EXPLORING INTERACTIVE MEDIA

EXPLORING INTERACTIVE MEDIA FOR INDOOR
LARGE-CAPACITY TOURIST ATTRACTION:
SOUND OF THE NETHERLANDS (SOTN)

DELFT UNIVERSITY OF TECHNOLOGY
INDUSTRIAL DESIGN ENGINEERING
DESIGN FOR INTERACTION
MUSEUM FUTURE LAB

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EXECUTIVE SUMMARY

This graduation project focuses on leveraging interactive media and designs for a future large capacity indoor attraction, namely "sound of the Netherlands". Since the project starts from scratch, project assumption is needed in the beginning to facilitate the follow-on study and design. Desk research was used to define the scope and formulate project assumptions, which are the stepping-stone for the following phases. Moreover, the research about the interactive media and representative sounds of the Netherlands were conducted to spot the relevant media and content that can be used in the design.

In the second step, user research was conducted to define and better understand the target group. The result revealed their primary motivation, expectation, and concerns toward large capacity cultural tourist Attraction. Building upon this, the design goal was formulated:

Design an interactive Creative Cultural Attraction (400-450 p/h) with a novel experience and intuitive interaction around the topic "Sound of the Netherlands, which allows people to feel free to enjoy with others and know about the lifestyle of the Netherlands.

To address the design goal, the designer viewed current large-capacity tourist attraction. Moreover, the literature research on how to adopt intuitive interaction design for a variety of users was conducted to find possible design solutions.

The fourth stage was the design phase. The design started with building a holistic story and context for the Attraction. JORA VISION suggests to kick off the attraction design from developing the storyline. Two brainstorming sessions were conducted to develop the storyline. There is no precise number about the size and scale of the Attraction given in the design brief. So the designer developed a space model based on the design requirements and visitors' needs. After the space model was built, the detailed interaction design is developed along with the design guideline.

Finally, an evaluation test was conducted to validate whether the design concepts fulfill the design goal and reach interaction quality. The designer used the Walkthrough 3D video and VR model in the cardboard for participants to understand the context and experience the space. The interaction storyboard (animation with sound) and interactive prototypes were used to test interaction. The designer combined 7-point Likert Scale and interviews to gain the feedback and insights of participants. The results of the test were used as a foundation for future recommendations for the company.

Overall, it's an explorative project. The designer did extensive explorations in both problem space and solution space. During the process, the problem and solution also co-envolved.

TABLE OF CONTENT

HOW TO READ THIS REPORT?

This report is divided into SIX main chapters, and every chapter has its own colour.

The project layout is shown on page 15.

Every chapter starts with an overview infographic, which to illustrate the process and applied method. Chapter 2-3 end with a concluding page in which the key take-aways are summarized with an annotation number. (e.g. 1A)

The essential aspects in the text are highlighted in colour.

1

PROJECT INTRODUCTION

This chapter describes the project objectives, scope,
research questions and approach.
It provides a structured overview of the project layout and offers
guidelines on how to read this report.

1 INITIAL BRIEF

The graduation assignment offered by Jora Vision Europe B.V. aims to explore the interactive media to enhance indoor large capacity tourist experience.

Jora Vision Europe B.V. is a design and production company with over 25 years of experience in Themed Attraction Design & Build. Attraction and Experience Design & Build is their core competencies. They want to explore more in the design of large-scale attractions and want to get new inspiration in the exploration of interactive experiences. Jora Vision Europe B.V. defines the large capacity as 400-450 people per hour, which is the essential requirement for this project.

In recent years, Interactive media has become the preferred format for the uses of many indoor tourist experiences, including exhibition and museum, and so on. The times when a video wall at the stand was something special are in the past. Today we see virtual reality games, interactive screen, motion sensor lights and other interactive media which bring an immersive and impressive experience to the visitors.

However, many of these tourist experiences with interactive media are of low capacity. For example, the VR game only allows one person per time. Also, the research about those high capacity indoor attraction like the dark ride or flying over theatre shows most of them are an immersive but passive experience. Jora Vision Europe B.V. now wants to explore the application of interactive media and design a large capacity tourist experience around the topic of "Sound of the Netherlands".

PROJECT GOAL

To explore the application of interactive media in large indoor tourist experience a nd design an interactive tourist experience for a large group of international tourist (400-450p/h) around the topic of the sounds of the Netherlands.

In this project, we aim to explore the usage of interactive media for the future large capacity 2 indoor tourist experience. And following research questions are raised:

1. How to Enable Interactivity for A Large Group of Tourist by Using Interactive Media?

2. How to Control the Flow of the Large Group of Tourists while Retaining an Optimal Experience?

2   INITIAL SCOPE

A couple of factors determine the INITIAL SCOPE of this project. See FIGURE 1
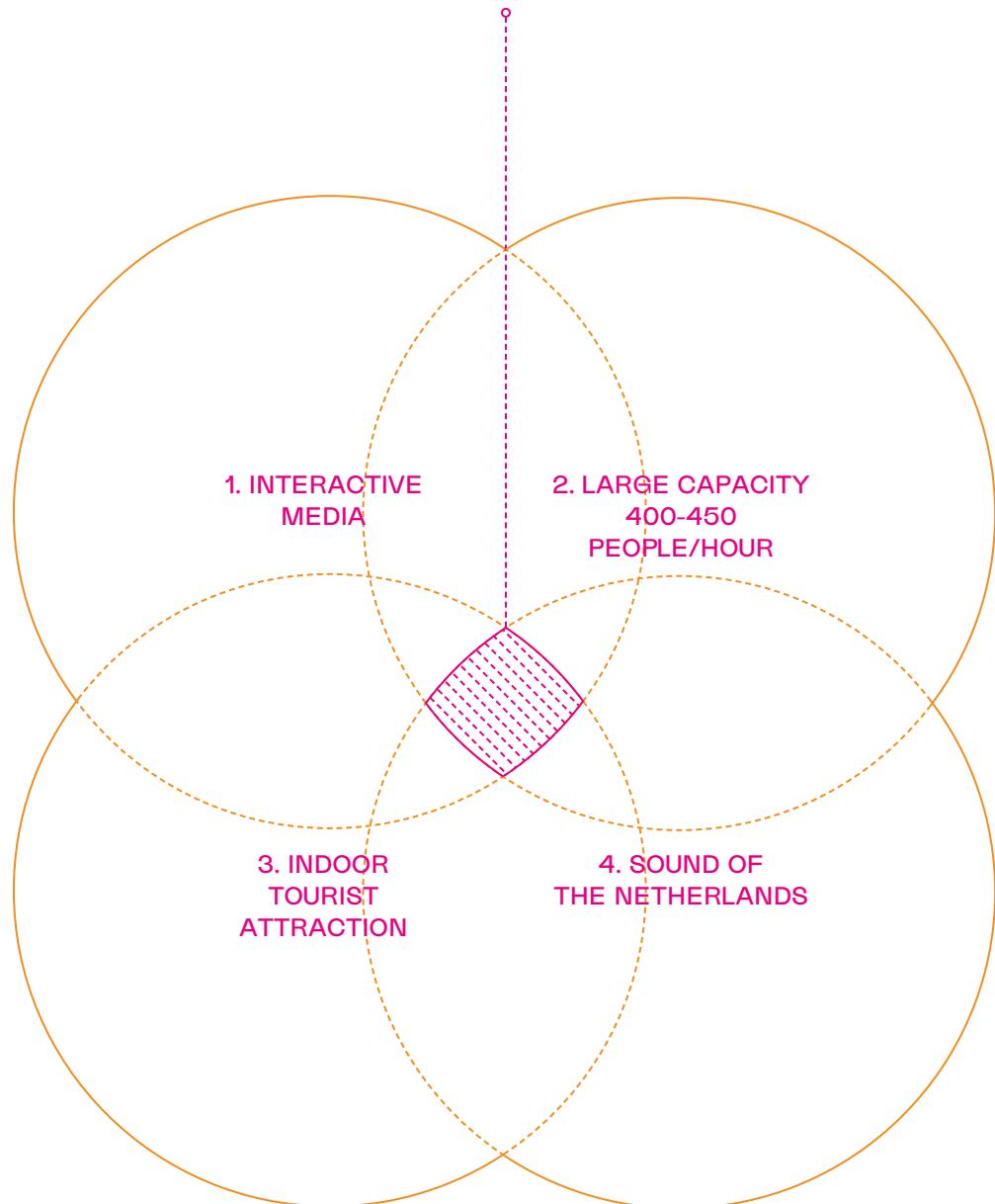
FIGURE 1
Initial Scope
of the project

1. INTERACTIVE MEDIA

One of the objectives of this graduation assignment is to explore the interactive media. Interactive media consists of digital products and services which reacts to the user's actions by showing content in the format of animation, video, audio etc.

2. LARGE CAPACITY

There are many types of indoor tourist attractions in the market and various definition of the "large capacity". However, in this project, the capacity of the attraction is defined by the Jora vision, videlicet 400-450 people per hour.

3. INDOOR TOURIST ATTRACTION

The SOTN is defined as an indoor tourist attraction.

4. SOUND OF THE NETHERLANDS

This project will explore the future application of interactive media through the case of designing a future tourist experience called the sounds of the Netherlands. Therefore, the sound of the Netherlands is the scope of the design content.

1   RESEARCH QUESTIONS

The two majority research questions and the sub-questions in the figure 2 are the basis for the research. The research plan also shows the methods used for finding answers to these questions.

1. How to Enable Interactivity for A Large Group of Tourist by Using Interactive Media?

Who is the target user group?
literature research, interview

What kind of interactive technology can allow multiple users to interact within the same time?
Desk research

What are visitors' concerns and expectation in interacting with many other people in an indoor attraction?
Context Mapping

How to enable intuitive interaction for a large variety of tourist?
literature research

2. How to control the flow of the large group of tourists while retaining an optimal experience?

What kind of the flow in the large capacity tourist attraction do visitors expect?
Context mapping

What is the current design of the visitor flow in large capacity tourist attraction?
Desk research

2   RESEARCH LAYOUT

The project is structured in six subsequent parts, each building on the outcomes of the previous one. Within the phases, it is aimed to explore and combine, both in theory and practice.

CHAPTER 2
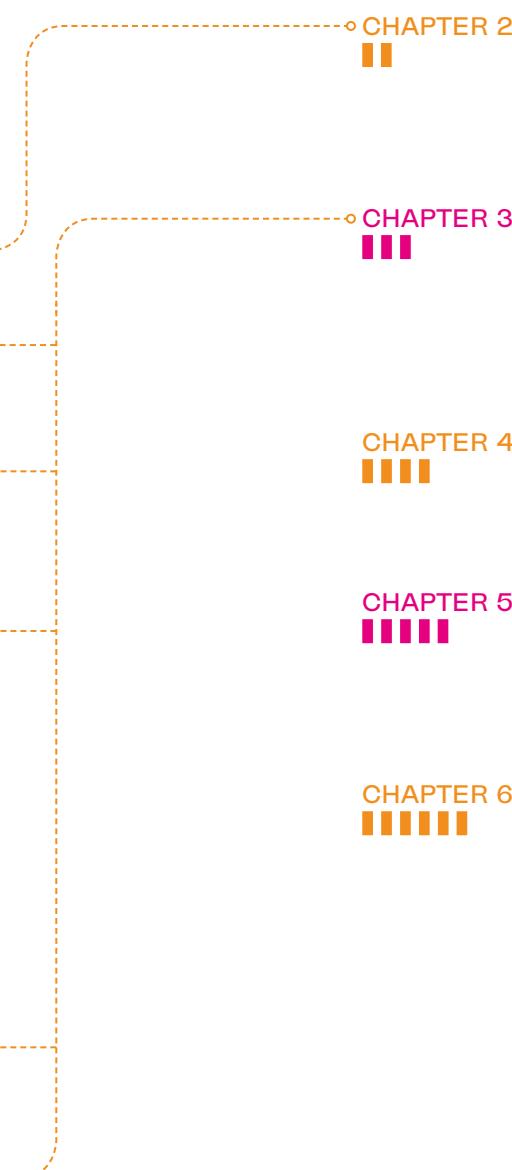
In the initial part, research into the initial scope (see Figure 1) of project is conducted. The academic literature was used to narrow down the scope and define what tourism type of "Sound of the Netherlands" attraction is. This step helped this project to set up the assumption map as a stepping-stone for further research.

CHAPTER 3

Exploratory Research was to answer the research question and gather insight. Literature research and Desk research around the research questions were conducted. The research consisted of three perspectives, namely, user research (context mapping), large capacity indoor tourist attraction study, intuitive interaction design. The insights gathered from these research provide powerful backing for the design.

CHAPTER 4

The next part is the Synthesis. In this part, all the insights from the previous phases were mapping together and resulting in the development of Interaction vision, Design guideline, target groups, Design opportunity. These four outcomes acted as the "Bible" for Design and validation.

CHAPTER 5

Design. There are two main phases of this part. The Design started with building a holistic story and context for the Attraction. The ideation phase was conducted for collecting the story and ideas from the target group. After that, the conceptualization phase, the space model based on the design requirements and visitors' needs were built. Furthermore, iterate the concept by Sketching, Modeling, Rapid prototype in the VR environment, suggestions from JORA VISION.

CHAPTER 6

The last part, Validation. Since the design is too big to be prototyped in the real scale, there are only key interactions are prototyped for the test. The design is tested with the target groups and the company to gather the feedbacks from both sides. The results of the test were used as a foundation for future recommendations for the company.

2 PROJECT ASSUMPTION

Research into the initial scope of the project is conducted to set up the assumption map.

The literature research is used to narrow down the scope and define what is "Sound of the Netherlands" attraction from four perspectives, namely, tourism typology, assumed target group, representative sounds in the Netherlands and interactive media. The assumption map is a stepping-stone for the project and the base of exploratory research.

2.1 OVERVIEW

ASSUMPTION
MAP

P21	1	**TOURISM TYPOLOGY** DESK RESEARCH To Define the tourism type of SOTN
P22	2	**CULTURAL TOURISM TYPOLOGY** CSAPÓ, JÁNOS, 2012 Explore the segment of the cultural tourism and Define the SOTN as a creative cultural tourism
P24	3	**CULTURAL TOURIST TYPOLOGY** MCKERCHER & DU CROS,2002 To assume the target group by it's motivation toward cultural tourism
P25	4	**DEMOGRAPHIC PERSPECTIVE** DESK RESEARCH Discover the relationship between age range and travel habit To assume the target group from demographic perspective
P29	5	**INTERACTIVE MEDIA INVENTORY** DESK RESEARCH Discover the what is interactive media and current technology. What is the possible technology for large-capacity attractions?
P30	6	**REPRESENTATIVE SOUND OF THE NETHERLANDS** INTERVIEWING AND DESK RESEARCH To build up a knowledge base of the sounds to know what content to design.

Definition of tourism
type asCreative cultural tourism

Assumed target group

Knowledge base of
what/how to design

This graduation project is to explore interactive media and design a future indoor attraction called "sound of the Netherlands" which can afford large capacity of tourists. Since the Project starts from scratch, A project assumption is needed to facilitate the following study and design. Even though there are a couple of factors (indoor tourist attraction; interactive media; large-capacity) determine the scope of this project, yet all these factors have a large scope of themselves. Therefore, to build up the project assumption, a clear scope is indispensable.

Desk research was used to define the scope and formulate project assumptions, which is the stepping-stone for the following phases.
First, to define what tourism type the SOTN is ① literature research around tourism typology was conducted. The finding indicated the SOTN was in the scope of cultural tourism ② . Moreover, cultural tourism could be categorized as many subsets. According to the definition of each subset purposed by Csapó, János, 2012, the SOTN could be defined as creative cultural tourism.

Secondly, target group was assumed as a cultural tourist ③ based on the definition of the tourism type of the SOTN. The further Literature research about the cultural tourist typology was conducted to help segment the cultural tourist. Moreover, Desk research about the relationship between age and travel habit ④ helped to formulate the target group from a demographic perspective.

Then, the following two studies were conducted for building the knowledge base of interactive media ⑤ and the representative sound of the Netherlands ⑥ .
By brainstorming with locals and international students to collect the representative sound of the Netherlands. A mind map and infographic were used to conclude the results. Besides, the infographic was used as part of the toolkit in the generative session in the user research phase. The study of interactive media gave an impression of what tools and what form of interactive media can be used.

2.2 CREATIVE CULTURAL TOURISM

1 CULTURAL TOURISM

It's critical first to position the Sound of the Netherlands (SOTN) tourist experience in the tourism market, which requires determining the type of tourism that SOTN belongs.

There are various typologies of tourism, and this study followed a list of adjectival tourism (see Table 1.0) to define the SOTN tourism experience.

Definition of cultural tourism :
Cultural tourism is the subset of tourism concerned with a country or region's culture. Specifically, the lifestyle of the people in those geographical areas, the history of those people, their art, architecture, religion, and other elements that helped shape their way of life.

The design content is related to the sounds of the Netherlands, which can be categorized as an indigenous intangible resource that can present the lifestyle of the Netherlands. Hence, SOTN is in the scope of cultural tourism.

Merely categorizing SOTN as a cultural experience to narrow down the scope is not enough. Therefore, the cultural tourism categories (Csapó, János, 2012) were used to define SOTN further. Please refer to Table 2.0.

As Csapó & János (2012) indicated, there are eight subsets of cultural tourism. Along with the project brief, SOTN can be included in the scope of creative tourism. The next page will explain the reason.

TABLE 1
Adjective tourism typology

Adventure travel
Atomic tourism
Bicycle tours
Cultural tourism
Ecotourism
Geotourism
Industrial tourism
Medical tourism
Railroad attractions
Religious tourism
Rural tourism
sex tourism
Space tourism
Sustainable tourism
Virtual tourism

TABLE 2
cultural tourism categories (Csapó, János, 2012)

Cultural tourism categories (Csapó, János, 2012)

Aa tourism type
Adventure travel
Heritage tourism
Cultural thematic routes
Cultural city tourism, cultural tours
Traditions, ethnic tourism
Event and festival tourism
Religious tourism, pilgrimage routes
Creative culture, creative tourism

2   ABOUT CREATIVE TOURISM

Creative tourism is often seen as a form of or an extension of cultural tourism and the field of creative tourism is continuing to expend. The definition has expanded well beyond the narrow range of "learning" experiences originally envisioned by Richards and Raymond (2000).

Richard and Wilson (2006) state various ways in which the application of creativity can help develop cultural tourism into creative tourism. These are
• Creative spectacles: the production of creative experiences for passive consumption by tourists
• Creative spaces: the development of a spatially demarcated creative 'enclave' populated by creatives to attract visitors
• Creative tourism: a more active involvement of tourists, not just spectating or being there but reflexive interaction

It now includes a wide range of creative experiences, in which the "creative" content can as activity or used as a "creative background" (see Figure 2.0). Moreover, Richards & Marques (2012) affirm creative tourism can be: (see Figure 3.0)

According the the initial brief, The Project aims to explore the interactive media for large-capacity tourist attraction around the topic of the sound of the Netherlands. That is, the designer designs a space related to the sound of the Netherlands by using interactive media. It can also be considered as the designer is using a creative means of using existing resources to attract the tourist.

Consequently, SOTN can be described as a creative cultural tourist experience around the topic of sound of the Netherlands that allows tourists have senses of creativity and interactivity. Tourists can learn about the lifestyle of Netherlands by interacting with creative space.

The definition of the SOTN's tourism type lay the foundation for the Project and helps to formulate the target groups.

FIGURE 2
Forms of creative tourism (Richards, 2011)
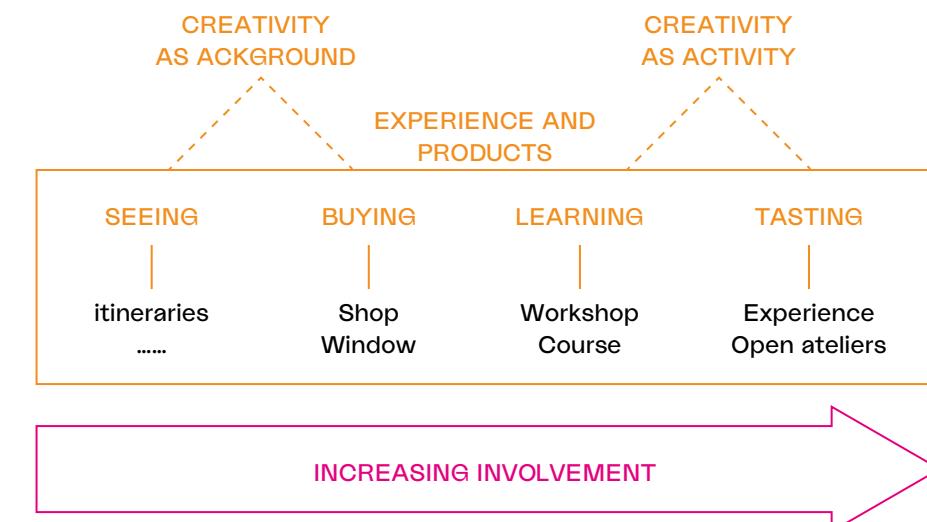
FIGURE 3
Definition of creative tourism (Richard & Marques, 2012)

A means of involving tourists in the creative life of the destination

A creative means of using existing resources

A means of strengthening identity and distinctiveness

A form of self-expression/discovery

A form of edutainment–education a self-realization and education

A source of "atmosphere" for places

A source for recreating and reviving places

2.3   ASSUMED TARGET GROUP

1   CULTURAL TOURIST TYPOLOGY

After determining the tourism type, it is imperative to assume the target group. The target group was first identified as international tourists in the initial brief, while It's not enough to develop the project assumption. Since each destination attracts certain types of tourists(Buhalis, 2000) and the SOTN in the scope of cultural tourism, the target group can first narrow down to the international cultural tourist.

McKercher and Du Gros's typology for cultural tourist defines cultural tourists based on the depth of their experiences and the role of culture as a motivational factor for their travel. Cultural tourists are of five types: purposeful, serendipitous, sightseeing, causal and incidental cultural tourists.

PURPOSEFUL CULTURAL TOURIST
Cultural tourism is the primary motivation for visiting a destination and the tourist has a very deep and elaborate cultural experience.

THE SERENDIPITOUS CULTURAL TOURIST
A tourist who does not travel for cultural reasons, but who, after participating, ends up having a deep cultural tourism experience.

THE SIGHTSEEING CULTURAL TOURIST
Cultural tourism is a primary reason for visiting a destination, but the experience is less deep and elaborated

THE CASUAL CULTURAL TOURIST
Cultural tourism is a weak motive for travel and the resulting experience is shallow.

THE INCIDENTAL CULTURAL TOURIST
This tourist does not travel for cultural reasons, but nonetheless participates in some activities and has shallow experiences.

From the above, the first two types of cultural tourists were considered as the target group based on their primary motivation and experience for selecting a destination.
The purposeful tourists have strong motivation toward travel and achieves intense and elaborate cultural experience, which are easy to be attracted by cultural tourism. Moreover, the serendipitous tourists, who are not traveling for cultural reason, but they are also attracted by cultural tourism and ends up with deep cultural experience as well. The sightseeing cultural tourists are not be considered because they prefer visiting the natural landscape while the SOTN is an indoor attraction.
Therefore, the purposeful and serendipitous tourist are considered as the assumed target groups.

2   RELATIONSHIP BETWEEN AGE AND TRAVEL HABITS

Next, to better assume the target group, desk research on relationship between age and travel habits was conducted. Analysis showed the characteristics of each age range (see TABLE 3), thereby helping in formulation of precise definition of the target audience from demographic perspective.

TABLE 3
characteristics of each age range

Aa AGE RANGE	☰ Column 1
👀 Gen Z (18-23-year-olds)	try something new / travel internationally / travel to explore / budget restricitions / social media users / fun-seeking cultural center / adopt new tech quickly / grow personally
👀 Millennials (24-35-year-olds)	travel to explore / social media users / travel to see the sites / travel internationally / fun-seeking grow personally
Gen X (36-55-year-olds)	relaxing travel less / hotels and accomandation / rely on revies and brand
Boomers (55+)	prefer nature environment / less budget constraints

Gen Z (18-23) has grown up in the digital age and adopt new technologies quickly. They are the generation most likely to try something new when traveling .
The 18-23-year-olds want tips from locals and have budget limitation. This age group tends to travel for a combined total of one month per year, though budget restrictions control a lot of trip planning. They are also the generation most likely to travel internationally. This generation wants experiences, exploring the road less travelled and they are familiar with smart device.

2.3   ASSUMED TARGET GROUP

MILLENNIALS they were most likely to report their travel habits. Their decision influenced by advertising, the smarter and more visually appealing, the better. Millennials are out there traveling to explore and see the sites and relax, rather than visit family or friends. They want, more than ever, to enrich themselves with cultural experiences, to meet local people and to improve their employability when they return home.

GEN XERS are a particular group, who though travel less are also most likely to spend more on hotels and accommodation. Their number one priority is to unwind or go on relaxing sight-seeing vacations. This age range relies on traveller reviews and deals searching to decide on where to go. When booking a trip, they tend to go with a brand who provide the most information on a potential location. They are also a huge fan of the classic road trip.

AARP reports that BOOMERS (aged 50+) are active travelers, Boomers are the least likely generation to be bound by budget constraints and yet are most motivated to travel to a destination through a good deal or value for money.They are the most likely to spend their holidays visiting family and love to explore the nature of a destination.

This step helped to take into account the demographic aspects of the assumed target group. And generate the profile. Combining the results from 2.3.1 and 2.3.2, two assumed large group were generated.

3   TWO ASSUMED TARGET GROUPS

According to the characteristics of different age range describe in the table, GEN Z and millennials possess stronger motivation for international travel and new experiences like creative cultural tourism. Moreover, people in this age range are familiar with smart device and have basic knowledge of interactive technology like touching the screen. Another assumed age range are children aged 10-18years, travel for education purpose under the supervision of their parents or teachers. Therefore, tourists age from 10 to 35 years old, who interested in creative cultural tourism are considered as target group of this project.

Consequently, the target group assumed as:

Purposeful cultural tourist (10-35yrs) , who has the primary motivation for visiting a cultural destination, and they have a profound and elaborate cultural experience. They aim to grow personally and sake of the cultural value.

Serendipitous cultural tourist (10-35yrs) , who like to travel to explore and experience different cultures. They do not travel for cultural reasons, but who, after participating, ends up having a deep cultural tourism experience.

The assumed target group is one of the essential part of the assumption map and also are used as a guideline in the selection of the participants for the user research (context mapping).

