ID PROJECT
LONG DESCRIPTIONS
2014-2015 - Q3 & Q4

PLAYFUL INTERACTIONS
Description

<table>
<thead>
<tr>
<th>Description</th>
<th>DPH92</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year</td>
<td>2014-2015</td>
</tr>
<tr>
<td>Quartile</td>
<td>Q3/Q4</td>
</tr>
<tr>
<td>Title</td>
<td>Playful Learning Toolkits for Children</td>
</tr>
<tr>
<td>Responsible Lecturer(s)</td>
<td>Tilde Bekker</td>
</tr>
<tr>
<td>Co-lecturers</td>
<td>Iris Douma (if possible)</td>
</tr>
<tr>
<td>Type of education</td>
<td>Project</td>
</tr>
<tr>
<td>Learning objectives</td>
<td>Main competency development target</td>
</tr>
</tbody>
</table>

User focus and perspective: how to design a flexible system that meets the requirements and values of children, teachers and other stakeholders involved.

Form and senses: design of the look and feel of the building blocks of the toolkit, and possibly the toolkit ‘box’.

Integrating technology: exploration of what sensors and actuators to present and combine and in what manner.

Business process design: how to incorporate values of different stakeholders in the design, and determine how to position the final design in the (educational / home) market.

Design and research process: examining how to design a product, system and service combination for a set of stakeholders.

Team/individual
Both are possible.

Contents

Introduction

Mitch Resnick, the famous director of the LifeLong learning Lab of MIT, has always promoted learning through doing, which can be done with building sets such as MindStorms, LittleBits and Raspberry Pi. However, new toolkits are required for teaching young children to develop skills, such as digital literacy. Such toolkits should combine learning about design thinking and digital fabrication. Providing simple building blocks, that allow quick explorations, and different materials for expression are some of the starting requirements for such a toolkit. Also providing a simple design process that can be easily followed by children.

Understanding of technology/digital literacy is part of 21st century skills, which will need to be included in the curriculum of the near future: this is an educational innovation opportunity!

NB: The project is NOT about teaching children about programming and maths, it is about teaching children the value of technology in society!
**Design challenges**
The main challenge is to develop an integrated **Design Based Learning Approach** (DBLA) that combines a learning process with the use of a set of simple and playful building blocks that allow children to easily create diverse simple designs in a trial and error process.

You also have to understand enough of the context to have a good overview of the requirements for the toolkit. For example, how does the activity fit in the curriculum of the school, who facilitates the activity, what knowledge does the facilitator need to have?

Design challenges include:

- Decide on the look and feel of the building blocks (does it have appeal for both boys and girls). It can be related to the building blocks, but also to what you connect it to, combine with??
- Decide on a limited set of building blocks that provide enough opportunities for diverse design activities (e.g. some sensors and actuators, with simple direct links)
- How to develop a design learning activity that is suitable for the contextual requirements (e.g., teacher, children, educational material makers)
- What is a good design problem for a children of a specific age group?
- How to combine some concrete learning goals of schools (as measured by e.g. Cito tests) with the ‘new’ 21st century and digital literacy learning goals.

**Contribution to the mission of the department**
The **ID department** intends to create interactive and (co-)evolving systems where future technologies and humans co-adapt to achieve qualities beyond utility and usability. It focusses on values including social inclusion, sustainable healthcare and healthy aging.

**This project** focuses on providing children the ability to learn the right skills to participate in a future society full of digital technology (social inclusion). In order to do so, they need to develop 21st century and digital literacy skills. The educational approach needs to be adjusted with appropriate tools and educational processes to meet these changing requirements in education. The solution needs to meet the values of the diverse stakeholders and provide a good experience.

**Bio lecturers**
Tilde Bekker. She is a design researcher with expertise in designing for children and elderly. She has expertise in diverse design methods for designing with and for children. She is interested in creating solutions for playful interactions to support diverse activities, such as learning, play and social interaction.

Iris Douma, is a designer, researcher and expert on interaction design and education. She is also co-owner of children’s FabLab.

**Description of partners and their contribution**
The project is related to a recently started long-term design research project in Playful Interactions Theme called Playful Learning Toolkits, with Tilde Bekker (in collaboration with Saskia Bakker).

We are developing a stakeholder network including local schools and teachers, and technology education developers. Experts include: Linda de
Valk (playful interactions for children), Pepijn Rijnbout (toolkits), Mark de Graaf (toolkits), Iris Douma (Fablab and educational activities for children).

*Experts* in the form of a publisher (*Malmberg*) and a hands-on science experience provider for children (*MadScience*) provide knowledge about user groups and business considerations. Contacts at *schools* (primary and secondary) provide knowledge about pedagogy and user requirements and considerations. Contacts at the *Fontys Pabo* provide information about teacher education and pedagogy. Designer-based learning experts provide information about the design-based learning approach with children. Experts from the *Nationale Expertisecentrum Leerplan ontwikkeling* (SLO) provide information about long term plans for education in the Netherlands.

