

User Experience (UX) Research for Emerging Technologies

UX Research Portfolio

Jie Li

www.jieli-research.com

OUTLINE

1. About Me

2. Typical UX Research Process

3. Three UX Research Cases

Case 1 Developing a production platform for broadcasting customizable multiscreen TV programs

Case 2 Designing a social VR clinic for remote medical consultation

Case 3 Designing a VR tool for co-designing cakes

ABOUT ME

I have been professionally trained as an
Industrial Designer and
UX Researcher
at TU Delft
(**Master's and PhD degree**)

Meanwhile, I am the **founder**
of a successful pastry brand
“Cake Researcher”.



My Core Skills

Qualitative UX Research Methods

- Interviews, surveys, focus groups, creative sessions/workshops, diary studies, contextual inquiries, field studies
- Qualitative data analysis (open coding and thematic analysis)

Quantitative UX Research Methods

- A/B test, controlled experiments, survey design and validation
- Inferential statistics (SPSS and R)

Sketching, wireframing, prototyping, video storytelling, oral presentation

ABOUT ME

Master's Thesis

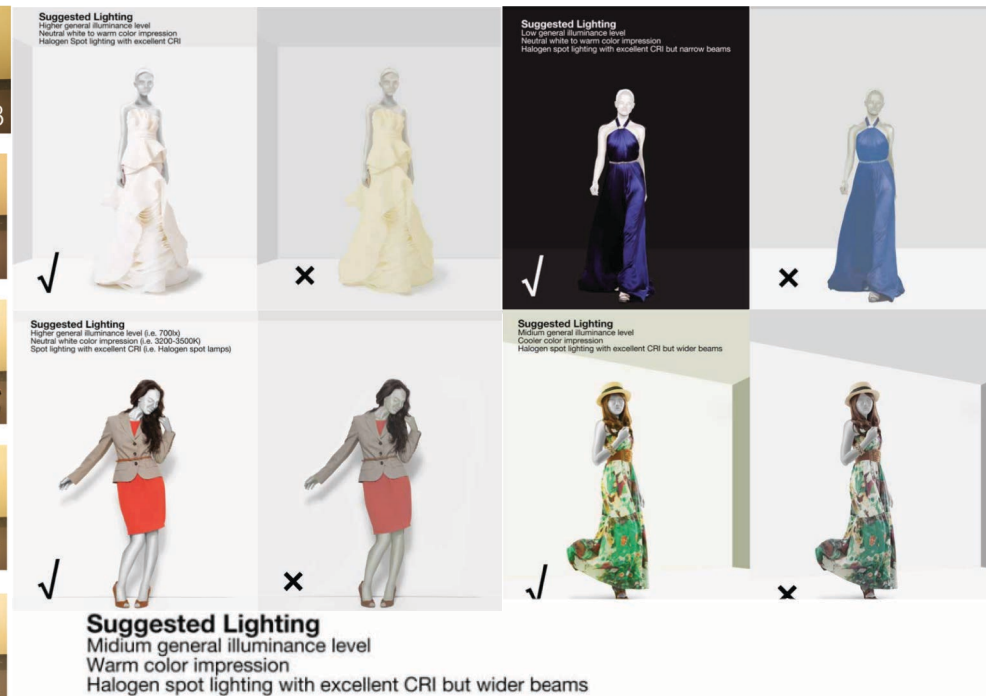
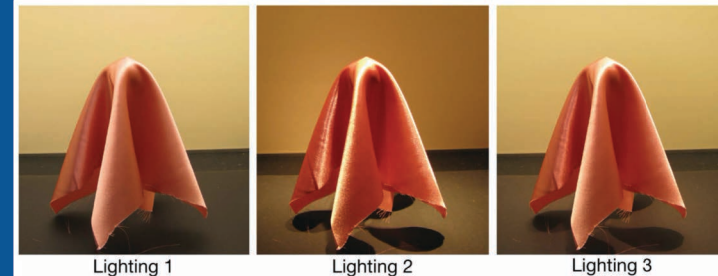
Philips Research, Eindhoven

Task

Design retail lighting to maximize the attractiveness of apparel textiles

Research and Design Methods

- Focus group sessions with consumers
- Interviews with lighting designers and textile experts
- Card sorting
- Controlled lab experiments
- Design visualizations



ABOUT ME

PhD Thesis

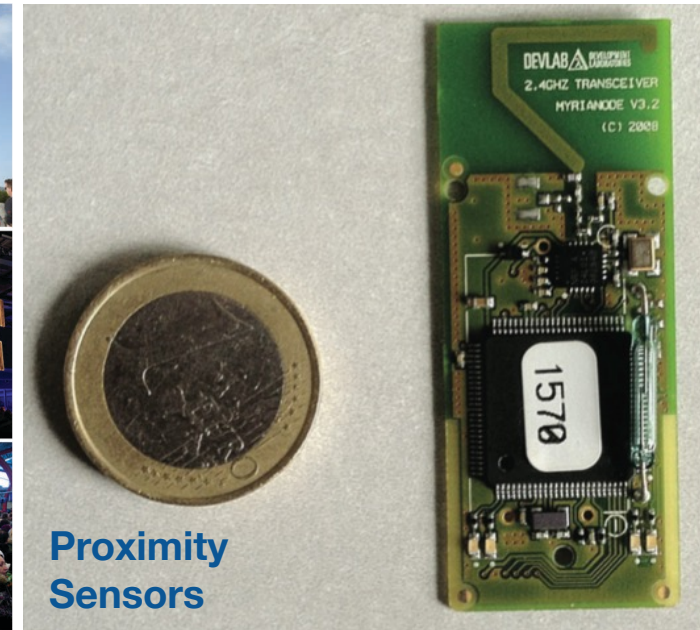
Crowd Inside Out: Measuring crowd behavior and Designing for crowd Well-being

Research and Design Methods

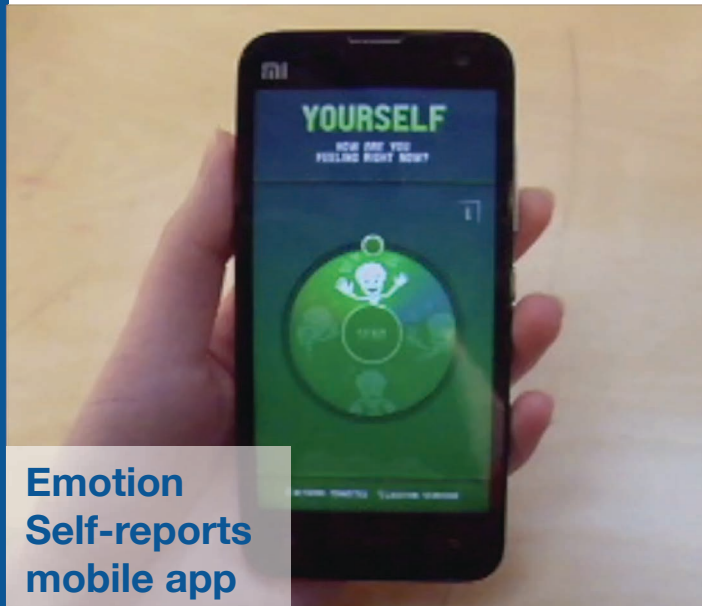
- Ethnographic studies at large crowd events to understand crowd management strategies and requirements
- Design an mobile app to sample crowd emotions
- Track crowd density and movement using proximity sensors