2.4 INTERACTIVE MEDIA

Interactive media consists of digital products and services which reacts to the user's actions by showing content in the format of animation, video, audio etc. One of the objectives of this graduation assignment is to explore the interactive media which can be used for large capacity tourist attraction. Hence, acquiring more knowledge of the interactive media is necessary.

It gives an impression of what tools and what form of interactive media can be used. Desk research is conducted for studying the interaction media. And the result presented in two parts: interactive media, interactive technology.

1 INTERACTIVE MEDIA

Definition:

Interactive media presents a technique of communication wherein the output of the media is based on the user's input. Interactive media functions as per the user's involvement. While the media serves the same purpose, the user's inputs facilitates interaction and introduces fascinating features to the system for superior entertainment. Unlike traditional media, interactive media is meant to enhance a user's experience. To achieve this, an interactive medium will require the following elements:

Moving images and graphics
Animation
Digital Text
Video
Audio

**Current Interface of interactive space**

Interface, also sometimes called a human-computer interface, contains both hardware and software components. It manages the interaction between the user and the system. The following are three currently being used.

GUI : Graphical User Interface (Microsoft Windows, macOS)
NUI : Natural user interface (eg: Microsoft Kinect, leap motion)
VUI : Voice user interface (Apple Siri)

2 INTERACTIVE TECHNOLOGY

Interactive technology allows for a two-way flow of information through an interface between the user and the technology; the user usually communicates a request for data or action to the technology with the technology returning the requested data or result of the action back to the user. According to the desk research of current interactive technology, Technology for detecting user input and the technology for displaying user input are listed separately in the figure below, and the technologies allows multi-users are marked with a

FIGURE 4
interactive
technology

ALLOW
MULTIPLE
USERS

Technology
to detect input

Smart device   Pressure Detection   Gesture Recognition Leap Motion   Gesture Recognition Kinect1.0/2.0

Laser Rifle   Chatbot   Pattern Recognition Face detection   Infrared Sensor

Smart glasses   VR Glasses   Hologram   Augmented Reality

Technology for
Displaying
output

Projection   Screen

2.5 NETHERLAND'S
REPRESENTATIVE SOUNDS

This step is to build a knowledge base of "sounds" which can represent life in the Netherlands. It can provide the assumption of what content to design and can be a stepping-stone for the ideation phase. And the infographic (see Figure 8) of representative sounds was drawn and used for the generative session (see page 45)

A brainstorming session was conducted to gathering information about the representative sounds in the Netherlands. By asking both Dutch people and international students to say out loud and draw what is the representative sounds of the Netherlands in their mind to collect the data (Raw materials see Figure 5). Figure 6 and 7 show the result of the analysis. The result of this study shows a scope of what content can be designed, and it facilitates the ideation stage.

FIGURE 5
One of the results
from the session
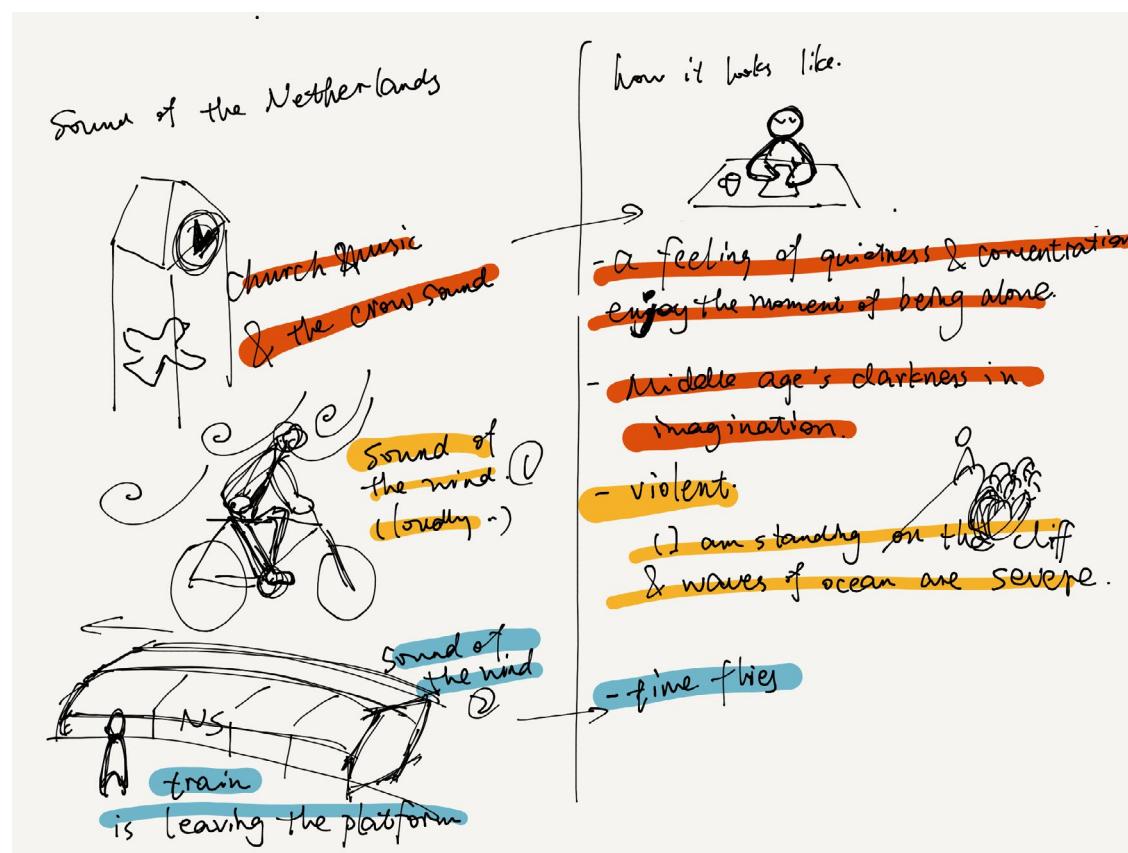
FIGURE 6
Analysis

● = FREQUENCY

Bike ● ● ● ●
Rain on the window ●
Sea ● ●
Boats in old city center ●
Market square hollering selling sounds ● ● ●
Bike bells ●
Kings day noise ●
Sound of the wind and the rain. ●
Sound of the ducks swimming in the river. ● ●
'Dank je wel!' 'Alsjeblieft!' ●
The sound of 'G' in Dutch ●
Sound of the ship on the river ●
Wind ● ● ● ●
Bicycle (lock, din lin lin) ● ●
Sounds of the sea ● ● ●

Boat (engine) ●
Market shouting (selling) ●
Rain ● ● ● ●
water/river/beach ● ●
animals   ducks ● seagull ● cows ● ● ● ●
Leaf ●
church bells ● ●
tram ● ●
train notification ●
Windmill turning ●
NS sounds ● ●
Whistle before closing the train doors ●
Street organ ●
Sounds of the football ●
Sound of the horses ●

FIGURE 7
Representative
sounds of
the Netherlands
inventory
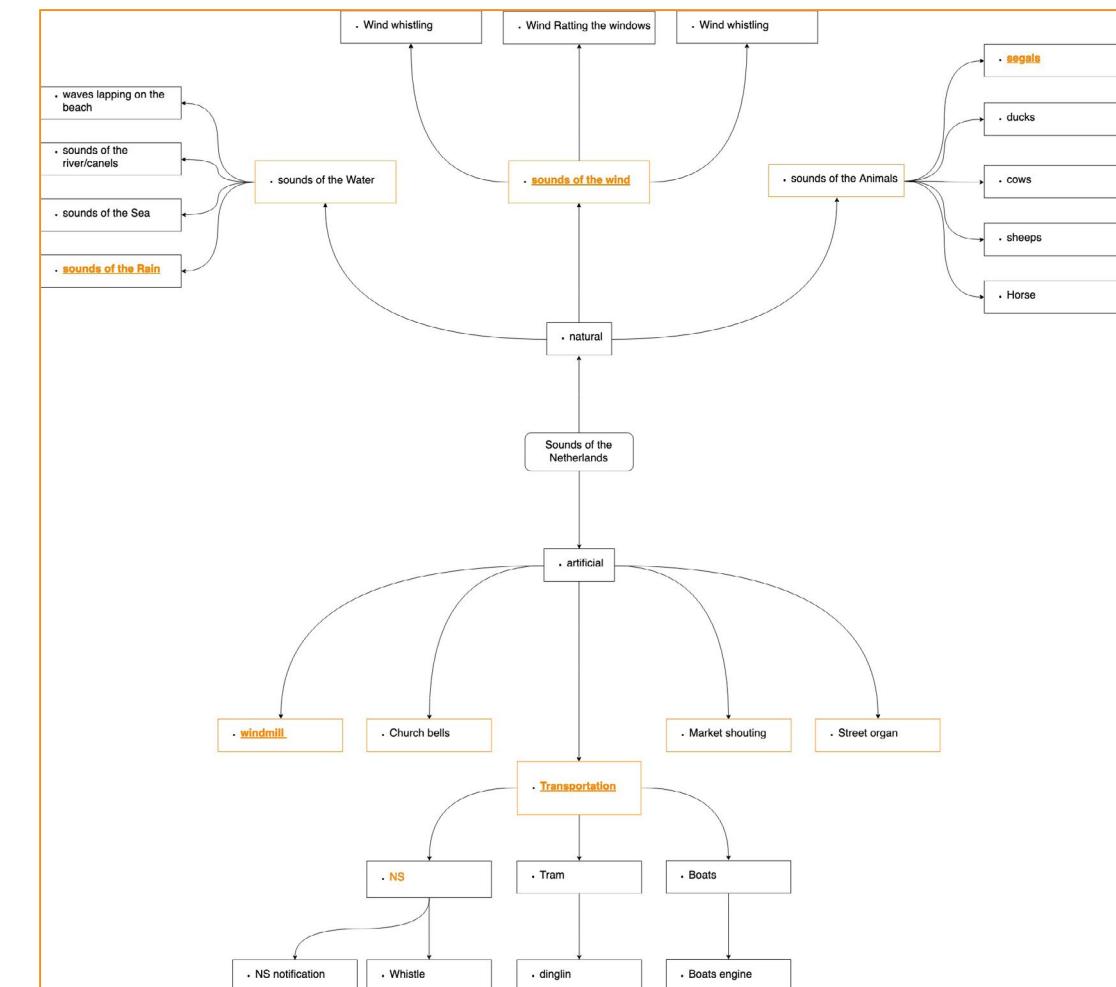
FIGURE 8
Infographic of the
representative
sounds of the
Netherlands

SOUNDS OF THE NETHERLANDS

NATURE SOUND

Sound of the Wind:
Wind whistling
Wind ratting the windows
Strong wind
Windmill

Sound of the rain
Sound of the sea wave
Sound of the river/canal

Animals:
Sea gulls
Ducks
Cows

ARTIFICIAL SOUND

Windmill
Market shouting
Street organ
Church bells
Tram bell
Boats engine
NS whistle
Dutch techno
Dutch people talking

2.6   ASSUMPTION MAP

SOUND OF
THE NETHERLANDS
ATTRACTION DESIGN

CAPACITY
400-450 people/hour

TOURISM TYPE
Cultural creative tourism

ASSUMED TARGET GROUP
Cultural tourist(purposeful/serendipitous cultural tourist)

INTERACTIVE MEDIA
Allow multiplayers, involving tourists, interaction

DESIGN CONTENT
Representative sound of the Netherlands (sound as a means of interaction or as a content)

DEFINITION
SOTN can be defined as a creative cultural tourist experience around the topic of sound of the Netherlands that allows tourists have senses of creativity and interactivity. Tourists can learn about the lifestyle of Netherlands by interacting with creative space.

FIGURE 9
ASSUMPTION MAP

INDOOR TOURIST ATTRACTION

Capacity :
400-450 people/hour

Multiplayer

Moving images and graphics

Sound relevant

Animation

Audio visual

Cultural tourist

Cultural Industry

Recreating and Reviving places

Edutainment

INTERACTIVE MEDIA

Audio

Novelty

Future attraction design

CREATIVE TOURISM

involving tourists

Sound experience

Discovery & exploration

Video

Interaction

A creative means of using existing resources

Life style

DESIGN CONTENT: SOUND OF THE NETHERLANDS

Representative sound of the Netherlands

Sound as design content

Sound as a mean of interaction

2.7   KEY TAKE AWAY

2A   CREATIVE CULTURAL TOURISM

Creative tourism is often seen as a form of or an extension of cultural tourism, and the field of creative tourism is continuing to grow. From the definition of the narrow range of "learning" experience to "Creativity as actively or used as "Creative background"

2B   CULTURAL TOURIST

From tourism type to target tourist
The definition of the tourism type helps to find the target tourist group since each destination attracts certain types of tourists

Cultural tourist segment
Cultural visitors can be classified into the following categories based on the depth of their experiences and the role of culture as a motivational factor for their travel.
(Mckercher, 2002),

The purposeful cultural tourist /culture vulture - cultural tourism is the primary motive for visiting a destination and the tourist has a deep cultural experience

The sightseeing cultural tourist - cultural tourism is a primary reason for experiencing a destination, but the experience is less deep

The serendipitous cultural tourist - a tourist, who does not travel for cultural reasons but who, after participating, ends up having a deep cultural experience

The casual cultural tourist - cultural tourism is a weak motive for travel and the resulting experience is shallow

The incidental cultural tourist - the tourist does not travel for cultural reasons, but nonetheless participates in some activities and has shallow experiences

2C   NETHERLAND'S REPRESENTATIVE SOUNDS

In order to better prepare for the next stage, it is important to establish a knowledge base about the representative sound of the Netherlands. The data collected in the interviews were mainly divided into two categories, natural sounds and artificially generated sounds. The most representative Dutch sounds collected from participants were:

Natural sound: Sound of Wind / Rain / Ducks (animals)

Artificially generated sound: Sound of Dutch techno / Train(Tram) / Market

Moreover, these data were translated into mind maps and poster, which as part of the toolkit for the generative session in user research.

2D   INTERACTIVE MEDIA

Interaction media definition
Interactive media generally refers to products and services on digital computer-based systems that respond to user actions by presenting content such as text, moving images, animation, video, audio, and video games.
Below are three main interface connect the user and the system:

GUI: Graphical User Interface (e.g. Microsoft Windows, macOS)

NUI: Natural user interface (e.g. Microsoft Kinect, leap motion)

VUI: Voice user interface (e.g. Apple Siri)

Interactive technology definition

Interactive technology allows for a two-way flow of information through an interface between the user and the technology; the user usually communicates a request for data or action to the technology with the technology returning the requested data or result of the action back to the user.

2E   PROJECT ASSUMPTION

Project assumption plays a vital role in this project since the project starts from scratch. It helps to shape the scope of the project and as a stepping-stone for the following research and design.
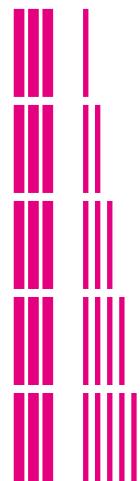
3 EXPLORATORY RESEARCH AND ANALYSIS

Exploratory Research was to answer the research question and gather insight. Literature research and Desk research around the research questions were conducted. The research consisted of three perspectives, namely, user research (context mapping), large capacity indoor tourist attraction study, intuitive interaction design. The insights gathered from these research provide powerful backing for the design.

EXPLORATORY
RESEARCH
AND ANALYSIS

① USER RESEARCH
CONTEXT MAPPING
To further define the target groups
To explore the expectation,
concerns from user perspective

Motivation   P46

Expectation   P47

Concerns   P48

② LARGE CAPACITY TOURIST
ATTRACTION ANALYSIS
To know how the current large-capacity
manage to control the visitor flow and
achieve the large-capacity.

Management of   P50
Visitor flow
Capacity   ↓
Interactive media   P53

Insights
overview

③ INTUITIVE INTERACTION
FOR LARGE VARIETY OF TOURISTS
LITERATURE RESEARCH
To know what is intuitive interaction
To explore how to enable intuitiveness
for large variety tourist with various background

Intuitive interaction   P54
Principle   ↓
Feedbacks for
intuitive interaction   P57
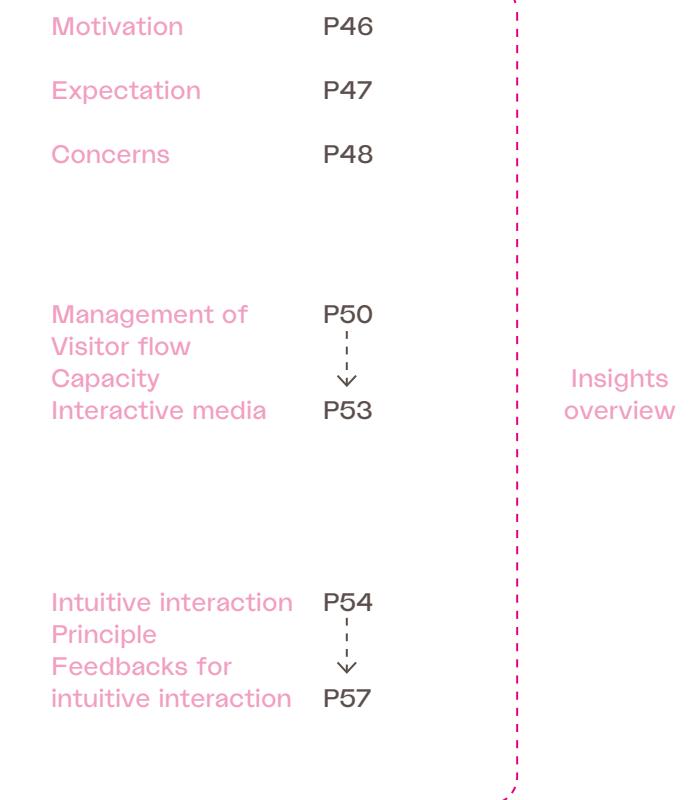
The research consists of three perspectives:
User research (context mapping)
Large capacity indoor tourist attraction study
Intuitive interaction design.

The approach context mapping ① was used for seeking target groups' motivation,
expectations, concerns. Correspondingly, The insights were also clustered into three parts.

The literature research ② around the topic of enabling intuitive interaction for crowds to
answer the question of :
"How to enable a large variety of tourists to understand how to interact with the tourist
experience intuitively?"
The strategy of designing intuitive interaction for crowds was found and developed as a
design guideline.

Another research conducted in parallel, the large capacity tourist attraction study ③ ,
which helps to answer the research question of:
"What is the current design of the visitor flow in large capacity tourist attraction?"

The analysis of four existing large-capacity tourist attractions and Information provided
by specialists in JORA VISION. The four cases were:
Flying over the Netherlands
The universe of Water Particles in the Tank
The Amazing Adventures of Spider-Man
Mystic Manor .
The results indicate how current large capacity tourist attraction to manage the visitor
flow and capacity.

3.2 USER RESEARCH: CONTEXT MAPPING

The project assumption provides the assumed target group, but the target group needs to be further studied. The method of" context mapping" was used to explore their motivation, expectation and concerns.

1 METHOD

Context mapping is a qualitative research method, which used to learn about the needs, wishes, motivations and experiences of users and the result used to gain insight for better solutions.The process see FIGURE 10
1.Preparation 2. Sensitizing 3. Session 4.Analysis

FIGURE 10
Overview of the Context-mapping Process (Sleeswijk Visser & Stappers,2015)
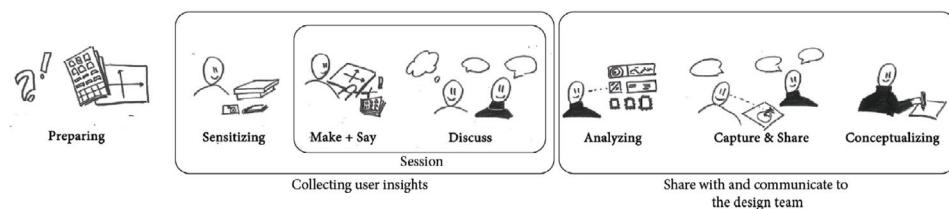
2 GOAL

To explore expectation, concerns from target group and understand their motivation to further segment the target group.

To learn
What motivates the cultural tourist to visit a tourist attraction?
What do they expect if there is a creative cultural attraction about the sound of the Netherlands?
What do the tourists value/care more about while visiting creative tourism?
Which factors influence their experience in large capacity tourist experience?
What concerns do the tourists have before/during/after visiting the attraction?
What sounds do the tourists associate Netherlands with, in their minds?

3 PARTICIPANTS

After setting the goals, A questionnaire (refer to Appendix 1.0) was designed to select the participant. The assumed target group is acted as the base of the questionnaire. The questionnaire consist of following parts:
Basic information
Travel motivation (Pearce & Lee,2005)
Mention your favorite destination.
Based on the result of the questionnaire, 15 participants were selected.

4 SENSITIZING AND INDIVIDUAL INTERVIEW

Firstly the session schedule and an invitation letter were developed for the 15 participants who agreed to participate in the research. They all were given a sensitizing package (see Appendix 2.0). This package included three exercises which had to be completed before the start of the creative session.

Exercise 1. The participants were asked to describe one of their favorite tourist experience. (Before/During/After)

Exercise 2. The participants were asked to draw/write down the sounds they associated with the Netherlands.

Exercise 3. The participants were asked to select the creative factors (maximum three) that motivate them the most when traveling for a creative cultural attraction, and what they expected from a visit to a creative sound experience?

After having collected the booklet, information obtained from participant response was digitally transcribed, and then they would be invited to have an individual interview. The interview is to make sure every participant have a clear idea of the context and ask them if they have any confusion of the sensitizing package.

FIGURE 11
One of the booklets from particip
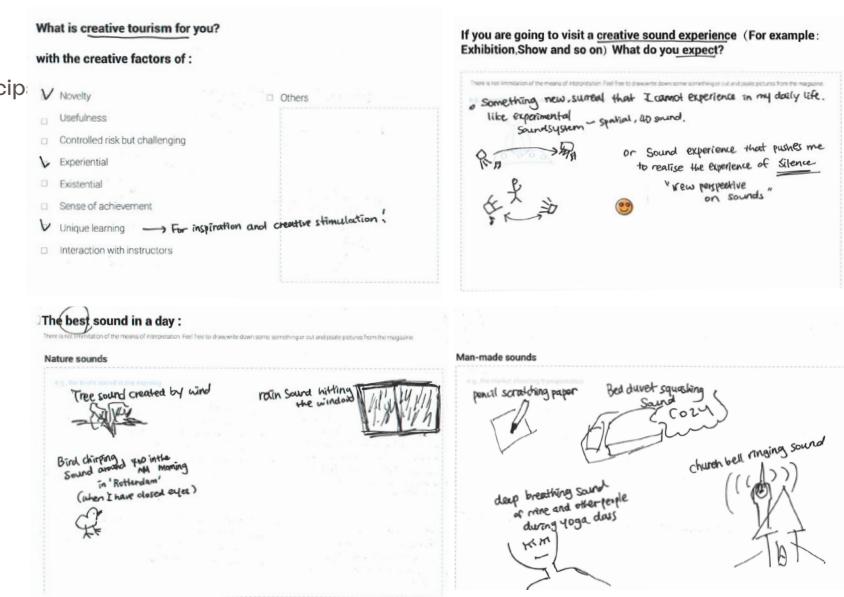
5 GENERATIVE SESSION

Three discussion sessions were conducted in the IO faculty. These sessions had 16 participants and facilitator per session. The participants were encouraged to design artifacts by using the tools provided to them around the topic of designing an interactive sound experience for a large-capacity indoor attraction. They were also encouraged to convey their opinions, perspectives and emotions during the session. This session had 6 phases, which consisted of instructions for the participants.
The 6 phases were as follows:

Introduction **5 mins**	The participants are informed of what will be done during this session and its time duration of the activity.
Post-it on an **A2 sheet** **10 mins**	The participants are asked to write down the sound that associated with Netherlands to share with everyone.
Say it out loud **10-15 mins**	The participants are then allowed to select their favorite sounds (maximum three) and describe the sound, the environment and the emotion.
Draw your ideas **10 mins**	The participants were asked what they would do if they were asked to design an interactive sound experience for a large-capacity indoor attraction by utilizing the sounds selected by them.
Let's build it **15 mins**	After allowing the participants to form teams of two, they were allowed to select one of the ideas to build their own interactive sound experience by using the provided material box(see Appendix 3.0/ Figure 12)
Discussion **10mins**	The participants share their ideas with each other and explain the reasons behind their ideas (question will be asked to the participants based on what they build)
Wrap up	Feedback about this session

FIGURE 12
Material box
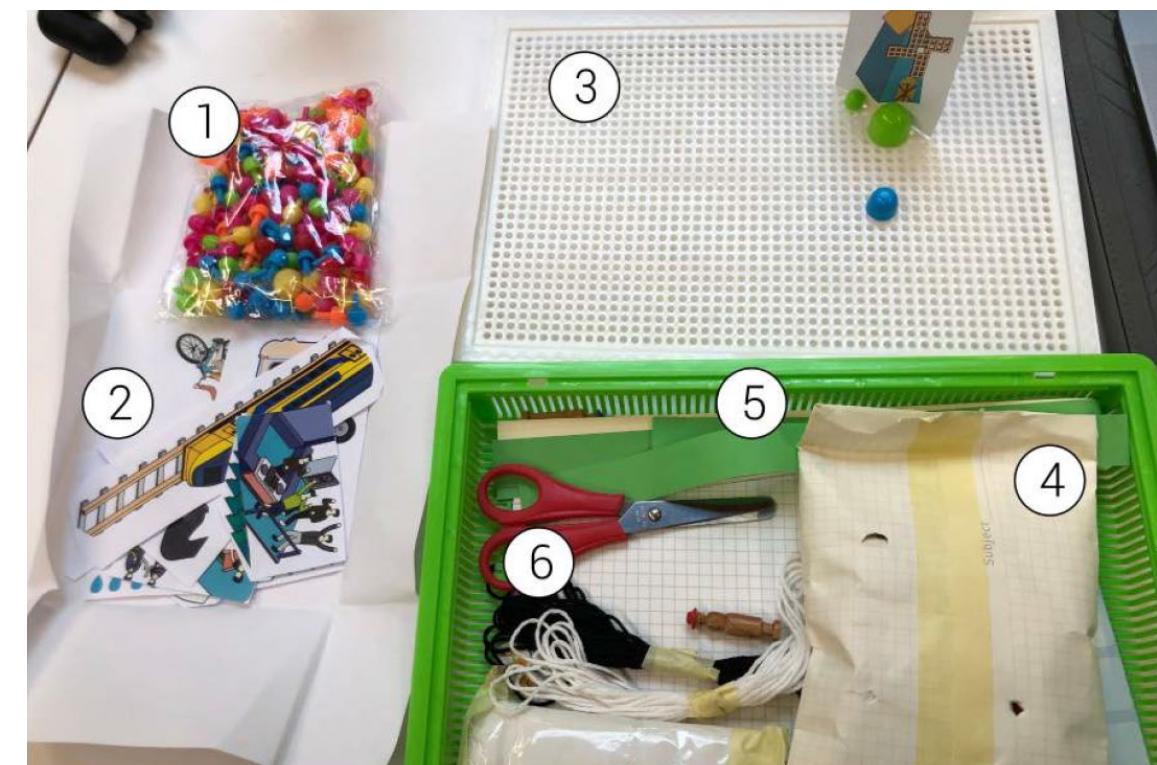
FIGURE 13
Participants built
up the ideas

3.2   USER RESEARCH:
CONTEXT MAPPING

6   ANALYSIS

The session presents rich insights. The quotes from the participants were digitally transcribed, along with the sensitizing booklet. All the raw data were clustered into several categories by statement card (FIGURE 15) under the relevant research questions; The data was divided into four parts as per the subject.