### Possible deliverables:
- Report
- Prototype
- Video
- Presentation
- Reflection report

<table>
<thead>
<tr>
<th>Course Material</th>
<th>References</th>
</tr>
</thead>
</table>
[1] National Expertisecentrum Leerplan ontwikkeling/ Learning goals at schools:  
- [http://www.slo.nl/](http://www.slo.nl/)  
- [http://www.slo.nl/organisatie/recentepublicaties/](http://www.slo.nl/organisatie/recentepublicaties/)  
[2] Kennisnet reports, education needs of the future:  
[3] 21st century skills booklet:  

Websites with existing toolkits and educational activities:
- [http://littlebits.cc/](http://littlebits.cc/)  

---

Course Material

<table>
<thead>
<tr>
<th>Course Material</th>
<th>References</th>
</tr>
</thead>
</table>
[1] National Expertisecentrum Leerplan ontwikkeling/ Learning goals at schools:  
- [http://www.slo.nl/](http://www.slo.nl/)  
- [http://www.slo.nl/organisatie/recentepublicaties/](http://www.slo.nl/organisatie/recentepublicaties/)  
[2] Kennisnet reports, education needs of the future:  
[3] 21st century skills booklet:  

---

### Possible deliverables:
- Report
- Prototype
- Video
- Presentation
- Reflection report

---

Course Material

<table>
<thead>
<tr>
<th>Course Material</th>
<th>References</th>
</tr>
</thead>
</table>
[1] National Expertisecentrum Leerplan ontwikkeling/ Learning goals at schools:  
- [http://www.slo.nl/](http://www.slo.nl/)  
- [http://www.slo.nl/organisatie/recentepublicaties/](http://www.slo.nl/organisatie/recentepublicaties/)  
[2] Kennisnet reports, education needs of the future:  
[3] 21st century skills booklet:  

---

Course Material

<table>
<thead>
<tr>
<th>Course Material</th>
<th>References</th>
</tr>
</thead>
</table>
[1] National Expertisecentrum Leerplan ontwikkeling/ Learning goals at schools:  
- [http://www.slo.nl/](http://www.slo.nl/)  
- [http://www.slo.nl/organisatie/recentepublicaties/](http://www.slo.nl/organisatie/recentepublicaties/)  
[2] Kennisnet reports, education needs of the future:  
[3] 21st century skills booklet:  
People play [3]. Play has an important function in training social, cognitive and physical development. It is embedded deeply into our nature.

In the Vision of Playful Interactions one of the directions in designing for play is to look for little triggers for playful behavior. A boring meeting and a pen make us doodle. A loose thread on a shirt irresistibly makes us fiddle with it. Play occurs spontaneous. One moment of play triggers the development of defining play, which leads to negotiating rules and goals. For children, a lumber-room ("rommelzolder") in this perspective is a dream environment. The world around them turns into a playground, providing means and context. The clutter around them provides opportunities to use in play. The objects do illicit directions for play, because of form, texture, or physical properties yet they do not define the goals or rules of play. This makes the lumber-room a good example of an environment for open-ended play. [1]

Designers on the other hand want control. They want to know, or better decide, what their users can and cannot do. That is a good attitude when you design something for strict functionality, like a car, a power tool, and a kitchen appliance. But when it comes to play, real fun starts when you cross the lines of control. In this project, we want to create a metaphorical interactive lumber-room. The mess, the unpredictability in this case is in the diversity of embodied interaction possibilities.

Design challenges
Most design processes focus at reducing uncertainty, in this case you have to design for unpredictability. For many designers, this will be a key challenge. This is the consequence of the aim to develop and/or research an interactive environment that supports open-ended play [4]. How can we get the children back in the position of play creators as opposite to play consumers? What triggers can we provide through interactive objects that inspire diverse and continual play, without directing it? How much control do we give to the children, how much initiative is taken by the interactive environment?
In general we approach this design challenge by focusing on the development of play, and the user experience while playing, and find what interaction opportunities can be provided to support this. We refer to this as ‘Design for Dynamics’. The following scenario describes how play might look like in such an environment:

Rick and Clair play in a park. They play a game of tag. It is Rick’s turn to tag the others. Clair runs away, towards the square. Clair runs towards an interactive tile on the square that is lit in green. She jumps on the tile and jells; ‘You can not tag me here, I’m safe’. Rick sees another tile flash in red. He jumps on it. “Now I have superpowers” Rick says and he tags Clair. Later they agree to try to turn all the interactive tiles green.

As a starting point for the ‘CATCHY CLUTTER’ project we have a large number of interactive tiles with light and sound output. Every tile is independent, and reacts autonomously on what it perceives. This is called a decentralized system [2]. We have good reasons to believe that decentralized systems are a perfect match to open-ended play. These decentralized building blocks are available from an ongoing Playful Interactions research project. The environment can play as much with the children as the children play with it.

As said, the focus of the project is on the interactivity of the environment. Previous research has made clear though that the physical context as well as the embodiment does matter a lot. You have to take a position as a designer on these aspects too. In the research project, we have explored a variety of possible stakeholders. In addition to the before mentioned challenges, there are also opportunities to explore business processes through the creation of product service systems.

Contribution to the mission of the department
The department intends to create interactive and (co-)evolving systems where future technologies and humans co-adapt to achieve qualities beyond utility and usability. It focuses on values including social inclusion, sustainable healthcare and healthy aging.

The project examines how decentralized play solutions can provide flexible, playful and educational opportunities for children to develop important skills for the rest or their lives.