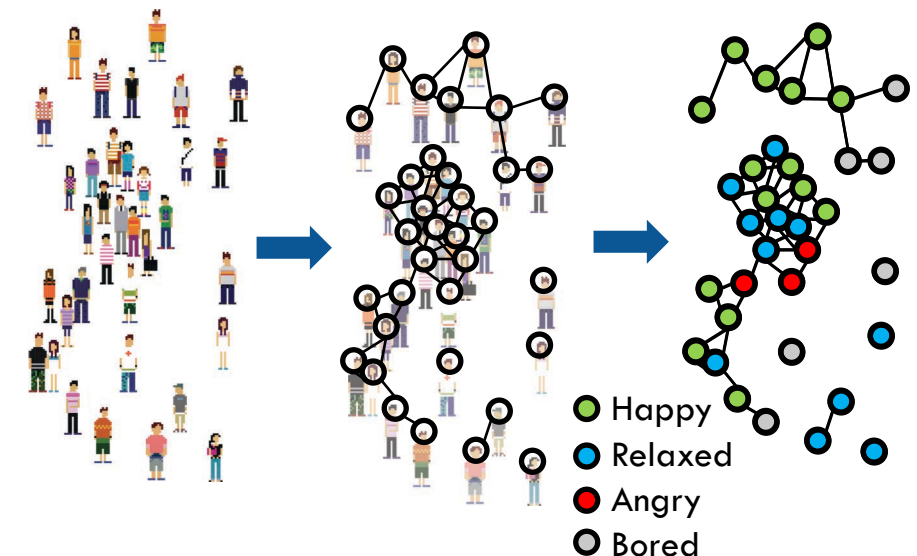
Ethnographic Studies



Proximity Sensors



Emotion Self-reports mobile app



ABOUT ME

I am NOW a...

- **Postdoctoral Researcher (UX Research Lead)** at Centrum Wiskunde & Informatica (Dutch National Research Center for Computer Science and Mathematics)
- **Entrepreneur/Cake Artist** at Cake Researcher www.cake-researcher.com

My research about virtual conferencing and cake VR got featured in **New Scientist NL** (February, 2021)



TYPICAL UX RESEARCH PROCESS

From my own experience, this process can be as short as **2-4 weeks** for mobile applications and website designs, and can also last for **1-3 years** for large innovative EU projects.



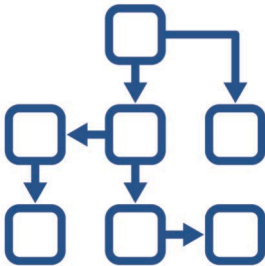
Step 1

Run field studies/interviews/focus groups/contextual inquiries to identify design requirements based on (latent) user needs



Step 2

Map a user journey and a storyboard based on the results from Step 1



Step 3

Design, iterate and implement the system/product
(collaborating with developers)



Step 3a

Run user/expert evaluation studies for the iterations



Step 4

Bring the final prototype to the end users and run final user evaluation study in the real environment

CASE 1

Developing a production platform for broadcasting customizable multiscreen TV programs

Clients



Task

Imagine you are watching a football match at home, where you can customize the content showing on your TV screen, browsing extra information on your mobile devices, and choosing the camera angles to follow your favorite football players... However, to enable these experiences, it requires changes in the current TV broadcasting workflow.



CASE 1

Goal

Design a new production platform to fit into current live broadcasting workflows and enable TV programs to be customizable at end-users' home.

So, the first step, I need to know

- **What is the current live broadcasting workflow?**
- **What are the requirements for design a new production platform to support customizable TV program broadcasting?**

CASE 1

Step 1 Run a field study at MotoGP 2017 to understand the current live broadcasting workflow and gather requirements from broadcasting experts to design a new production tool for delivering customizable end-user experiences.



Where: MotoGP 2017
Silverstone racing event

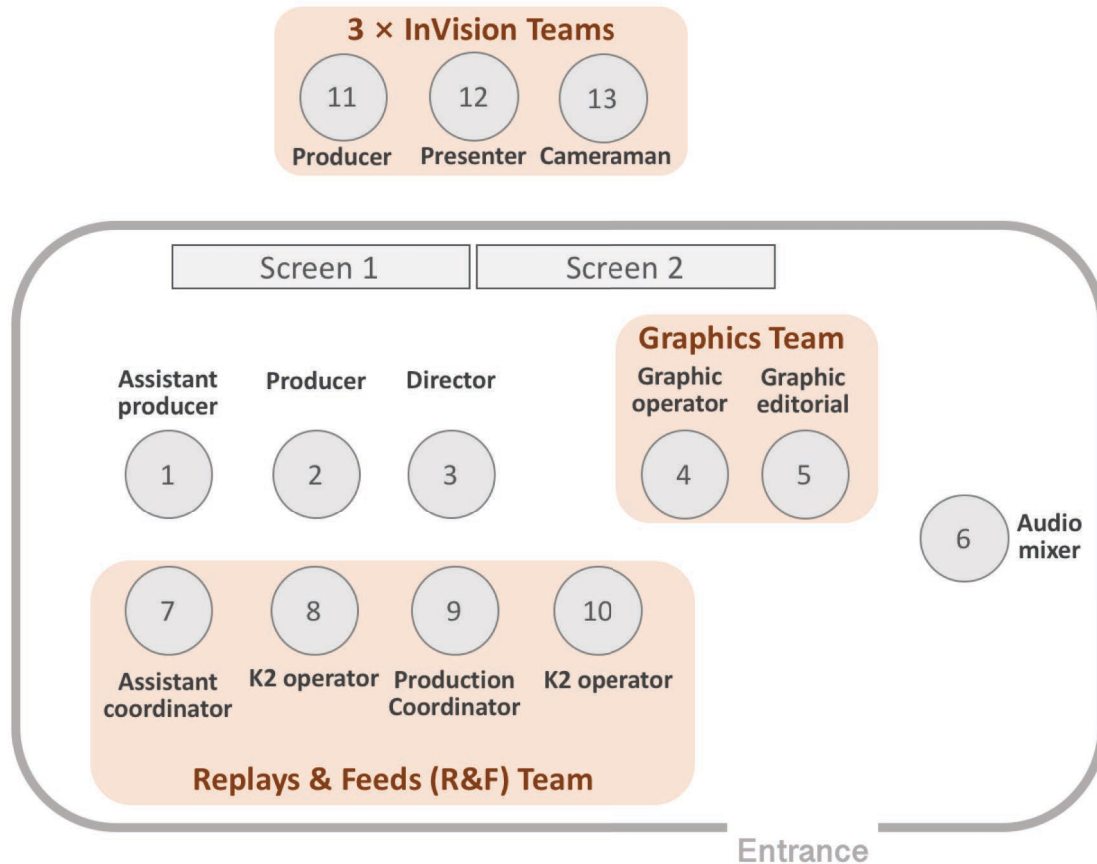
Subjects: A live broadcasting team working on the BT Sports/North One Television Outside Broadcasting (OB) Truck

