

# GSGS'19

4<sup>TH</sup> GAMIFICATION & SERIOUS GAME SYMPOSIUM

4 & 5 July 2019 | Neuchâtel | Amphi. HE-Arc | Espace de l'Europe 21 | [www.gsgs.ch](http://www.gsgs.ch)

EDUCATION

HEALTH

TOURISM

CULTURE

ART

POLITICS

PEDAGOGY

TRAINING

ECONOMY

BUSINESS



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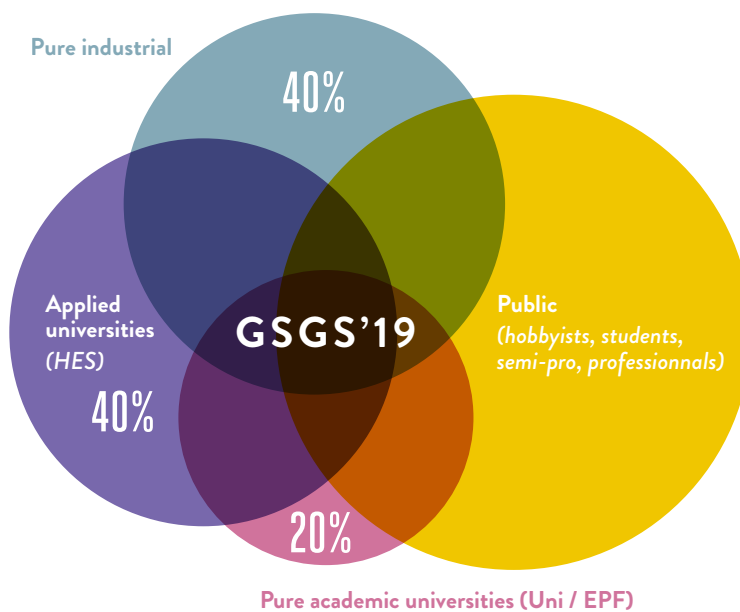
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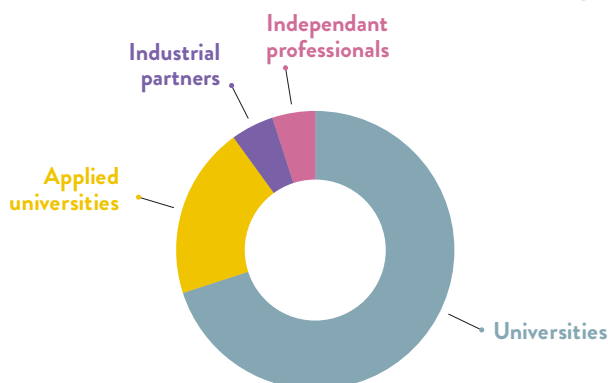
## GS GS'19: AN INTER-PROFESSIONAL OPPORTUNITY FOR THE SWISS INDUSTRY

The GS GS'19 conference is at the interface between industrial needs and original answers by highlighting the playful perspective to tackle technical, training, ecological, management and communication challenges. Bringing together the strengths of our country, this event provides a solid bridge between academia and industry through the intervention of more than 40 national and international actors. In parallel with the 53 presentations and demos, the public will be invited to participate actively through places of exchange and round tables.

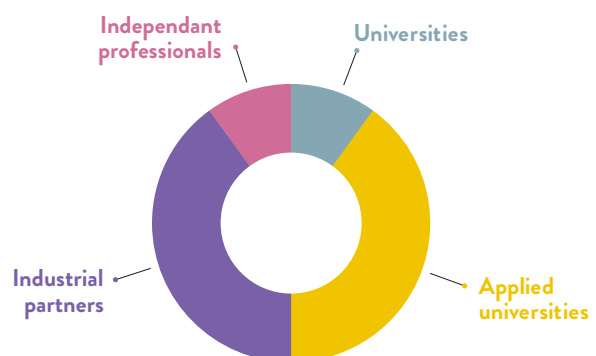


*Four categories of people interacting to rise innovation.*

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# GSGS'19

SIX SESSIONS COVERING  
A LARGE PALETTE OF DOMAINS

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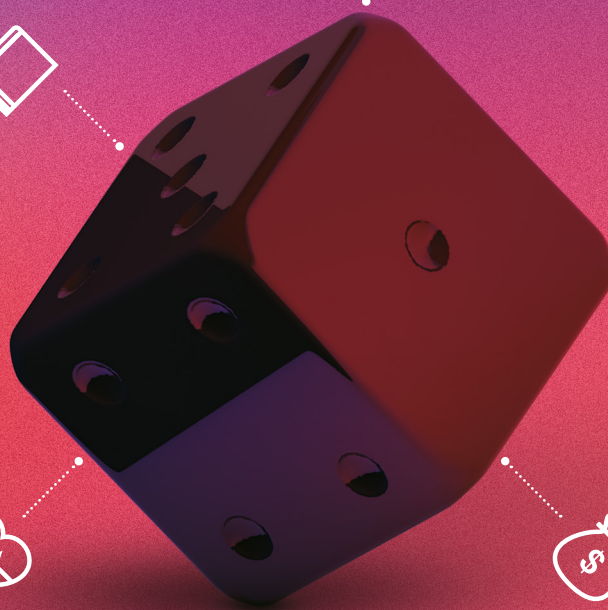
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## DAY 1

8h00–8h30 Café-croissant, Proceedings &amp; Program

8h30–9h00 Welcoming &amp; Intro speech



## HEALTH I

CHAIR: FRÉDÉRIC EHRLER | HUG-GE | GENEVA

9h05–9h17

## 1 Escape addict

Claire-Lise Favre | Promotion santé Valais | Sion

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9h20–9h32

2 Bus simulator in virtual reality  
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Francesco Carrino | HEIA-FR, HES-SO | Fribourg

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9h35–9h47

## 3 ANI: How to turn a muscle into a motivating character

Sebastian Imbach | OpinionGames GmbH | Brugg

pp. 13–16

9h50–10h02

## 4 Shadow's Edge – Building Resilience through Mobile Gaming

Kevyn Eva Norton | Digging Deep Schweiz | Zürich

pp. 17–20

10h05–10h30 Break



## ART, CULTURE &amp; TOURISM

CHAIR: FRÉDÉRIC FISCHER | ACADEMIE DE MEURON

10h35–10h47

## 5 PfuQs

Mélisha Monnier | HEAD, HES-SO | Geneva

pp. 23–26

10h50–11h02

## 6 games@museums – immersive game design for the museum context

Mela Kocher | ZHDK | Zürich

pp. 27–30

11h05–11h17

7 YAPASPHOTO: Promoting regional public  
transport and tourism with a board game

Johan Jaquet | Entrée de Jeux | La Chaux-de-Fonds

pp. 31–34

11h20–11h32

## 8 St-Ursanne, Circuit Secret

Maria Sisto | HE-Arc, HES-SO | Neuchâtel

pp. 35–38

11h35–12h00 Break

12h00–12h50

## SPECIAL GUEST

Beerda Joris | The Octalysis Group | Lugano

Volkswagen's Gamified Loyalty Program

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Lunch break &amp; general demo

14h10–15h00

## SPECIAL GUEST

Marklund Björn Berg | University of Skövde | Sweden

Working with Serious Games: Surviving between  
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- 15h20–15h32** **10** Gamifying to empower citizens in environmental decision-making  
Alice H. Aubert | Eawag | Dübendorf **pp. 49–52**
- 15h35–15h47** **11** Discover the world of BFM through role-playing games  
Marikit Taylor | Entrée de Jeux | La Chaux-de-Fonds **pp. 53–56**
- 15h50–16h02** **12** Knitting the chaussethic: to promote ethical reflection and team communication  
Sylvie Chatelain | Centre de vie enfantine de la Grangette | Lausanne **pp. 57–60**
- 16h05–16h17** **13** COMM'IMPRO; teaching techniques. concepts and tips to increase your oral presentation skills  
Cyrille Ghiste | CHUV | Lausanne **pp. 61–64**