Part 1: What motivates the cultural tourist to visit a creative tourism? What are their expectations from creative tourism?
Part 2: What are the expectations while visiting an interactive sound experience in a large capacity tourist indoor attraction?
Part 3: What are the concerns while visiting an interactive sound experience in a large capacity indoor attraction?

7   RESULTS

FIGURE 14
Result of Part 1

MOTIVATION: CREATIVE FACTORS

Novelty	75 %
Relax	8.3 %
Usefulness	8.3 %
Experiential	67.7 %
Autonomy	33.3 %
Sense of achievement	8.3 %
Self-development	8.3 %
Culture-related	75 %
Having fun	8.3 %
Interaction with constructor	8.3 %
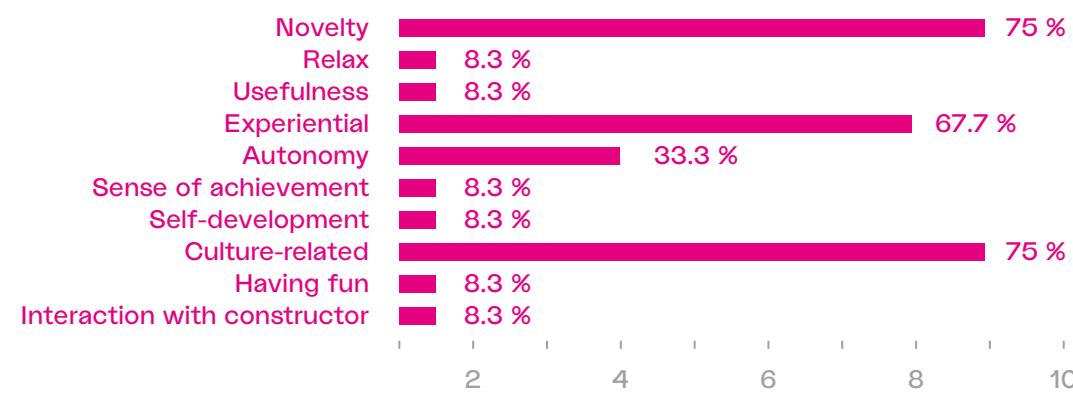
According to the data from the exercise 3, the result of what creative factor influence the target group the most are analyzed. The results helped in answering the following questions:
What motivates the cultural tourist to visit a tourist attraction?
What do the tourists value/care more about while visiting creative tourism?

The figure 14 indicates **Novelty, Culture-related** experience and **Experiential** are the main factors to attract creative tourist to visit such an attraction. And this result helps to further segment the target group and build up personas.

Expectation
Part 2 offered the most inspiration and design opportunities by clustering the expectations and inspiring quotes from exercise 1 and 3. And these insights help to develop as a design guideline.

Multi-sensory
"I would dream something in combination with other senses."
"I wish it can be a Multi-sensory exhibition: learning and touching."
"I prefer an audiovisual show."
"I want to touch the sound."
"I want not just to hear but can touch or see "sound"."

Exploring&Learning
"I want to experience something Unknown."
"Avant-grade sound experience."
"A systematic introduction to the sound cognitive knowledge."
"Some sounds from the universe responses."
"Sound from everything to be unexpected."
"I wish there is something I can not experience in my daily life like."

Fun&interesting
"I like to visit if the experience is fun&interesting."
"Get to know more the detail or fun fact(anecdote)."
"Experimental sound system."
"Gamificate the experience."
"Sometimes, the "creative" brings me the stress, i prefer to do something fun without thinking."

Easy/Intuitive
"I want the interaction can Easy to be used, cause there are many 'high-tech' thing which are really hard to use."
"The creative should not create stress. Sometimes 'creative' things make me feel stress
"Don't like the feeling that i have to be creative and create something 'creative'."

A feeling of guidance
"A systematic introduction to sound cognitive knowledge. And i can control my pace."
"A feeling of guidance(Dutch design week) have an awful experience on this part)."
"Indicating the next part of The exhibition(by the tram sound, as a notification)."
"A pre-show (introduction) it would be good to implement the storyline."

Sharing
"The experience can be able to save it as video, and I can post to my social account."
"I want to collaborate with people, so the experience is shared."
"Do something with others."

3.2 USER RESEARCH:
     CONTEXT MAPPING

Concerns

Part 3 shows what the concerns are if target group visits an interactive sound experience in a large capacity indoor attraction. The result comes from clustering the quotes from the exercise one and three.

Part 1: What motivates the cultural tourist to visit a creative tourism? What are their expectations from creative tourism?
Part 2: What are the expectations while visiting an interactive sound experience in a large capacity tourist indoor attraction?
Part 3: What are the concerns while visiting an interactive sound experience in a large capacity indoor attraction?

The experience is influenced by others

"Behaviors of other visitors and necessary facilities offered may concern me the most."
"Do not like the feeling of jostling with each other in a crowd."
"Watching things will be blocked by other tourists."
"People's activity, for example, if someone was taking the photo and occupied the space, the quality of the experience is not that good."
"I am not a big fan of the crowd, cause if there are too many visitors, it quite hard for me to take a good picture."
"When I was taking pictures, other people were waiting for me, which also bring me an uncomfortable feeling."
"If I take a picture, many people are included."

The order the visiting flow/pace controlling

"An unclear flow will bring a bad visiting experience."
"Order of the flow and the clear guidance for an attraction is really important for me."
"I'd visited Teamlab exhibition before, the experience is impressive, but it made me a bit lost because there is no clear guidance of the experience."

Waiting

"Waiting in the queue annoyed me."
"The time of waiting is boring."
"I am not that care if there are many people, the only thing I care about is the waiting time."
"I do not like the feeling of queuing"
"Have to wait for a long time in the queue for the exhibit."
*"A long line in front of the toilet."*

Sounds

"The sound might not clear."
"The sound probably will become a noise and mess."
"The experienced sound maybe covered by others."
"Have no idea how to interact with the sound/exhibit."

Interesting quotes

"I want to collaborate with people, so that the experience is shared"
" I also wish to be able to observe if I want to "
" Use different sound elements to compose a melody with some arrangements maybe on the ground, so that I can pull then with my feet to trigger physical play"
" I want to touch things and be able to modify my surroundings."
" I want darkness sometimes to listen."
" A 'black hole' that I can talk to."
" I prefer physical interaction."
" To experience the lifestyle of the Netherlands."
" View the entire city from a different perspective."
" Gamification of the sound experience."
" I wish to visit aN immersive theming attraction."

FIGURE 15
Quotes cluster by
statement cards
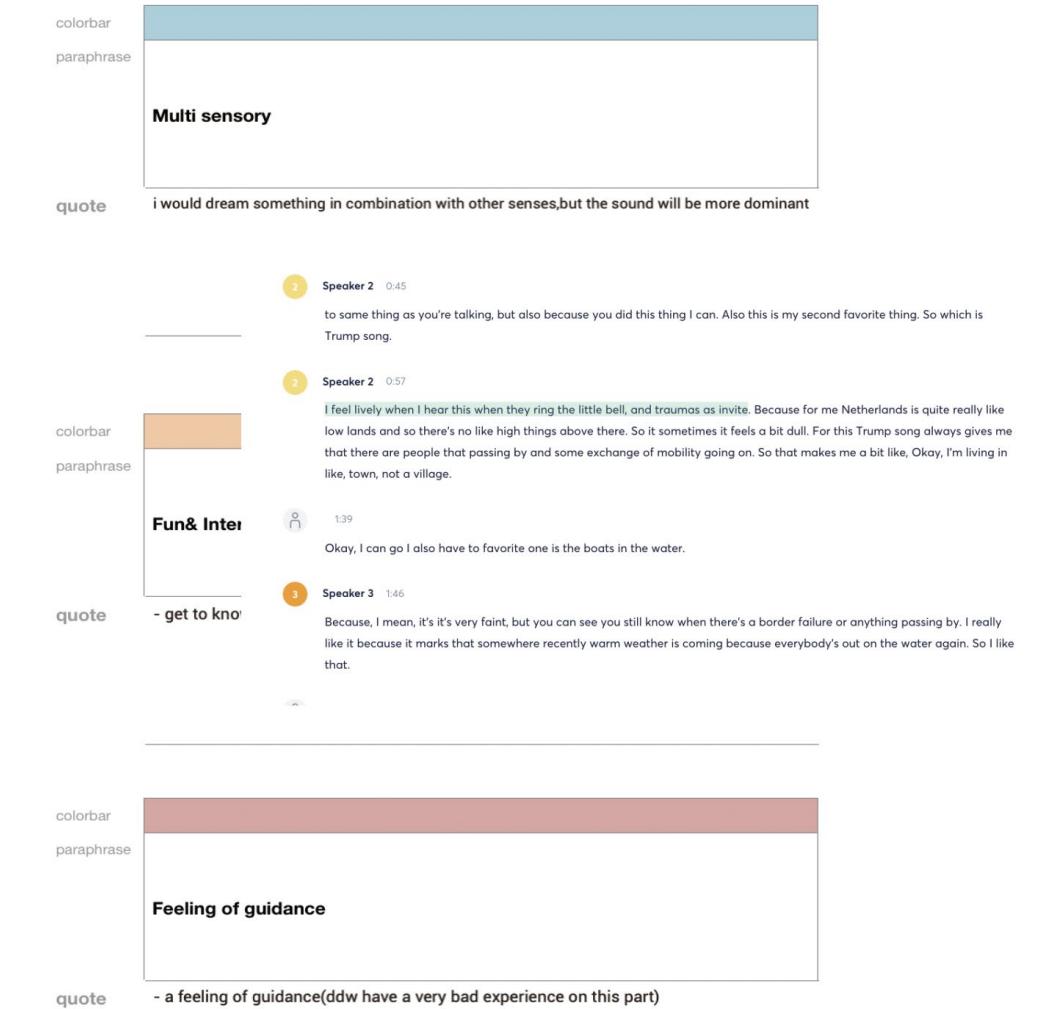
3.3 LARGE CAPACITY TOURIST ATTRACTION ANALYSIS

1 CURRENT MANAGEMENT OF VISITOR FLOW AND CAPACITY

A large capacity indoor tourist attractions analysis was undertaken to arrive at the research question: How to control the flow of the large group of tourists while retaining an optimal experience?

Four examples(see Figure 14) that are representative of large capacity tourist attraction recommended by the supervisor were selected to study. The analysis focused on four perspectives, namely, visitor flow, capacity management, experience and application of interactive media. The result shows how current large-capacity indoor tourist attraction manage the visitor flow and capacity.

CURRENT MODEL OF LARGE CAPACITY TOURIST ATTRACTION:
Walk-through experience
Equipment-based experience
Or Both walk-through and equipment-based.

VISITOR FLOW
The equipment-based attraction allows the forming of groups to control both the visitors' flow and duration of the experience. For example, like the flying theatre in Amsterdam, it has well-organized flow by forming 40 visitors in one group and visitors will be led by a virtual assistant to go through the 9 minutes experience.

Amusement park experience will implement the storyline to facilitate visitor flow like the The Amazing Adventures of Spider-Man ride experience in NEW YORK . The walkthrough experience usually utilizes the Visual sign system design to guide visitors like the universe of water particles in the tank.

CAPACITY:
Equipment-based attraction can operate efficiently to large-capacity of tourists. For example, like the Mystic Manor dark ride experience in HONGKONG, it can achieve 768 visitors per hour. It relies on the ride system, which has Thirty-five vehicles and each vehicle can hold up six visitors. On the contrary, compared to the equipment-base experience, the walkthrough attraction in the management of capacity is lower. However, the universe of water particles in the tank attraction also consists of similar capacity as that of equipment-based attractions due to the availability of large floor space.

INTERACTIVE MEDIA:
Walk through experience offers more possibility for tourists to actively experience the attraction. On the contrary, Equipment-based attraction offers less interactivity as the tourists can only sit inside the vehicles or other fixed position to view the themed environment with special effects. But there is still interactive equipment-based experience like the Amazing adventures of spider man in NEW YORK, which is a shooting experience.

It is worth mentioning that the interactive experience in the exhibition of the universe of water particles in the tank, which is very worth learning. It uses digital media to create an immersive environment where people can freely interact with the digital content displayed. For example, The universe of Water Particles exhibition in SHANGHAI, in the interactive area where people pass, the water will separate and form a wonderful and interesting sight.

SELECTED EXAMPLES:

FIGURE 16
Pictures of selected examples

Flying over the Netherlands

The universe of Water Particles in the Tank (Teamlab studio)

Mystic Manor

The Amazing Adventures of Spider-Man

3.3   INTUITIVE INTERACTION FOR
LARGE VARIETY OF TOURISTS

Tourist experience	Introduction	Interactive means	Visitor flow	capacity	Experience
Flying Theater (Flying over the Holland)	5D flight experience with an enormous spherical screen + special effects: wind, fog and various scents, smell	Interactive installation (individual experience)	instruction given through a digital character (voice assistant) and also by the staff	240p/h	Dome theater
The amazing Adventure of spider-man	Immersive passive experience along with ride system. movable Animatronic doll +lighting+sound+themed environment+projection mapping	No	visitors guided by staff And visitor sit on the vehicle	768p/h	Traditional dark ride experience
Mystic Manor	Motion-based 4k3D dark ride experience along with shooting game.\n\nAnd with special effect: lighting+sound+themed environment+projection mapping	Laser rifle Shooting game	visitors guided by staff And visitor sit on the vehicle	780p/h	Interactive dark ride experience
The universe of Water Particles in the Tank.	A fully immersive experience about the abstract art (high culture) with the interactive wall and floor(Particle).	Interactive wall Interactive floor (collective interactive experience) Interactive Art installation	Free exploration Visual indication	300p/1.5-2h	interactive walkthrough experience

2   CONCLUSION

To conclude, the result brings insight on how current large-capacity indoor tourist attractions manage their visitor flow, and these insights prepare the project to the ideation phase.

VISITOR FLOW:
Storytelling technique can be an effective approach to guide the visitors and able to bring an optimal experience to the visitors. Moreover, visual indication of the space can enhance the visitor flow. Also, the forming of groups can better control the visitor's flow.

CAPACITY:
Equipment-based attraction can allow a larger capacity of tourist than the walk-through experience. But if space is large enough, the capacity of walk-through attraction can also as large as the equipment-based one.

INTERACTIVE MEDIA:
Walk through experience offers more possibility for tourists to actively experience the attraction. Most of the projects from Teamlab studio are excellent examples of collective performative interactive space.

3.4 INTUITIVE INTERACTION FOR
   A LARGE VARIETY OF TOURISTS

As in any interactive design, to design the interaction that is intuitive and user-centered is also the core concern when design a tourist attraction applied interactive media.
This short research aims to study one of the user expectation, which is about how to enable intuitive (easy to use) interaction for a large variety of tourist in public space.

1 "INTUITIVE"

Blacker et al. (2006) and Blacklerand Hurtienne (2007) have identified that interfaces considered as intuitive design usually allows users to finish the task faster, precisely by utilizing the features they may have used in another context before.
Moreover, they affirm three principles of intuitive interaction:

2 INTUITIVE INTERACTION PRINCIPLE:

(1) Utilize familiar features from the same field;
    such as body reflectors, physical affordances, population stereotypes
(2) Shift familiar things from other fields and
(3) Redundancy and internal consistency.

Based on these principles, They developed a continuum of intuitive interaction (see figure 15.0), ranging from elements generally perceived similarly by most people to more unfamiliar features that may require mapping through metaphors or familiar concepts acquired from other fields. From the beginning to the end, internal consistency and redundancy should be considered to support the diversity of user diversity.

Given the diversity of audiences and the differences in technology familiarity, the essential elements that determine interface intuitiveness often vary widely. Consequently, physical affordances (body reflectors) is often preferred for solving basic behavioral patterns common to all human (Hespanhol, L., & Tomitsch, M., 2015)

According to the IUUI research group framework for intuitive design is concerned (see figure15.0), Hespanhol, L., & Tomitsch, M. (2015) define the use of physical affordances as addressing innate and sensorimotor knowledge, originated from the common denominator factor of having a human body. Vice versa, this fact ensures its universal application and make physical affordances a powerful tool for designing intuitiveness.

FIGURE 17
Continua of intuitive interaction and the relationship between them (Hespanhol, L., & Tomitsch, M. ,2015)
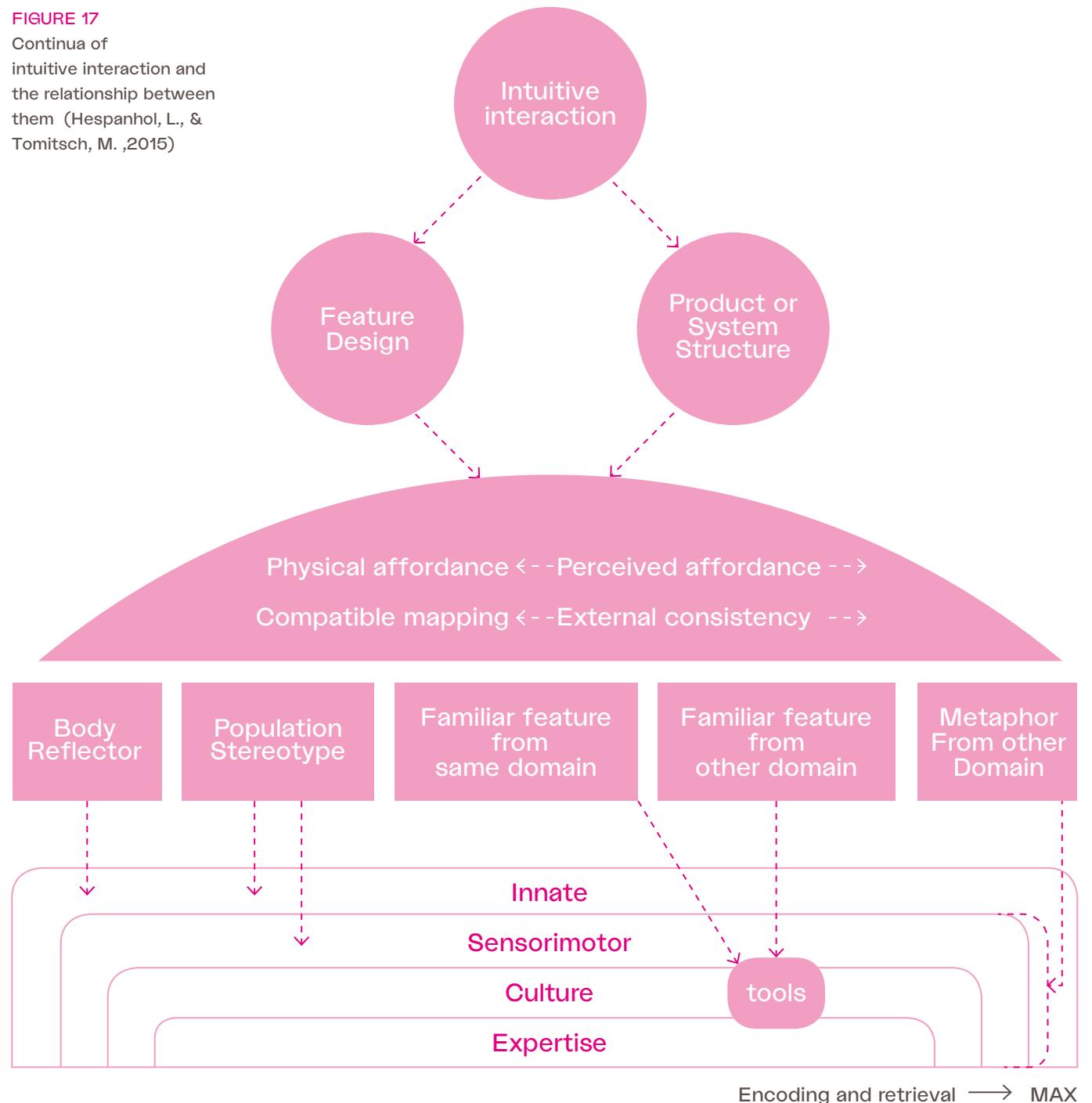
Innate knowledge: Acquired by activating genes or during prenatal development. This is what the reflexes or intuitive interaction takes, ensuring universal applicability and unconscious handling.

Sensorimotor: It consists of general knowledge that was learnt during childhood and through continuous interaction with the world and continued to be used. Scientific concepts like affordances grounds at this level of knowledge.

Culture: It refers to the culture an individual lives in, what is known within the western cultural groups is not necessarily equivalent to the eastern group of cultures.

Expertise: this is specialist knowledge acquired in individual's profession, for instance, Doctor.

3.4   INTUITIVE INTERACTION FOR
A LARGE VARIETY OF TOURISTS

3   FEEDBACKS FOR INTUITIVE INTERACTION

However, the study from Antle et al. (2009) have shown that the mental model originated from physical affordances are not adequate to imply intuitiveness. Moreover, they point out the importance of perceptible feedback in the construction of intuitive input actions. The essential concerns underpinning the design of interactive experiences in public spaces include:

(i) to give precise feedback about who is in control of the interface at any given time;
(ii) to precisely indicate what each visitor is in control of and
(iii) to analyze the identities assumed by people participating in the interaction.

In general, visual and audio feedback are the two primary means that interactive applications use. In the specific domain of the interactive public space, **visual feedback seems to be primarily the first choice for direct and immediate response**. (Brynskovet al., 2009; Hespanholet al., 2011; Hespanhol andTomitsch, 2014; Jacucciet al., 2010; Lozano-Hemmer, 2001; Mueller et al., 2012; Wiethoff and Gehring, 2012). It is also the most effective way to indicate the operating progress assigned by users (Hespanholet al., 2012; Microsoft Corporation, 2013).

On the other hand, **audio feedback can be more effective as cueing mechanisms or upcoming events** affecting the whole crowd in space because not everybody can see every section of the environment, but a sound played loud enough will be heard by all participants and intuitively interpreted as a general alert. (Hespanholet al.,2013) . The audio feedback can be disruptive and confusing in a public space, as a result, the audio feedback needs to be easily distinguishable from the other ambient noise.

To conclude, **precise feedbacks in terms of visual and audio can be a great help for enabling intuitive interaction** for large variety tourist, which can make up for the shortcomings of only utilizing physical affordance.
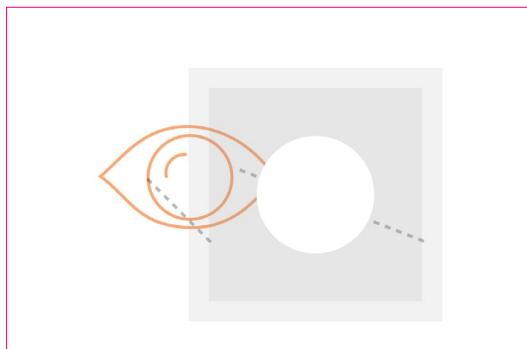
Visual feedback for immediate response   Visual feedback for immediate response

4   CONCLUSION

SOTN is a large indoor attraction that targets international visitors from all over the world. Different cultural backgrounds bring about a diversity of perceptions of things. The main objective of this project is to explore the use of interactive media in large-capacity tourist attractions. The ensuing consideration is the universal applicability, how to make it possible for visitors with different cultural backgrounds to experience interactions easily in terms of intuitive interaction when using interactive media.

The research result shows the principles of designing the intuitive interaction for the crowds and indicates that the use of physical affordances(body reflectors) is often favored, for dealing with basic behavioral patterns common to all humans.

However, there is a doubt that the mental model derived from user familiarity is not sufficient to imply intuitiveness. Antle et al, (2009) propose precise feedback can make up for the deficiency. In general, visual and audio feedback are two main choices that interactive application used. The visual feedback system can provide intuitive and timely feedback information. The sound feedback system has a precise feedback function in the upcoming event.

To conclude, to enable intuitive interaction in public space for a large variety of visitors can be achieved by utilizing the principles purposed by Blacker et al. (2006) and Blacklerand Hurtienne (2007), and make employing the precise feedback system to facilitate it.

3.5 KEY TAKE AWAY

3A MOTIVATION -
A FURTHER SEGMENT OF TARGET GROUPS

The definition of the assumed target group is subdivided into the purposeful tourist and serendipitous cultural tourist aged from 18-35yrs. The results from users research have shown there were two majority factors (novelty and cultural-related knowledge) motivate the participant toward creative cultural tourism. Therefore, the assumed target groups can be segmented as Novelty hunter and Cultural seeker (18-35yrs).

3B EXPECTATIONS FROM TARGET GROUPS

From the results of user research, the expectations of the interactive sound experience in large-capacity tourist attraction from the target group are summarized as follows:

Multi-sensory
Fun&interesting
Exploring&Learning
Easy/Intuitive
A feeling of guidance
Sharing
| Can be shared with friends/family or to social media
| Look back to the highlight
| Memory to go (souvenir)
| Instagram-worthy

3C CONCERNS FROM TARGET GROUPS

From the results of user research, the concerns of the interactive sound experience in large-capacity tourist attraction are summarized as follows:

The experience is influenced by others
The order the visiting flow/pace controlling
The waiting time is long and boring
Concerns about Sounds
| The sound is not clear.
| The sound is becoming noise and mess.
| The experienced sound is covered by others.
| Have no idea how to interact with the sound/exhibit

3D VISITOR FLOW

Storytelling technique can be an effective approach to guide the visitors and able to bring an optimal experience to the visitors. Moreover, visual indication of the space and audio assistance can enhance the visitor flow. Also, the forming of groups can better control the visitor's flow.