Method: Contextual inquiry



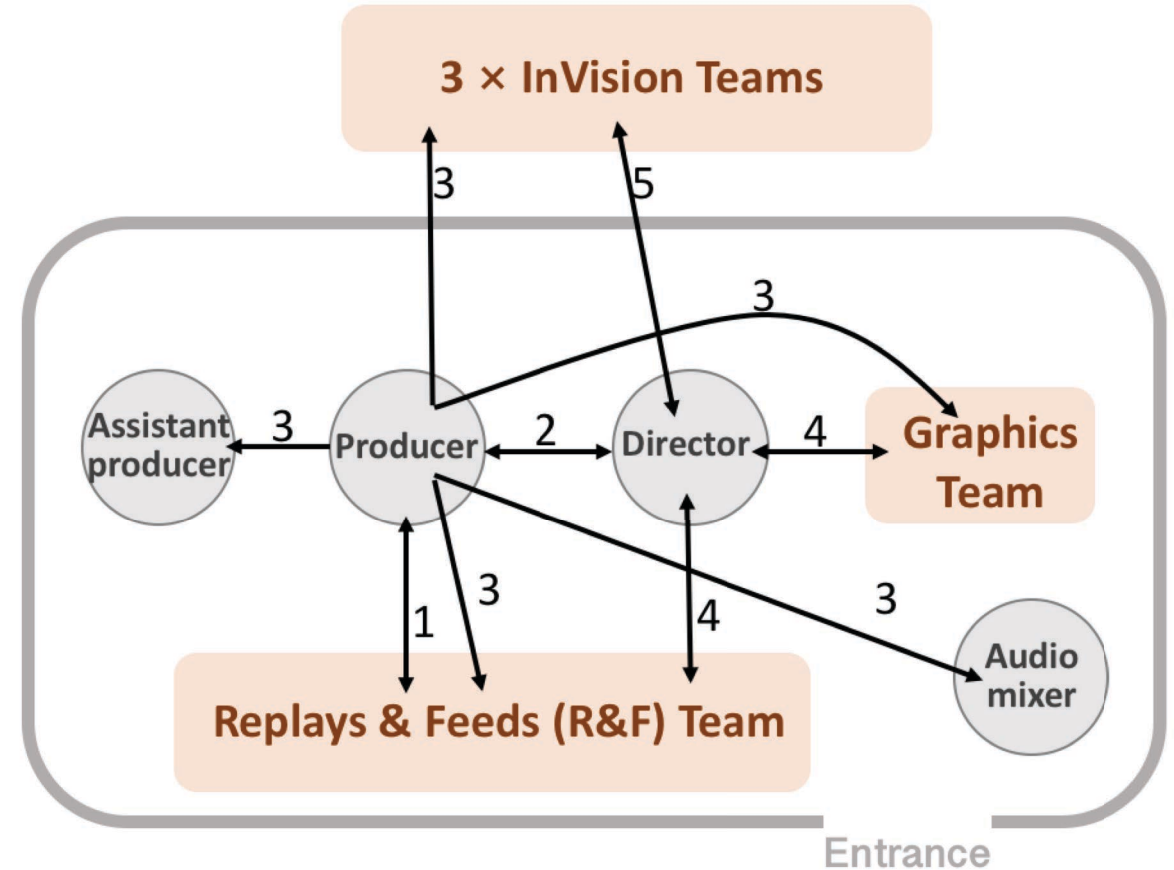
CASE 1

Step 2 Clean contextual inquiry notes, transcribe audio recordings, do thematic analysis, visualize the current broadcasting workflow, and gather requirements for designing the new production platform.



OB Truck

Roles in the OB truck



OB Truck

Workflow in the OB truck

Extremely heavy workload for the director and the producer

CASE 1

Conclusions of Step 1 and Step 2

Current
broadcasting
workflow



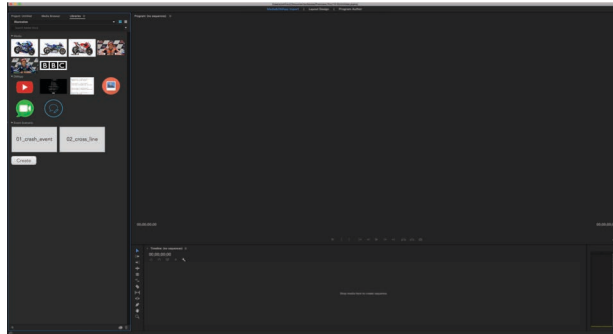
Require new
tools to
digitalize
preproduction
and reduce
workload for
live editing



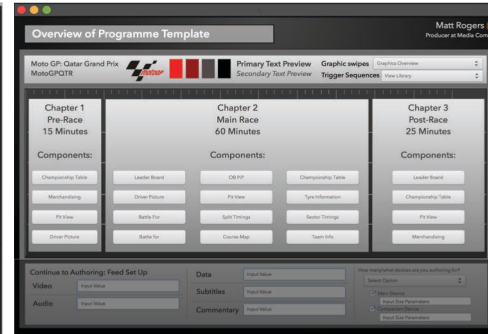
CASE 1

Step 3 Start drafting the core functions and wireframes for new production platform. Evaluate the four initial concepts with broadcasting experts to select one concept and decide the core features.

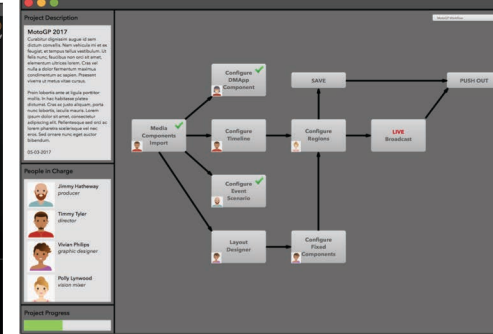
Concept 1



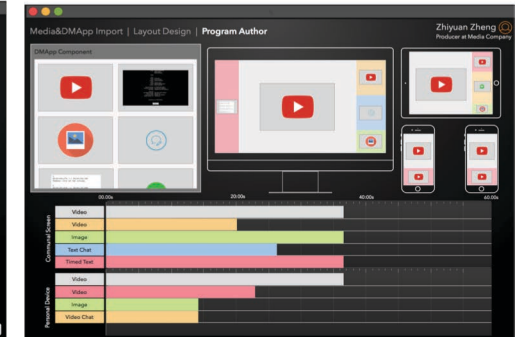
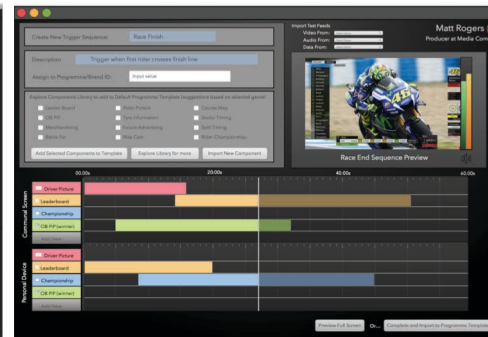
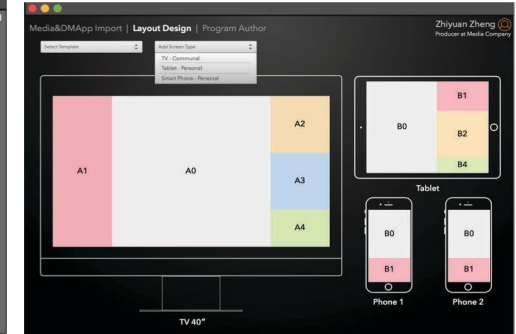
Concept 2