Bio lecturers
Dr. ir. Mark de Graaf is researcher and coach at ID. His research focuses on the use of decentralized systems for open-ended play environments. The big challenge here is to span the gap between low level technological aspects and high level human behavior and meaning giving, especially in an open-ended context. His roots are in Physics.

Tilde Bekker. She is a design researcher with expertise in designing for children and elderly. She has expertise in diverse design methods for designing with and for children. She is interested in creating solutions for playful interactions to support diverse activities, such as learning, play and social interaction.

Ben Schouten is professor Playful Interaction in Intelligent Systems at Eindhoven University of Technology as well as lector Design for Games and Play, Hogeschool van Amsterdam. His group focuses on multimodal playful interaction and ambient game design in intelligent systems.
**Description of partners and their contribution**
The network involved in the CRISP Intelligent Play Environment project plays a role in this project. E.g. Driessen and Verstappen are artists that examine how emergence can trigger interesting interactions, and Almende develops sensor actuator networks. These partners are discussants in developing the Catchy Clutter solutions.

**Possible deliverables:**
- Report
- Prototype
- Video
- Presentation
- Reflection report

### Course Material
**References**


**Description**

<table>
<thead>
<tr>
<th>Code</th>
<th>DPH96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year</td>
<td>2014-2015</td>
</tr>
<tr>
<td>Quartile</td>
<td>Q3/Q4</td>
</tr>
<tr>
<td>Title</td>
<td>Persuasive game design</td>
</tr>
<tr>
<td>Responsible Lecturer(s)</td>
<td>Ben Schouten, Erik van der Spek</td>
</tr>
<tr>
<td>Co-lecturers</td>
<td>Martijn Kors</td>
</tr>
<tr>
<td>Type of education</td>
<td>Project</td>
</tr>
</tbody>
</table>

**Learning objectives**  
*Main competency development target*
- UFP (Psychology for persuasion, user motivation, effects testing)
- Others:
  - IT (Developing a game or persuasive technology)
  - DMM (Programming, creating game rules)
  - F&S (Aesthetics, Graphics design)
  - SCA (Embedded in (games) culture, meaning and impact for different ages and culture)
  - I&C (Games require curiosity, novelty, surprise)

**Team/individual**
- Both

**Contents**

*Introduction*
Playing is learning. As we play, we immerse ourselves in alternate realities and take on different roles. In this safe and friendly environment we learn to operate with given or negotiated alternative rules, create elaborate what-if scenarios and test out hypotheses. By making decisions in someone else's shoes, getting moved through engaging stories, learning about the underlying systems and forming optimal game strategies, the play activity can become impactful. We reflect on our worldview and can be 'persuaded' into attitudes and behavior that improves our quality of life.

For example, in Wii Fit, the player is motivated to lose weight. Through proximal goals the game shows how well the player is improving and boosts a feeling of competence. Ultimately, leading the player to believe a healthy lifestyle is attainable. Can these principles be used for an ageing population and mental health?

In the game *Papers, Please* you take on the role of an immigration inspector of a fictitious Soviet state, who has to check the passports of incoming civilians. What starts as a simple game of matching patterns, quickly turns into a study of the player’s compliance with obscene rules and a meditation on how to survive in a corrupt society. The player is both engaged (because it's a game) and complicit (because he or she is the protagonist), stimulating a reflection on society and the player’s attitude.
Figure 1. In the game Papers, Please the player is an immigration inspector forced into corruption.

Figure 2. Games about the impact of fastfood on the environment and the machinations of human trafficking.

In this project you will investigate how to design games to make an impact, and thereby improve wellbeing, health, or societal problems, in line with your vision.

**Design challenges**
In this project, you will design a game or playful activity that lures a person in (how do you design something that evokes curiosity and persuade people to start playing?), engages them fully (how do you motivate people to persist in an activity and become fully engrossed by it?) and through play changes their attitude. How to design for attitude change is also still very much an open question. Should the message be overt or covert, explicit or allegorical, emerging from playful mechanics, etc.

**Contribution to the mission of the department**
Games (intelligent systems) that improve the quality of life, for instance in the health care domain and for an ageing population, in societal contexts such as education or human rights, and the preservation of energy.

**Bio lecturers**
Prof. dr. Ben Schouten is a full professor in playful interactions and lector in game research and play design, with a background in art and computer science. Dr. Erik van der Spek is an assistant professor in game design, with a background in computer science and cognitive psychology. Martijn Kors MSc. is a PhD candidate in persuasive game design with a background in industrial design.

**Description of partners and their contribution**
This project is part of a nationally funded research endeavor together with the EUR and UU on the culture, design and validation of games for attitude change. It aims to uncover design guidelines how to shape people’s attitudes...
towards societal problems and for the benefit of working and learning environments (education, training, wellbeing), through the design of intelligent, playful systems. Project partners that students can work together with are companies in game and media creation (e.g. IJsfontein), healthcare (UMCs), NGOs (stop the traffik), and universities (UU and EUR).

