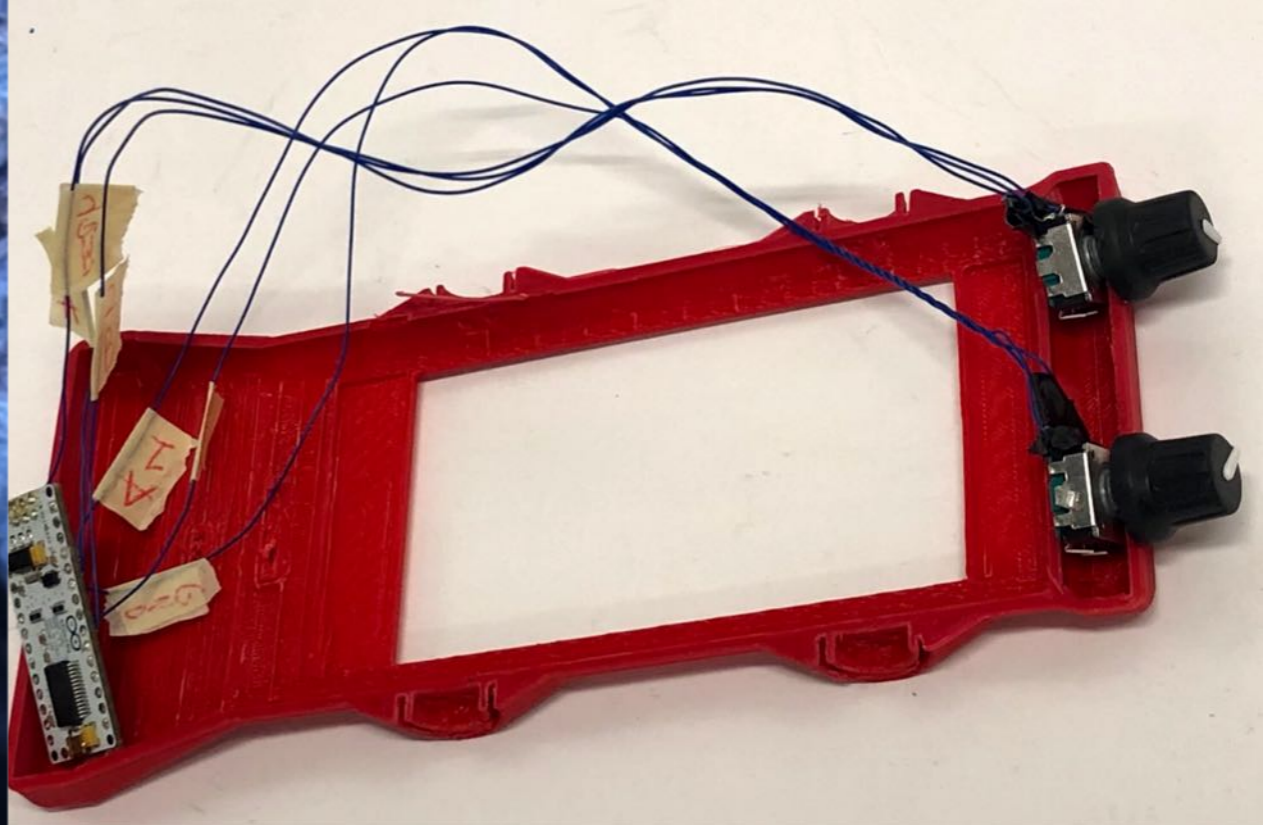


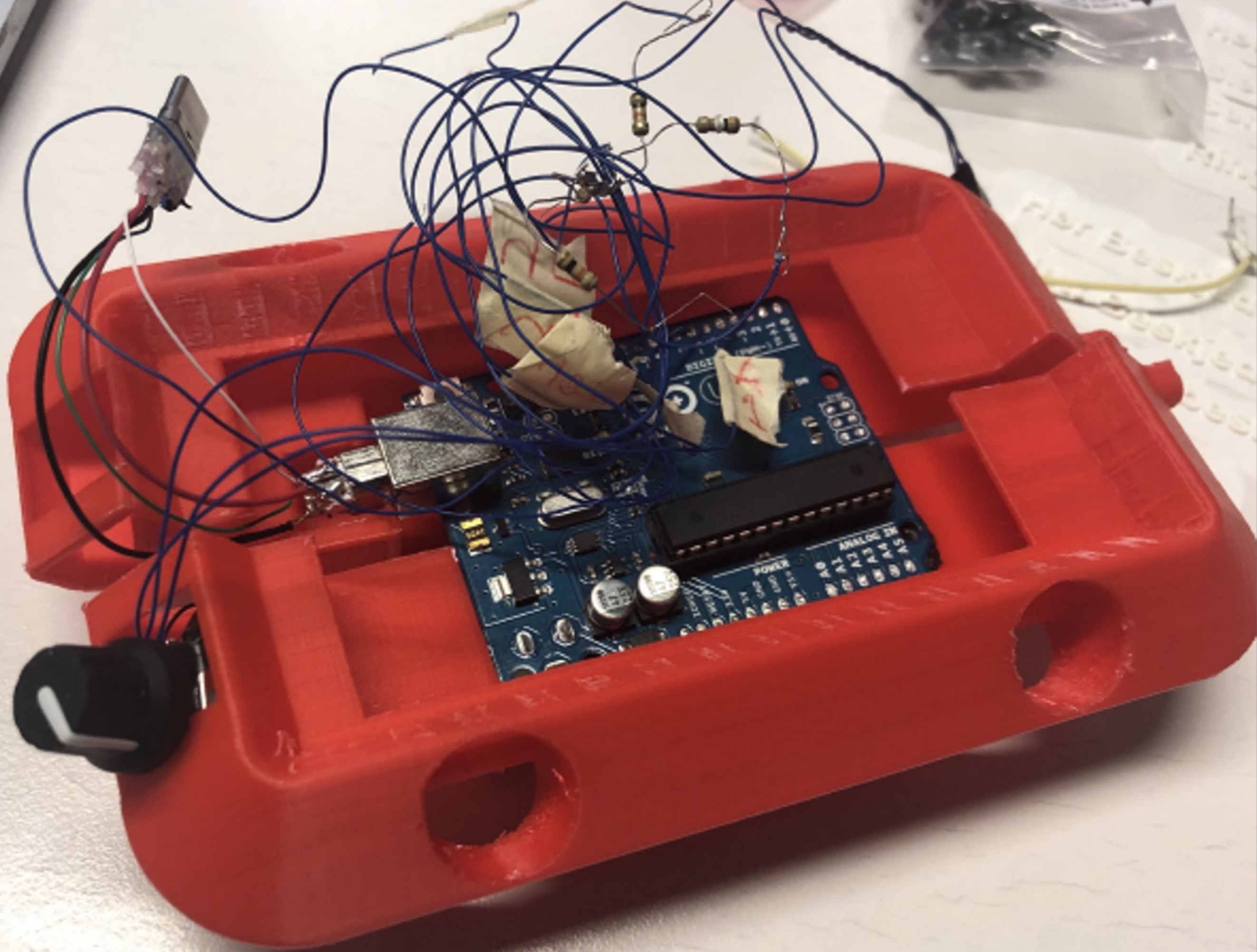
# INDEPENDENT PROTOTYPES

Design work on their own terms

- "having a bad day"
- Time & energy

Experience and Mutual learning

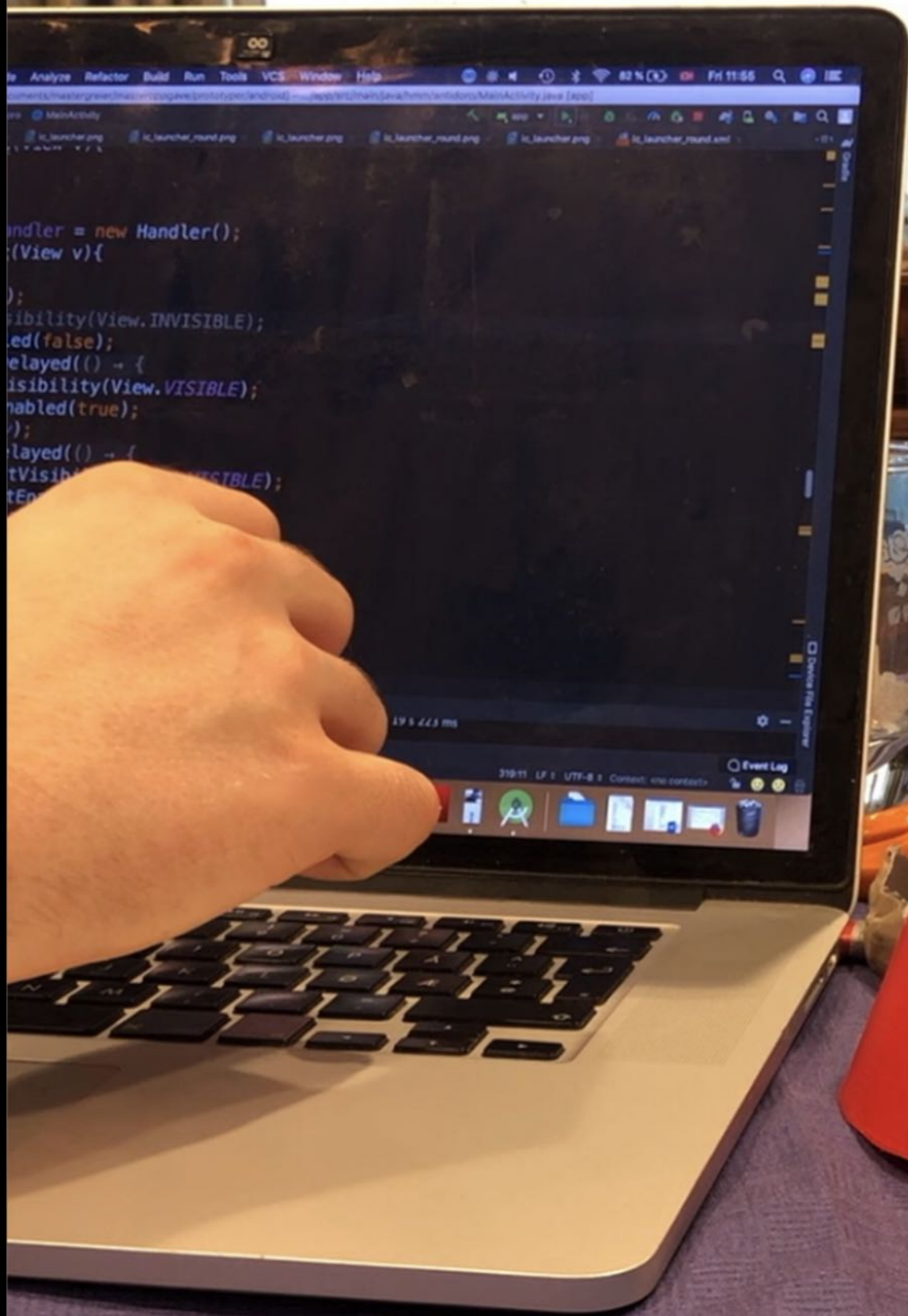