Concept 3



Concept 4

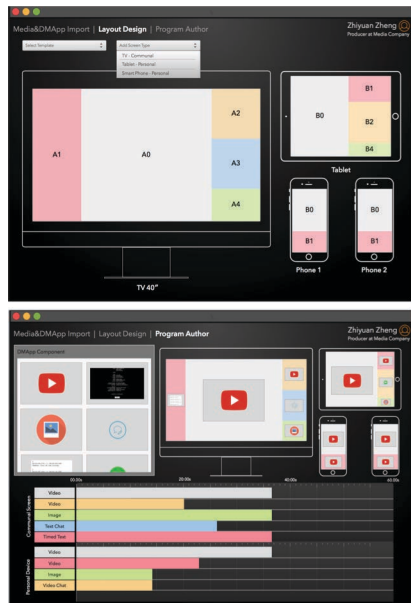


The 1st Expert Evaluation of the 4 Initial Concepts
Where: BBC User Experience Lab, Media City, Manchester
Subjects: 10 TV production experts
Methods: Semi-structured interviews with think-aloud strategy

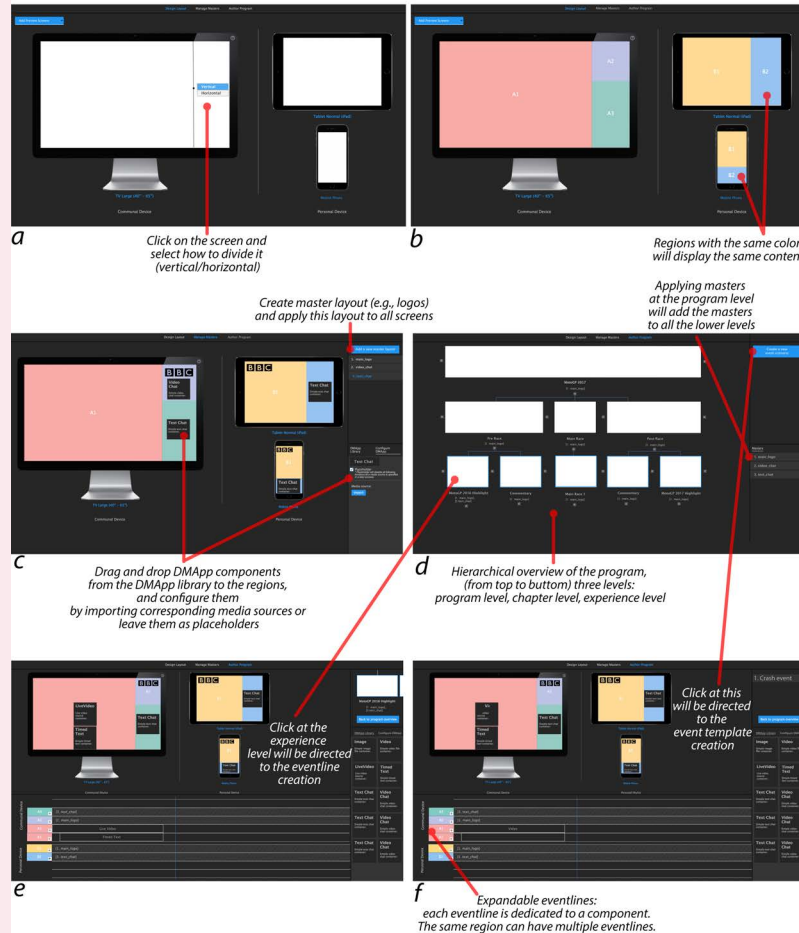
CASE 1

Step 3a Based on the selected concept from the expert evaluation, further specify the core functions and wireframes.

Selected concept (Concept 4)



Digitalized preproduction

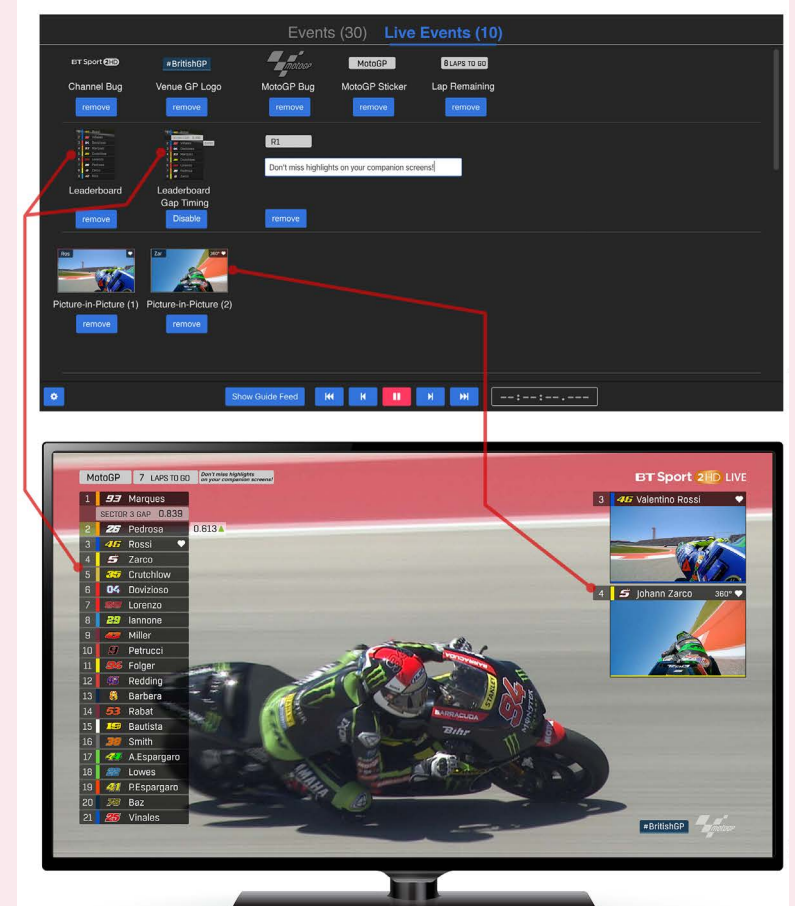


Defining
layout

Adding
media
objects

Creating
storylines

Efficient live editing



CASE 1

Step 3b The 2nd Expert Evaluation of interactive prototypes.



The 2nd Expert Evaluation of the Refined Concept

Where: BBC User Experience Lab,
Media City, Manchester

Subjects: 10 Sports TV production experts

Methods: Semi-structured interviews. Invite experts to use the interactive prototype and think aloud.

CASE 1

Step 4 Final implementation of the platform based on the experts' feedback and test the platform at FA Cup 2018 Football Match.

Final Evaluation of the Platform at FA Cup 2018

Where: FA Cup 2018 Semi-final and Final, Wembley Stadium

Subjects: A broadcast team from BT Sports, broadcast customizable FA Cup football matches to 20 households

Method: Field studies with surveys and semi-structured interviews



CASE 2

Designing A Social VR Clinic for Remote Medical Consultation

Clients

Reinier de Graaf 



Task

It is painful for knee arthritis patients to travel to the hospital multiple times to meet the doctor. The surgery preparation information that patients usually receive is often vast and text-based, which is overwhelming for aged patients to remember. Both patients and doctors need a tool to support the remote medical consultation and better visualize the surgery preparation process.



CASE 2

Goal

Use Social VR as a medium to design a remote medical consultation tool and to better prepare the patients for surgeries with visualized medical/anatomical knowledge and preparation process.

So, the first step, I need to know

- **What is the current patient treatment journey?**
- **What are the requirements for designing a social VR clinic for remote consultation?**

CASE 2

Step 1 Interview doctors and nurses with a context mapping booklet to help them map the patient treatment journey and distill requirements for remote consultation tool design. Observe patient-doctor consultation sessions to understand the surgery preparation process.