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**16h40–17h40** roundtable

**17h45–18h00** Conclusions of Day #1 | Important informations



## DAY 2

8h30–9h00 Café-croissant, Proceedings &amp; Program



## STUDENTS

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9h05–9h17

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Megann Stephan | HEAD, HES-SO | Geneva

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Maud Plumettaz-Sieber | Université de Fribourg | Fribourg

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## 16 Unresolved

Ghofran Akil | HEAD, HES-SO | Geneva

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Florent Gluck | HEPIA, HES-SO | Geneva

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## 19 Prototyping a Virtual Reality Game to Support Breathing Exercises for Treatment of Cystic Fibrosis

Richard Wetzel | Lucerne University of Applied Sciences and Arts | Lucerne

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## 20 Gamification to improve adherence of home-based activities offered on a tablet to seniors

Sylvain Cardin | Mindmaze | Lausanne

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## 21 Breathing Games – A free/libre/open source initiative to create open content on respiratory health

Nicolas Wenk | Breathing Games | Geneva

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12h00–12h50

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Thibault Mattia | Tampere University | Finland

ReClaim – critical design and punk gamification in the urban environment

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- 15h50–16h02 **25** MRI and I: How I am learning to design games  
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 between researchers and game developers  
 Ralf Mauerhofer | Koboldgames GmbH | Brugg pp. 127–130

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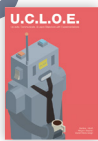
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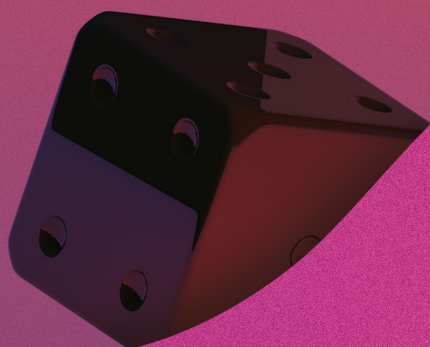
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Julia Németh | HE-Arc, HES-SO





# SPEECH & SHORT PAPERS





## ROUNDTABLE

### FINANCING AND DEPLOYMENT OF SERIOUS GAMES AND GAMIFICATION SOLUTIONS IN INDUSTRY AND ADMINISTRATION: SITUATION, LIMITS AND PERSPECTIVES

**Julien Schekter**

Responsable de la communication  
DFJC (Département de la formation, de la jeunesse et de la culture)  
État de Vaud, Lausanne, Suisse

The adoption of gamification and Serious Games in certain areas such as training, medicine, marketing and culture has undergone an impressive evolution in recent years. However, some other areas and sectors are still resisting. Industry and administration are two examples of a resistance to Gamification and Serious Gaming. What are the reasons for this reticence: financial? psychological? Legal?

This round table attempts to identify the current situation of deployment and use of Gamification and Serious Gaming in industry and administration. It also tries to imagine future prospects and trends, as well as ways to remedy issues in the current situation.

## SESSION HEALTH I

9H05-10H00

In a context of financial pressure on the healthcare system, supporting citizen empowerment toward their health become of prior importance. Gamification has the capacity to support this change by making education and prevention much more adapted, accessible and attractive interventions. Promotion santé Valais well understood this approach by proposing an escape room game to educate teenager around addiction prevention. Carrino Francesco from HES-SO Fribourg rely on Virtual Reality to train people with intellectual disabilities to deal with daily situations in a safe simulated environment. Kevyn Eva Norton from Digging Deep Schweiz proposes a 3D mobile adventure game give teens and young adults suffering from a chronic illness the tools they need to master their situation, gain a sense of control and take an active role in their emotional health. Finally, Sebastian Imbach from Opinion Games address the challenge of making motivating the training of pelvic muscle to fight incontinence.



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# 1 | ESCAPE ADDICT: A NEW AND INNOVATIVE ADDICTION PREVENTION TOOL

**Favre Claire-Lise, Cottagnoud Sophie, Berthouzoz Cathy, Moulin Roh Catherine, Dubuis Alexandre**

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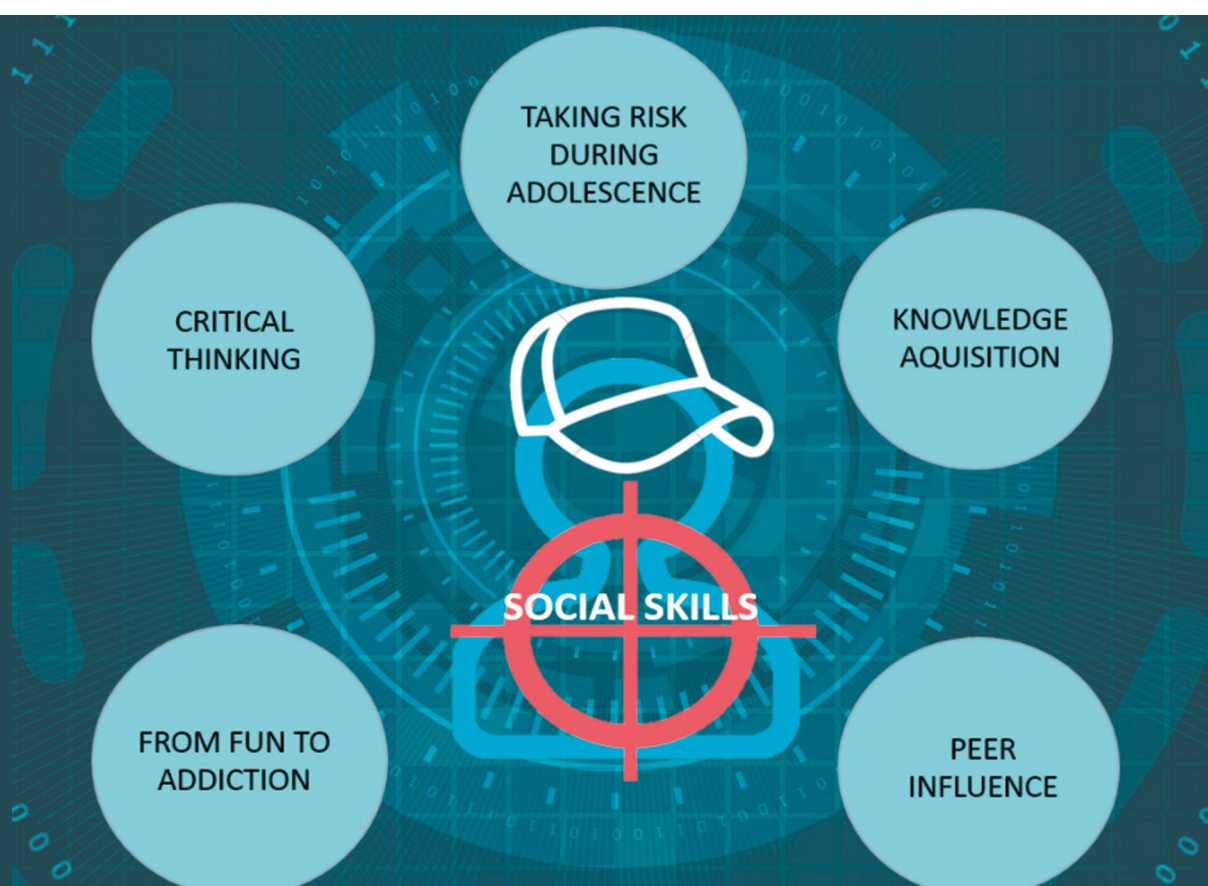
## ABSTRACT

Escape Addict is a new and innovative addictions prevention tool developed by Promotion santé Valais. Using attractive aspects of popular escape room games, this bilingual (French-German) tool aims to transmit multi-addiction information to students in Valais during their secondary I school. This project allows 11/15-year-old teenagers to experience situations they may encounter and to develop social skills. Thanks to gamification, Escape Addict has many benefits : pleasure, pedagogy and adherence, hope and encouragement, perseverance and surpassing.