Possible deliverables:
- Report
- Prototype
- Video
  - Presentation
  - Reflection report

<table>
<thead>
<tr>
<th>Course Material</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Games 4 Change <a href="http://www.gamesforchange.org">http://www.gamesforchange.org</a></td>
</tr>
<tr>
<td></td>
<td>Fogg, B.J. (2002). <em>Persuasive technology: using computers to change what we think and do</em>.</td>
</tr>
</tbody>
</table>
### Description

<table>
<thead>
<tr>
<th>Code</th>
<th>DPH97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year</td>
<td>2014-2015</td>
</tr>
<tr>
<td>Quartile</td>
<td>Q3/Q4</td>
</tr>
<tr>
<td>Title</td>
<td>Play and The City</td>
</tr>
<tr>
<td>Responsibl Lecturer(s)</td>
<td>Prof. dr. B. Schouten, Dr. M. Bekker. Dr. E van der Spek</td>
</tr>
<tr>
<td>Co-lecturers</td>
<td>Martijn de Waal (external)</td>
</tr>
<tr>
<td>Type of education</td>
<td>Project</td>
</tr>
</tbody>
</table>

| Learning objectives | **Main competency development target**  
**Ideas & Concepts.** The participation society is mainly a theoretical issue, sometimes lacking direct concepts to act and or organize. How to design for this. Concepts that generate direct results.  
**Analyzing complexity.** How to design for the analysis of big data sets coming from many sources, visualization techniques, but above all to create a meaningful context that enables the user to participate in decision making or control over for instance their health care.  
**Social Cultural Awareness.** How to design with the use of persuasive technologies for participation and awareness.  
**User Focus & Perspective.** These design strategies can only succeed if there is a strong bottom up approach where users have direct ownership over the problem they want to manage in order to have a strong commitment.  
**Team/individual**  
Both |

### Contents

**Introduction**

City municipalities and governments worldwide embark on smart city policies, together with tech businesses and knowledge institutions. They deploy digital technologies and big data to optimize services like traffic, energy, environment, governance and health. Also bottom-up smart citizen initiatives in many cities blossom, consisting of networked people who engage in issues like neighborhood livability, community building, energy provisioning, sharing resources and measuring and generating environmental data. Often they employ sensor technologies, use open data or utilize digital media to organize themselves around a common issue. Examples are the ‘games for change’ initiative ([www.gamesforchange.org](http://www.gamesforchange.org)). Founded in 2004, Games for Change facilitates the creation and distribution of social impact games that serve as critical tools in humanitarian and educational efforts. An example game is SimCityEDU. Awareness is central in this game where you can solve your city’s pollution problems while growing the economy in this mission-based simulation game.
Also in Eindhoven there is a large community involved with the hackable city: [http://themobilecity.nl/2013/02/01/eindhoven-hackable-world-city-speculating-on-future-investments-for-the-city/](http://themobilecity.nl/2013/02/01/eindhoven-hackable-world-city-speculating-on-future-investments-for-the-city/). Digital technologies are used to optimize urban processes and make them more efficient, like mobility and healthcare. On the other hand citizens and cultural organizations are increasingly often taking matters into their own hands. Tapping into the online culture and ethics of do-it-yourself (DIY), they take ownership over their city and undertake collective action: from collaboratively maintaining urban gardens to creating sensor networks to measure noise pollution or air quality. See for instance the IDSPEX app [www.ispex.nl](http://www.ispex.nl).

In this research by design project we forward the notion of the ‘hackable city’ to investigate how new media technologies can open up urban institutions and infrastructures to systemic change by citizens.

A primary goal of the project is to make information about salient urban issues, visible in situated contexts in the city and to utilise these visualizations as starting points for creating interventions in the urban context.

**Design challenges.**

Attaching an information layer to an urban representation is rather limited. The proposed project will attempt to connect the affordance of visualizing urban data in a situated context with traditions of storytelling, games and culture, so that these experiences ultimately take the form of embodied techno-social performative events. Good examples to study are initiatives as Play the City ([www.playthecity.nl](http://www.playthecity.nl)) , Goldsmith Citizen Sense ([http://www.citizensense.net/](http://www.citizensense.net/)) and The Programmable City ([http://www.nuim.ie/progcITY/](http://www.nuim.ie/progcITY/))

The theoretical aspect of the research will be related to actual practices of storytelling, serious games and playful interaction, as well as the use of persuasive technologies and social media. Captured data sets will be utilised for creating meaningful storytelling events, collectively experienced by groups of citizens. In many cases we will design for tangible results using wearables and other artifacts, or installations.

**Example scenarios**

One scenario could be that you want a plan in your neighborhood to share the care of elderly people in the neighborhood or similar for toddlers.
Another scenario could build upon the measurement of (air) pollution in order to reduce traffic throughput in the neighborhood.

**Plan**

In the first phase of the project (3 weeks) you would identify which part of city life you want to hack and what it needs (data, decision strategies, stakeholders, end users) to do this. An analysis of stakeholders and the way the project is mediated through for instance storytelling, gaming, and cultural artifacts will be a part.

In the second phase, the best ideas are put into action. You will look into how to create a strong participation and long lasting meaning for the specific user groups involved and do research on their needs and background and design prototypes that will be tested in real use cases.

The project requires a strong process of designing with end users and stakeholders.

Several competencies are involved: Ideas & Concepts, User Focus & Perspective, Socio-cultural Awareness. In the project we want to realize several tangible results, from and senses

**Contribution to the mission of the department**

This project focuses on smart environments, participatory design & data. It targets toward social innovation. Main applications will be in well being and health care of other parts of city life (entertainment)

**Bio lecturers**

http://www.idemployee.id.tue.nl/b.a.m.schouten/CVSchouten.pdf
https://www.linkedin.com/in/ellisbartholomeus/nl
https://www.linkedin.com/in/martijndewaal
http://www.idemployee.id.tue.nl/m.m.bekker/default.htm

Ben Schouten, Erik van der Spek and Tilde Bekker are all at the department in theme of playful interactions.