Utilizing the storyline technique to guide the visitors
Grouping visitor and controlling the time
Visual indication and Audio assistance

3E CAPACITY

The fundamental factor of capacity management is the floor space one person at least required $0.5m*0.5m=0.25m^2$. Equipment-based attraction can allow a larger capacity of tourists than the walk-through experience. However, if space is large enough, the capacity can as large as the equipment-based one.

The current means of large indoor capacity tourist attraction:
Walk-through experience
Equipment-based experience
Both walk-through and equipment-based.

3F INTUITIVE INTERACTION
STRATEGY FOR CROWDS

There is no universally accepted definition of the term "intuitive". Preferably, intuitive design is informally used to describe an easy-to-use design.
Three prinicples purposed by Blacker et al. (2006) and Blacklerand Hurtienne (2007):
(1) Utilize familiar features from the same field;
      such as body reflectors, physical affordances, population stereotypes
(2) Shift familiar things from other fields and
(3) Redundancy and internal consistency.

3G PRECISE FEEDBACKS FOR
INTUITIVE INTERACTION

Precise feedbacks in terms of visual and audio feedback can be an excellent help for enabling intuitive interaction for large variety of tourist, which can make up for the shortcomings of only utilizing physical affordance. In general, visual and audio feedback are two primary choices that interactive application used. The visual feedback system can provide intuitive and timely feedback information. The sound feedback system has a precise feedback function in the upcoming event.

4

SYNTHESIS

In this part, all the insights from the previous parts are mapped together and resulting in Target Groups, Design Goal, Interaction Vision, Solution Space.

4.1 OVERVIEW

① **PRE-EXPERIENCE**
Desk research

Motivation

Activities

→ 5.PERSONAS

MAPPING INSIGHTS

Design challenges

"How might we"

Concerns map

Design opportunity

② **THE EXPERIENCE**
Expectations
Concerns

Interaction qualities

Expected experience

3D Management of visitor flow

3E Management of capacity

3F Intuitive interaction strategy for crowds

2C Representative sound

2D Interactive media

③ SOLUTION SPACE

DESIGN GUIDELINE

Novel experience

Easy to follow

Capacity management(400-450p/h)

Togetherness

Multiple users

Physical Affordance

Recognizable sound

Multi-sensory

Precise feedback

DESIGN GOAL

INTERACTION VISION

POSSIBLE TECHNOLOGY

The insights map (see 4.2.1) links the most valuable insights from previous user research and resulting in a Design guideline, which becomes a "Design Bible" for the design process.

The mapping is divided into two parts: one is "pre-experience, and the other is" the experience", which brings an overview of the whole journey.

"Pre-experience" stage ① focuses on the motivations and activities of target group before they are visiting the creative attraction, which helps the project to classify better and accurately define the target group.

Furthermore, "The experience" stage ② combines the insights of all expectations and concerns from the target group are divided as concerns map, interaction vision and expected experience. It helps to see the connection among all the insights, and formulated the design goal. Then, design challenges are reframing as "How Might We" questions to turn into Opportunities for design. Subsequently, Along with the insights 3D,3E,3F,2C,2D, all the synthesis summarized in the solution space, which provides an overview of how to design and what to design.

Solution Space ③:

The interaction vision is generated by taking account of all the desired interaction qualities, which used for the inspiration in the generation of ideas and as reference to look back to.

Principles of intuitive design for the crowds and capacity/visitor flow managment are proposed to address corresponding design opportunities.

Possible interactive technologies are listed.

4.2 MAPPING INSIGHT

1 INSIGHTS MAP

PRE-EXPERIENCE

| DREAMING | PLANING | BOOKING |

MOTIVATION

ACTIONS

Planning with companion
Well scheduled / prepared
Searching for the unique destinations
Online booking
Other's review is one of the main reference

*From user research - interview

Having fun

Relax

Experiential
66.7%

Novelty
75%

Cultural-related
75%

Autonomy
33.3%

Usefulness

Interaction with locals

Self-development

Sense of achievement

THE EXPERIENCE

| WAITING EXPERIENCE | DURING EXPERIENCE | END EXPERIENCE |

CONCERN
The waiting time is long and boring
Long queue

EXPECTATION
Shorten the waiting time
A interesting waiting time

EXPECTATION
Multi-sensory
Fun&interesting
Exploring&Learning
Easy/Intuitive
A feeling of guidance

CONCERN
Long queue during the experience
The experience is influenced by others
The order the visiting flow/pace controlling
Unclear sound/becoming noise

EXPECTATION
Instagram worthy
Can be shared with friends/family or to social media
Look back to the highlight
Memory to go (souvenir)

*From context mapping

Concerns Mapping:

Long queue before and during the experience

Influenced by others

Messy visitor flow

Unclear sound

Becoming noise

Interaction qualities:

Exploring

Easy

Novelty

Fun

Expected Experience

Multi-sensory

Intuitive Interaction

Feel free to enjoy with others

A feeling of guidance

To design a well-organized visitor flow to avoid the waiting time and control the pace.

To design an interactive space allows people feel free to play together.

To design novel interaction by using interactive media which can enable multi-sensory.

To utilize the physical affordance as a tool for constructing the intuitive interaction for given variety of tourists.

To apply audio-visual system for displaying the design content and the precise feedback system.

To tide with social media and design a novel "souvenir" by applying interactive media.

INTUITIVE DESIGN STRATEGY FOR LARGE VARIETY OF TOURIST

2   CATEGORIZING INSIGHTS

The insights 3A,3B,3C are categorized into two phases: Pre-Experience and The Experience. Therefore, the target groups are defined as Novelty hunter and cultural seeker (18-35yrs)

EXPECTATIONS FROM TARGET GROUPS

From the results of user research, the expectations of the interactive sound experience in large-capacity tourist attraction are summarized as follows:

PRE-EXPERIENCE

Dreaming:
The insight about what motivates tourist toward creative cultural tourism. The result from the user research shows two main motivation, namely, Novelty and Cultural-related.

Planning and Booking:
This part presents the activities that the target group will do before traveling.
The target groups prefer to plan with their companion and research the "unique" destination to visit. Moreover, they like to book the ticket, accommodation in advance through the website or application.

THE EXPERIENCE

The concerns and expectation of Waiting experience:
The main concern during the waiting time is that tourists do not enjoy the waiting time and feel the waiting is annoying. And they expect the waiting time can be shortened.

The concerns and expectation of During experience:
- Multi-sensory:
  The target user groups expect the experience can be multi-sensory in terms of the experience can combine the sound and other sensory to achieve an optimal experience.
- Fun&Interesting:
  They wish the interaction and content can be fun and interesting, but not arcane.
- Exploring&Learning:
  They want to learn something about the local culture and to explore the unknown.
- Easy&Intuitive: The target groups expect the interactive element can be easy to use.
- A feeling of guidance: The target groups prefer to have a well-organized visitor flow, while they do not like the feeling of loss.
- They are also concerning the long queue during the experience, and the experience might be influenced by others, which reduce the quality of the visiting.

The concerns and expectation of End experience:
- The target groups wish they can have something novel that can bring to go as a souvenir, and they like to share their experience with others by social media.

This step helps the designer to select which phase is the main focus, the pre-experience has less opportunity to explore the interactive media. therefore, the design focus on "The Experience" phase.

3   MAPPING

PERSONAS:

The motivation factors further segment the assumed target user groups, and the activities help to shape the characteristics of the target groups. The target groups are defined as Novelty hunter and cultural seeker, and the personas see page 60.

CONCERNS MAP:

This map indicates the summary of the core concerns of the target groups. From the map on the previous page, you can see the three concerns are mentioned most frequently:

- Long queue before and during the experience
- Others influence the experience
- Messy visitor flow
- The unclear sound and noise are two majority concerns about the sound experience.

INTERACTION QUALITY AND EXPECTED EXPERIENCE

Interaction quality and expected experience are the synthesis of the expectations.
Interaction quality: Exploring/Easy/Novelty/Fun
Expected experience: Multi sensory/ intuitive interaction/ feel free to enjoy with others/a feeling of guidance.

DESIGN OPPORTUNITY:

Combining the strategy of intuitive design for the large variety of people with the otters synthesis, a series of Design opportunities are concluded:

- To design a well-organized visitor flow to avoid the waiting time and control the pace.
- To design an interactive space allows people feel free to play together.
- To design novel interaction by using interactive media which can enable multi-sensory.
- To utilize the physical affordance as a tool for constructing the intuitive interaction for given variety of tourists.
- To apply audio-visual system for displaying the design content and the precise feedback system.
- To tide with social media and design a novel "souvenir" by applying interactive media.

These results see 4.3-4.5

DESIGN AN INTERACTIVE[1] CREATIVE CULTURAL ATTRACTION[2] (400-450 P/H) WITH NOVEL EXPERIENCE[3] AND INTUITIVE INTERACTION[4] AROUND THE TOPIC "SOUND OF THE NETHERLANDS, WHICH ALLOWS PEOPLE TO FEEL FREE TO ENJOY WITH OTHERS[5] AND KNOW ABOUT THE LIFESTYLE OF THE NETHERLANDS[6]

[1] Interactivity: The objective of this project is to explore interactive media in large capacity tourist attraction

[2] Creativity: The definition from the project assumption

[3] Novel experience : Novelty is one of the main motivation of the target groups

[4] Feel free to enjoy with others: Develop from the design opportunity

[5] Know about the lifestyle from the destination: cultural-related knowledge, which is one of the main motivation from the target groups. And also the definition of the cultural tourism

[6] Intuitive interaction: User expectation

4.4 TARGET GROUP

CULTURAL SEEKER (SEE FIGURE 18)

"I want to learn something that I can bring back home. I don't want just to visit a place and get/learn nothing, I will feel 'empty' and 'sense of loss' if I get/learn nothing from the activities."

This type of people have a strong motivation to visit cultural attractions, and they want to gain knowledge from travel and explore the different cultures.

NOVELTY HUNTER (SEE FIGURE 19)

"I always search for an experience that is different from others, and I usually browse online for new activities. For me, if a place has new activities frequently, I may visit this place often.

Novelty hunters prefer to find novel attraction and want to make their own travel experience unique. They are also very interested in cultural attractions which can bring their new insight through travel.

FIGURE 18
Cultural seeker
persona

Demographic
age: 29 years old
gender: male

Social media
Wechat
Weibo
Instagram

Technology
Have the basic knowledge of the interactive media and can be able to adapt technology quickly.
Familiar with social media

Wui Ho, Chinese
Cultural Seeker

Motivations
Experience different culture
Exploring the unknown
Having fun
Gaining a new perspective of life

Background
Wui is a 29 years old scriptwriter who always curious about new things and cultures. In his free time, he likes to travel internationally to experience different cultures, which is because traveling can bring him a lot of inspiration for his writing.
Wui prefers to visit the attraction with cultural value and local markets to experience authenticity.

Frustrations
Budget

FIGURE 19
Novelty Hunter
persona

Demographic
Age: 24 years old
Gender: Female

Social media
Instagram
Snapchat
facebook
Whatsapp

Technology
Adapt the new technology quickly
Familiar with social media
Good at using the smart device

Yagmur, Turkish
Novelty Hunter

Motivations
Novel experience
Having fun
Exploring the unknown
Experience different culture

Background
Yagmur is a 24 years old students who can adapt new technology effortlessly.
She likes to try new things and to use social media to acquire information and interact with others. One of her interests is to travel internationally with friends, and she will use the internet first to research novel and choose a budget-friendly travel destination.
She also interested in experiencing cultural tourism, but she prefers to visit the cultural-related attraction, which is novel and Instagram-worthy.

Frustrations
Budget

4.5 SOLUTION SPACE

1 DESIGN GUIDELINE

Design guideline

If the attraction wants to attract the target groups, a novel experience cannot be missed.
A novel experience can be achieved through innovative interaction techniques, or by uniquely presenting the Dutch sound.

Capacity management (400-450p/h)

Utilizing large-scale equipment like ride system

Walkthrough experience with enough space

Grouping visitors and limit the time

A clear signage system of the space

Togetherness

The interaction has to involve more than one user in a direct or indirect way, and allow tourists feel free to play together

Multiple users

The design should allow multiple users, that is, the application's technology can be opened for numerous users and users can see their own input.

Easy to follow

The attraction requires a clear layout in terms of clear visitor flow, allows tourists easy to follow.

INTUITIVE INTERACTION FOR CROWDS

Utilizing physical affordances (body reflector) as a powerful tool when designing intuitive interaction for a variety of tourist.

Precise feedbacks in terms of visual and audio feedback can be an excellent help for enabling intuitive interaction for large variety tourist, which can make up for the shortcomings of only utilizing physical affordance. In general, visual and audio feedback are two primary choices that interactive application used.

Recognizable sound

Whether it is sound as a design content or a tool for interaction, this factor must be recognizable and clearly perceived by the user.

Multi-sensory

A purely sound experience may be too artistic, But combining visuals or other sense can make the sound more interesting and help people understand the sound. Moreover, the audio-visual feedback system can assist the design of intuitive interaction.

2 INTERACTION VISION

Desired interaction:

People free feel to enjoy the interactive space together

Exploring   Novelty   Easy   Fun

3 POSSIBLE INTERACTIVE TECHNOLOGY

Physical affordance(body reflector) / Multi-players
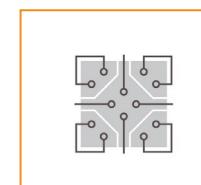
Pressure Detection
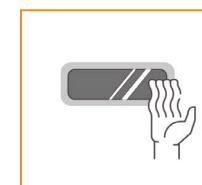
Leap Motion
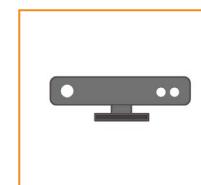
Kinect1.0/2.0
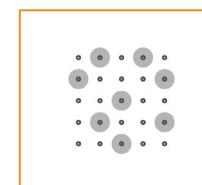
Pattern Recognition

Infrared Sensor
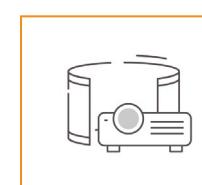
Interactive projection

Ride system

Large touch screen

5   DES DESIGN

Design. There are two main phases of this part. The Design started with building a holistic story and context for the Attraction. The ideation phase was conducted for collecting the story and ideas from the target group. After that, the conceptualization phase, the space model based on the design requirements and visitors' needs were built. Furthermore, iterate the concept by Sketching, Modeling, Rapid prototype in the VR environment, suggestions from Jora Vision Europe B.V.

5.1 OVERVIEW

DESIGN GUIDELINE

TECHNOLOGY

BRAINSTORMING

STORYLINE

BUBBLE DIAGRAM

SCENARIO DRAWING

INITIAL FLOOR PLAN

INITIAL INTERACTION STORYBOARD

INITIAL IDEA

FLOOR PLAN ITERATION

MODEL ITERATION IN VR ENVIRONMENT

ADVICE FROM COMPANY

ATTRACTION DESIGN

FINAL INTERACTION STORYBOARD

FINAL CONCEPT

IDEATION

CONCEPTUALIZATION
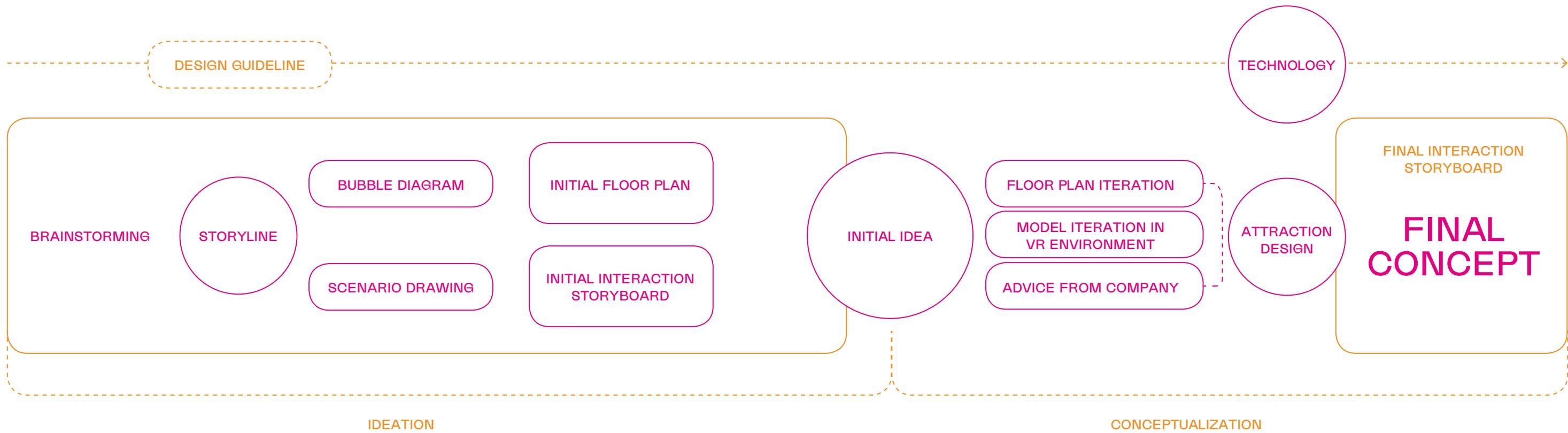
IDEATION:

This project is a future project with no specific locations and space. To better design the interaction, it is essential to build the context. Hence, this project starts from building the attraction by the modeling and then go in deep to the interaction design. However, the design of the model required the relevant data, and the project brief does not have any requirement of where the attraction is located and how large is space. JORA VISION suggests to kick off the attraction design from developing the storyline. Therefore, to broaden my thoughts and find more inspiration for developing the storyline, two brainstorming sessions were conducted.

The storyline is translated to bubble diagram as the base of the Floor plan. Also, the scenario drawings are drawn to develop the storyline into the details. With the initial Floor plan and scenario drawings, the ideation of the interaction design starts according to the design guideline, and interaction storyboards present initial ideas.

CONCEPTUALIZATION:

Along with the initial idea, the iterating of the Floor Plan starts.
The interaction is going to happen in an indoor attraction with a capacity of 400-450 per hour, which means the interaction design needs to consider how many people will interact with each other in the same time, and how large is the space that the interaction happens. Combine with the desired interaction and the capacity calculation, the Floor Plan is done, and the model is built based on it.

Even though the Floor Plan has been calculated based on the capacity, but it needs to be verified to make sure is the concept fit with the capacity. Therefore, verification in the VR environment is conducted. The design model is placed in the VR environment by using the software called EYECAD. Moreover, 3D human models are placed inside the VR environment to measure the space for visitors to interact. The model is iterating based on the result.

After the model has been built, the interaction design further is developed along with the original interaction storyboard. The concept is presented by an infographic (including area layout, technical explanation and the interaction storyboard), concept drawing and 3D model.

5.2   IDEATION

1   BRAINSTORMING

During the internship at JORA VISION, the designer've learned the skill of kickinf off an attraction design with the storyline technique. Therefore, Two brainstorming sessions (see FIGURE 21) were held at the beginning of the design process. One was with four from previous participants in the co-creation session. The other was with six students with a design background. These group sessions were arranged to expand the thinking of the designer and see how participants were mapping the sounds in a story.

SETUP

1. Introduction: Project assumption;Design goal; Interaction vision

2. Mapping the experience:
How are you going to design an interactive space around the topic of the sound of the Netherlands?

There are two sets of cards provided (see Appendix 4.0), one is a card set of the representative sound of the Netherlands, and the other is the card set of interactive technology. Participants are asked to use the "sound card" to tell a story, and based on the story to use the technology card to design the interactive experience. (see FIGURE 22)

3. Discussion
Everyone says out loud their thinking and select their most favorite storyline and the interactive experience.
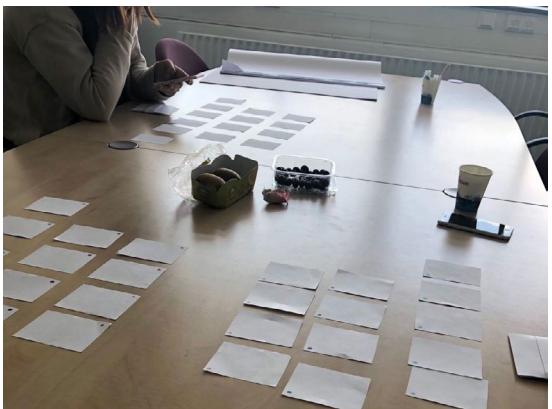
5.2   IDEATION

2   RESULT

STORYLINE

These sessions have brought much inspiration for the beginning of the design. Cluster the various stories that participants have spoken, and combine with my ideas to summed up a storyline — A storyline of one day in the Netherlands, which the sound experience from peaceful to active becomes the stepping-stone for the further design. The storyline was divided into three parts, see FIGURE below:

FIGURE 23
Storyline

Morning	Afternoon	Night
Natural view and Relevant sounds	City view and Relevant sounds	Disco-Night Dutch techno

One day in the Netherlands (Sound experience: from peaceful to active)

SELECTED SOUNDS

The selected sounds (see Figure 24) were becoming the sources of the scenario design, and also the basis of dividing the theme area while building the bubble diagram. (see FIGURE 25)

FIGURE 24
Selected sounds

Natural view and Relevant sounds
Seaside(seagull, sea wave)
Pasture sound (cow)
Wind(windmill)
Duck(Giethoorn)

City view and Relevant sounds
Tram
Market
Bike
Wind/Rain
Dutch people talking
Music festival crowds

Disco-Night Dutch techno
Disco music

SOUNDS FROM

FROM STORYLINE TO BUBBLE DIAGRAM

The storyline was also used as the basis for the drawing of the bubble diagram (see Figure 25).
The storyline included three parts, correspondingly, the bubble diagram was also drawn in three partitions.The Floor Plan was developed with the calculation of the capacity based on the bubbles diagram.

1	2	3
Natural view and Relevant sounds	City view and Relevant sounds	Disco-Night Dutch techno

FIGURE 25
Bubble Diagram

Pasture-cow

AREA 1
Natural view and Relevant sounds

Sea -
Sea wave
Seagull

Windmill-
Wind

Giethoorn-
Duck

AREA 2
City view and
Relevant sounds
Tram
Train
Church bell
Market
Dutch people
talking

AREA 3
Disco-Night
Dutch techno
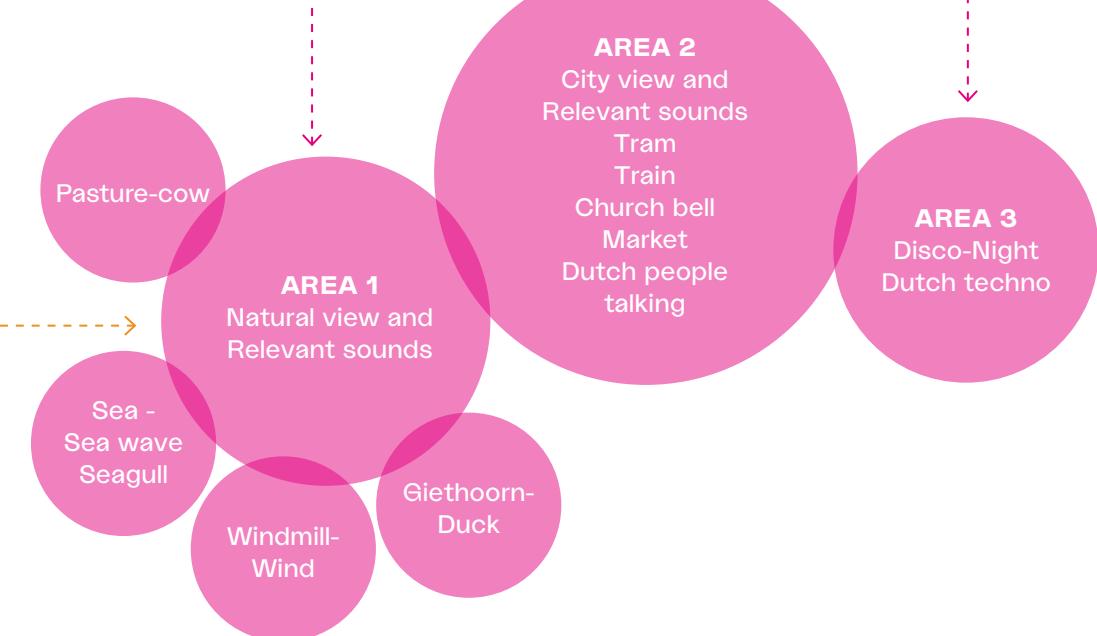
5.2   IDEATION

FROM STORYLINE TO SCENARIO DESIGN
The storyline was also translated into the scenario drawing (see Figure 26,27,28), which presents what people can see and hear in that area. Moreover, the scenario drawings were shown in the form of video with added sound effect. (video link in the end). It's a bridging step that was transforming the storyline to the interaction storyboard.