Prototypes gave participants experience with their own design proposals

Demonstrating that they are valued and have influence - Power - having a say

# Systematic Literature Review

Use of Prototypes & Prototyping with older adults in PD

Search

1. Participatory Design
2. Prototypes or Prototyping
3. Older adults

76 studies

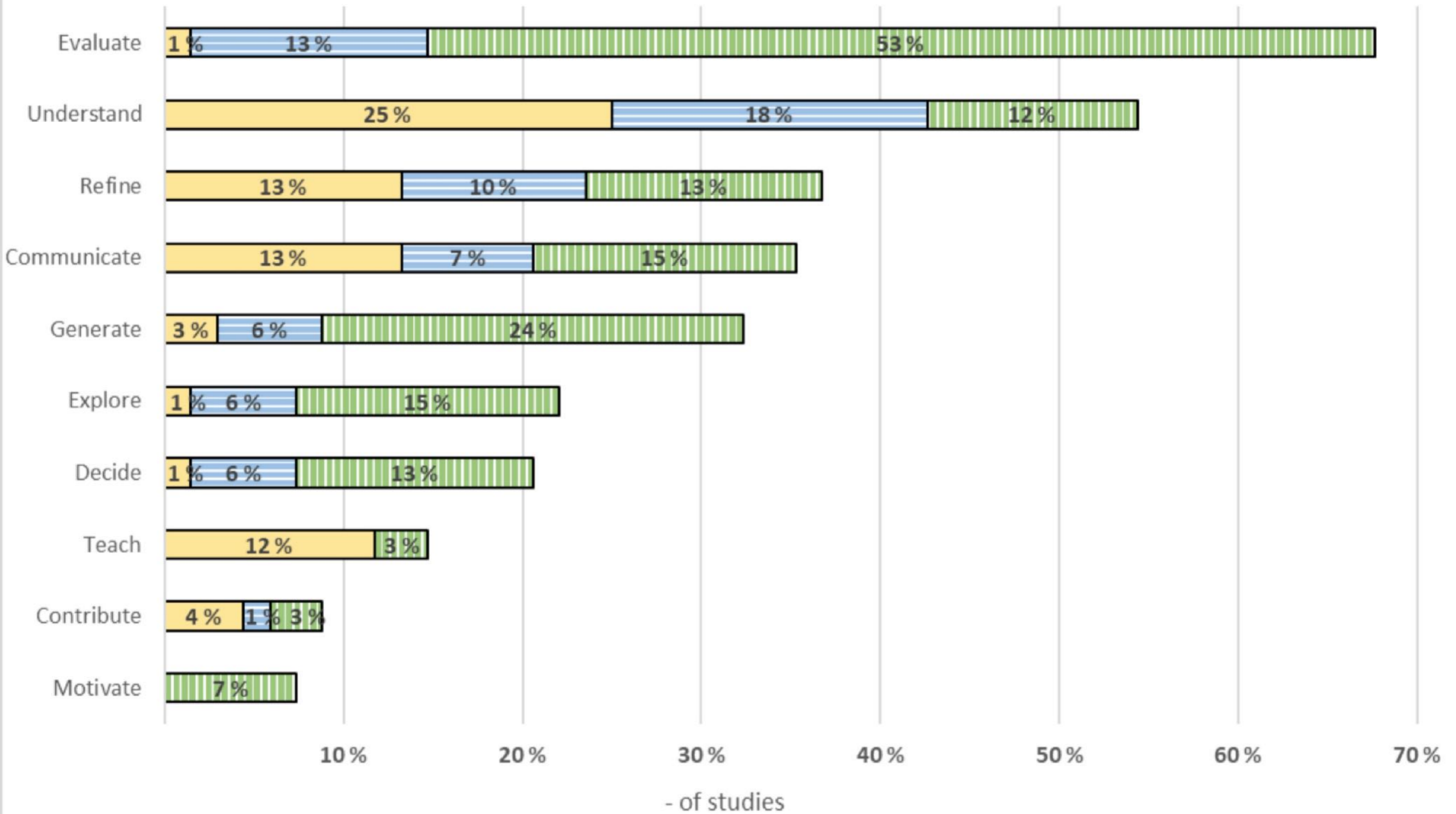
Refine	Converge, Adjust a precursor to a product
Evaluate	Feedback, Validate, Test, Verify, Criticize
Motivate	Induce enthusiasm, Inspire
Decide	Design, Change
Generate	Ideate, Inspire
Explore	Try out, Experiment, Experience
Teach	Demonstrate, Explain, Convey knowledge
Communicate	Articulate, Represent, Visualize, Clarify, Demonstrate
Understand	Investigate, Gain insight, Test, Experience, Think with
Contribute	Practical contribution, Research contribution