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## KEYWORDS

Addiction; School; Prevention; Gamification; Consumption; Adolescence; Escape Game.







## CONTEXT

In 2018, Promotion santé Valais (PSV) received the assignment of preventing addictions in secondary I school level (11-15 years old) by the Canton of Valais. In this context, PSV developed a new and innovative prevention tool that uses attractive aspects of popular escape room games to transmit multi-addiction information. This bilingual (French-German) project wants to reach once during their compulsory school all young people in Valais. The 10th Harmos year (13-14 years old), which concerns more than 3,000 students per year, is the right time to discuss the addiction topic. The Escape Addict tool has been available to schools since September 2018 and is a great success.

## TARGETED ISSUES

The adolescence is a sensitive period in which behaviours can positively or negatively affect health. During this development period a teenager will take risks and try certain substances. Hence the need to intervene and prevent unhealthy behaviours. Adolescence is also an age when young people do not like prohibitions and moralizing theories. In this context, a playful experience conveying serious and educational messages makes sense. Whether with alcohol, tobacco, cannabis or screens in general, first experiments will take place between 11 and 15 years. During this period, consumption frequency also increases: from an experimental to occasional use, ending in an intensive one.

## PROPOSED SOLUTION

In the atmosphere of a real escape room, Escape Addict allows 11/15-year-old teenagers to experience situations they may encounter. With this game, they develop their social skills by acquiring tools to achieve objectives related to the different consumption stages:

- › Valuing and encouraging abstinence in order to reduce the number of young people starting consumption, or at least delaying this moment as long as possible.
- › Raising awareness of the risks associated to festive consumption and preventing it from becoming regular.
- › Bringing help to regular consumers.

Five action axes make it possible to address these themes and stimulate thinking:

- › **Taking risks during adolescence**  
Psychotropic products consumption is linked to the risk notion because of the dangers it entails, but also because exposure attraction to these dangers.
- › **From fun to addiction**  
When and why does festive consumption become problematic, solitary or self-medicated?
- › **Knowledge acquisition**  
Youth overestimate the percentage of consumer peers. False beliefs must be countered, and necessary knowledge must be provided in order to resist bad influences.
- › **Critical thinking**  
Teenagers are constantly targeted by ads, placed on the most visible spots. Advertising increases on Internet and social networks, where 94% of the 12-to-19-year-old teenagers have a profile.
- › **Peer influence**  
The use and abuse of psychoactive substances result in part from the need to please peers and be part of a group identity.

*[...] Escape Addict is an innovative addiction prevention tool for students in secondary I school level developed by Promotion santé Valais.*





## RELEVANT INNOVATION

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Escape Addict is based on new technologies and is an effective way to capture young people attention.

Benefits of gamification:

- › Pleasure: gamification makes it possible to transmit, in an attractive and enjoyable way, content that seems daunting at first sight.
- › Pedagogy and adherence: gamification eases rapid adoption of new reflexes.
- › Hope and encouragement: gamification, through the game context and team support, eliminates failure fear and provides a dynamic moment of exchange, efficient at overcoming one's weaknesses.
- › Perseverance and surpassing: the solution lies in teamwork and clue sharing. This notion of competitiveness provided by gamification and interclass competition ensures a high level of motivation and energy.

Escape Addict evokes positive emotions and provides young people with unique experiences shared with their peers. They are actors of this prevention moment. Escape Addict, in the form of a game and in an equal opportunity perspective, opens the doors of specialized classes, migrant classes and institutions. This prevention is based on the reality of young people's daily lives and on their short-term behaviour consequences. Escape Addict benefits from the latest scientific knowledge in prevention and youth consumption fields and is based on previous prevention projects evaluation.

## PROJECT OUTCOMES AND RESULTS

After almost 1 year of operation, Pr. Valéry Bezençon, Professor at the University of Neuchâtel, has just carried out an external evaluation, based on a social marketing approach and assessing different project aspects: method relevance, messages perception and recall as well as tool ergonomics and attractiveness.

For the results to be scientifically valid, we conducted a controlled study, so there were classes allocated to the experimental group and classes allocated to the control group. Classes in the experimental group completed the questionnaires 2 weeks before and 3 weeks after their Escape Addict session. Classes in the control group completed them on the same dates as the experimental classes, but without Escape Addict session in between. This allowed us to check the Escape Addict session effect on pupils. Results will be available before summer 2019.





## CONCLUSION

Using new technologies for prevention was an audacious bet which seems to have paid off! Launch of Escape Addict received media coverage throughout Switzerland. This prevention tool, based on the reality of young people's daily lives, has made people outside Canton of Valais envious and curious. We thus organized a presentation for our partners outside the canton. Escape Addict seems to have a bright future!

## PERSPECTIVES AND NEEDS

We are now developing the follow-up of Escape Addict. The objective here is to maintain and reinforce the above-mentioned objectives by ensuring the long-term sustainability of the messages and skills that were acquired during the classroom intervention.

To do this, we focus our future actions on two areas:

- › Development of pedagogical tools for teachers, in line with the Plan d'Étude Romand.
- › Development of an Escape Addict dedicated website, with attractive and informative content, including an investigation to be solved online.

## WEBSITE

[www.escape-addict.ch](http://www.escape-addict.ch)

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## 2 | BUS SIMULATOR IN VIRTUAL REALITY FOR YOUNG ADULTS WITH INTELLECTUAL DISABILITIES

**Carrino Francesco, Cherix Robin, Abou Khaled Omar, Mugellini Elena, Wunderle Dominique**

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### ABSTRACT

Virtual Reality (VR) can be used to simulate training scenarios that may be too dangerous or too expensive to be recreated in real life. Currently, people with intellectual disability (ID) train complex everyday situations in the real world under the strict supervision of one (or more) accompanying person until they become autonomous. However, these real-life simulations present risks, can be complicated to set up, and mobilizing the involved people requires time and money. This paper presents a VR simulator conceived with the help of social educators and intended for teenagers and young adults with a light or moderate ID. The simulation enables the users to train different conditions in the scenario of a public transport bus in an urban area.

### KEYWORDS

Virtual reality; Intellectual disability; Simulation.



### Virtual Reality

- Safe, low-cost, controlled training



### Reality

- Validation of knowledge transfer







## CONTEXT

Self-determination has been defined as “the attitudes and abilities necessary to act as the primary causal agent in one’s life and make choices and decisions regarding one’s life quality free from undue external influence or interference” [1].

Young adults with intellectual disabilities (ID) often have the ability to personally control the events in their life. However, this capacity being often underestimated, they can engage in self-determined behavior processes when given the opportunity and the means to choose. Therefore, it is very important to continue supporting young people with ID into acquiring the skills for a better independence. Practically, this means to let them test certain situations autonomously and safely (e.g. taking the bus, how to behave if they miss the right stop, manage conversations with strangers, etc.).

## TARGETED ISSUES

Currently, in order to allow young people with ID to train in situations of interest, several people must participate to build the desired conditions and provide constant supervision. The required cost and time prevent it sometimes. However, new technologies, such as Virtual Reality (VR), can be used to simulate certain conditions safely, in a structured, repeatable and controlled way.

This project aims to create a VR-based system that would offer learning situations to adolescents or young adults with a light to moderate intellectual disability, in order to let them face these situations without risk before practicing them in real life.

With the help of a social educator, we designed and developed in this project a bus scenario in which the user can simulate the three following conditions:

- › Get on the right bus
- › Get off at the right stop
- › Interact with a stranger

## PROPOSED SOLUTION

The solution we propose in this paper is a VR simulator with which three scenarios can be played, one per condition presented at the previous section’s end. These three scenarios can be played independently or to-

gether to make a bigger, more comprehensive scenario. The played scenario depends on the skills that we want to train with a specific user (however, for our target population it is usually better to train one skill at a time). The three scenarios take place in an urban environment: in the “Get on the right bus” scenario, the user waits for his bus at a bus stop. Several buses arrive one after the other within a customizable time interval and the user has to get on the right one.

In the “Get off at the right stop” scenario, the user sits in the bus and she/he has to select the right stop.