AREA 1 NATURE SOUND

FIGURE 26
Scenario drawing
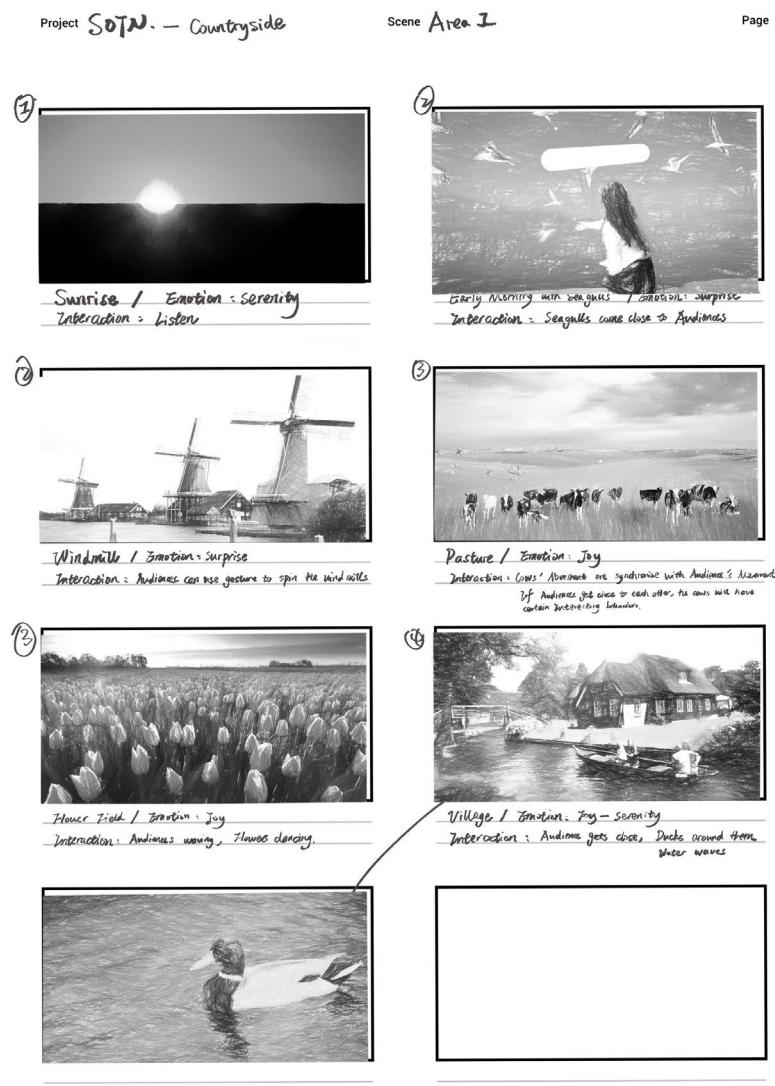
- Scenario: Seaside
- Sound: seagull/ sea wave

- Scenario: Zaanse Schans
- Sound: wind/ windmill
- Scenario: Pasture
- Sound: Cow/wind/ animal steps

- Scenario: Tulip field
- Sound: Flowers blossom
- Scenario: Giethoorn
- Sound: Duck/ People talking/ stream

Go to tram station
AREA 1—AREA 2

https://vimeo.com/349454072

AREA 2 CITY SOUND

FIGURE 28
Scenario drawing
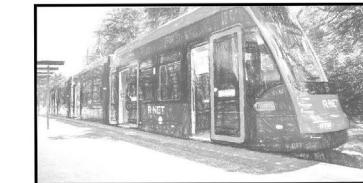
- Scenario: Tram station
- Sound: Tram bell/ Notification
- Scenario: Biking people
- Sound: People talking/Bike bells/ Rain

- Scenario: cheese market
- Sound: People selling/People talking/Food

- Scenario: Street
- Sound: Street organ/street music

Night fall,
Go to enjoy the music
AREA2—AREA 3

AREA 3 NIGHT DUTCH MUSIC

- Scenario: Club/Music festival
- Sound: dutch-techno

5.2 IDEATION

3 INITIAL CONCEPT

This is an interactive attraction with novel experience around the topic of sounds of the Netherlands, which has three theming areas. In this attraction, there are three areas, namely, Ride experience, Immersive tram experience, and sound playground.

AREA 1 Sounds From The Nature (Utilizing The Gesture-Based Interaction And Audio Guide)
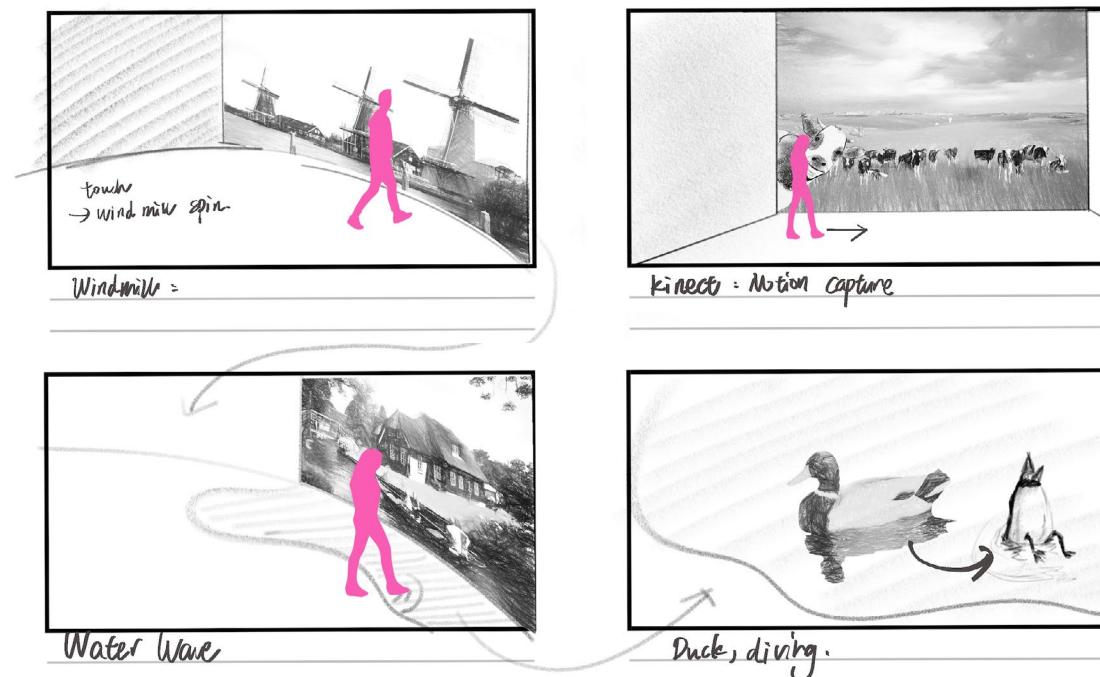
Interaction
Interact with the show element on the screen by gesture along with the audio assistant
Technology
Interactive wall and ground, Kinect, gesture detection
Show content
Seaside/ Windmills/ Pastures(cow) / Giethoorn

AREA 1 is an immersive interactive environment, where utilizing physical affordance (body reflector) as the tool of constructing intuitive interaction. Visitors can interact with the show content on the digital screen by the gesture. The screens mainly display the scenery and sounds from the Dutch nature and countryside, and divided into four themes: Seaside, Windmills, Pastures and Giethoorn.

AREA 2 Immersive tram experience (interaction with narrative feedback system)
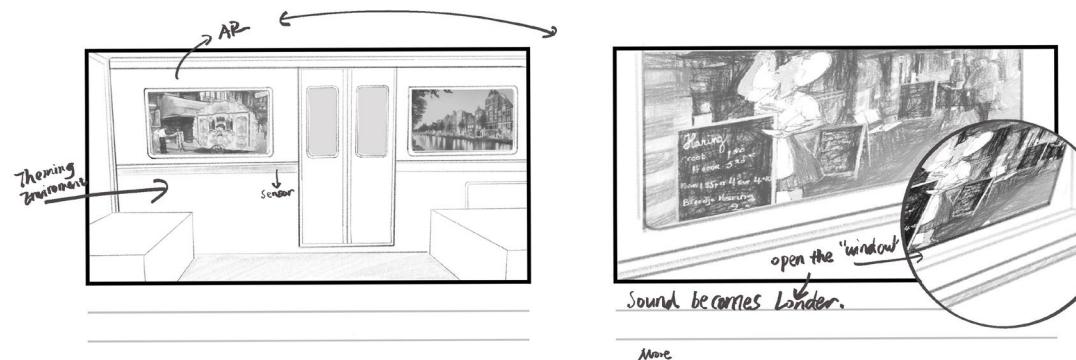
Interaction
Interact with the screen by the narrative feedback
Technology
Touch screen/ Motion simulator (Tram theming)
Show content
Biking people on the street/Riding under the rain/Street organ/Cheese market

AREA 2 is a tram theming environment, where users the story to trigger tourist to interact with video content. Based on the scenario drawing, three narratives are developed:
Biking people wave and say hello to the tourist/
Street organ sound outside the blurry window/ Cheese porters knock the windows.

AREA 3 Sound playground
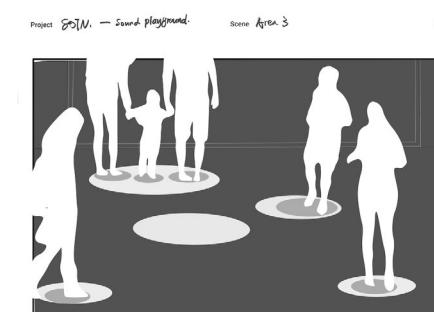
Interaction
interact with the round on the ground and generate music)
Technology
Radar detection/Interactive projection
Show content
Disco theming with interactive projection and techno music

AREA 3 is an interactive sound playground where tourist can stepping on the visual element (Round) on the ground to activate the soundtrack to compose the music with others.

5.3   CONCEPTUALIZATION

1   CAPACITY CALCULATION

Along with the initial idea, the iterating of the Floor plan starts.
Firstly, the bubble diagram is translated into the initial floor plan, which indicates the placement of the area and the initial visitor flow. (see Figure 32)

The interaction is going to happen in an indoor attraction with a capacity of 400-450 per hour, which means the interaction design needs to consider how many people will interact with each other in the same time, and how large is the space that the interaction happens.

Now the attraction is divided into three parts, which means the capacity of each area is: 400÷3≈133p/h, In order to manage the capacity and design an optimal interactive experience for such amount of visitors, The approach: "Grouping visitors and limit the time" is applied. (3D)

The suggestion from the company about the assumed visiting time of mean experience is 45 minutes, and the experience time would be around 15 minutes for each area. Which means each area at least need to allow: 133p/h ÷ 1/(1/4)h ≈ 33p in one time.

With the time limit of each area and also the minimal space of each area, and the advice from architects in JORA VISION, the iterating result can see in the next page.

TO conclude:

Capacity for each area :400 ÷ 3 ≈ 133 p/h

Capacity for each area per 15 minutes : 133p/h ÷ 1/(1/4)h ≈ 33p

FLOOR BUBBLE DIAGRAM TO THE INITIAL FLOORPAN
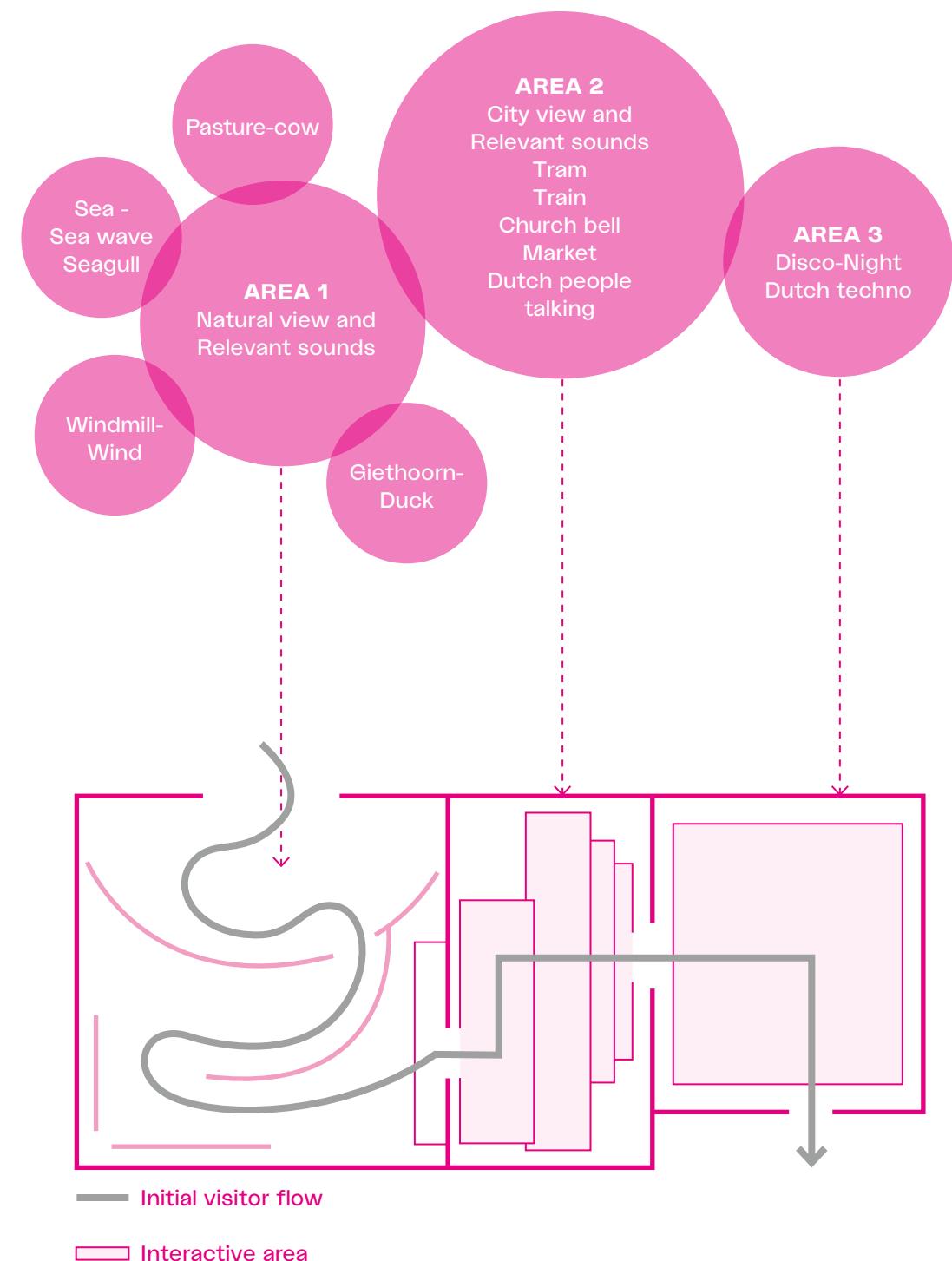
Pasture-cow

Sea - Sea wave Seagull

AREA 2
City view and Relevant sounds
Tram
Train
Church bell
Market
Dutch people talking

AREA 3
Disco-Night
Dutch techno

AREA 1
Natural view and Relevant sounds

Windmill-Wind

Giethoorn-Duck

── Initial visitor flow

▭ Interactive area

5.3 CONCEPTUALIZATION

1 CAPACITY CALCULATION

Area 1 experience time ≈15 minutes

■ Interactive area

133p/h Capacity

AREA 2 experience time ≈15 MINUTES

■ Interactive area

133p/h Capacity
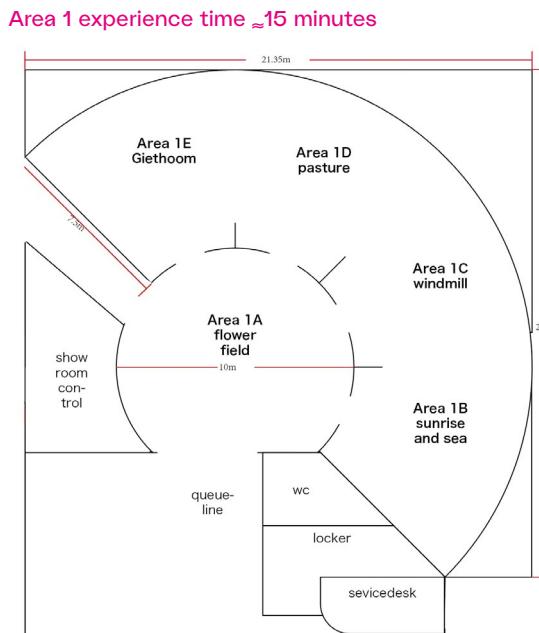
AREA 1

The initial idea of area 1 is a walkthrough interactive experience, and for the walkthrough experience, it requires enough space.

There are four themes in this area. Correspondingly, the visitors are distributed as ≈ 9 visitors per theme area. The estimated experience time is 15 minutes for this area. Moreover, this area plans to develop the desired interaction which is based on the gesture tracking device. Therefore, the area needs to have extra space for the device. Based on the consideration mentioned above and the suggestion from JORA VISION, the iteration of area 1 see above.

AREA 2

This area is a tram theming experience, which relies on large-scale equipment. The estimated experience time is around 15 minutes. Moreover, the desired interaction in this area is that visitors can touch the screens (tram's windows) to capture the moment visitors like, so how many people share one screen is the issue need to be considered. Considering this area is going to simulate the tram experience and the viewing experience, one window is shared by 2 visitors might be the best choice.

Therefore, this area at least needs 33/2 ≈ 16 screens. Also, 33 visitors is separated into two trams.

Accordingly, The iteration of area 2 see Figure 34:
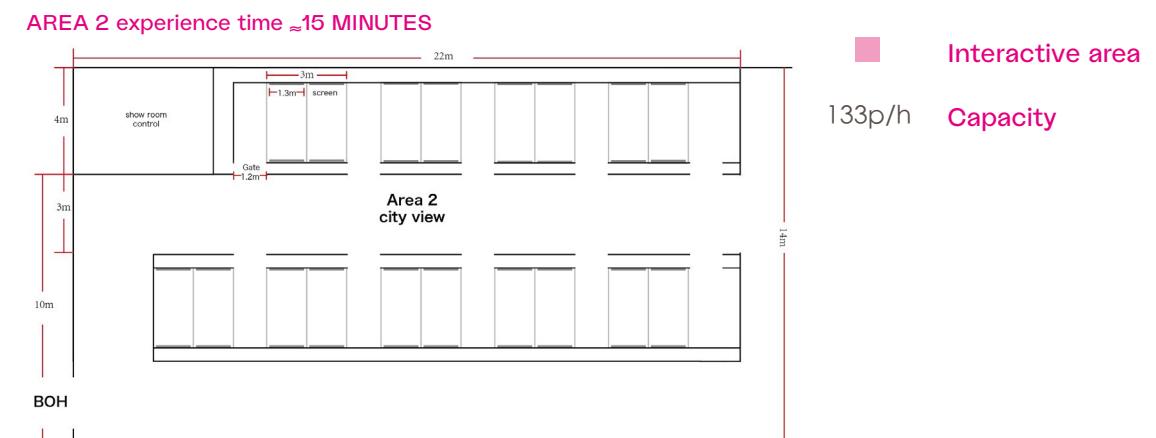
AREA 3

This area is a sound playground, where visitors can play together in a dark environment with interactive projections. And 33 visitors is separated into 4 rooms, which means each room need to allow at least 9 visitors in one time.

AREA 3 EXPERIENCE TIME ≈15 MINUTES

■ Interactive area

133p/h Capacity
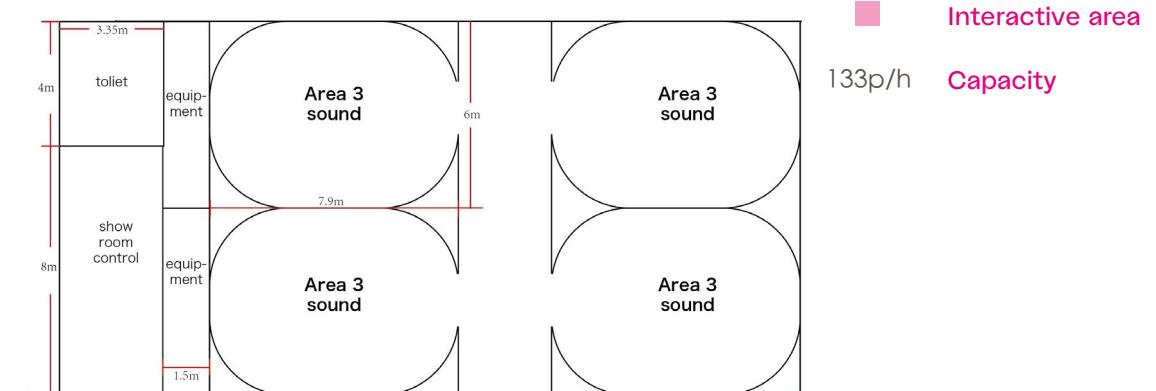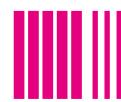
2   MODELING AND ITERATION IN VR ENVIRONMENT

METHOD

The model was iterating based on the rapid prototype by using EYECAD software. The model (see Figure 36) was built according to the floor plan, but it needed to be verified to make sure was the concept fit with the capacity. Verification in the VR environment was conducted. By using VR technology, the designer and participants could be able to understand the dimensions of the construction intuitively. Moreover, the model in the VR environment could provide a virtual environment for innovating, testing and evaluating for specific characteristics of a design.

The design model was placed in the VR environment by using the software called EYECAD. Moreover, 3D human models were placed inside the VR environment to measure if the space enough for interacting with others or not. The specialist in JORA VISION and four design students were invited to experience the VR model.

DESIGN DECISION

The verification resulting in an important decision, which was change the idea of walkthrough experience of area 1 (see FIGURE 36) to a ride experience (see FIGURE 37).

Because
From the experience perspective

1. When the 33 3D human models were placed in area1, the participants felt crowded. Moreover, Participants think others might influence the interaction.

From the technical perspective

1. The detection range of Kinect 2.0 (or the other gesture detection device) is limited, and people need to be in a specific location to interact with the screen.

2. The ride system can offer clear visitor flow, and indicate the interactive area clearly when stopping in the interactive area.

FIGURE 36
The Sketch up model and the model in VR environment
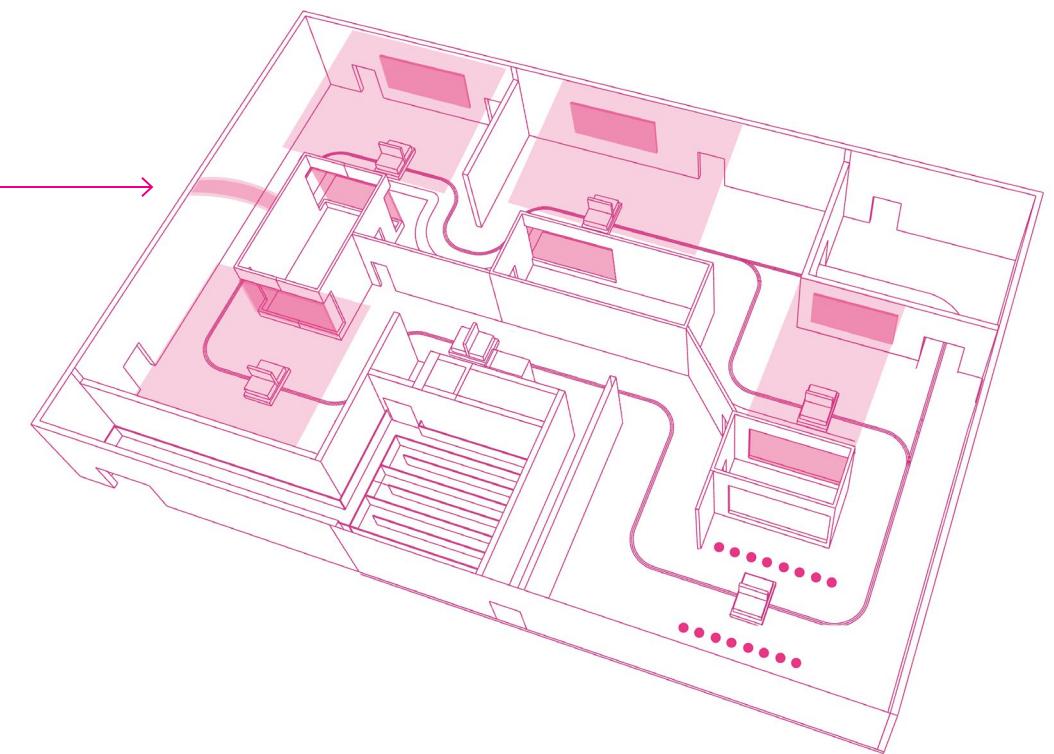
FIGURE 37
Ride experience

5.4   FINAL CONCEPT

1   ATTRACTION OVERVIEW

1. Entrance
2. Service desk
3. Locker
4. Office
5. Equipment room
6. Waiting area
7. queue line
8. Area1-Flower field theme area
9. Area 1-Sea side theme area
10. Area 1-Wind mill theme area

11. Area 1-Pasture theme area
12. Area 1-Giethoorn
13. Rest&shopping area
14. Waiting area
15. Area 2-Tram theming room A
16. Area 2-Tram theming room B
17. Area 3-Sound playground A
18. Area 3-Sound playground B
19. Area 3-Sound playground C
20. Area 3-Sound playground D

FIGURE 38
Overview of the
SOTN attraction
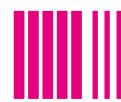
5.3   CONCEPTUALIZATION

AREA ARRANGEMENT

Area arrangement of
SOTN attraction

Area 1:
Sounds from nature
-Interactive immersive environment

Area 2:
City's Sound
-Tram theming experience

Area 3:
Sound Jockey
-Sound playground
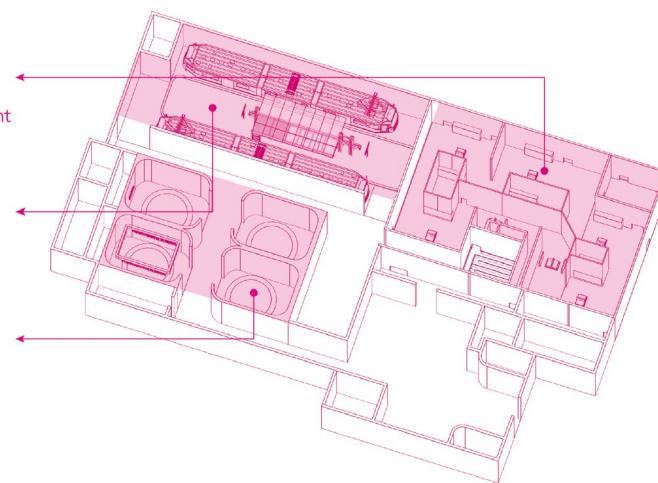
VISITOR FLOW

Visitor flow of the
SOTN attraction
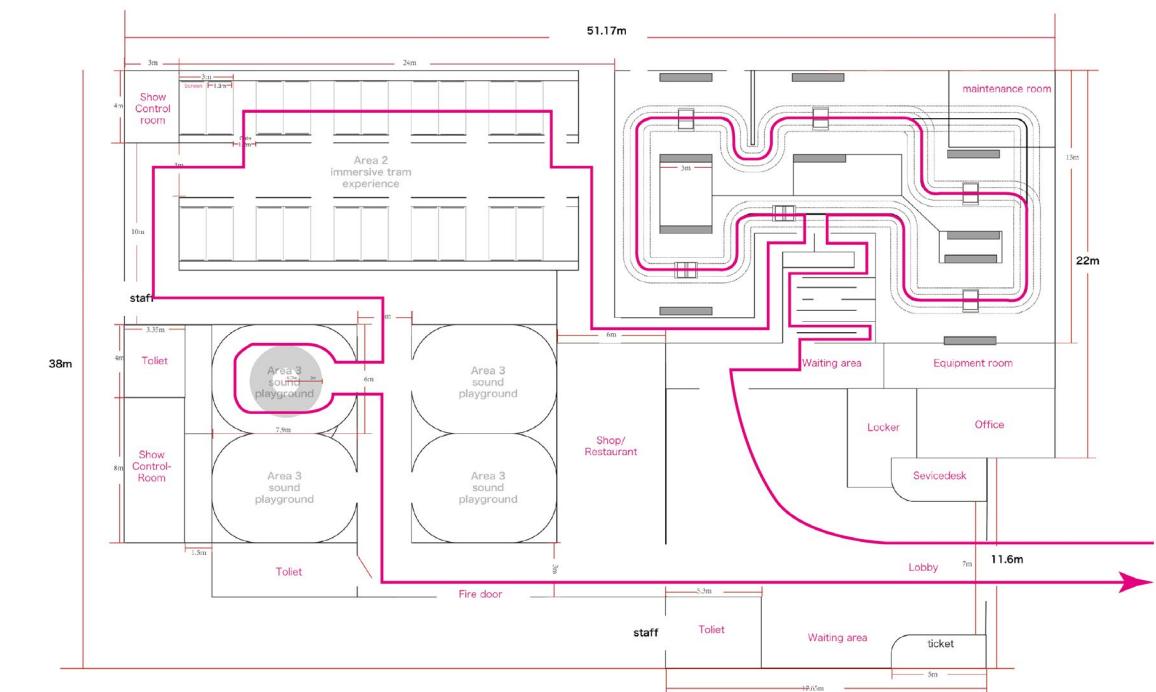
5.4　FINAL CONCEPT

2　AREA 1 INTERACTIVE RIDE EXPERIENCE: NATURE SOUNDS

After the model has been built, the design can further develop based on the initial interaction storyboard. The Final design is presented by an infographic including area layout, technical explanation and the interaction storyboard.