Reference	Refine	Evaluate	Motivate	Generate	Explore	Teach	Decide	Communicat	Understand	Contribute
Illison et al., 2020	OA&R*	OA								
er & Östlund, 2020	OA			OA						
field et al., 2020	OA		OA	OA&R			OA	OA&R	R	
o Gomes et al., 2020		OA		OA				OA		
Welsen et al., 2019	R*	OA&R*					OA	OA	R	
wles et al., 2019		OA		R*					OA	
King, 2019	OA	OA&R						OA	R	
Joshi, 2019	R	OA&R		OA	OA	R			OA&R	
an et al., 2019								R		
ngton et al., 2019					OA&R		OA	R		
erero et al., 2019		OA				R				
ker et al., 2019	OA	OA					R*	R		
ado et al., 2019		OA		OA*						
ndakis et al., 2019								OA		
Yeemink et al., 2018				OA				OA	R	
Buchmüller, 2018	OA	OA		OA	OA	R		OA&R	R	
es & Saville-Smith,	OA	OA							OA*&R*	
Nielek, et al., 2018			OA		OA	R				
Kopeč, et al., 2018		OA								
rsi et al., 2018	OA	OA							OA	
tá Gaspar et al., 2018		OA&R		R					OA&R	
galla et al., 2017	OA&R	OA&R								
ichards, 2017			OA			R		R	OA	
l Falcão et al., 2017	R	OA&R					OA&R		OA	
ee et al., 2017		OA		OA	OA	R		R	OA&R	
nana & Homung, 2017		OA	OA	OA	OA	R				
even et al., 2016		OA					OA	R	R	
inder et al., 2016		OA					OA		R	
col et al., 2016				OA		R	OA	OA	R	
ett & Östlund, 2016										
uh et al., 2016	OA	OA		OA*					OA&R	
zza et al., 2016		OA		OA		OA			OA&R	
huri & Octavia, 2016	OA&R	OA								
sai et al., 2015							OA			
er & Scandura, 2015		OA								
so et al., 2015		OA								
iller et al., 2015		OA								
nsden et al., 2015								OA	OA	
elho et al., 2015		OA								
asi et al., 2014									R	
odil et al., 2014		R				OA&R	OA		OA	
nsden et al., 2014	OA			OA	OA				OA	
& Lewkowicz, 2014	R	OA&R								
son & Jensen, 2013								OA&R*	R	
nvall et al., 2013					OA					OA*
me et al., 2013									OA&R	
o & Hyysalo, 2013	OA&R*	OA		OA&R	OA		OA&R	OA	OA&R	
ylor et al., 2012		OA							R	R
odil et al., 2012		OA		OA			OA&R	OA&R	R	
dsay et al., 2012				OA&R	OA			OA	OA&R	
Davidson, 2012									R	OA*
eggs et al., 2012		OA		OA	OA					
oual et al., 2012	R	OA&R						R	OA	
ek et al., 2011	R	OA							R	
schner et al., 2011		OA								R
han et al., 2010	OA&R	OA							R	R
wen et al., 2010									OA&R	
Salman et al., 2010	R	OA					OA			
Alm, 2010	OA&R	OA								
nsen et al., 2009	OA&R	OA							R	
ythe et al., 2009	R			OA&R	OA&R				OA&R	
stlund et al., 2008		OA						R		OA&R
ce & Alm, 2008	R	OA	OA	OA	OA&R				R	
gaard et al., 2008		OA					OA&R			
ssimi et al., 2007		OA					OA	R	OA&R	
le & Van Rompaey, 2006								OA&R		
hens et al., 2006		OA								
Illison et al., 2003		OA&R		OA	R				OA	