In the “Interact with a stranger” scenario, a human avatar (male or female) approaches the user asking him/her to follow him/her for a coffee, a cigarette or something else. If the user refuses, the stranger insists with an increasing degree of insistence.

## RELEVANT INNOVATION

VR has been previously used to train children and adults with various types of IDs in different scenarios such as street-crossing [2] or route learning [3, 4]. Many studies were performed even before that realistic VR became widely accessible. In 2005, a review [5] showed VR efficiency to promote skills for independent

*This project aims to create a system based on VR that would offer learning situations to adolescents or young adults with a light or moderate intellectual disability [...].*





living in scenarios such as shopping, cooking, and road safety. With the notable exception of people with autistic spectrum disorders, the studies also showed that there was a transfer from what they learned in VR to reality. The current technology may improve these results by providing better immersion and interaction possibilities and by providing new ways to monitor the user's behaviors in VR.

In our project, in order to have a realistic simulation of the stranger's avatar in the "Interact with a stranger" scenario, we combined motion capture (performed using inertial sensors), automatic facial animation (based on recorded dialogs) and manual animation to fine-tune facial expression. In addition, to track the user's point of view, we use eye tracking integrated in the VR headset. This will be used in a following analysis to study the differences between the target population and a control group and hopefully provide guidelines for better training practice.

The project has been developed by an interdisciplinary team composed of engineers and social educators in order to handle the target population needs in the best way possible.

## PROJECT OUTCOMES & RESULTS

This project main result is a functional prototype that can be used to train people with ID in everyday situations. This prototype allows playing the three defined scenarios.

In the "Get on the right bus" scenario, the user is instructed to get on board of a particular bus (identified by its number and the destination) and can select the right bus by simply going near the bus door and clicking on the button to open the door with the controller.

In the "Get off at the right stop" scenario, the user sits in the bus waiting for the right stop. Since people belonging to the target population could have reading disabilities, similarly to what happens in real buses, the next stop served by the bus is presented to the user in a multimodal way: a voice announcing the stop name and a writing on a panel above the driver's place. The city environment is spread with landmarks such as colorful houses, signs of common supermarket chains or post offices. In this way, the user can train to retain or pay attention to particular landmarks.

The "Interact with a stranger" scenario is the most challenging of the three and is currently an early stage prototype. The character animation is fluid and realistic but the overall result needs to be thoroughly tested with users in order to reduce the possible bias coming from the uncanny valley (*you can see the impact of bad illumination in Fig. 2*).





## CONCLUSION

Getting on the right bus, get off at the right stop, and interact with a “dangerous” stranger are three scenarios often recreated in real life by social educators to train young people with ID to become more independent and develop self-determination.

In this paper, we present our work in which we recreated these scenarios in VR proposing a low-cost, easily reproducible and safe training environment.

## PERSPECTIVES & NEEDS

In the short term, the next goal is to perform the first acceptability tests with users belonging to the target population. In a longer-term view, we would like to assess the learning transfer from VR to reality. Finally, we plan to add physiological sensors to the system so as to monitor elements such as stress and fear.

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# 3 | ANI: HOW TO TURN A MUSCLE INTO A MOTIVATING CHARACTER

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## ABSTRACT

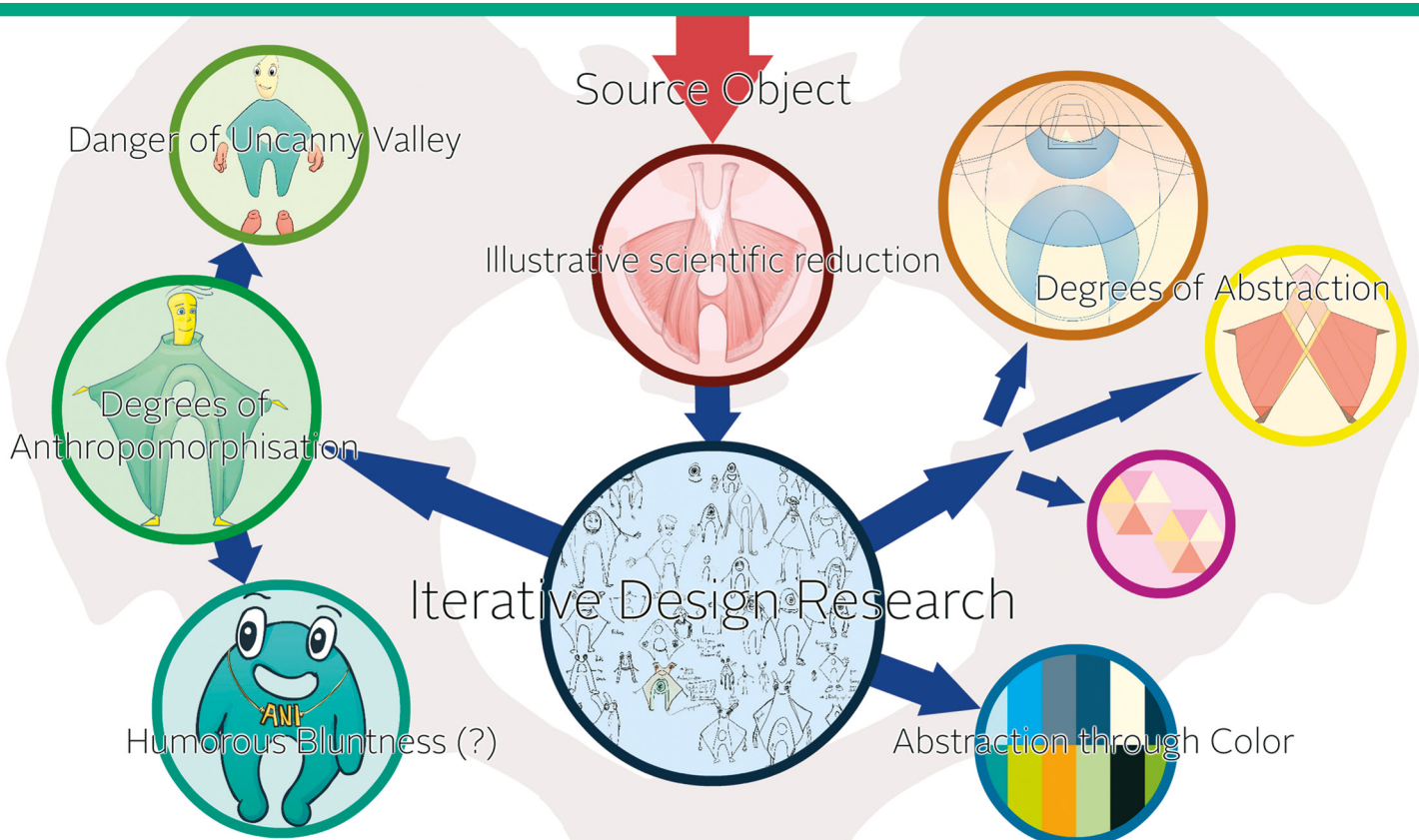
This paper explores how modelling an approachable, motivating character on the chiefly concerned muscle proves to be optimally suited to achieve a destigmatization of incontinence and provide an enjoyable and successful therapy. Through iterative design research the muscle “Levator Ani” turns into the friendly and quirky coach “ANI”, who guides the user through gameplay, questions and the overall training within the “Acticore”-app.

## KEYWORDS

Character Design; Abstraction; Dialogue; Humor in educational/medical contexts; Motivation design; Relatability.

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Fig. 1: Iterative Design Research







## CONTEXT

Urinary or fecal incontinence is a widespread problem for people of all ages and sexes. Kids who wet the bed, young women who recently gave birth, people who recover from injury and the elderly make up the group of the affected. [1, 2] Fitness of the pelvic floor muscles does not only guarantee continence, but also increases quality of life in many aspects, such as sexuality, core stability and relief of back pain. Incontinence being the main issue, makes it a rather unsavory topic to present. After all, the topic is concerned with bodily functions like defecation, body parts like muscles, flesh and blood and last but not least with shameful mishaps in social situations. With that comes a kind of stigma, which causes the issue to be largely obscure to people not directly affected by incontinence.