Martijn de Waal is working at the Amsterdam University of Applied sciences as a researcher in citizen empowerment and is the founder of The Mobile City. Ellis Bartholomeus is a well renowned game designer in the Netherlands

**Description of partners and their contribution**

Mobile City: The Mobile City is an independent research group founded in 2007 by Martijn de Waal and Michiel de Lange. The Mobile City investigates the influence of digital media technologies on urban life, and what this means for urban design and policy. How can we employ digital media technologies to make our cities more just, improve the quality of urban life, as well as make our cities more interesting places to live in? www.themobilecity.nl

Play the City. Play the City is an Amsterdam and Istanbul based City Gaming Company.

City Gaming Method can facilitate participatory processes, manage complex urban projects, resolve conflicts, help connect to communities. www.playthecity.nl

**Possible deliverables:**

- Report
- Prototype
- Video
- Presentation
- Reflection report
## S2-1415 Project Descriptions Playful Interactions

<table>
<thead>
<tr>
<th>Course Material</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>DPJ30</td>
</tr>
<tr>
<td>Academic year</td>
<td>2014-2015</td>
</tr>
<tr>
<td>Quartile</td>
<td>Q3/Q4</td>
</tr>
<tr>
<td>Title</td>
<td>Hands down/Look, No Hands! The Driving Experience in the Smart Mobility era</td>
</tr>
<tr>
<td>Responsible Lecturer(s)</td>
<td>Jacques Terken, Hanneke Hooft van Huijsduijnen</td>
</tr>
<tr>
<td>Co-lecturers</td>
<td>Chao Wang</td>
</tr>
<tr>
<td>Type of education</td>
<td>Project</td>
</tr>
<tr>
<td>Learning objectives</td>
<td>Main competency development target User Focus and Perspective Designing Intelligence Team/individual Individual (team project to be discussed)</td>
</tr>
<tr>
<td>Contents</td>
<td>Introduction</td>
</tr>
</tbody>
</table>

“When I was a little boy my grandfather took me in trips into the countryside in his car. One time, while driving through a big forest, we unexpectedly came across an adventure playground. Another time, when heading towards a castle, we found a huge dam. Each month, my grandfather ordered a different map from his automobile club for our cruises. These maps were detailed but abstract, covering a limited area only. Some places my grandfather had heard about were just outside the map’s area. Once, on a trip to a silent volcano, he told me about a bird park with a talking parrot. The park was just outside our map, but I wanted to go there. My grandfather drove into the wild, hoping not to get lost. Because of the parrot, we became explorers, adventurers united by challenge and curiosity. On many trips, we discovered new sights and spots before finally arriving at our original destination. Later, my grandfather and I reflected, conserved and collected these experiences. ‘Do you remember?’ we asked, while looking at faded Polaroids.”[1]

As can be read in the story above, multiple meaningful experiences can be related to driving a car. In the future, cars as we know them nowadays will disappear. Intelligent systems will take over activities as steering, accelerating and braking, creating automated vehicles in which the driver will turn from an actuator into an observer, and ultimately into a passenger. This development will change the relation between the driver and the vehicle and the driving experience. Some if not all of the experiences described in the story above will disappear or perhaps partially replaced by new types of experiences. These new experiences may not always be positive experiences, possibly resulting in drivers neglecting or putting off systems which were designed to support drivers and increase safety, efficiency and comfort.

In a study which explored how Adaptive Cruise Control (ACC) impacts people’s driving experience [2] one of the participants driving with ACC said: “… it feels like sitting on the neck (of the cat) just watching …” which was in contrast to the experience when driving manually: “… a cat lying in
the wait … when I drive the car, I become the cat to some extent …”. This study revealed that ACC created a distance, a gap between the driver and the car. When driving with ACC on, the experience of driving a car changes.

With smart vehicles, vehicles are able to communicate information such as direction, location, speed, deceleration and acceleration to other vehicles (and other road users as well). Technically this is known as cooperative driving. It allows vehicles to anticipate the upcoming traffic situation and to adjust their own behavior to the upcoming traffic situation and negotiate their actions with other agents (whether human or automated).

According to Stanton & Marsden [4] several arguments support the automation of the driver role. It is argued that driving is a stressful activity influencing the well-being of the driver, and that automation can reduce stress and workload [5]. Secondly, it is suggested that the removal of human elements in driving could lead to reduction of accidents as “human error constitutes to a major cause of road accidents” [4]. Thirdly it is argued that automation can enhance desirability by means of differentiating from other drivers and brands and therefore perhaps leading to an increase of sales.

The technology to let cars drive cooperatively is making fast progress, but the human factors of cooperative and automated driving still require considerable attention. In particular the role of the drivers will change drastically. Drivers will become less engaged and lose awareness of the situation, and they may not build up or even lose driving skills. On the other hand, being less engaged, they may instead engage more in other activities.