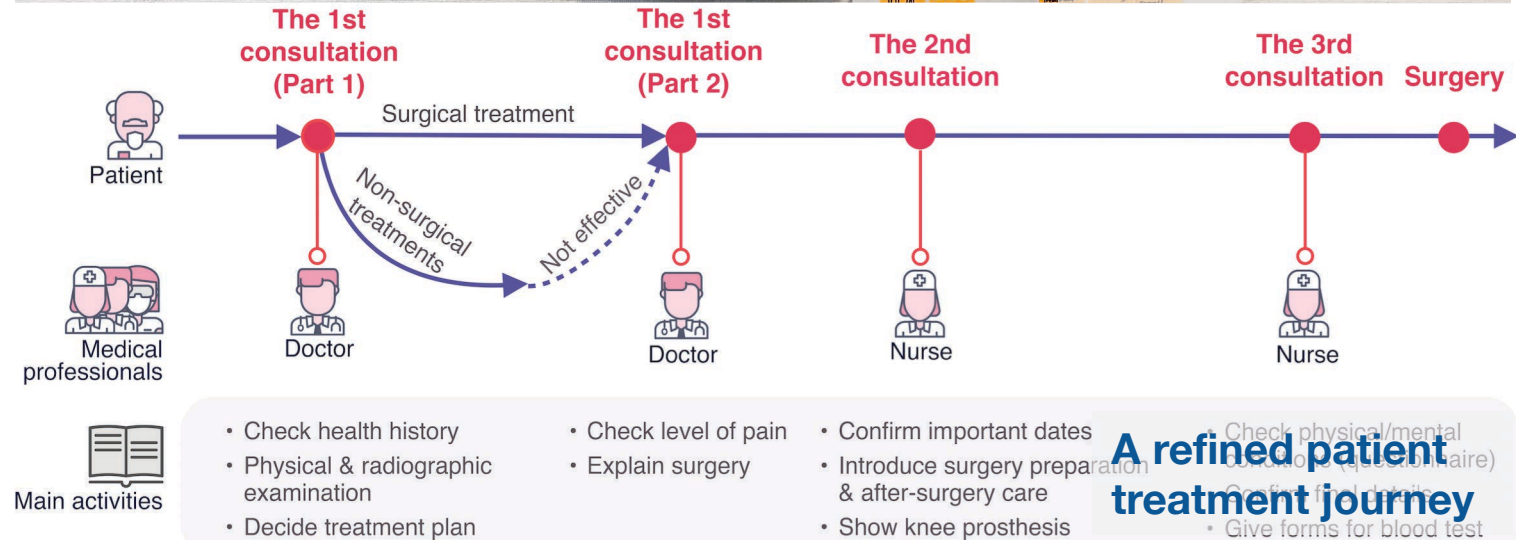
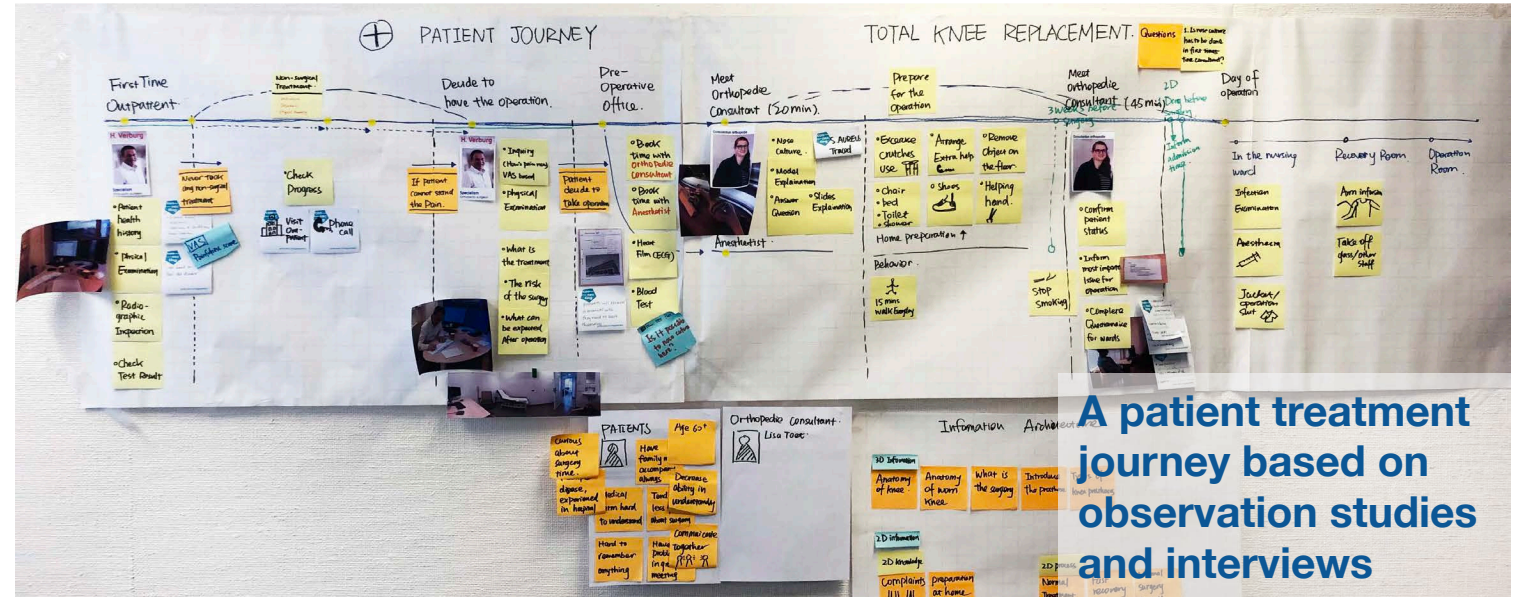
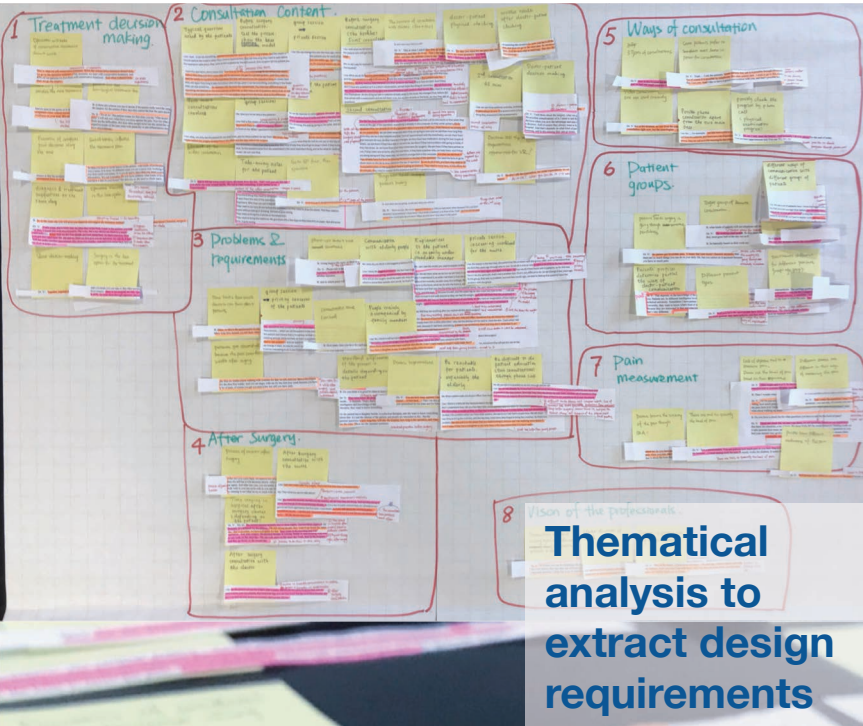
Where: Reinier de Graaf Hospital, Delft, The Netherlands

Subjects: 2 doctors, 1 nurse, 6 patients

Method: Contextual inquiry with pre-filled diaries by the doctors and nurses, observation study of the consultation sessions

CASE 2

Step 2 Clean contextual inquiry notes, transcribe audio recordings, do thematical analysis, visualize the current patient treatment journey, and gather requirements for designing remote consultation tool.