## TARGETED ISSUES

Within the fields of scientific visualizations there are well-known strategies to simplify subjects to convey specific, deeper truths that would be hidden behind the effects of photorealistic depictions. [3] While such visualizations are often used in the educational context, the idea herein is to have a bigger impact by enabling a personal relationship towards a topic and consequently yield higher success rates in therapy or lifestyle motivated fitness training. (Fig. 1)

Since the beginning of the project, there has been the intention to break the aforementioned stigma by having the user/player enter into dialogue with his/her pelvic floor muscles. By metaphorically and practically communicating with your pelvic floor muscles, we want to give the issue a voice. To have a voice means wanting to be cared for, to have own agency and interest in wellbeing. In consequence, we want the user to care more about muscle recovery and/or improving their fitness.

## PROPOSED SOLUTION & RELEVANT INNOVATION

### Anthropomorphize

But how does one overcome the challenge of presenting flesh and blood as something motivating? When transforming a muscle to an anthropomorphic character design, one has also to be concerned with relatable (empathize) character traits. Above all, by intending to boost compliance/motivation within the training program through the character, it is important not to fall into an uncanny valley with the design and cause adverse effects.

### Characteristics/Behavioural Details

What type of muscle is anthropomorphized can be a source for its characteristics and behaviour too. Is the muscle in its original functions rather timid? Is it a muscle that might think higher of itself, compared to others? With the 'Levator Ani' muscle, we want to create a sympathetic face, a hard working, grounded and motivated bundle of muscles. Maybe simple of mind, but definitely certain in its 'profession'.

*By metaphorically and practically communication with his/her pelvic floor muscles, we want to give the issue a voice.*



### Abstraction

Through abstraction of facial features, the idea of emotion becomes better replicable and relatable in the viewer's mind. A cartoon style is therefore preferable. [4]

### Color

Choice of color too can be a powerful tool to set up a character. Apart from color psychology, e.g. a light green color being refreshing, it can also help dissociate the character of its meaty source.

### Educational Humor

Additionally, dialogue with the character has to be friendly and informative.

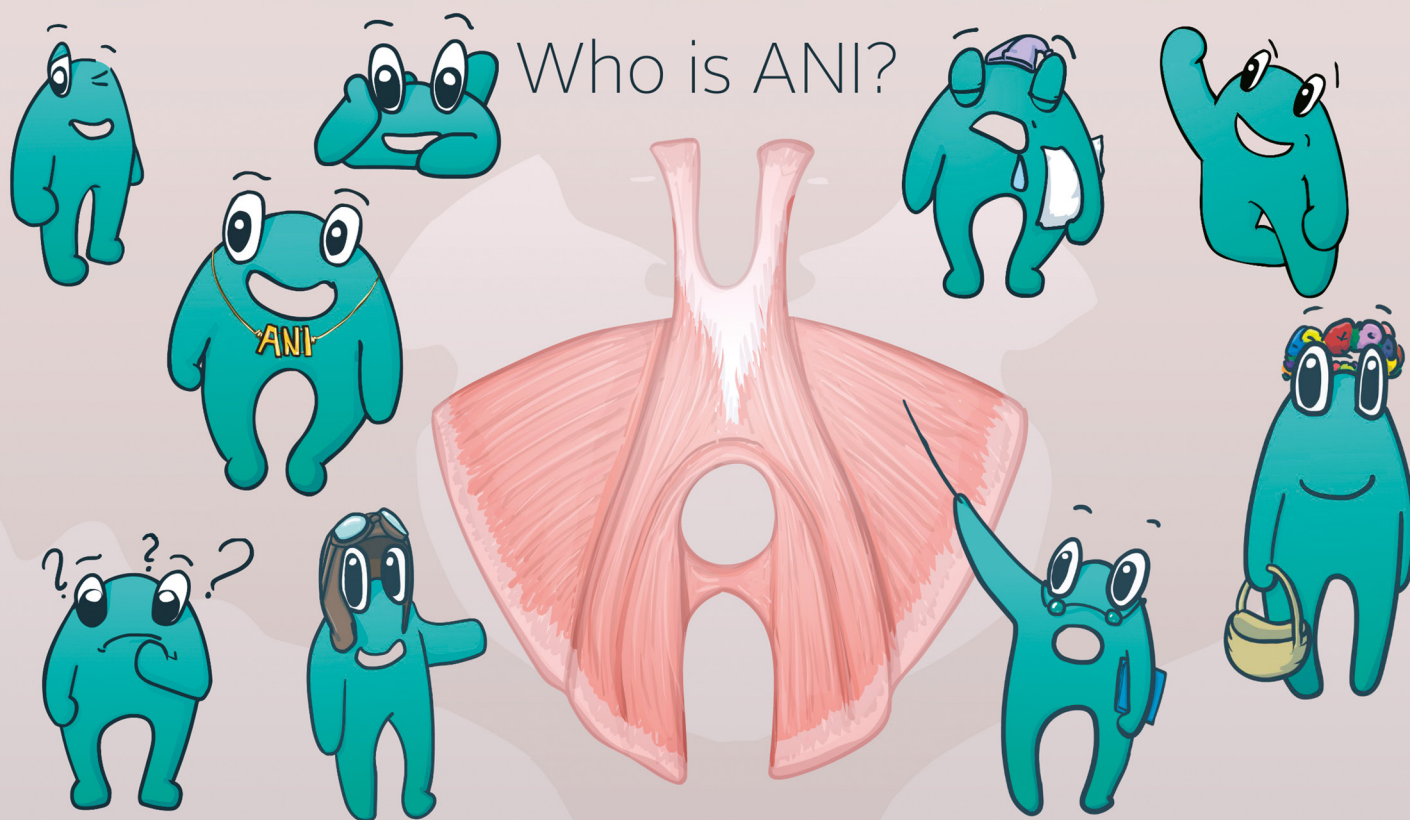


Fig. 2: ANI in several poses and interactions.

In the specific case of pelvic floor muscles, being close to the buttocks is also a possibility to introduce a kind of relaxed humor to the character. Connecting crucial information about the everyday job of the muscle or criticism about the user's performance with a certain portion of humor, has a lot of educational advantages. [5]

### Everyday Situations

To reflect the nature of the app as a training plan as well as the muscle being and working always with you, it makes sense to represent the character in everyday situations. You might find it sleepy in the morning or making an appropriate comment wishing the user a happy birthday. This too can serve as a good basis for contextual humor.

### Dispelling the Stigma/Marketing

Having a presentable character is also a potent messenger for the topic. As the face of a discussion, it can help to dispel the stigma and normalize discussion around incontinence. From a marketing viewpoint it also can be a symbol or icon for a product.

## PROJECT OUTCOMES & RESULTS

Acticore1 is a package consisting of an app for mobile devices and a "Sensor Seat" that communicates with it via bluetooth. The app assesses the fitness of your pelvic floor muscles by sitting on the sensor seat, contracting and relaxing your pelvic floor muscles. The app gives you a customized training schedule/plan and provides you with the possibility to train with different styles of games, while scaling the difficulty appropriate to your fitness. All game/training types are developed in cooperation with ETH Biomechanics and cover different aspects of pelvic floor muscle fitness like endurance, speed strength and coordination. Additionally, the user is offered to contact therapists specialised in the field to further intensify the coaching.

Within the Acticore1 APP, a quirky character named ANI (derived from the muscle "Levator Ani") accompanies the user through the app and also acts as the avatar with which the trainings are played. Either the user can ask ANI questions regarding the subjects on the screen or ANI itself will explain how to play different trainings, comment on the user's performance or on the ideal amount of training still left to do. ANI lightens up situations with humorous comments and different poses and emotions.