Reference	Refine	Evaluate	Motivate	Generate	Explore	Teach	Decide	Communicate	Understand	Contribute
Taylor et al., 2012		OA							R	R
Rodil et al., 2012		OA		OA			OA&R	OA&R	R	
Lindsay et al., 2012				OA&R	OA			OA	OA&R	
J. L. Davidson, 2012									R	OA*
Briggs et al., 2012		OA		OA	OA					
Alaoui et al., 2012	R	OA&R						R	OA	
Siek et al., 2011	R	OA							R	
Menschner et al., 2011		OA								R
Khan et al., 2010	OA&R	OA							R	R
Bowen et al., 2010									OA&R	
Batu Salman et al., 2010	R	OA					OA			
Alm, 2010	OA&R	OA								
Robinson et al., 2009	OA&R	OA							R	
Blythe et al., 2009	R			OA&R	OA&R				OA&R	
Vimarlund et al., 2008		OA						R		OA&R

## Prototyping and prototype use in primary data

■ Researchers
 ■ Older Adults and Researchers
 ■ Older Adults



**Figure 2: Prevalence and composition of prototype and prototyping use in PD with older adults**

	Refine	Evaluate	Motivate	Generate	Explore	Teach	Decide	Communicate	Understand	Contribute
Refine	1,000	0,267	0,019	0,059	0,080	-0,169	0,095	-0,116	0,230	-0,158
Evaluate	0,267	1,000	-0,166	0,008	-0,061	0,048	0,096	-0,213	-0,085	0,027
Motivate	0,019	-0,166	1,000	0,166	0,242	0,335	0,006	0,028	0,040	-0,095
Generate	0,059	0,008	0,166	1,000	0,432	0,294	-0,016	0,081	0,274	-0,131
Explore	0,080	-0,061	0,242	0,432	1,000	0,321	-0,093	0,098	0,106	0,040
Teach	-0,169	0,048	0,335	0,294	0,321	1,000	-0,112	0,093	0,014	-0,149
Design	0,095	0,096	0,006	-0,016	-0,093	-0,112	1,000	0,267	0,159	-0,165
Communica te	-0,116	-0,213	0,028	0,081	0,098	0,093	0,267	1,000	0,203	-0,149
Understand	0,230	-0,085	0,040	0,274	0,106	0,014	0,159	0,203	1,000	0,029
Contribute	-0,158	0,027	-0,095	-0,131	0,040	-0,149	-0,165	-0,149	0,029	1,000

	1	2	3	4
Refine		0,590	0,564	
Evaluate	-0,188	0,247	0,663	-0,267
Motivate	0,554	-0,198		-0,237
Generate	0,707		0,236	0,162
Explore	0,687	-0,161	0,237	0,221
Teach	0,640	-0,333		-0,339
Design		0,674	-0,288	-0,207
Communicate	0,342	0,319	-0,650	
Understand	0,372	0,510		0,549
Contribute	-0,258	-0,340	0,104	0,689



# SLR Conclusions

Who is included in each prototyping and prototype activity?

How are they included in these activities?

Why are they involved?

1. Generate, Explore, Teach, Motivate, and partly Understand and Communicate.
2. Decide, Refine, Understand, Communicate, and the absence of both Teach and Contribute
3. Evaluate, Refine, and the absence of Communicate

# DESIGN DECISION COMPETENCE

From Informed consent and Design as decisions

- Getting the possibility to understand, bring in, and create one's own design ideas.
- Choosing which of the design ideas to try out.
- Engaging in concretizing the ideas by deciding on materials and forms of the design

result. Design decision competence

- Developing an understanding of the consequences of design decisions for use.
- Developing an understanding of the consequences of design decisions for the design process.

# PROTOTYPING CHALLENGES

Resource demanding

Prototype was not used much at home

Prototypes perceived as homework/tasks where I knew the answer and they had to get it right

No robots prototyping until role was established (Robot workshop)