CASE 2

Step 2a Draw a storyboard to illustrate the core functions of the social VR clinic based on the patient treatment journey, and compare the face-to-face medical consultation with the social VR clinic consultation.

Face-to-Face Consultation

1

Explain the preparation process for the surgery



2

Describe or show a video of the the surgery room



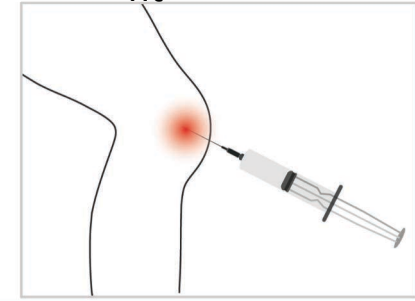
3

Explain the surgery with a **knee prosthesis**

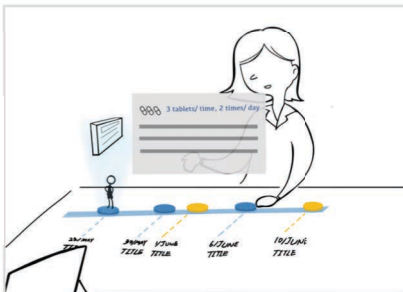


4

The patie practices the injection at home



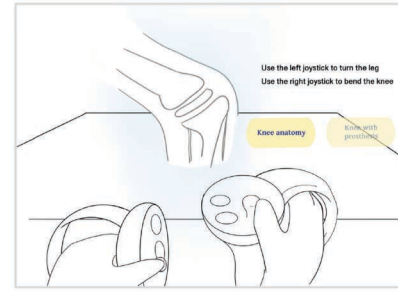
Social VR Consultation



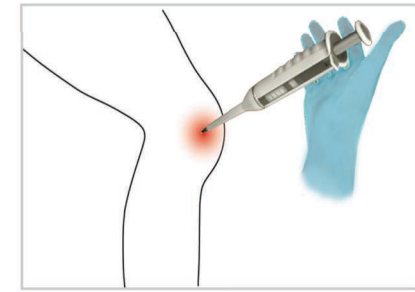
Visualize the preparation process, and explain the medical jargons in VR



Allow the patient to **"walk into"** a virtual 3D surgery room



Explain the surgery with **an interactive virtual 3D knee anatomy model**, and a virtual knee prosthesis

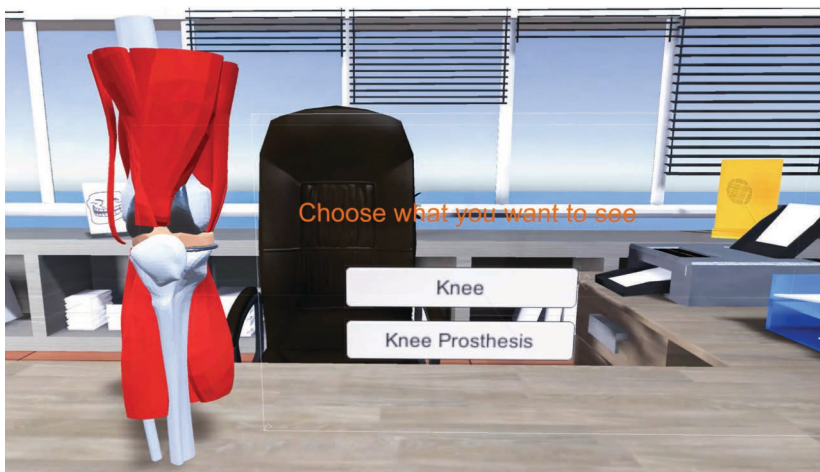


The patient practices **risk-free virtual injection**

CASE 2

Step 3 Design and Implement the social VR clinic based on the storyboard.

Click [HERE](#) to watch the video of the social VR clinic



CASE 2

Step 4 Evaluate the social VR clinic with UX designers. It is planned to set up the social VR clinic at hospital and involve doctors and patients to the evaluation (currently delayed due to COVID-19).



Where: TU Delft library

Subjects: 24 UX designers

Methods:

- Invite UX designers to use the social VR clinic prototype and think aloud
- Semi-structured interviews
- Surveys (i.e., Social VR questionnaire and simulator sickness questionnaire, NASA TLX)

CASE 3

Designing a VR Tool for Co-designing Cakes



Client



Task

Pastry chefs often face difficulties in communicating the decoration and size of a customized cake just using texts or images. As shown in the image, (a) includes the design keywords from the clients, (b) is a cake reference picture, (c) the final cake design in a 2D photo, and in (d), the clients only saw the final cake at the celebration.

Forest & Wood
White chocolate
White flowers
with golden elements
For 40 persons

a



b



c



d

CASE 3

Goal

Design a social VR tool for pastry chefs and clients to co-design cakes with real-time 3D visualizations of the cake decorations and sizes.

So, the first step, I need to know

- **What is the current cake customization process?**
- **What are the requirements for designing a social VR tool for cake co-design?**

CASE 3

Step 1 Conduct contextual inquiry with pastry chefs at their bakeries and interview clients who had experiences of ordering customized cakes to understand cake customization processes and distill design requirements for a social VR cake co-design tool.