## CONCLUSION

With ANI, we did not only manage to create a sympathetic character that is inspired by the shape of the pelvic floor muscles, ANI also became also the face of Acticore1, as a messenger for the user's pelvic floor and by extension of the general topic of incontinence in the public space. (Fig. 2)





In the future, Acticore1 wants to work more closely with therapists to further intensify the interaction between app, patients and therapist – providing more coaching quality in general.

## PERSPECTIVES & NEEDS

Regarding the future of ANI as a character, there is probably a lot of potential in expanding the motive of “direct communication” between user and muscle to other muscle groups. Creating a family of different muscle characters would give an opportunity to lots of dynamic interactions between them and learning moments for the user. Also, since the taboo of incontinence is still prevalent, the hope is to open up dialogue, help people to take action and increase their quality of life by having a fit ANI.

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## 4 | SHADOW'S EDGE – BUILDING RESILIENCE THROUGH MOBILE GAMING

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### ABSTRACT

Children and teenagers, especially those suffering from a chronic illness, can have a hard time opening up about their feelings, to a therapist, friends or family. Dealing with everyday challenges is not always easy and can often be a source of frustration.

This application's purpose is to create a safe place for these young people to relieve the pressure through content creation in this adventure game, helping them draw strength from this experience. User tests are currently going on in Switzerland and the United States and the results seem promising.

### KEYWORDS

Resilience; Emotional healing; Journaling; Graffiti; 3D mobile adventure.







## CONTEXT

More and more paediatric patients are surviving with complex diseases. Yet sadly, there hasn't been parallel progress in helping young patients deal with the emotional side of their illnesses. Patients may feel pressured to "be strong" for themselves or their families. This may mean their true feelings stay bottled up inside. We all know how difficult it is to have hard conversations. Far too much remains unsaid, so patients are left alone with their feelings.

Complex treatments over an extended period of time take their emotional toll. Unfortunately, reimbursement pressure means shorter and shorter hospital stays. Patients may not be in the hospital long enough to receive the ongoing emotional support they need, or if they are in the hospital, they may be too sick to take advantage of it. Also, after or in between treatments patients often need to rely on their own resources.

Professional intervention and therapy is not easily accessible, often too expensive, may not be desirable for teens, or may simply not be available when they need it the most. The result is that only a small portion of teens who could benefit from ongoing emotional support are receiving it. Shadow's Edge is designed to fill that gap.

Sheri Sobrato Brisson, founder of the Digging Deep Project, experienced her own health challenges growing up and had her fair share of hospital visits. It wasn't until after her health was restored that she recognized how little emphasis there was on her mental health during the hospitalization.

## TARGETED ISSUE

The purpose of Shadow's Edge is to help give teens and young adults suffering from a chronic illness the tools they need to master their situation, gain a sense of control and take an active role in their emotional health. There are few resources out there for adolescents and young adults battling serious illnesses, which is why digital therapeutics are finding their way as complementary ways to support patients. Playing Shadow's Edge provides an incredible opportunity for patients to connect with themselves and others in new ways. This mobile game aims to guide players through their emotional journey and help redefine who they are, not only as a patient, but as a person.

Shadow's Edge is designed for teens 13+ and young adults facing any type of significant health challenge. We targeted this age group because there are very limited resources for adolescents and young adults with these needs. This life stage is critical for identity formation—a process that can be impacted by illness. Our typical player may be hospitalized or be in outpatient treatment, have a serious life-limiting or a chronic illness, perhaps disabled and undergoing rehabilitation, or maybe be post-treatment and in remission. The content in Shadow's Edge addresses the emotional content of these experiences that are most common to young people facing medical conditions.

*We truly believe immersive games, with a storyline and characters, can provide a new dimension to help a young person move through the emotional experience of illness.*



## PROPOSED SOLUTION

Today, young people live and learn through technology. Serious games give players the chance to interact with content, experiment and practice what they learn, all within a fun and immersive environment. With Shadow's Edge we created a 3D mobile adventure game. Users can play the game discreetly anywhere at any time, offering patients a chance to work through feelings whenever they need to get something off their chests or want an emotional boost.



Like therapy, Shadow's Edge creates a safe place to hold and process feelings. But in the world of Shadow's Edge, this "blank slate" is not a sterile white sheet of paper nor a therapist's office, but a cityscape that comes to life as players express themselves in words and art.

We embedded psychosocial interventions within the metaphors of Shadow's Edge—in the characters, the game worlds, and the quest of the game itself. We've also inserted psycho-educational "nuggets" inside the pigeons of the game as another way of providing useful self-help content.

Just like therapy, the goal of Shadow's Edge is to help players process their emotions and give meaning to their experiences in order to heal and move on. Shadow's Edge lets players do this in a fun way, by spraying graffiti and creating a journal which holds their personal narrative. Through gameplay, players find their voice, come to terms with their experience, and connect to others in similar circumstances.

Shadow's Edge can be used in conjunction with therapy, helping young people.

## RELEVANT INNOVATION

Most apps for people facing health challenges are designed to manage treatments, record symptoms, or promote healthy behaviour. No apps for youth with medical conditions focus on the emotional wellbeing of the patient. No game exists today for teens to reflect on their personal journey and gain skills for dealing with their health challenges.

Shadow's Edge is unique in delivering psycho-educational content through a gaming platform with an immersive 3D world, characters, and storyline. The status quo is to help young patients feel as "normal" as possible during and after their treatment. But honestly, there is nothing normal about a young person with a life-altering medical condition! Shadow's Edge is not a shooting game about dominating your illness – it is about living in harmony with it. Our tools encourage young people to acknowledge what is scary or difficult – to go deeper into their experience – and build strength through it.

In Shadow's Edge, players search a city devastated by a storm for pages of a missing journal, along the way bringing color back to the city. The game story is a metaphor for the real-life situation the players are in. It serves to create a feeling of immersion, and exports the player out of his or her real world into a fantasy world. Here, rules are simple and there is no real-world consequence or judgement for being true with one's emotions.

The story provides the backdrop for the player's actions and connects them with the quest.



## PROJECT OUTCOMES & RESULTS

Shadow's Edge is designed to build emotional resilience and help teens ultimately be proactive in dealing with the realities of their situations. Our hope is that young people discover and listen to their own voice and learn to trust their feelings. We believe that players will become more confident in expressing themselves and proud of their personal narrative. We expect that young people will feel more connected, less alone, and more able to reach out for help in their real lives.

Prior to game launch, we conducted in-house research with 55 teenagers and young adults facing health and mental health challenges. Each player played Shadow's Edge daily for 20-30 minutes during a six-week period. We found Shadow's Edge significantly impacted all seven resilience factors tested, most notably emotional regulation, optimism, and positive self-identity.

- › Additionally, 85% of players felt more creative and had fun
- › 81% reported that Shadow's Edge helped them understand others better
- › 73% reported Shadow's Edge helped them realize other teens think and feel the way they do
- › 73% of players reported they felt "more real" after playing

We are currently working with Northwestern University, Lurie Children's Hospital (Chicago), to evaluate the impact of playing Shadow's Edge. Specifically, they are conducting research with 174 cancer survivors and young patients in end-stage treatment between the ages of 13 and 24. We look forward to collaborating with other academic institutions for both questions.

## CONCLUSION

The majority of apps on the market today that fall into the "psychology" space deliver cognitive behavioral interventions for diagnoses such as depression, anxiety, phobias; we truly believe immersive games, with a storyline and characters, can provide a new dimension to help a young person move through the emotional experience of illness.

## PERSPECTIVES & NEEDS

For Shadow's Edge to be a Digital Therapeutic, we need scientific research to prove its effect on patients. We are heading in this direction, with the first study with Northwestern University Feinberg School of Medicine and the Lurie Children's Hospital Chicago. We are looking for additional research partners to define further therapeutic settings with the game. Lastly we are looking for AR and VR technology partners to expand the game.

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## SESSION ART, CULTURE & TOURISM

10H25-12H40

Whether visiting a museum (games @ museums), discovering a region (YAPASPHOTO and St-Ursanne - Circuit Secret) or sharing culture within the family (PfuQs), serious games become more and more a way to teach and discover new things. The diversity of mediums are very impressive: Mobile applications on tablets or smartphones, board games, augmented reality, interactive terminals, projections or even more complex systems. This allows serious game's developers to imagine multiple ways to spread their messages.