Secondly, driving is perceived to be an individual activity, in which we compete for limited road estate. In fact, driving is a social activity, where goal achievement is the outcome of a process of negation. Now, if elements of the driving task (or even the complete driving task) can be automated, so that drivers can delegate control of (elements of) the driving task to the system, time becomes available for drivers to embrace the social nature of driving, hopefully resulting in a mutual understanding with other road users and improving the driving experience.

Design challenges
The challenge for this project is to investigate how the changing relation between the driver and the vehicle influences the driving experience, and to identify and exploit design opportunities.

Concrete challenges:
**Challenge 1** In many cities so-called ‘green wave’ systems have been installed for a better throughput of vehicles. These systems use speed advice signs at the side of the road that inform drivers about the advised
speed to stay in the ‘green wave’. Typically, many drivers drive at higher speeds, taking over drivers who comply with the advice, as a result of which non-compliant drivers still need to stop for a red traffic light, disturbing the traffic flow for the compliant drivers. Smart vehicles will drive at the advised speed, but this creates a dissonance for the non-compliant drivers. The ambition is to make drivers accept this changed relation between him/her and the vehicle.

The concrete challenge here is to design means for persuasion preventing people from turning off the smart system and driving at their preferred speed, and instead making them comply with the recommended speed.

**Challenge 2** Smart vehicles allow the driver to delegate part or the entire driving task to the vehicle, freeing up time to do other things. In connection to driving as a social activity, we want to explore opportunities for driver-to-driver communication, against the background of the changing relation between the driver and the vehicle.

**Contribution to the mission of the department**

Smart mobility is directly connected to intelligent systems, products and related services in a societal context. The challenges outlined above make it possible for students to explore the development of intelligent systems and the consequences of such intelligent systems for people. A number of perspectives can be combined, including the user, technology and business perspective.

**Bio lecturers**

To be supplied

**Description of partners and their contribution**

To be supplied

**Possible deliverables:**

- X Report
- X Prototype
- X Video
- X Presentation
- X Reflection report

---

**References**


**Introduction**

China is now ageing at the second fastest rate in the world, after Japan. Twenty-six Chinese provinces and cities have entered into aged society status, and will become more so in the foreseeable future [1]. The evidence shows that the number of ageing people will peak around 2050 at about 480 million, about one in three people [2].

An ageing urban population will increase and complicate social and economic challenges. Seniors’ growing demands on medical care services, which are relied on social security systems to a large extent, will incur mega financial burdens to local government. Taking Shanghai, the most aged metropolis in China [3], as an example, the deficit in social security is mainly supported by increasing fiscal expenditures, a situation that will likely worsen over time [1]. On the other hand, family economic pressure will also be aggravated as well due to the prevalent 4-2-1 (a couple supports four aged parents and one child) family structure in Chinese cities [4]. What is more, hospitals would have to confront the enormous shortage of medical facilities as well as health care workers [5], and may fatigue tackling with the tough situation at that time.

To respond to these challenges effectively beyond policy reforms, we need to seek innovative and viable ways to strengthen seniors’ connection with public medical treatment and open more paths for them to conquer chronic disease in less cost but more obliging way. In this context, mobile health, which is defined as the emerging mobile communications and network technologies for healthcare [6], presents an interesting opportunity space. In fact, there is a growing body of evidence demonstrating that mobile communication has the potential to offer effective means of bringing healthcare services to developing countries like China. Thanks to the low-cost handsets and the penetration of mobile network, the amount of mobile phone users in China has approached to 1.3 billion so far, equivalent to over 90 percent of total, whereby only 29 percent users do not necessarily utilize mobile networks to deal with daily basis [7]. Which implies the great opportunity for mobile technology supporting health service delivery on a massive scale.
While the prospect of mobile health services has been detected obviously, there are numerous challenges and barriers for aging generation in adopting and fully using them. For instance, it is costly for elderly to grasp the method of using new devices. Also, their willingness of using mobile health services is not so strong, as they prefer keeping to their routines to changing lifestyle [8]. Designers could thus play key roles in detecting and removing these barriers, and this is where our project lying in. We will render you great opportunities to interrogate the essential issues behind aging generation, and then come up with possible innovative solutions and strategies. However, the development of this project is based on your insight.

**Design challenges**

This is an intercultural project. You have to confront challenges from clients that distinct from you in terms of social, cultural, economic and environmental aspects. You need to understand current status quo of China, which is definitely different from Netherlands. This task would be tough initially, but it will be beneficial and desirable for your future career, as you will face the largest potential market in the world.

A main challenge is unpredictable and diverse features of elderly. You had better focusing on a specific user group with similar social background, economic status, ICT experience, and health conditions. It would be helpful for you to get deeper acquaintance with in limited time.

Last but not least, m-health services can be a platform to link patients with other stakeholders closely, opening more pathways for patients to communicate with others effectively through mobile network. For instance, new emerging mobile apps in China, like 91120 and 5U+Family Doctor, enable patients to contact experts nationwide directly for consultation and treatment recommendation. What other stakeholders (for e.g. doctors, nurse, insurance, hospital, bank, pharmaceutical retailer, etc.) might get connected to the senior audience in the context of m-health services? What are the potential stakeholders [9] in this project? One of the design opportunities you already have is to design an m-health service system that optimizes connection between senior patients and other stakeholders.

**Contribution to the mission of the department**

The project is embedded in a larger research context, assuring expert input along the way. It is a cross cultural-disciplinary project in which experts from UCE and BPD as well as Chinese design practitioners are all onboard. This allows us to offer excellent learning opportunities on many areas, such as research, business process design, advanced design processes, social-culture awareness, user study and so on.