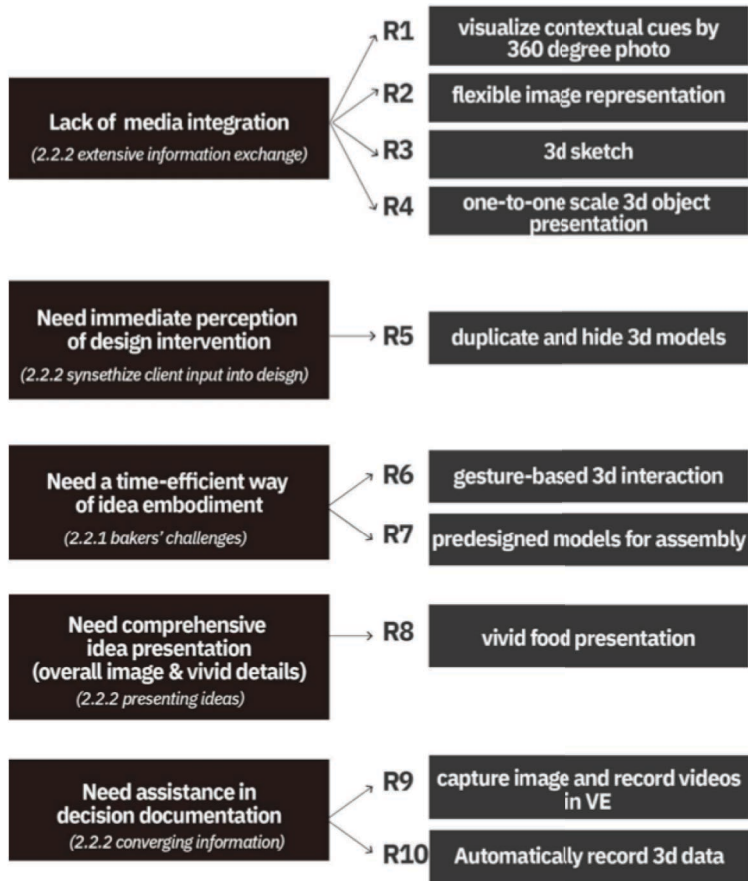
Where: Bakeries and homes

Subjects: 5 pastry chefs and 4 clients

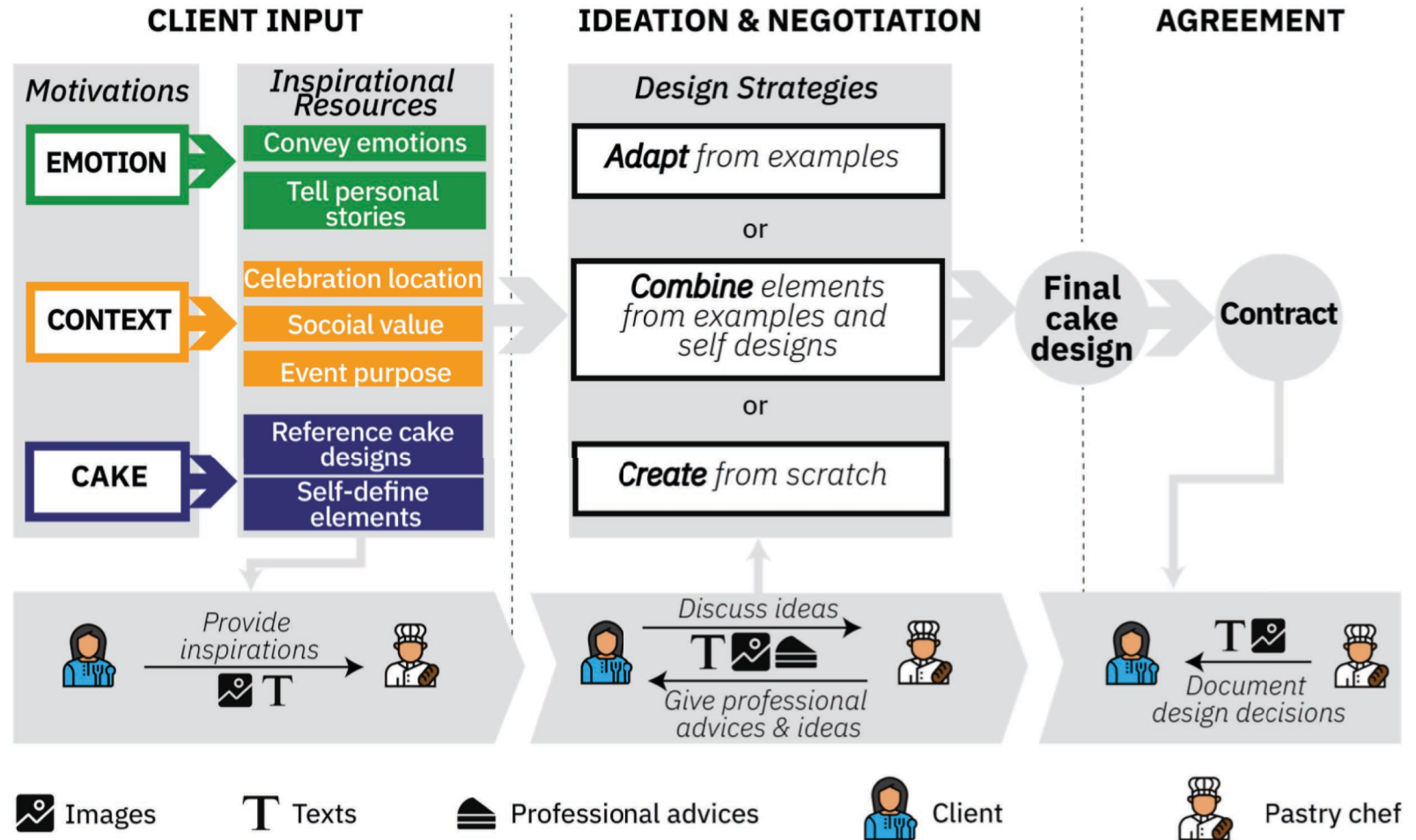
Method: Contextual inquiry with pastry chefs at bakeries, and interviews at clients' homes

CASE 3

Step 2 Clean contextual inquiry notes, transcribe audio recordings, do thematic analysis, visualize the current cake customization process, and gather requirements for designing the social VR tool.



Design requirements



Current cake customization process

CASE 3

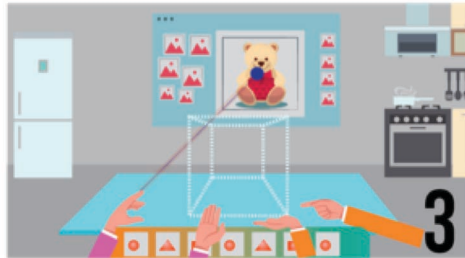
Step 2a Draw a storyboard to illustrate the core functions of the social VR cake co-design tool based on the design requirements.

Preparation



Upload reference pictures to CakeVR

Initial Ideas



Look through the reference pictures

Ideation & Negotiation



Manipulate the virtual cake with gestures



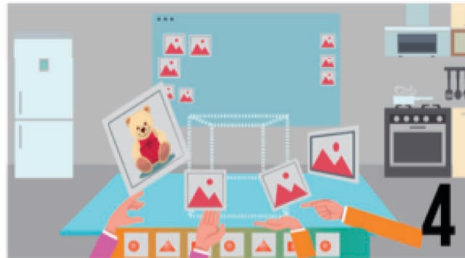
Switch to the virtual celebration location



Reach final design agreement



Enter the virtual co-design space (virtual bakery)