CHAIR: FRÉDÉRIC FISCHER | ACADEMIE DE MEURON | NEUCHÂTEL

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## 5 | PFUQS (PARTAGE EN FAMILLE AUTOUR DE L'USAGE QUOTIDIEN DU SMARTPHONE)

**Monnier Mélissa**

HEAD, Haute école d'art et de design, HES-SO, Genève, Switzerland

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### ABSTRACT

PfuQs is an app game to share between parents and teenagers aged between 11 and 15 years old. The main goal of the game is to engage parents and teenagers to share knowledge, exchange thoughts on smartphones and linked themes, but more importantly to promote mutual understanding. The game is designed to be played for three weeks. The players will receive every day either a quiz or a challenge to take up together. Once a week the game invites both parents and teenagers to play a role game in which they have to put themselves in each other's shoes. The app is also being adapted to address professionals' uses by enabling them to choose content from all three mechanics in order to reach their target in a prevention session context.

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### KEYWORDS

Smartphone; Families; Mutual understanding; Mediation; Prevention; Quiz game; Challenges; Role Game; Sharing.

## Numeric mediation:

On smartphone use and impact on family system and atmosphere

### Needs

**Educate and inform users on their empowerment :**

- General knowledge on digital culture
- Understanding of the stakes
- Security awareness

## Parent

### Fears and concerns:

- Fear of losing touch with teenager
- Fear of the teenager losing touch with reality
- Dangerous web content
- Health risks (sleep, sight, etc.)
- Marginalisation -> social pressure
- Generational gap
- Culpability and responsibility
- Reject of over-authoritarian role

## Teen

### Fears and concerns:

- Difficulty to limit oneself in time and place
- Good functional use but lack of ethic
- Lack of awareness on usage impact
- Development of sectarian behaviour and bullying
- Social pressure and acceptance need
- Need of peer validation

### Inter-generational link :

- Mutual assistance
- Knowledge sharing
- Technical control

### Mutual understanding :

Boost discussions  
Establishment of mutual values  
Collaboration for a positive family atmosphere

## QuizZ

### Digital Culture

Learning and understanding new concepts and notions about smartphones, internet and social networks.

## Challenge

### Take up challenges solo or together !

Practice makes perfect ! Challenges are designed to bring action to the every-day life.

## Swap!

### Put yourself in the other's shoes

Facing everyday situations, players will have to project themselves in the other's role in order to understand their stakes, fears, needs and wishes.





## CONTEXT

For my Thesis on the supervision of smartphones with the digital natives, I tried to understand the state of the situation between the market proposition, the schools and education system and the families. It turns out there are a lot of tensions both within the families around the smartphone issue but also between school and families. Hyper-connectivity and lack of ethical perspective are the two ingredients in this explosive cocktail. The market is trying to put up limitations to protect the teenagers but at the same time they try to sell more. Responsibility of education is solely resting on the parent's shoulder and they often don't feel fit for the task as they feel unfamiliar with the numeric and digital world. It seems the tensions rely on lack of tools and information at the disposition, lack of exchanges and understanding paired up with the inter-generational gap between kids and parents.

## TARGET ISSUE

Misuse of smartphone and numeric tools. We are often shown that teenagers have issues with the usage of screen devices and have a poor ethical use when we hear about cyberbullying and other similar problematic. But we sometimes forget that adults too may have a problematic usage or are just missing a lot of information on our fast growing numeric world. After a thesis on the smartphone and the digital natives, I did a series of interviews in families, in schools and with social workers or psychologists in order to understand the current state of the situation. In conclusions, I discovered that parents generally find themselves lacking tools to understand what their kids are doing and feel like they don't have the right knowledge to talk or act on it especially when it comes to technologies. Teens, on the other hand, tend to have a great knowledge of technicalities but lack ethical guidance when it comes to the internet and social networks.

Today more than ever it is time to try to understand each other and to find the best way to profit from our new technologies in order to find balance. Smartphones are neither good nor bad, they just have to be used with consciousness and conscience isn't possible without power of knowledge.

## PROPOSED SOLUTION

PfuQs (partage en famille autour de l'Usage quotidien du Smartphone) is a 3-week-long family game on smartphones where teenagers between 11 and 15 and parents play together. Every day they get a Quiz or a challenge to take up. For the moment the game is designed to be shared together on one device only. As the main goal of the game is to motivate exchanges, they have to play it together physically.

Quizzes are designed to help learn and understand various topics around the smartphone, the internet (For instance: what are cookies?), social networks (As an example: what's the e-reputation?), security and more. They help the family to acquire knowledge on the numeric world in general in order to understand the implications of their everyday use.

The challenges are destined to boost exchanges in the family and to help the parents discover new uses of their phones while the teenagers get to have fun with their parents. Some challenges are mostly for fun (write a message codified with emojis) but they are encouraged to share knowledge and to learn together (Challenge for the parent: show your teenager what pages did you like on your favorite social network and can you explain why?... And vice-versa).

Finally, the last game mechanic is a role play the family can discover at the end of each week. In the role play,

*Its main goal is to engage parents and teenagers in sharing knowledge, exchange thoughts on smartphones and linked themes, but more important to promote mutual understanding.*





teenagers get to become the parents and parents become the teenagers. They each get several situations with multiple choices to act on the given situation. But more importantly, they have to put themselves in each other's shoes. This mechanic aims to help understand each other, their needs, hopes and fears. They also get to understand that there are no absolute perfect solutions but that they have to discuss together in order to find what is best for their own family.

Indeed, most of the choices consequences invite them to play the situation together, posing as an angry teenager or a strict parent if they like! The goal is to allow them to express what they feel or think under the cover of a role game. This mechanic is an opportunity to discuss hypothetical situations that are not so far-fetched. For instance, the teenager playing the parent's role will have to decide if he answers this work e-mail during dinner or if he waits after. Or if he decides to impose a numeric curfew or to negotiate it with his teenager. In any case they will have to enact the situation together. On the other hand, the parent playing the teenager will have to choose for instance between sending a nude to a love interest or not, replying to insults on social media or ignoring them, or even choose to break the curfew in order to keep his snapchat flames or risking a friendship in order to follow the house's rules. They can also negotiate most of the time, of course.

## RELEVANT INNOVATION

Parents and kids sharing time on their mobile device together is quite an innovation. But what's really innovative is giving an opportunity to the families to share knowledge and to communicate more with each other. In a context where we hear we are more and more on our screens, keeping in touch with each other in real life is more and more important. It's a solution to the parent's fear, an opportunity for them to understand their children and a moment of fun for the kids. Moreover, the game does not target especially the teen or the adult. Both players will have to reflect on their own use of their smartphone!

## PROJECT OUTCOMES & RESULTS

As the game was tested on a few families, results are more qualitative than quantitative. For now PfuQs got positive feedback from parents who were only but wishing to get some insight in their teenagers habits. Both parents and teenagers agreed that they learned some new concept, as a teenager said: "I'm totally a nomophobic! I didn't know the word!"

Parents were happy to share a moment talking about these subjects they're so unsure of. And kids enjoyed the swap game and to be able to play the parent role for fun. When PfuQs was in Yverdon for the Numeric



Game festival, visitors tried the prototype app and expressed their curiosity towards the game. Moreover, they expressed their wish to try it at home with their kids. The family that tested the game were pleased by their experience and often asked where to download it.

The game was also tested amongst teenagers in community centers and they thoroughly enjoyed the Swap phase together. What was more interesting was the way explanations arose from the teenager themselves sharing it with their peers. The game session was punctuated by anecdotes and memories they shared with each other.

## CONCLUSION

The game has taken a new turn recently as professionals from education, sociocultural coordinators and psychologists wish to use this tool in their profession. PfuQs will probably reach a version 2.0 to target these professionals needs. PfuQs is still in development but its goal is to become a tool for prevention campaigns in institutions or a workshop tool for teachers and educators. The user tests are still ongoing and very promising.