LAYOUT AND DURATION

FIGURE 41
Area 1 layout and technology

8　Tulip light field
9　Seaside
10　Windmills
11　Pasture
12　Giethoorn

36 people in one time
6 people/vehicle
6 vehicles

15 minutes experience
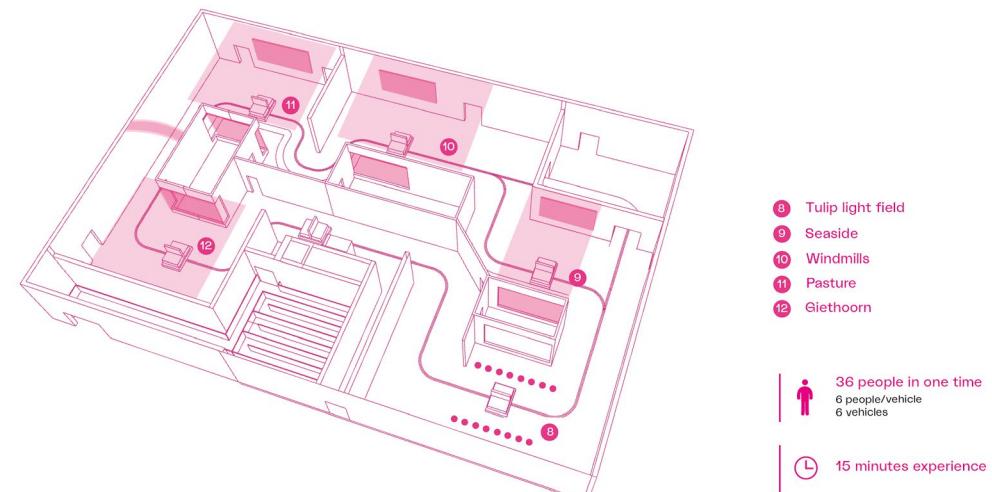
In Area 1, visitors can enjoy the interactive ride experience. The experience of this area is mainly around the natural view and sounds of the Netherlands in the suburbs. As shown in Figure 41, there are Five theming areas, namely the Tulip field Seaside, Windmills, Pastures and Giethoorn that visitors can together interact with the video content to get more fun by using their hand gesture. This ride experience lasts 15 minutes and can carry 36 visitors in one time.

Interactivity
There are four interactive spots in this ride experience with different theme and content. The vehicle will stop in the interactive space for 1.5 minutes, and there is audio assistant to announce how to interact with the screen. Details see final interaction storyboard.

Gesture detection
Kinect 2.0 or Leap Motion can be implemented to the experience to enable the gesture detection. And visitors can interact with the content without holding a device. That is, If visitors wave their hands, the corresponding content is changing by receiving the data translated by the gesture detection hardware.

Sensor light
In the tulip area, the lights are theming as flower shape, when the vehicle is passing by, the "flowers" are lighted up.

FINAL INTERACTION STORYBOARD

In the beginning, Visitors pass through the tulip fields. Here they can hear the sound of the flowers blooming accompanied by the special effects of the lighting.
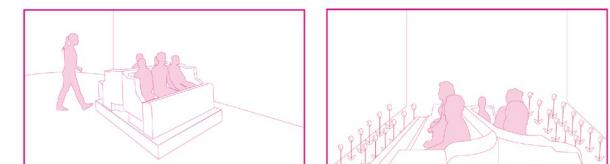
FIGURE 42
Area 1 interaction storyboard
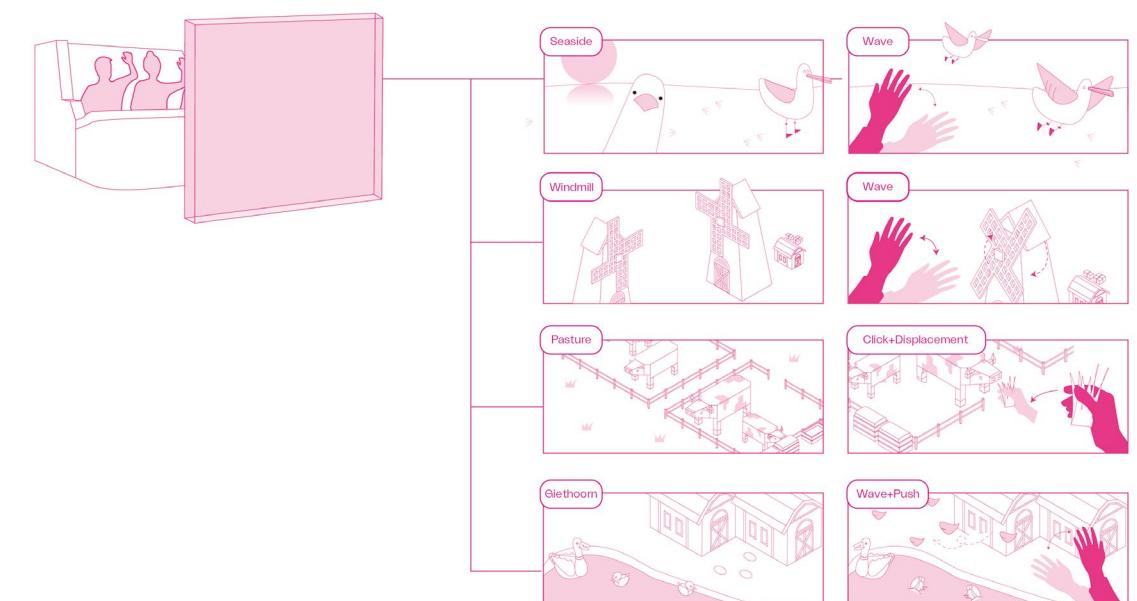
In the seaside theme area, visitors can hear the ocean waves crashing along the beach with seagulls' squawk and the sea wind blowing to them. Visitors can wave their hand to interact with seagulls; if they "touch" the seagulls, they will fly away and squawk.

In the windmill area, visitors can experience the sound of wind in the Netherlands. They can spin the windmill by waving their hand. If visitors waving together will make the wind sound louder, and the windmill turns faster.

In the pasture area, with the sound of the breeze blowing over the pasture and the sound of cows step on the grass, Visitors can interact with cows in the pasture by raise their left or right hand at the appropriate position for at least 2.5 seconds to pick up the forage(for picking up content). And move their "hand" on the screen to feed cows.

In the last area, people will pass through the Giethoorn theme area, where people will hear the sound of ducks playing in the creek and the sound of the boat coming and going. Visitors can also interact with the ducks in the river. If they wave at the ducks and the ducks will get into the water.

AREA 1 CONCEPT
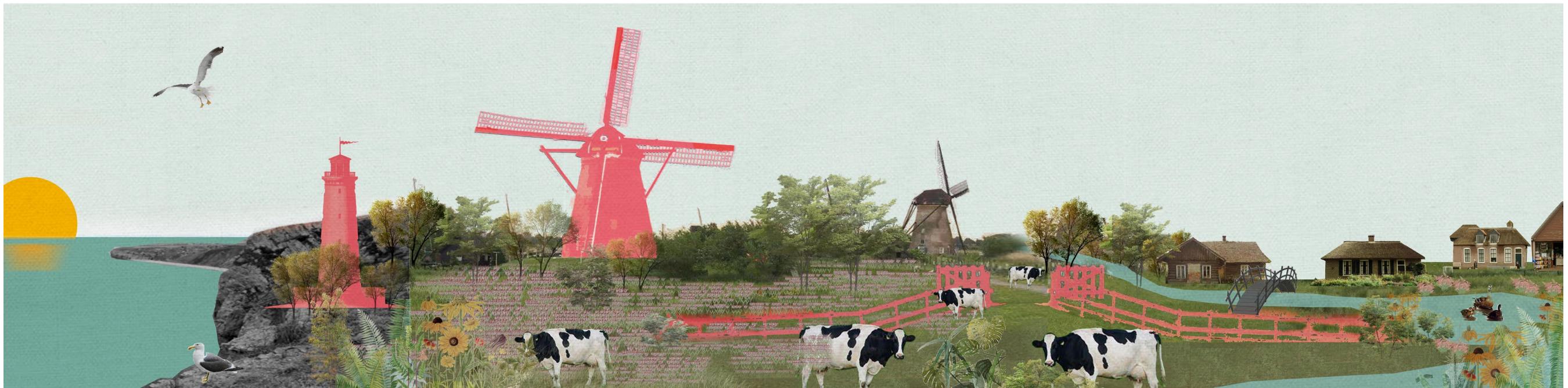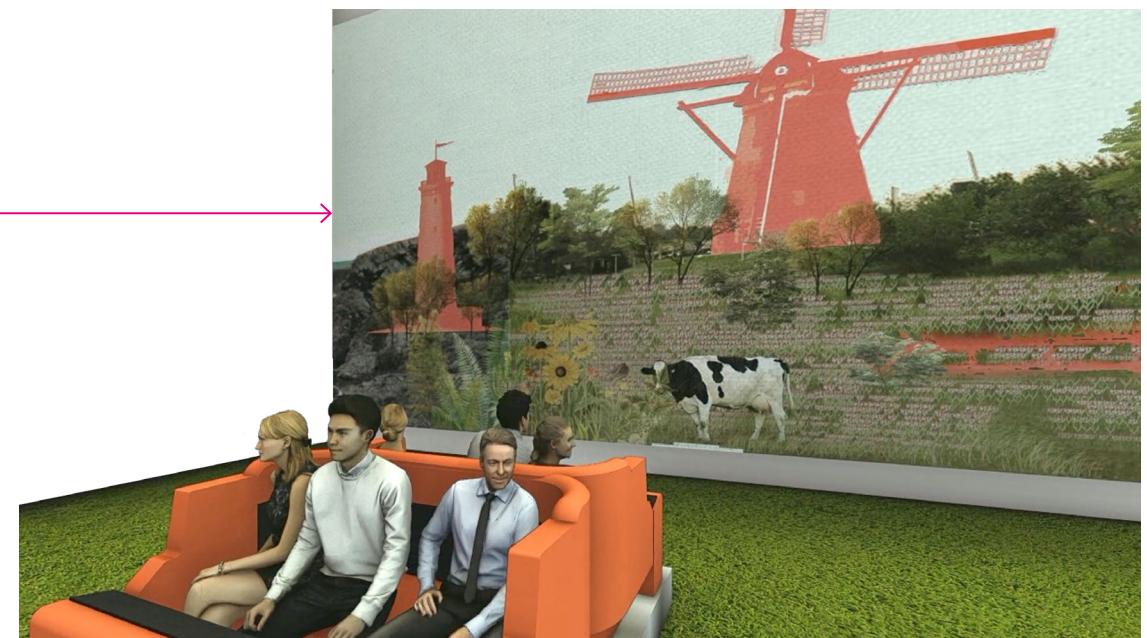
Area 1 Bird's eye view

Area 1 Sea side

Area 1 Tulip field

Area 1 Ride to the Giethoorn

5.4   FINAL CONCEPT

3   AREA 2

LAYOUT AND DURATION

Here visitors can enjoy the view from Netherlands city and experience the immersive sound created by the directional speakers. Through the "window", visitors can watch 3 video stories which present the life or interesting moment in the Netherlands, and visitors can interact with video content.(Details see the interaction storyboard). This ride experience lasts 15 minutes and can carry 18 visitors per tram.

FIGURE 45
Area 2 layout and technology

- 15 Area 2-Tram theming room A
- 16 Area 2-Tram theming room B

36 people in one time
18 visitors per tram

15 minutes experience

Directional Speaker
(760mm)

Motion simulator
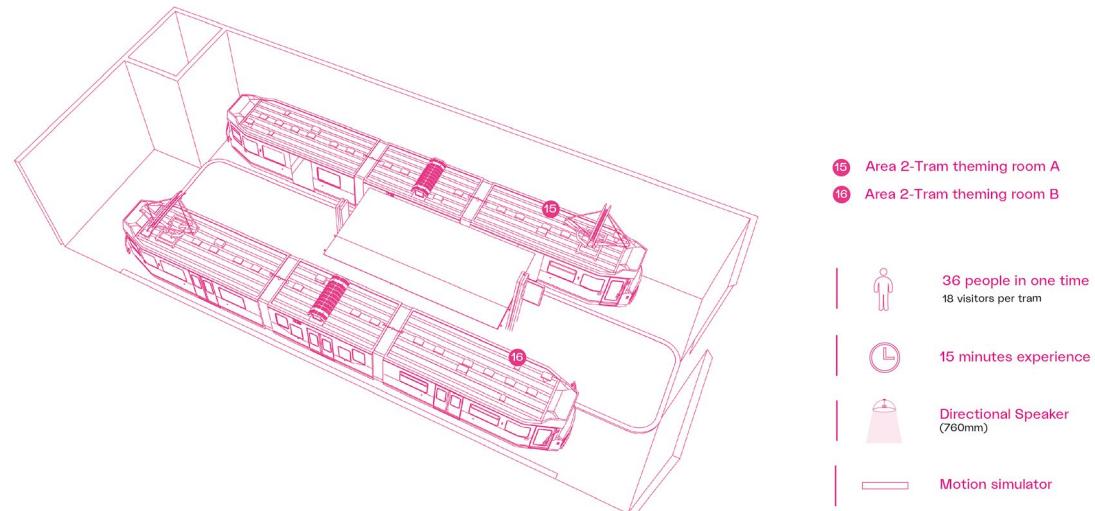
Interactivity
There are 20 screens in total in this area, every two visits can share one screen. The video content is not just showing visitors the cultural-related knowledge of the Netherlands but also acts as the narrative trigger to enable the interactivity.

Directional speakers
This kind of speakers can bring the sense of the sound comes from a distance and gradually disappears, within the enclosed cabin along with synchronized motion simulator, visitor can experience a realistic and immersive vehicle experience.

FINAL INTERACTION STORYBOARD

FIGURE 46
Area 2 storyboard
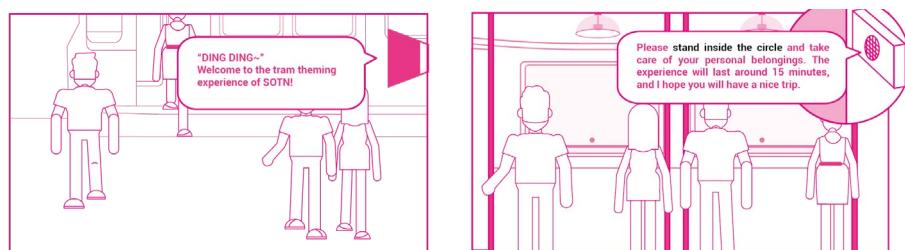
To achieve the best sound experience, people need to stand inside the circle where the directional speaker can spread.

FIGURE 46
Area 2 storyboard

Trigger
a biking persona say hi and wave hand to visitors.

Interaction
Visitor "open" the windows by touch the screen. And hear the sound.

Trigger
Special wind and rain effect.

Interaction
Visitor "close" the windows by touch the screen.

Trigger
Street organ's sound outside the window with blurry "window"

Interaction
Visitor wipe the window to see clearly where the sound comes from.

Trigger
Cheese carriers will knock the window

Interaction
Visitor can click the window to hear the sounds from the market.

AREA 2 CONCEPT

Area 2 concept
drawing

Biking person   Street Organ   Cheese Market

Area 2 rendering

5.4   FINAL CONCEPT

4   AREA 3

LAYOUT AND DURATION
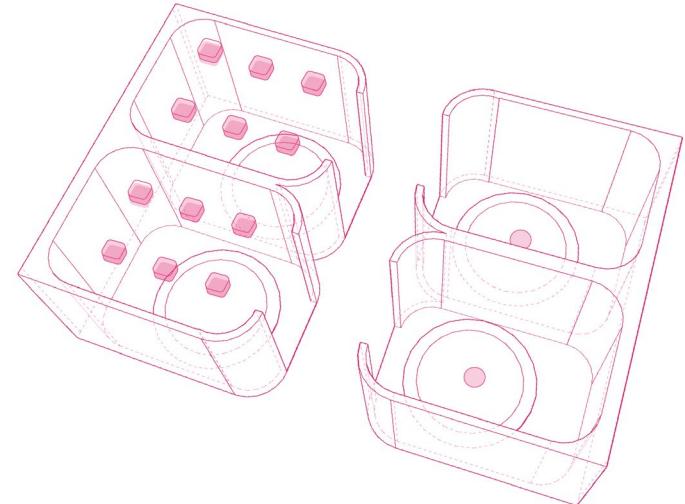
17 Area 3-Sound playground A
18 Area 3-Sound playground B
19 Area 3-Sound playground C
20 Area 3-Sound playground D

36 people in one time
18 visitors per tram

15 minutes experience

6 Projectors
(4.5m distance from ground)

Radar Detection
(10 meters diameters range)

Visitors can experience the charm of dutch techno here. And experience the feeling of being a DJ to compose the music by playing with the visual element on the ground. The experience lasts around 15 minutes and can carry 9-10 visitors per room.

Interactivity
Area 3 is the interactive sound playground experience uses the projectors suspended at the top to project the interactive visual element to the ground. The visitors can step on the visual element to activate different soundtrack to compose the music.

Radar Detection
The radar system can recognize if the visitors step into the round, which helps to enable the interactivity.

Audio visual
The melody created by the visitors are synchronized into the system and will be visualized; The visualized sound is rendered and present as different patent (see figure) on the screen on the wall.

FINAL INTERACTION STORYBOARD

Indication of the START on the ground
Audio assistant explains how to play.
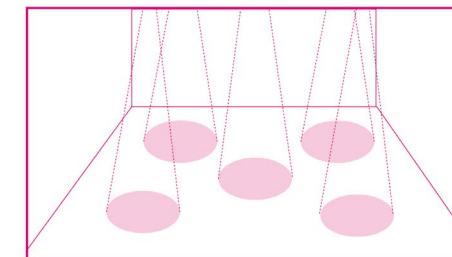
The ground becomes the playing field and five rounds are projected on the ground.
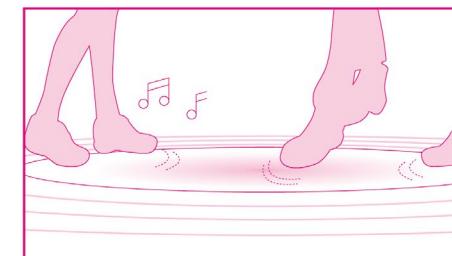
Tourists step on the circle and activate the sound. Each circle presents a different track of the melody. More visitors (maximum five) step on the circle the volume becomes higher(40dB-100dB).

If one visitor step in, there is one circle line appears. And so on, more visitors step in(maximum 5), the more circle lines appear. On the contrary, when the visitor leaves, the circle line will decrease.
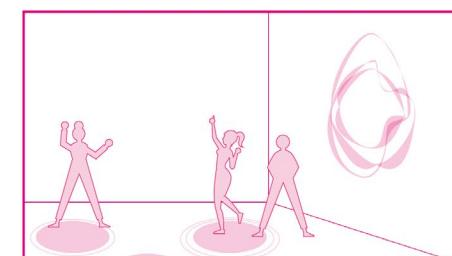
The melody created by the visitors are synchronized into the system and will be visualized on the wall.
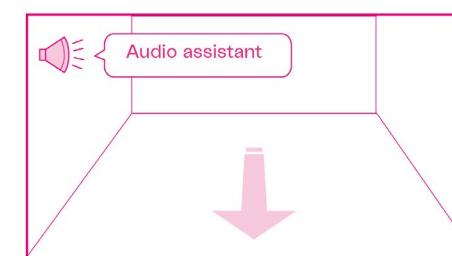
Visitors can enjoy the music together and have fun with others.

VISUAL ELEMENTS

Sound track 1 Sound track 2 Sound track 3 Sound track 4 Sound track 5

Default setting → ← Volume: 40dB

One user step in → ← Volume: 50dB

Two users step in → ← Volume: 60dB

Three users step in → ← Volume : 70dB

Five users step in (maximum) → ← Volume: 80dB

AREA 3 CONCEPT
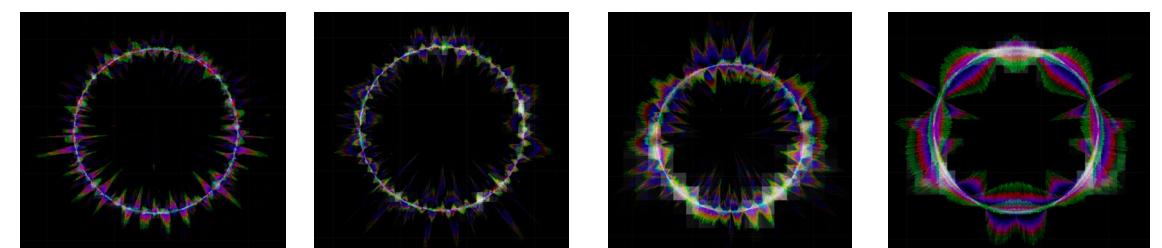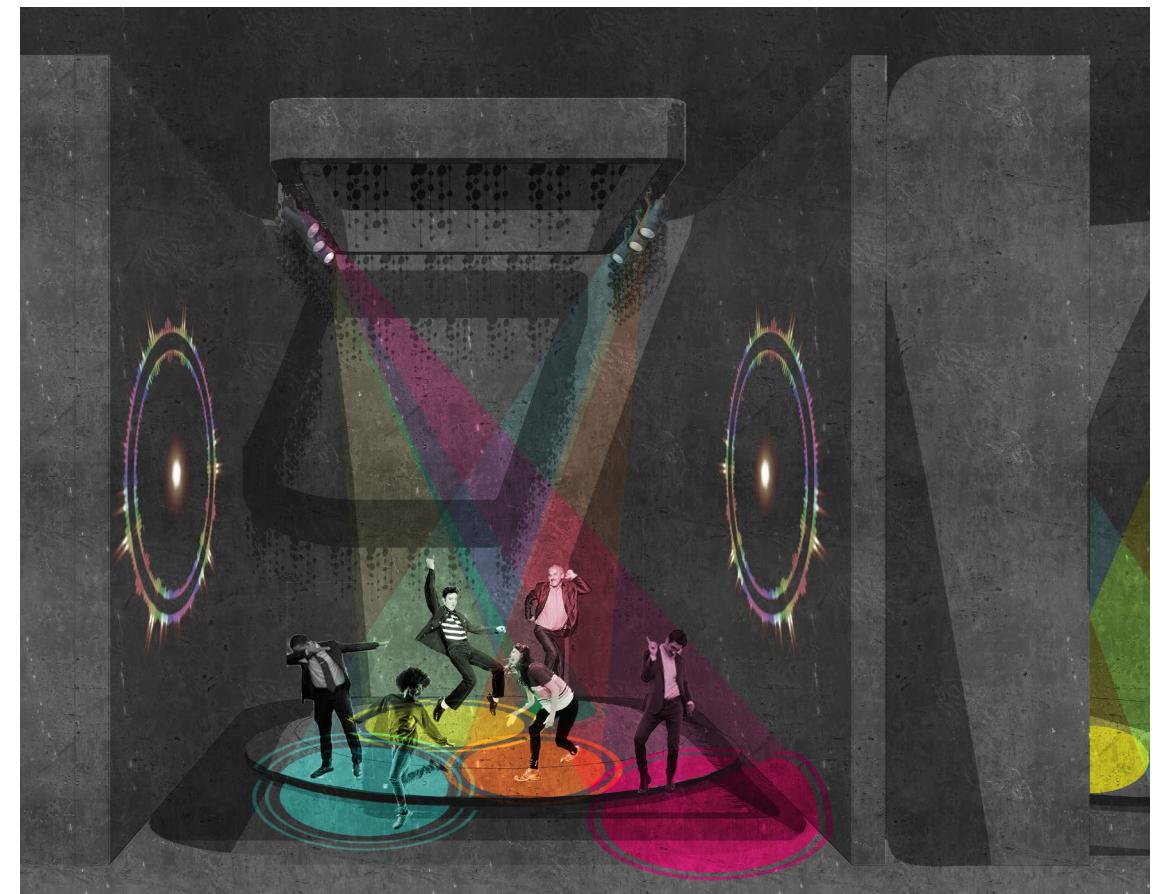
Audio Visual Pattern
(Programmed by Touch Designer099)

6

VALIDATION

The last part, Validation. Since the design is too big to be prototyped in the real scale, there are only key interactions are prototyped for the test. The design is tested with the target groups and the company to gather the feedbacks from both sides. The results of the test were used as a foundation for future recommendations for the company.

6.1 OVERVIEW

Creativity

Novelty

Intuitive interaction

Interact with
others (inclusive)

Present Cultural-related
knowledge

VALIDATION

USER TEST

Test objectives

Test materials

Test set up

Walkthrough 3D video
VR model in cardboard

Interactive prototype

Interaction storyboard

AREA 1
Interactive prototype from one
of the theme to test the gesture-
based interaction

AREA 2
Interactive prototype based
on one of the story to test the
interaction with screen along with
the narrative guidance.

AREA 3
Interactive prototype

Questionnaire
Open questions

**Test result
Recommendation**

This chapter provides an overview of the validation steps that were taken to evaluate the concept.All activities provided insight into evaluating how well the final concept could meet the design goal.

To be able to evaluate the design, few materials were built. Walkthrough 3D video and model in the VR environment help the participants to understand the context. The interaction storyboard and interactive prototype helped the participants to understand the desired interaction.At the end of the session, Questionnaire and open questions around the test objectives were asked for collecting data.

The results of the test were used as a foundation for future recommendations for the company.