More importantly, this project is concentrated on the theme of health & wellbeing, aiming to design intelligent systems, products and related services to tackle with certain social problems, which is apparently in accordance with the mission of our department. With the close collaboration with industry and peers in China, broader prospect of this project has been vivid illustrated in front of us. Also, potential R&D scope for our department would be triggered by this project, as we will encounter a social environment completely filled with challenges and opportunities.
**Bio lecturers**

Yuan Lu is an associate professor at the BPD group. She is interested in researching how to create business opportunities to initiate open and dynamic multi-stakeholder innovation in the experiential design landscape of intelligent products, systems and services.

Xipei Ren is a PhD candidate at BPD group. He is passionate in designing mobile health services for elder people in different cultural context. His knowledge and experience on Chinese seniors will be beneficial to the further process of the project.

Pengxiang Jia is a PhD Candidate in the BPD research group. He will bring expertise in designing for user experience, qualitative research method and data analysis. Cross-culture collaboration awareness and strategy.

**Description of partners and their contribution**

We will work with a technic company Mextal, which has rich experience in intelligent product system design and platform design for e-healthcare. They are also ambitious of obtaining the entrance ticket of Chinese market. Hence this project will be win-win collaboration between you and Mextal.

We also work with Zhejiang University, which is one of the top-three universities in China. Their expertise in industrial design is similar to TU/e, focusing on intelligent product and related service systems in a certain social context. As a partner in this project, Zhejiang University could share avant-garde knowledge on Chinese aging generation with you as well as provide you relevant local social resources. With this connection, you also have great opportunities to co-work with peers from China for this project.

**Possible deliverables:**

- Report
- Prototype
- Video
- Presentation
- Reflection report

**Course Material**

**References**


<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
## S2-1415 Project Descriptions Playful Interactions

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code</strong></td>
<td>DPJ32</td>
</tr>
<tr>
<td><strong>Academic year</strong></td>
<td>2014-2015</td>
</tr>
<tr>
<td><strong>Quartile</strong></td>
<td>Q3/Q4</td>
</tr>
</tbody>
</table>
| **Title**   | *Is your grandma addicted to her Smart Phone?*  
  (Technology acceptance in an aging society) |
| **Responsible Lecturer(s)** | Pengxiang Jia |
| **Co-lecturers** | Lu Yuan, Xipei Ren |
| **Type of education** | Project |
| **Learning objectives** | *Main competency development target* |
| | IC; UFP; SCA; DBP; T; DRP; C; |
| | *Team/individual* |
| **Contents** | *Introduction* |

We all know that aging society is a global trend today. In Europe, it is known as the greying of Europe, a demographic phenomenon characterized by a decrease in **fertility**, a decrease in **mortality rate**, and a higher **life expectancy** among European populations.[1] Many developing countries are also into the aging society. Take China as an example. The number of citizens above 65-years old is 175 million in 2010, about 12.57% of the total population, which is catching up the footsteps of Netherlands' 16.20% in 2012.[2] And it is foreseeable this number will keep growing in this century. One of the major problems followed with global trend is that, due to the continuous increase in life expectancy and the decreasing number of children, an increasing number of people will have to rely on increasingly expensive health care paid by a decreasing number of people. Thus, the medical treatment, health care service or other services for the aging population based on ICT system will no longer a hypothesis. Instead, it will become a trend in our living environment. Many business opportunities will emerge along with it.

According to many cases study of intelligent system and service design, there are numerous challenges and barriers for elderly users in accepting and even fully using them. It is difficulty for elderly users to grasp the method of using a new device. Meanwhile, their willingness of using intelligent product of services is not so strong, as they prefer to stick to their routines lifestyle.

Researches about Technology acceptance have been done by many researchers from different disciplines in the past 50 years. [3] Most of them tackled this Challenge with the process that individuals go through to adopt a technology or innovation. Technology driven innovations, especially information technology, are emerge drastically in the recent years, which makes understanding why and how people perceive and learning technology a critical and pressing issue to intelligent product service system design.
Research about technology acceptance should focus not just on adoption and implementation of an information technology. It is meaningful to understand the characters of the contexts which individuals to perceive, understand and learn technology. Also the circumstance, social interaction and communication play very important roles in this research. The learning process of technology could be a stressful activity for the elderly people. So by doing research with elderly people together to tackle the technology acceptance challenge, we can explore the story behind the interaction between technology and their lifestyle.

By tackling the technology acceptance of elderly people from social influence prospective, we have run the first round research by exploring the technology acceptance with playful interaction. One PDEng student Barbara Wajda [4] carried out the research for around half year. A set-cards has been designed and tested for helping elderly learn how to using computer. We got some very positive feedbacks from elderly people and industry partners. So this proposal continues the research and hopefully there will be more insights be summarized and contribute to designing intelligent product service system for the elderly people.

**Design challenges**

This is not an easy project. Break through projects never are.

You do need to develop a clear vision on this project, to create a pleasant and convincing user experience together with the elderly people, while gaining insights of how elderly interact with the design and how they understand the related service at the same time. You need to position this experience in a real world situation and make it appealing to anyone involved. You need to face a few big challenges.