Discuss initial ideas based on the pictures



Sketch in the mid-air based on reference pictures



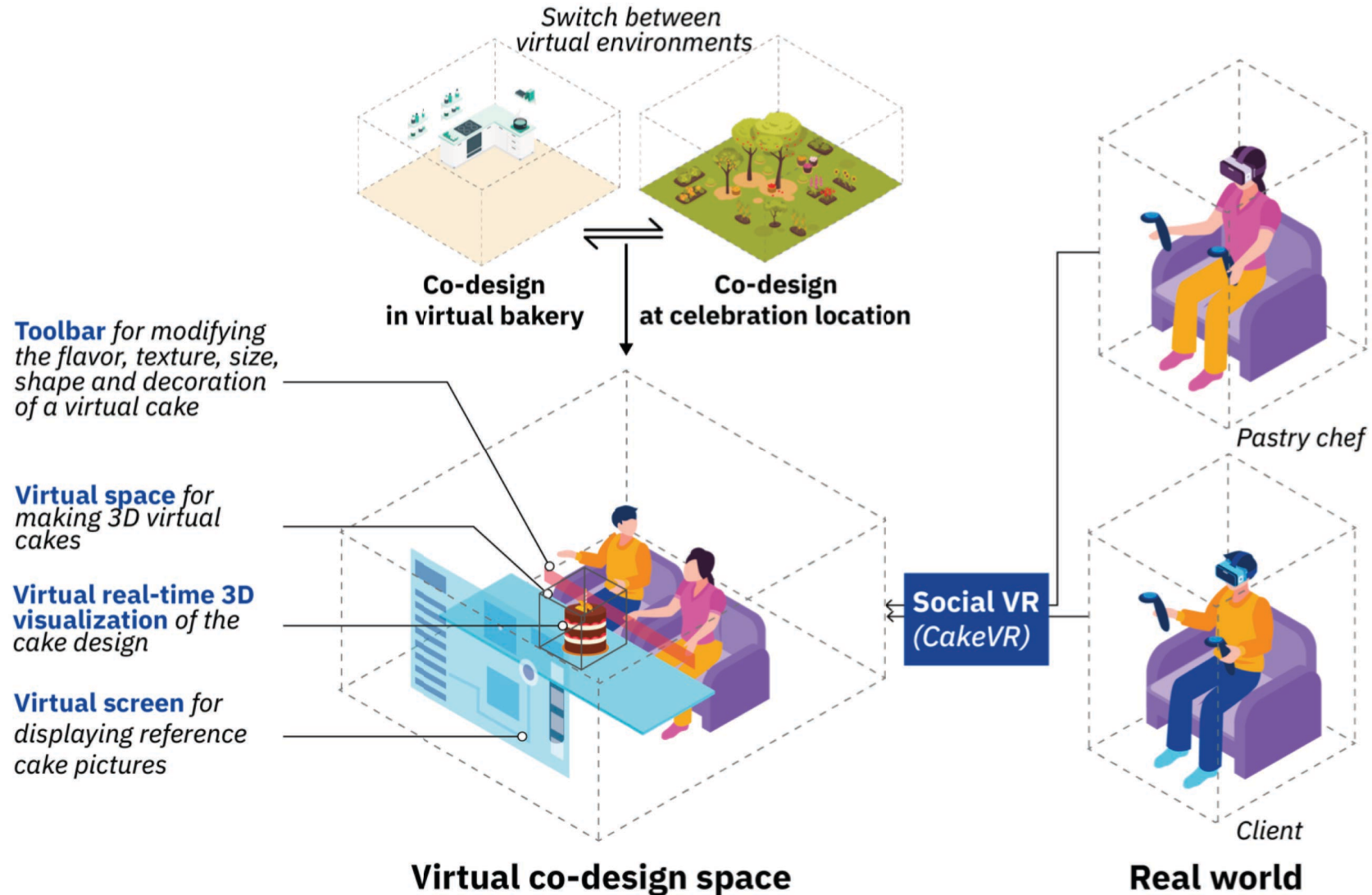
Compare different designs at the virtual celebration location, and take photos for the final contract



Discuss the contract on the virtual screen

CASE 3

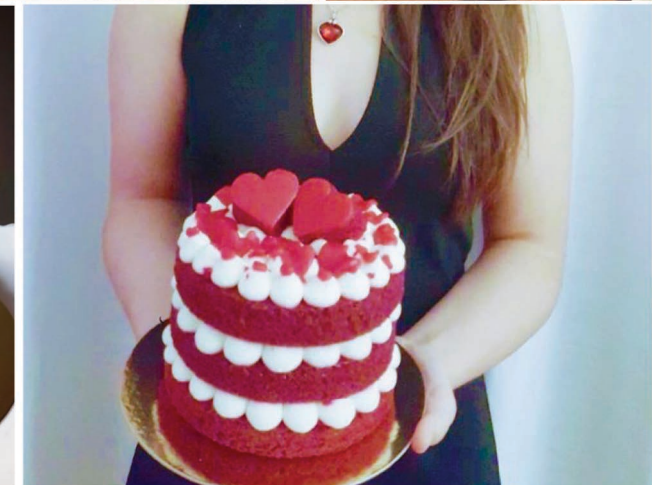
Step 3 Design and Implement the social VR cake co-design tool based on the storyboard.



CASE 3

Step 3 Design and Implement the social VR cake co-design tool based on the storyboard.

Click [HERE](#) to watch the video of the social VR cake co-design tool



CASE 3

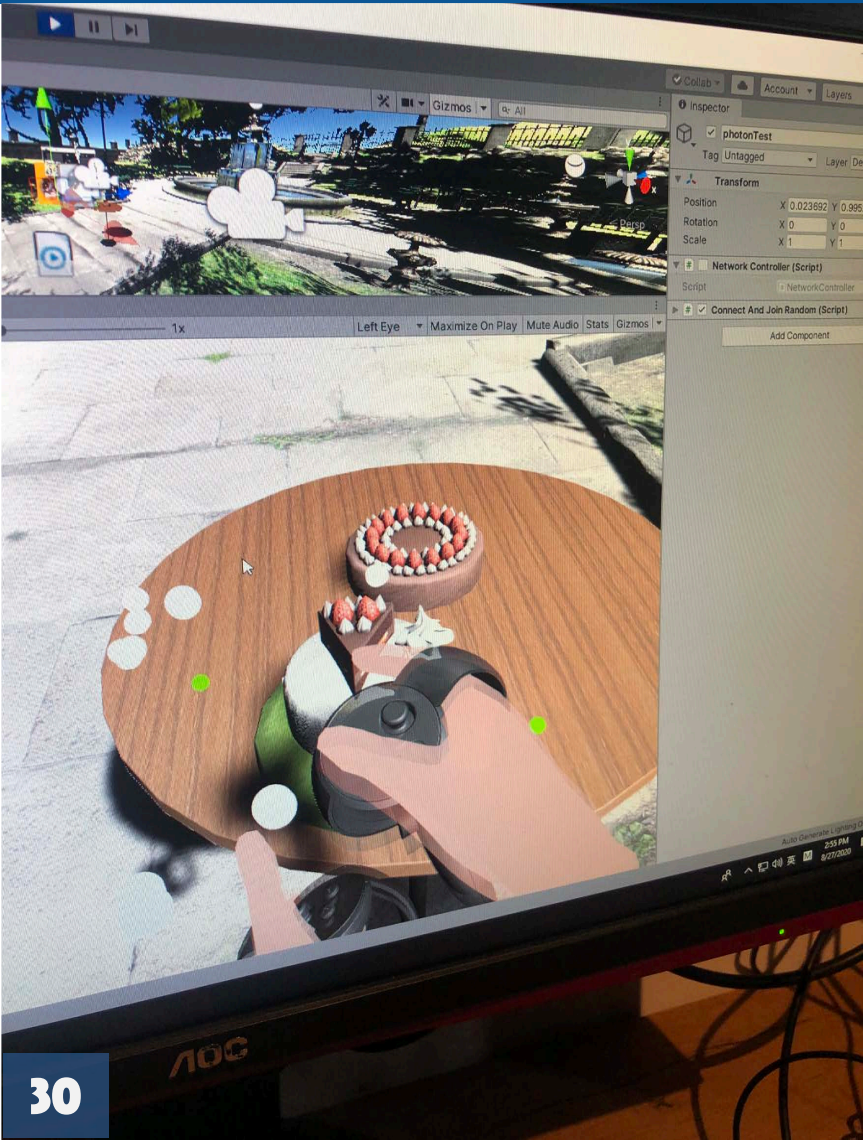
Step 4 Evaluate the social VR cake co-design tool with clients and pastry chefs.

Where: In a lab on the TU Delft Campus

Subjects: 4 pastry chefs and 6 clients

Methods:

- Invite both pastry chefs and clients to use the social VR cake co-design prototype and think aloud
- Semi-structured interviews
- Surveys (i.e., simulator sickness questionnaire, NASA TLX)



THE END
THANK YOU

Jie Li

www.jieli-research.com