Besides, because of the technical issue and the requirement of the space, interactive prototypes of each area were not entirely presenting the whole process.

For **AREA 1,** Interactive prototype from one of the theme (Windmill) to test the gesture-based interaction.

For **AREA 2**, Interactive prototype based on one of the stories was built to test the interaction with the screen along with the narrative guidance.

For **AREA 3**, reduced scales Interactive prototype was built in the digital interface and project to the ground to simulate the concept.

6.2 USER TEST

1 TEST OBJECTIVES

OBJECTIVES

The overall aim of the user test was to evaluate how well the final concept could meet the design goal. The concept was tested with the target groups to gather the feedback to find out what are the benefits, limitations and potential improvements based on the feedback.
A list of research questions was formulated based on the design goal. After the test, these questions should be answered.

1. Creativity
How well does the concept perform creativity?

2. Novelty
How well does the concept provide a novel experience?

3. Intuitive interaction
How well do participants fell intuitiveness with the concept?
Is the gesture-based interaction brings the feeling of intuitive interaction?
Is the visual/Audio indication (audio assistant/ narrative guidance)to understand the interaction?

4. Interact with others (inclusive)
Do participants feel free to enjoy with others?

5. Present Cultural-related knowledge
Does the participant think the concept presents the cultural-related experience?

METHOD

To evaluate the overall experience but also specific interaction qualities, 7 points Likert Scale method has been applied.

Additionally, for measuring creativity, Horn, D., & Salvendy, G. (2006) have identified that there are three major types of dimensions of product creativity: Product attribute, Affect, Preference. Few factors from these three dimensions have been confirmed are associated with product creativity, which used in evaluating the concept of the SOTN.

Product attribute dimension: The perception of product creativity (Factor: Novelty)

Affect dimension: The emotional impact of product creativity (Factor: Pleasure)

Preference dimension: The preference for product creativity Factor: (Desire)

After participants filling in the questionnaire, three open questions were discussed. The quotes were transcribed and clustered.

2 TEST MATERIALS

To be able to evaluate the design, few materials were built (Used softwares see APPENDIX 6.0)

For participants to better understand the context and experience the space

Model in VR environment (see FIGURE 52)
Walkthrough Video (see FIGURE 53)

FIGURE 52
Model in the VR environment

FIGURE 53
Walkthrough 3D animation

For participants to better understand the desired interaction

Concept drawing (see FIGURE 54)
Interaction storyboard for each area (Area 2 is animated storyboard with sound) (see FIGURE 55)
Interactive prototypes for each area. (Download link see APPENDIX 6.0)

FIGURE 54
concept drawing of area 3

FIGURE 55
interaction animated storyboard
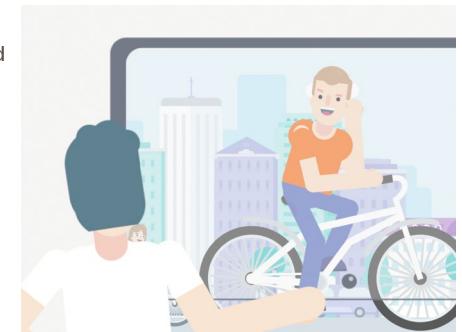
For evaluating the concept

Questionnaire (see APPENDIX 7.0)

Open questions:
Which part do you think is intuitive, which one is the most intuitive and least intuitive?
What kind of Cultural-related knowledge of the Netherlands did you learn from the concept?
Comparing to your previous experience, do you feel more willing to enjoy with others in this attraction?

6.2   USER TEST

3   TEST SET UP

PARTICIPANTS

There were two groups of participants who belongs to the target group in the test. The first group had 4 participants and the other had 6 participants.

Process:

The concept of 3 areas were tested separately. As shown in Figure 56, Firstly, the designer introduced the project to the participant. And participant could experience the concept by using VR cardboard and watching the 3D walkthrough video(see Figure 58). After each, the sound storyboard(video) and interaction storyboard (see Figure 59) were shown to the participants to explain the concept. And then participants were asked to interact with the prototype. After these steps, participants needed to fill in a questionnaire(see Appendix 7.0). In the end, some open questions asked by the designer to the participants.

1. INTRODUCTION
Brief introduction of the project, the designer introduces what is the SOTN attraction. VR cardboard and walkthrough video (see FIGURE 57) can help participant to better understand the concept and can sensitizing participant into the context.

2. SOUND AND INTERACTION STORYBOARD
The interaction storyboard in the form of illustrations displayed the interaction design of each area. (see FIGURE 58). The animated storyboard in the form of video with sound displayed the sound of each area(see FIGURE 59)

3. TESTING WITH PROTOTYPE
Interact with the interactive prototype for each area in an immersive room.
As shown in figure on the next page, the test is conducted in the cinema in Van Embdenstraat to simulate the context of areas.

4. CONVERSATION
Firstly, the participants are asked to fill in a questionnaire and then discuss the open questions together.

5.WRAP UP

FIGURE 57
3D Walkthrough
Video

FIGURE 58
Storyboard of Area 3

FIGURE 59
Animated storyboard
of Area 2

FIGURE 60
Interactive prototype
of Area 2

6.2   USER TEST

4   TEST RESULT

Although the test did not include all parts of the concept, the parts that were tested can be considered to be the core of this design. The results from the questionnaire were analyzed and present in the chart. Moreover, the quotes collected from the interview were clustered based on the test objectives. The most valuable insights were shared below. The raw data sees Appendix 8.0.

CREATIVITY
The evaluation of creativity of the concept was divided as three factors:
Novelty, Pleasant, Desire.

Novelty:
As can be seen from the figure below, participants have a high average score (around 6.1) for the factor of novelty, which indicates this concept can be identified as a novel experience.

FIGURE 61
Result about novelty
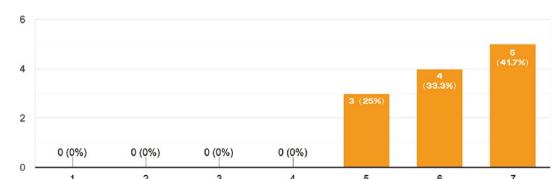
"It can be known that some interactions are based on everyday life, but these are interpreted in another interesting way by using interactive media and bring a novel experience to me. "

"By using video content to guide me to interact with the screen is quite unique. It's not like the usual guidance that I'd experienced in the museum or other attraction before."

"It's cool that I can compose the music by stepping on the ground and play with others. Moreover, the music along with the audio-visual pattern impressed me a lot. "

Pleasant:
Figure 62 shows that eight participants gave 7 points, three people gave six points, and one person gave 5 points. Also, the average score for is around 6.5, which means the concept performs quite well in bringing the sense of pleasure to the participants.

Desire:
The Figure 63 presents how likely are the participants to visit this concept. The average score is 6, which means most of the participants are willing to visit the attraction. In other words, from the preference damson, the concept performs well.

FIGURE 62
Result about Pleasant
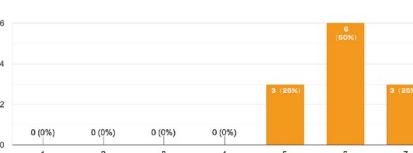
FIGURE 63
Result about Desire
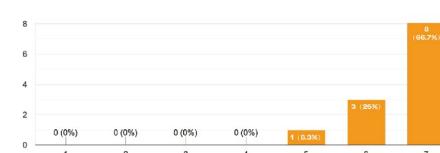
INTUITIVE

The figure below indicates how well do participants fell intuitiveness with the concept. The average score is 5.75, which means, the concept presents the intuitiveness in terms of interaction. However, two of the participants gave 4 points, and they felt the interaction is not as intuitive as they wish.

FIGURE 64
Result about
intuitive interaction
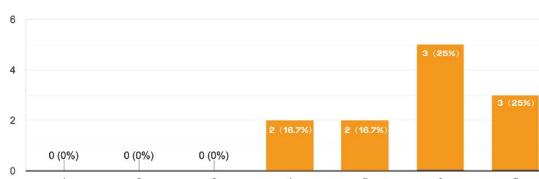
The gesture-based experience: (AREA 1)

P5: " With the video content, it's quite intuitive to interact with the screen by using the gesture, especially when the actions look like will happen in daily life. For example, like the seagull's scene. When the seagulls fly to me, I subconsciously wave my hand to let it go away. And when I waved to the windmill, the wind sound becomes louder, this feedback gives me a strong indication that I can control the wind and windmill"

P1: " I think the theme of Area 1 indicates some similar scenes in the real life which remind me of some related interaction. For example, we arrive at the pasture and to feed the cow, and it's something I might do in real life. But for some interactive activities like waving to the windmill and spin it faster with others, it's something that will not happen in real life. If there is no audio indication, I might not know how to play with it."

P12: "I think the interaction with the screen without holding the device is cool. Compare to my previous dark ride experience, and this one brings me a novel experience. But I feel a bit lost control somehow, cause there is not a visual indication on the screen showing where is my hand. And the increased volume of the sound of wind indeed gave me the feeling of the wind became stronger, but I think the sound can combine with the real wind, it would be more immersive and the feedback would be more direct."

The tram theming experience (AREA 2)

P1: " The second area, the video story along with the special effects(rain and wind) with sound together build a context for me to understand well what to do next. The interaction happens smoothly. "

P6: " The second part, it kind of experience from the real-life, and different layers of the sound as the trigger is interesting. But I thought the story plays an important role here. If the story is far-fetched, it might not easy to understand the interaction. For example, the story of biking people wave a hand to and say hello to me. If without your (designer) notification, I won't execute the correct actions or even don't know I can interact with the screen. "

**6.2 USER TEST**

The sound playground (AREA 3)

P7: "I like the area 3, *visual indication on the ground gives me direct visual feedback* when I stepped in. and the sound I generated surprise me and *trigger me to step the other circle to explore the sound*."

P11: "The area three is the most intuitive one, and I think the feedback is direct, *the combination of generating sound and the visual feedback on the ground give me active feedback.*"

P8: "I like the Area 2 because the story behind it can guide me to do the interaction. But the visual of the area 3 is *a bit abstract,* it's not that intuitive for me. Without your(designer) explanation, I might don't know how to enable the music."

INTERACT WITH OTHERS (INCLUSIVE)
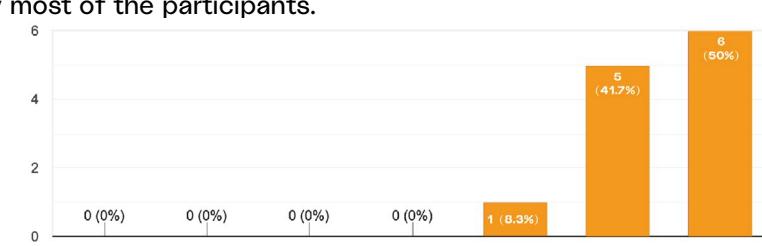
FIGURE 65
esult about inclusive

The figure shows the average score is high, which indicates that the participants feel free to interact with others in this attraction. It is worth mentioning that Area 3 is highly graded by most of the participants.

P2: " I feel okay to stay with others in this attraction. Since in area 1, *I have my seat in the vehicle, and no one can disturb my view.* Same as area 2. even though area 3 has no specific location for me, but the experience is *collective and inviting* everyone to play with others."

P7: " I like the last one (Area 3), and I think I will enjoy with others in that kind of *atmosphere.* The theming also gives me a feeling of clubbing. It's quite cool to *play with others and create music together*, so I don't mind there are many people there."

P3: " I think the third one is more e*ncourage me to join together* with others, not just dancing, but now is like you are going to interact with the music and light, I feel more *encouraged and motivated* to play with others."

CULTURAL-RELATED
The figure shows an average score of 6, which means that the concept presents culturally relevant knowledge to participants. It also shows that the interpretation of culture of the Netherlands by this concept can be understood by participants.

FIGURE 66
Result about cultural-
related
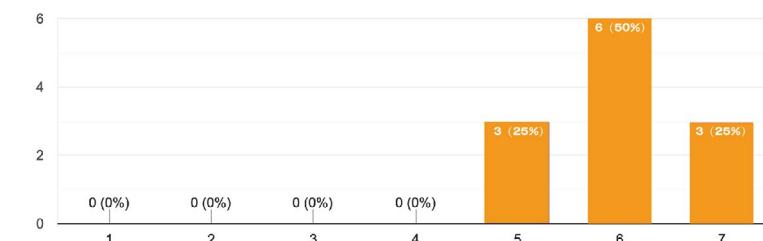
P2: "The first and the second parts are *introducing me the natural sound and view and also the city life of the Netherlands.* Even though there are just a few clips or scenes, but still gave me an impression of the Netherlands culture."

P6: " But for the third one, it brings me the feeling of Disco music, *but I will not immediately relate to the Dutch-techno.* I would prefer there is some *introduction* to the music, the background, the history."

LIMITATION OF THE TEST
The prototypes only present part of each area, which might result in incoherent of the story behind the concept. The concept is hard to build on the real scale, and participants can only experience the space through the VR model and the 3D walkthrough video.

For area 1, the designer was acting as the audio guide, and the participants may consider the notification from the designer is a test task but not the audio guidance.

For area 2, the video content waws separated as several clips, which the participants may feel the story is not coherence. Even though the storyboard helped to understand the concept, but compare to the video with sound, the storyboard was not immersive enough.

For area 3, Since the requirement of the space, the prototype only can be built in a smaller scale. Participants awere hard to immerse into the concept.

Moreover, When doing the questionnaire and interview, most of the participants were aware that it was my graduation project they were testing. Thus, they might be less critical because of this.

Last but not least, the amount of participants were not achieving the ideal default amount of the visitors for each area. So the evaluation of "inclusive" factor may be biased.

TOPS

CREATIVITY (NOVELTY)

The concept is perceived as creative according to the result of the evaluation in three dimensions: Novelty, Pleasant and Desire.

Creativity mainly comes from the content and the way of interacting with the content. The designer is applying the unique elements including sounds and view of the Netherlands, such as an animated cow in the pasture and biking people under the rain. Those sounds and views of the Netherlands were integrated into a timeline from day till night. The participants can obtain uniqueness in a holistic and immersive experience. Besides, the interaction in the attraction is different from the other traditional large-capacity tourist attraction. The visitors get to know the culture behind the attraction by interacting with the objects progressively. The Audio-visual feedback of the interaction brings surprised to the visitors and brings a sense of pleasure. The collective and playful experience appeal to most of the users and arise their desire to go the attraction.

INTUITIVE

The interaction in this attraction is designed based on the user familiar behavior like waving the hand, wiping the window.

Add to that, the precise feedback combining the audio and visual gives the clear indication to the users. Together, in this way, it creates intuitive interaction.The designer implement the storyline into the attraction. The narrative characters of the storyline helps to engage the users in a natural way.

INCLUSIVE

The attraction creates a collective atmosphere, and animated elements with sound imply messages of interaction. In this way, the visitors are motivated and encouraged to enjoy with others.

Also, the Attraction is designed to be experienced in the group. At the same time, the field of view of individuals is also considered. All the visitors could have a personal room without disturbing others, but at the same time enjoy the experience together with others.

CULTURE-RELATED

The designer is applying the unique elements including sounds and view of the Netherlands, such as an animated cow in the pasture and biking people under the rain. All the elements that the designer used in the attraction are rooted in the culture and typical characteristics of the Netherlands. The interactive and narrative way help to convey the cultural knowledge of the Netherlands to the visitors easily. That's why most of the participants can easily perceive the culture characteristics of the Netherlands.

TIPS

WEAK AT IMPLEMENTATION OF THE STORYLINE

The overall manifestation of the storyline is not particularly clear for the participants. Although the story of each area is interlocking, the participants are not well aware of the storyline behind the attraction.

First of all, the participants felt the transition between the three areas are not well displayed. They felt a bit sudden of the changing of three areas. 2. The interior design of the attraction does not fit well with the storyline. In the future, The designer can design the excessive space in between the areas as a "time tunnel", by using lighting effects to imitate daylight to simulate the changing of the time, which can enhance the connection among three areas and present the storyline in an easy to understand way. It would be suggested: in the following design

LACK OF MULTI-SENSORY FEEDBACKS: TANGIBLE FEEDBACK

Audio assistant can help participants know in advance how to interact with the content of the screen and the visual feedback on the screen can help the participants know what is happening. However, some participants expect various real-time feedback which can immerse them into the context better. For instance, in the area 1, if visitor wave their hand to spin the windmill, there can be special wind effect along with the sound of the wind. The application of the materials

IMPLICIT CULTURAL-RELATED KNOWLEDGE IN AREA 3

The first and second areas did a good job of getting people to understand the cultural aspects of expression in the area because these two areas applied the concrete view and theme environment along with the sound.

But in the third area, because of the abstract graphics and the music that international tourist is not familiar with, it might be difficult for participants to like to associate the corresponding cultural knowledge. So if the designer can add descriptive elements to introduce the story background of the area before the experience of each area, the sound of the area, the historical knowledge behind the sound, will achieve an optimal experience. And make it easier for people to understand the corresponding knowledge.

FROM COMPANY SIDE

IMPROVEMENT

Environmental, spacial and show set design can be improved.
The storyline can be scripted more dramatic.

6.4   RECOMMANDATION

**Apply the familiar interaction in the
real world to the virtual world:**
To make the interaction in the digital and virtual world more natural and easy to
understand, it's recommended to imitate similar behaviors from daily life when designing
interactions. For example, Area 2 transfers the interaction of wiping the fog and raindrop
on the window into the design, where users will intuitively wipe the screen to make it clean.

**Somatosensory interaction combined with
multi-sensory feedbacks:**
If the company wants to develop the somatosensory interaction in the future attraction
design, it's necessary to combine with the audio and visual feedback. Moreover, in further
development, the company can utilize multi-sensory interactions to construct a richer user
experience. For example, in the windmill theme of area 1, the company could create a more
vivid and real experience if they combine the movement, sound and even the air blowing
of the windmill.

Improving the connection between the three areas by theming:
Even though the designer implemented the storyline to maintain internal consistency
currently, it turned out to be the visitors might not well perceive and understand the story
behind. The reason lies in that the current connection between the three areas is weak.
And the transitions are not spontaneous enough. In a further development, the designer
can design the transition space in between the areas as a "time tunnel," by using light
effects to imitate daylight. The visitors could understand the transition by perceiving the
change of the daylight.

Strengthen implementation of the overall Storyline:
It is usual to use storyline in the attraction design to maintain the consistency and create
an immersive experience. The project applied the storyline for the overall construction of
the attraction. Moreover, the plot of the story could serve as narrative guidance for visitors
that trigger them to execute the interaction. For instance, one of the plot from area 2, the
biking people says hello to the visitors to trigger them to open the window to hear what he
is talking.

Sound effect and audio visualization:
This project focuses on the sound of the Netherlands. Limited by the technical
feasibilities in the project, the sounds used were in low fidelity. In the following
design, Sound effects should be refined. Moreover, the application of real-time audio
visualization in enhancing the atmosphere works well.

Present the related knowledge explicitly:
Area 3 receive positive feedback in terms of intuitive interaction and pleasant
experience. However, participants feel difficult to associate the corresponding cultural
knowledge because of the abstract graphics and the music that international tourist
are not familiar. If the attraction is using the abstract pattern or sound in the future
design, the descriptive elements to introduce the background (the sound of the area,
the historical knowledge behind the sound) are required.

Visitor flow:
This project focuses on the application of interactive media in large-scale attractions.
Although the designer has considered the issue of visitor flow, many details have not
been perfected due to time limitation. This design takes advantage of the split crowd,
grouping visitors to control the flow of people, but how to guide the flow of people is
not detailed design. In future designs, an effective guidance system can help guide the
crowd and group experience.

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APPENDIX 1.0
PARTICIPANTS SELECTION

PARTICIPANTS SELECTION SURVEY
This survey is a part of a graduation project about the sounds of the Netherlands attraction design. I highly appreciate it that you are willing to fill it and all responses will be treated anonymously and confidentially. There is not to a right or wrong answer; Please feel free to fill in. The questionnaire consists of 2 parts and will take a maximum of 10 minutes to fill out.

PART 1

What is your name ?

_____

Where are you from?

_____

What is your gender?
○ Female
○ Male
○ Others

What is your level of education?
○ Travel alone
○ Travel with family
○ Travel with friends

PART 2

When i Travel internationally, I prefer to:

In general, when I travel internationally, I prefer to:
○ mostly/more often do research before traveling
○ equally do research/do no research before traveling
○ more often/mostly do no research before traveling

In general, when I travel internationally, I prefer to:
○ mostly/more often education and culture
○ equally education and culture/ recreation and fun
○ mostly recreation and fun

In general, when I travel internationally, I prefer to:
○ mostly/more often grow personally
○ equally grow/ relax
○ mostly relax

In general, when I travel internationally, I prefer to:
○ mostly/more often visit well known sites first
○ equally well known/obscure
○ more often/mostly visit obscure sites first

In general, when I travel internationally, I prefer to:
○ mostly/more often wander through local markets
○ equally local markets/name brand stores
○ more often/mostly shop at name brand stores

Write down one of your favorite destinations:

_____

APPENDIX 2.0
SENSITIZING BOOKLET

PART 1
The participants were given a concise introduction to creative tourism with the help of four examples of creative tourism.

Introduction

The study is part of a graduation project which is to Design an interactive tourist experience for large capacity international tourist around the topic of the sounds of the Netherlands. This booklet is used to get you in the mood of this topic.

In the session next week, you are going to do simple tests while communicating with each other to prepare for that, please fill in this booklet. Note that there is no wrong answer.all of your insights are valuable. Feel free to include drawings or any other means as you want.

About creative tourism

Creative workshop

Creative Exhibition

dutch design week eindhoven
participant 2018

Creative festival

Creativity as backdrop

The creative industries were defined in this report as: knowledge-based creative activities that link producers, consumers and places by utilizing technology, talent or skill to generate meaningful intangible cultural products, creative content and experiences.

PART 1
The participants were asked to describe one of the best tourist attraction based on their memory.

One of the best tourist attraction in your memory:

Before visiting

what motives you to visit?

☐ having fun
☐ Visiting places related to my personal interests
☐ resting and realxing
☐ getting away from everyday physical stress/ pressure
☐ exploring the unknown
☐ develop my personal interest

☐ gaining a new perspective on life
☐ being creative
☐ working on my personal/spiritual values
☐ experiencing different culture
☐ meeting the locals
☐ others

What do you feel?
You can use the sticker or write down whatever word to describe the emotion you feel.

During visiting

The level of your involvement

☐ extremely high
☐ high
☐ moderate
☐ low
☐ exeremely low

Because ....
(write down why you have each level of involvement)

e.g., I enjoy employing in the experience. The experience interacts me. The experience is so pleasant.

What do you feel?
You can use the sticker or write down whatever word to describe the emotion you feel.

After visiting

What do you feel?
You can use the sticker or write down whatever word to describe the emotion you feel.

My favourite moment of this attraction is ....
Because
e.g., I like the moment that I interact with the wall, and the animation was moving by my touching. It's a novel experience for me.

PART 3
This part required the Participants to draw or write down the best sound in a day. This part helped in collecting information on the inspiration for the sounds in the Netherlands.

The best sound in a day :
There is not limitation of the means of interpretation. Feel free to draw.write down some something or cut and paste pictures from the magazine.

Nature sounds

e.g., the bird's sound in the morning

Man-made sounds

e.g., the market shouting/transportation

PART 4
In this part, the focus was on what is target groups' expectation

What is creative tourism for you?

with the creative factors:

☐ Novelty
☐ Usefulness
☐ Controlled risk but challenging
☐ Experiential
☐ Existential
☐ Sense of achievement
☐ Unique learning
☐ Interaction with instructors

☐ Others

If you are going to visit a creative sound experience（For example：Exhibition.Show and so on）What do you expect?

There is not limitation of the means of interpretation. Feel free to draw.write down some something or cut and paste pictures from the magazine.

e.g., I expect something I can play with or I expect.

APPENDIX 3.0
MATERIAL BOX

Instruction of toolkit

A set of the toolkit was provided to participants to build their ideas.


INSTRUCTION

Brainstorming tools for Xiaomin's graduation design:
The Sound Of The Netherlands Tourist Experience Design

What's in the box?