A major challenge is to approach and understand the mindset of elderly people. You cannot design for them only in the lab; co-design with stakeholders with an intention is an option. Can you imagine fun, motivating learning process of technology for the elderly people with or without people intervention? Last but not least, what is the consideration of this learning process for a product/service system design? What are the potential stakeholders [5] for this project?

One of the design opportunities you have is to design a product/service system which could lower the threshold of the technology acceptance of elderly user. Plus, after your project, you are welcomed to form a new technology acceptance model for designing intelligent product service system for the elderly together with me and make publications if interested.

**Contribution to the mission of the department**

The project is embedded in a larger research context, assuring expert input along the way. Since it is a cross disciplinary project, we want to collaborate with researchers from other research group, such as Tilde Baker from UCE group who can offer expertise of user experience by playful interaction, Jiang Wu with design skills of product prototyping are probably other researchers in DI group also doing research about Elderly Health Care. This allows us to offer excellent earning opportunities on many areas, such as research, business process design, advanced design processes, social-culture awareness, and user-experience study and so on.
Bio lecturers
Yuan Lu is an assistant professor at the BPD group. She is interested in researching how to create business opportunities to initiate open and dynamic multi-stakeholder innovation in the experiential design landscape of intelligent products, systems and services.
Pengxiang Jia is a PhD Candidate in the BPD research group. He will bring expertise in designing for user experience, qualitative research method and data analysis. Cross-culture collaboration awareness and strategy.
Xipei Ren is a PhD candidate at BPD group. He is passionate in designing mobile health services for elder people in different cultural context. His knowledge and experience on Chinese seniors will be beneficial to the further process of the project.

Description of partners and their contribution
We will work with technic company Metal and potentially Focus Cura, which both have rich experience in intelligent product system design and platform design for social interaction based on ICT.

We also work closely with a local home care provider Zuidzorg in the Noord Brabant region and Summa College in this project. We have excellent experience with them as clients in previous student projects. Zuidzorg have rich experience and expertise of caring and organizing activities for elderly people, which contribute to the design of workshop and other experiment of the project. For Summa College, it is a win-win opportunity that we can get student assistant and active elderly people by collaborating with them. And the MBO students involved in the project could gain empathy and knowledge about elderly people when service or job requirement involved elderly interaction with ICT technology.

Possible deliverables:
- Report
- Prototype
- Video
- Presentation
- Reflection report

References
Description

<table>
<thead>
<tr>
<th>Code</th>
<th>DPI63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year</td>
<td>2014-2015</td>
</tr>
<tr>
<td>Quartile</td>
<td>Q3/Q4</td>
</tr>
<tr>
<td>Title</td>
<td>Behaviour of Next Nature Species</td>
</tr>
<tr>
<td>Responsible Lecturer(s)</td>
<td>Emilia Barakova, Jacques Terken, Arne Hendriks*, Koert van Mensvoort* (<strong>to be confirmed)</strong></td>
</tr>
<tr>
<td>Co-lecturers</td>
<td></td>
</tr>
<tr>
<td>Type of education</td>
<td>Project</td>
</tr>
<tr>
<td>Learning objectives</td>
<td>Main competency development target <strong>SCA, IT, UFP, IC</strong></td>
</tr>
<tr>
<td></td>
<td>Team/individual <strong>Individual</strong></td>
</tr>
<tr>
<td>Contents</td>
<td>Introduction</td>
</tr>
</tbody>
</table>

**Design challenges**

**For the Drones:**
1. Design a context for independent functioning drones (either individually or as part of a swarm). Learning activities/competency development: Ideas and Concepts
2. Design a scenario and investigate issues of how interaction takes place between drones and humans. Learning activities/competency development: Ideas and Concepts, Form and Senses.
3. Design a prototype that is cheap, easy to build, and can be used to test a number of functionalities. Investigate the symbiosis between functionality and form. Will the drone’s appearance reflect its function and meaning? Learning activities/competency development: Integrating Technology, Descriptive & Mathematical Modelling.

**For the autonomous cars:**
Conceptualizing cars as robots: How can they sense our transient states, needs and interests and communicate them to the outer world? How can they negotiate with us in case our own perceived interests deviate from their understanding of what is best for us? **Learning activity:** Based on initial research you develop ideas and concepts for automotive behaviour expressed by and embedded in the car design. **Competency:** Form and Senses

To reconceptualize the car as an adaptive skin: How can the exterior and interior of the car adapt to the transient personal and social context of the driver: what are valuable concepts and how can they be elaborated, what multisensory systems could be developed? **Learning activity:** You survey user behaviour and expression in a real-time situation. Based on this you develop new products, systems and/or services. **Competencies:** User Focus and Perspective and Form and Senses.

Conceptualizing cars in dialogue with smart highways: recent developments in infrastructural technology show ways in which the highway becomes smarter. Lighting, roadsigns, self-sufficient energy
sources, and a streamlined flow of information turn the highway into more than just a strip of asphalt: the highway becomes a communicator. Learning activity: Develop a profound relationship between the vehicle and its surroundings. Envision possible ex-change between the smart highway and the driver and/or passenger(s).

*Contribution to the mission of the department*

*Bio lecturers*

*Description of partners and their contribution*

**Possible deliverables:**
- Report
- Prototype
- Video
- Presentation
- Reflection report

| Course Material | References |