1.PINS:

Orange   Blue   Green   Yellow   Red   Pink   image+pin

Orange indicates sounds: Combine with the image
Green indicates vegetation like: Trees,Grass and so on
Blue indicates Water like: Sea, River, Rain and so on
Yellow indicates Wall, Block
Red indicates visitors
Pink indicates others

2.Board   3.Images 4.Paper strips 5.Blank sticker 6.Color pens 7.Scissor

Thank you for participating in my brainstorming session!
-Xiaomin Li

1. Pins: there are three sizes of the pin with six colours are offered to let participant build the space and stick the stickers)
2. Stickers: A set of stickers based on the representative sound of the netherlands and blank stickers.
3. Board
4. Tape
5. Paper strips
6.Other materials:scissor; cotton thread; tape; mud
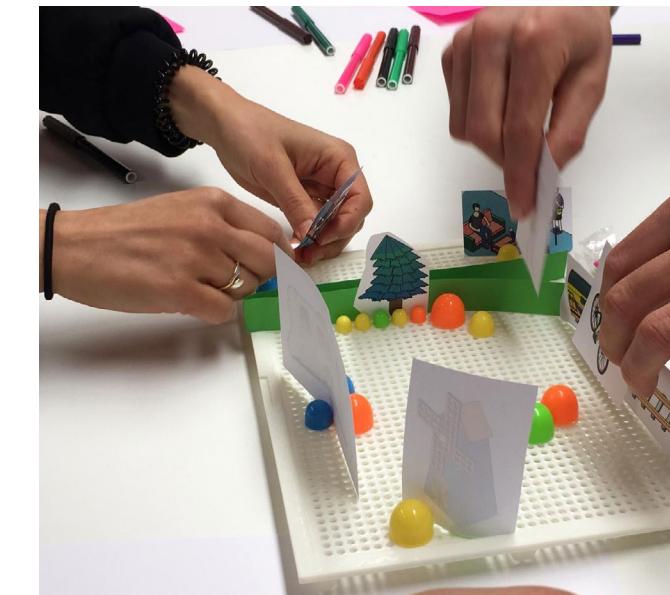
The toolkit in the test

APPENDIX 4.0 TWO CARD
SETS FOR BRAINSTORMING

Card set about the sound
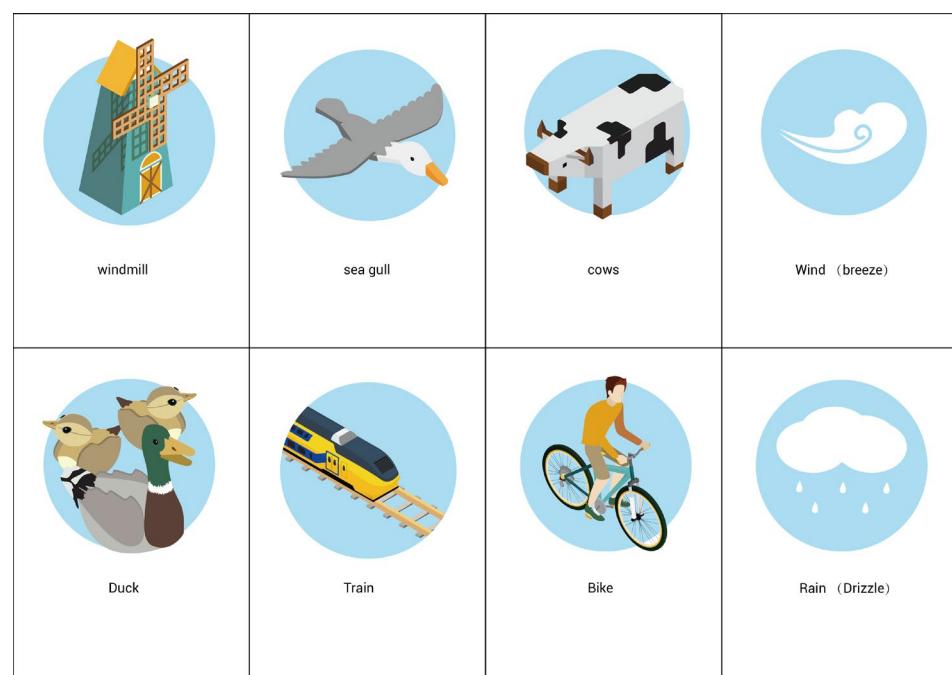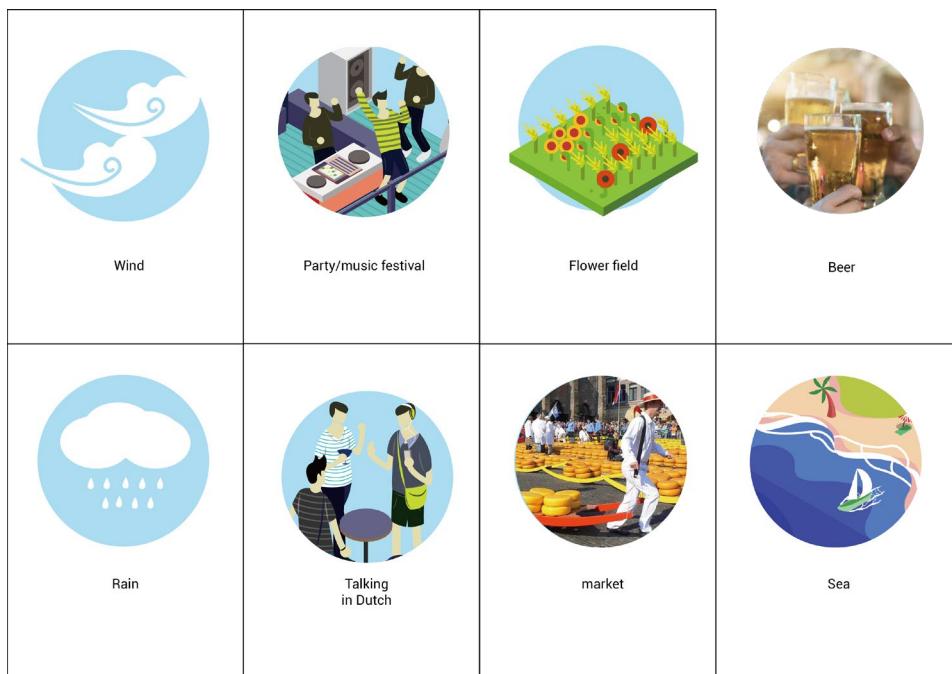
Card set about the interactive media and technology

| Wind | Party/music festival | Flower field | Beer |
| Rain | Talking in Dutch | market | Sea |

| windmill | sea gull | cows | Wind（breeze） |
| Duck | Train | Bike | Rain（Drizzle） |

Laser Rifle	Text & Images	Immersive Reality Projection
Pattern Recognition	Touch Screen	Virtual Reality
Voice Assistant Interface	Voice Assistant Interface	Flexible Display
Kinect	Augmented Reality	Volumetric Display
Presuure	Holographic Communication	Projection Mapping
Surround Stereo System	Game	Smartphone

VIDEO PLAYER

PROJECTOR

HI-FI SYSTEMS

APPENDIX 5.0
FLOOR PLAN ITERATION

Final Floor Plan
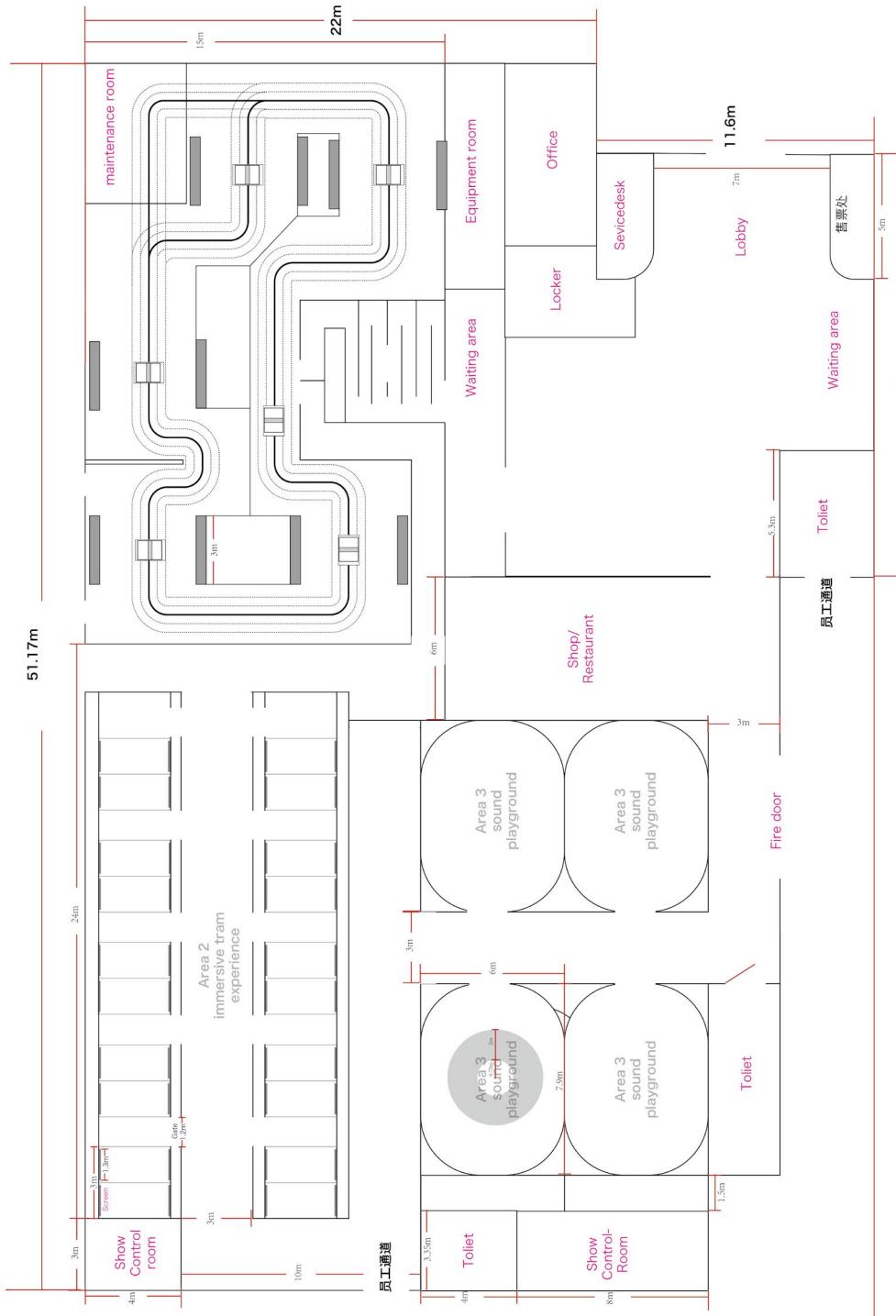
Floor plan iteration:
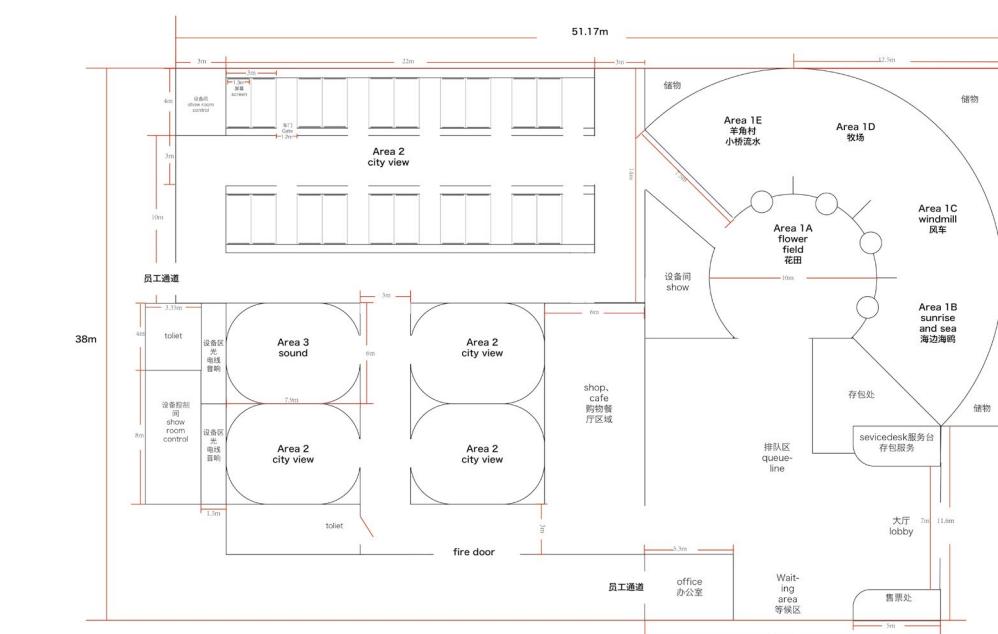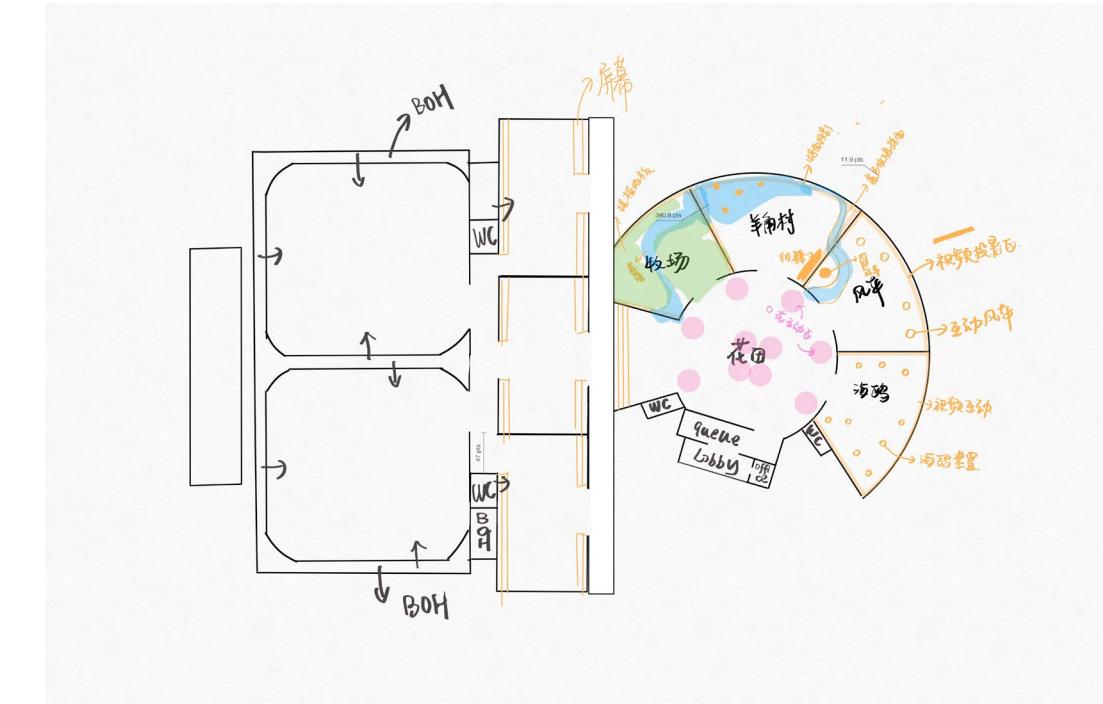
APPENDIX 6.0 PROTOTYPING

All the prototyping materials can be downloaded from the link below:
https://drive.google.com/drive/folders/16FHM2qYTe5I3IQrn63cUn-
qP0syYFd5V?usp=sharing

AREA 1 Prototype: Spin the windmill

Tool: Protopie (quick prototype tool)

Test start → Audio assistant introduce the area and the how to interact with the screen. → Participants wave hand → Enable Sound effect Enable Windmill spin → Participants wave hand harder

Windmill spin slower/stop ← Participants stop ← Windmill spin faster
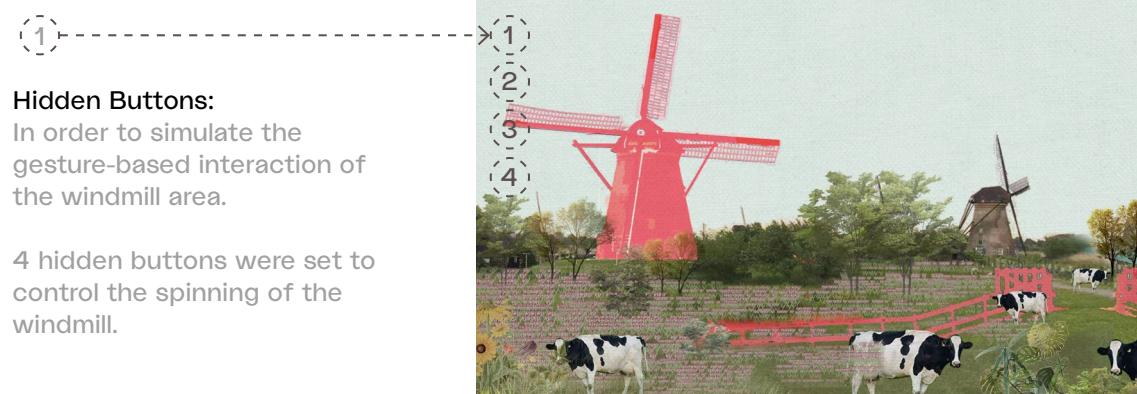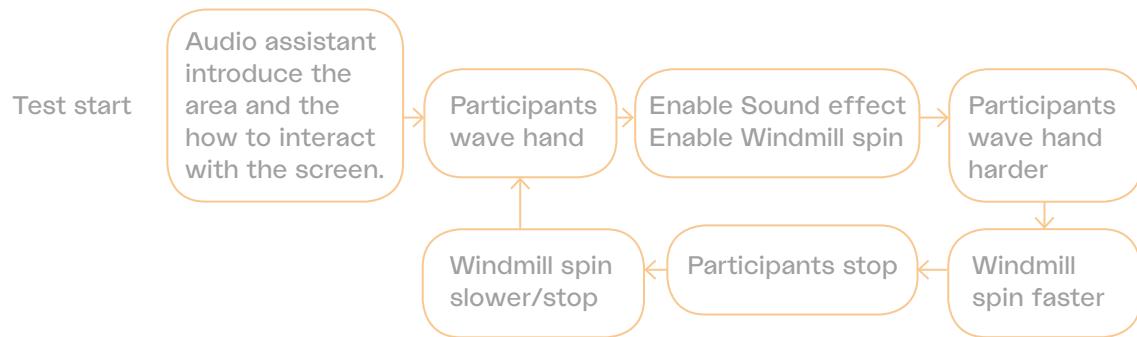
Hidden Buttons:
In order to simulate the gesture-based interaction of the windmill area.

4 hidden buttons were set to control the spinning of the windmill.

Sounds:
 Default sound: Breeze + mooing from cows

(1) Wind sound + mooing from cows + The wind blows through the grass

(2) Stronger wind sound + The wind though the trees

(3) Stronger wind sound + windmill turning sound effect+ The wind though the trees

(4) Fierce wind sound effect

AREA 2 Prototype: wipe the window

Tool: Photoshop
By setting two layers (one is the blurry layer, one is the video content), and using the eraser tool to simulate the scenario that the user is wiping the window.

Test start → Video content plays (animation and street organ sound effect) → Participants if → wipe → The water drops and fog that they wiped away will disappear. Street organ sound louder (other ambience sounds' volume decrease)

Do nothing → The animation keeps playing and go to next scene
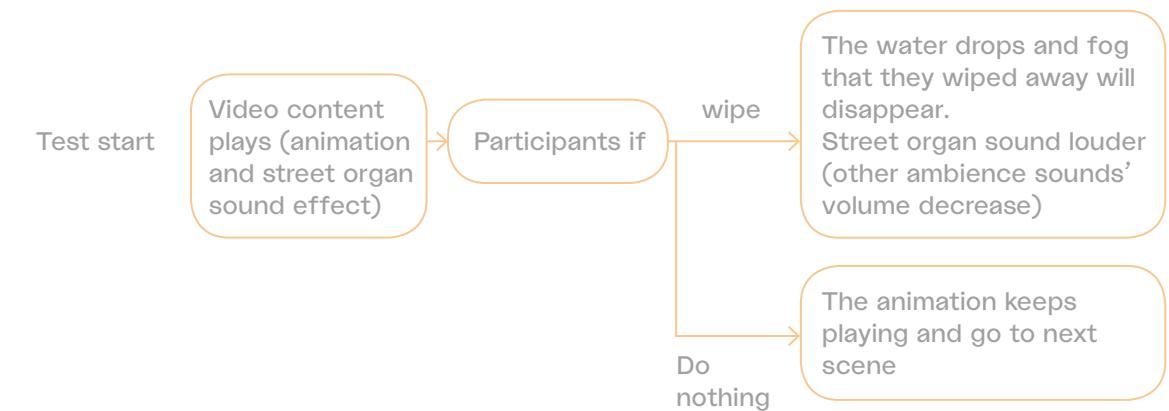
Video content:

Upper layer   Bottom layer   Simulation

Sounds:
Street organ music
Ambience sound (people talking+ bike bell +tram passing by)

AREA 3 Prototype: Sound playground

Tool: Sublime + Touch designer

Test start   Appear

sound track 1
sound track 2
sound track 3
sound track 4
sound track 5

Default
volume:0dB

If user step in

Circle line show and increases as the number of users increases.

First the volume will increase to 40 dB, and then gradually increases by 10 dB as the number of people increase. (Maximum users: 4)

Circle line disappear and decrease as the number of users left. The volume gradually decreases by 10 dB as the number of people decrease.

If user step out

Abstract pattern

Volume increase   Pattern expand

Volume increase   Pattern shrink

Test by using projection

Sounds:

APPENDIX 7.0 QUESTIONNAIRE

APPENDIX 8.0 QUOTES

1. How would you like to describe the concept (In terms of novelty)?

Regular   O   O   O   O   O   O   O   Extraordinary

2. To what extent do you agree that the concept is intuitive?

Disagree   O   O   O   O   O   O   O   Disagree

3. How would you like to describe the concept (in terms of pleasant)?

Unpleasant   O   O   O   O   O   O   O   Pleasant

4. To what extent do you feel engaged in the concept?

Annoyed   O   O   O   O   O   O   O   Engaged

5. To what extent do you think the experience is fun?

Borning   O   O   O   O   O   O   O   Fun

6. To what extent do you think the concept is relevant to your preference?

Irrelevant   O   O   O   O   O   O   O   Relevant

7. How likely are you to visit this attraction?

Unlikely   O   O   O   O   O   O   O   Likely

Intuitive:

P1: "The second area, the video story along with the special effects(rain and wind) with sound together build a context for me to understand well what to do next. The interaction happens smoothly. I think the theme of Area 1 indicates some similar scenes in the real life which remind me of some related interaction. For example, we arrive at the pasture and to feed the cow, and it's something I might do in real life. But for some interactive activities like waving to the windmill and spin it faster with others, it's something that will not happen in real life. If there is no audio indication, I might not know how to play with it."

P2: "I like the interaction in the third area. The sound is inviting me to join the experience. But for the area 1 experience, It's fun to wave to the windmill to trigger the spinning. But it hard for me to interpret the action of waving to the windmill can spin it faster without the notification from the audio guide."

P3: "I feel like all of them are easy to use, but the Area 1 is the most. I think the decoration of the environment which remind me of the real scene, and it helps me to understand the interaction."

P4: "I think the theme of area 1 indicates some similar scenes in the life which remind me of some related interaction. For example, we arrive at the pasture and to feed the cow, and it is something I might do in real life. Moreover, I feel like the by using the gesture to interact with the video content is better than using the device, especially the scene of the seagulls fly away."

P5: "With the video content, it's quite intuitive to interact with the screen by using the gesture, especially when the actions look like will happen in daily life. For example, like the seagull's scene. When the seagulls fly to me, I subconsciously wave my hand to let it go away. And when I waved to the windmill, the wind sound becomes louder, this feedback gives me a strong indication that I can control the wind and windmill."

P6: "The second part, it kind of experience from the real-life, and different layers of the sound as the trigger is interesting. But I thought the story plays an important role here. If the story is far-fetched, it might not easy to understand the interaction. For example, the story of biking people wave a hand to and say hello to me. If without your (designer) notification, I won't execute the correct actions or even don't know I can interact with the screen."

P7: "I like the area 3, visual indication on the ground gives me direct visual feedback when I stepped in. and the sound I generated surprise me and trigger me to step the other circle to explore the sound."

P8: "I like the Area 2 because the story behind it can guide me to do the interaction. But the visual of the area 3 is a bit abstract, it's not that intuitive for me. Without your(designer) explanation, I might don't know how to enable the music."

P9: "I like the interaction of the wiping the windows, the sound of the street organ triggers me to figure what it looks like. and then I wipe the windows. It's smooth and looks like it will happen in my life."

P10: " I like the moment of closing the windows when the special effect like wind and rain bring me the feeling of intuitive when the rain comes, and I feel I will close the window intuitively."

P11: " The area three is the most, and I think the feedback is direct, the combination of generating sound and the visual feedback on the ground give me active feedback."

P12: " I think the interaction with the screen without holding the device is cool. Compare to my previous dark ride experience, and this one brings me a novel experience. But I feel a bit lost control somehow, cause there is not a visual indication on the screen showing where is my hand."

Cultural-related knowledge

P1: I think I learn something about the Netherlands. Various weather, the rain and the wind that I learned from the story of biking people under rain brings me a strong impression. And the integration of the content and the interactive thing works quite well, it brings me into the context immediately

P2: "The first and the second parts are introducing me the natural sound and view and also the city life of the Netherlands. Even though there are just a few clips or scenes, but still gave me an impression of the Netherlands culture."

P3: The market is part of the culture of the Netherlands

P4: I like the idea that presents daily life in the form of the story to help me to learn about the lifestyle of the Netherlands. But the story was quite short, and I think the thing that I see is quite limited and a bit dramatization

P5: I'd visited the Zaanse Schans before, and at that time I just took some photo with my family and I feel a bit bored. But in your design I can play with the windmill which is quite fun even though it's not realistic. For me, to actively play with something can give me a stronger impression than only seeing something.

P6: " But for the third one, it brings me the feeling of Disco music, but I will not immediately relate to the Dutch-techno. I would prefer there is some introduction to the music, the background, the history."

P7: I feel like everything is fresh to me, I like the way to interact with the installation or screens. But in the last area (sound playground), I feel like it's hard for me to understand what is the cultural-knowledge behind it. Unlike the area 1 and 2, the audio-visual, the sound seems abstract to me to get the information. It would be good if there are some explanations about the history, background.

P8: The impression of the dutch people bike in the rain.

P9: Area 3 give me a strong impression of the DJ culture of the Netherlands, I've heard that Dutch DJ is famous and their music is amazing. It's good that I can play with the music and compose some.

P10: From a few clips that you present to me, i can know something about the Netherlands, like the tulip, the windmill. But i have expected some culture-related knowledge about the art. if there can be some interactive activities with the artwork, I think that would be fun.

P11: I feel like the way of the design to present the culture of the Netherlands is kind of like over-truth expression. But I quite like it, cause it helps me to figure out something hard to find in the daily life.

P12: I think all of them presents quite well in an interesting way.

Interact with others (Inclusive)

P1: I think the windmill one, cause it is collective. When we do it together, we wave our hand to spin the windmill faster.

P2: " I feel okay to stay with others in this attraction. Since in area 1, I have my seat in the vehicle, and no one can disturb my view. Same as area 2. even though area 3 has no specific location for me, but the experience is collective and inviting everyone to play with others."

P3: " I think the third one is more encourage me to join together with others, not just dancing, but now is like you are going to interact with the music and light, I feel more encouraged and motivated to play with others."

P4: I would prefer to stay with my friends rather than strangers, and I am worried about the queueing.

P5: The first and the third is equal to me. The third one is the way that you play with others; it's more like a trigger. So why not?

P6: Compare to previous experience, indeed, I am welcome to visit with others in this attraction because there are some activities required more than one person.
P6: area 1 and 2 are fine, cause I can have my spot. But probably because of my personality, I not a big fan of area 3 activity. I prefer to look but not play with others.

P7: " I like the last one (Area 3), and I think I will enjoy with others in that kind of atmosphere. The theming also gives me a feeling of clubbing. It's quite cool to play with others and create music together, so I don't mind there are many people there."

P8: Yes, because of the grouping of the visitors. It seems like I don't need to stand inside the crowds and try hard to interact with the installation, and everything is well organized.

P9: I feel like I am okay to stay with others in area 1 and 3, but in area 2, I prefer to stay with my friends and interact with the screen. Cause, in that case, I can talk with my friends.

P12: yes, there are quite a lot of collective interactive activities, so I am willing to play with others.

EXPLORING INTERACTIVE MEDIA FOR INDOOR
LARGE-CAPACITY TOURIST ATTRACTION:
SOUND OF THE NETHERLANDS (SOTN)

XIAOMIN LI
2019

EXPLORING
INTERACTIVE
MEDIA