## PERSPECTIVES & NEEDS

PfuQs still needs some time in development to finish the level design and the reward section of the game. Content and gameplay are done and we're exploring a version of the game where professionals will be able to choose some of the quizzes, challenges and situations in order to target their audience and reach just the way they need to.





# 6 | “GAMES@MUSEUMS” IMMERSIVE GAME DESIGN FOR THE MUSEUM CONTEXT

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## ABSTRACT

This contribution discusses the implementation of various game mechanics for a Swiss museums project called games@museums. The project's aim is to enhance the visitors' museum experience with new narrative and technological approaches. The results are three prototypes which were tested in the City Museum of Aarau: a flirt chat game for museum exhibits and visitors, an interactive beacon-based crime story and a destruction box for digital twins of museum artifacts. Next, those prototypes will be adapted for other museums, in order to research and develop market-ready game scenarios for a larger museum landscape.

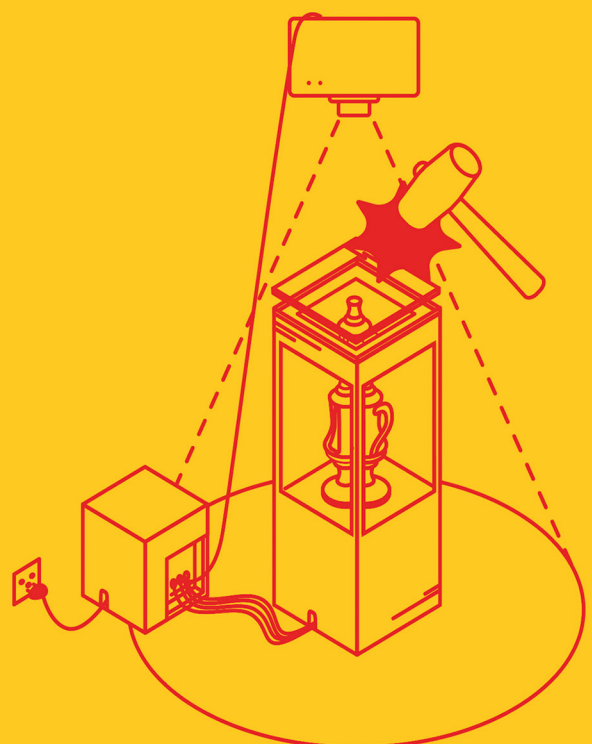
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## KEYWORDS

Serious games; Game design; Museums; Storytelling; Technology.

# Hammer To Fall

Schlag auf Schlag!





## CONTEXT

Swiss Museums are popular nowadays – in 2016, 12'081'844 entrance tickets were sold, almost 1 million more than the year before [1]. Swiss people visit about as much museums as cinemas [2]. To further strengthen this popularity, in 2017, Engagement Migros launched a multi-year project called “games@museums” that develops innovations and re-thinks digital and game-based museum experiences. Furthermore, “games@museums” shall address the fact that a large part of museum objects are not displayed in the permanent exhibitions, but stowed away in museum archives and depots [3].

## TARGETED ISSUES

How to make those invisible treasures of cultural and artistic life more accessible? How to generate game-based experiences that work not only for one particular museum, but can be transferred to a variety of Swiss museums of different orientations? To address these issues, Engagement Migros has initiated and financially supports a cooperative research and design project. In the French speaking part of Switzerland, the Master of Arts in Media Design of the University of Arts and Design (Haute école d'art et de design) (HEAD) is working with the Ethnography Museum of Geneva (MEG). In the German speaking part, the City Museum Aarau ([www.stadtmuseum.ch](http://www.stadtmuseum.ch), SMA) is, as project lead of “games@museums”, closely collaborating with the Zurich University of Arts (ZHdK). There, Master students & alumni of the Game Design specialization ([www.gamedesign.zhdk.ch](http://www.gamedesign.zhdk.ch)) have been researching museum games and are developing game-based scenarios for the City Museum Aarau. This contribution is focusing on the projects developed by the ZHdK-SMA cooperation [4].

## PROPOSED SOLUTION

The first phase consisted of exploration, research and analysis of museum games; it was closely linked to a Master seminar in Game Design at the ZHdK (August 2017-July 2018). Museums were visited and museum games played, brainstorming sessions were held, and about one hundred different game mechanics

or play elements for museums were differentiated. Some were more traditional ones, such as LARPs at the museum or some sort of Tamagotchi, others involved AR spray painting or VR curating. About 15 concepts were distilled into one-pagers, and, in a last evaluation process, three different concepts were finally chosen to be further developed into prototypes.

In the second and current phase of prototype development (August 2018-July 2019), three very different projects are being developed in a small team of ZHdK staff and MA alumni (the team consisting of René Bauer, Sonja Böckler, Stefan Schmidlin and Mela Kocher). In January 2019, these prototypes were exhibited and tested in the City Museum Aarau for 2.5 weeks.

## RELEVANT INNOVATION

“Hammer to Fall” is an experimentation box: on several screens, attached to a black wooden box, different perspectives of the same digital twin of museum exhibits are displayed; a projector hanging from the ceiling casts images on the floor. The user hits the top horizontal screen with a rubber hammer. And, the digital objects are destroyed and rebuilt in several steps, bits and pieces flying from the box into the ground. In the figurative sense, the visitor assumes the curator's role, who anatomizes the meaning and history of museum exhibits.

“Art Lover”, on the other hand, is a flirt machine which enables a conversation between visitors and the museum object via iPad. If the visitors perform to the object's liking in the multi-linear conversation, they might get a “kiss”, i.e. a secret word. If the visitors choose the wrong answers, they are rejected. The museum exhibits

*The project's aim is to enhance the visitors' museum experience by testing the adaptability of game scenarios for different museums.*





(such as an ancient city map, a hairdresser's chair or a theodolite), have voices and their part of conversation is heard, while the possible visitor's questions or answers can be read on the iPad screen.

"Murder at the Museum" is an immersive, beacon-based, audio crime play. The visitors walk alone or in pairs like detectives trying to solve the murder of a chandelier. They wear headsets and carry an iPad which is neatly stowed in a bag. Whenever they get close to a beacon while wandering around in the museum, the participants hear story bits and can choose to which exhibit they will go next, depending on their narrative interpretation. The goal is to find the guilty museum exhibit.

## PROJECT OUTCOMES & RESULTS

Each of the three prototypes, while oscillating between play and game, has different innovative angles, especially in the areas of technology and storytelling. In "Art Lover" and "Murder at the Museum", the focus lies on the imagined emotions of the museum exhibits. Since the visitors can interact with the objects, these seem alive, and even an awkward surveying instrument such as a theodolite can surprise, excite, insult or even laugh at the visitor.

Technically, experiments were conducted in all the projects: in "Art Lover", specific dialogue systems were created; in "Hammer to Fall", hitting monitors without crashing them, and testing different sensors for the hammer's vibration were on top of the list; "Murder at the Museum" faced (and matched) the challenge of implementing BLE beacons which send a signal to the iPad at periodic intervals. Since the proximity beacons trigger at certain distances, adjusting trigger zones was a big task, because the signal bleeds through ceilings and walls.

## CONCLUSION

While the games have been exhibited in the City Museum of Aarau in January, roughly 90 people have given feedback on an online survey. First results show that people in general felt comfortable and entertained while using the prototypes. While the (subversive) idea behind "Hammer to Fall" was harder to grasp intellectually and had a slightly inferior rating than the other two games (about 3.5/5 points in comparison to 4.3/5), visitors generally found that they all enriched the museum experience.





## PERSPECTIVES & NEEDS

The goals of the “games@museums”-project are the immersive extension of exhibition objects and the playful interaction with the permanent exhibition and depots. In the next step, these game prototypes potential, in respect to the transfer to other museums, shall be researched.

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## TRAILERS

*Hammer To Fall:* <https://vimeo.com/316256166>

*Art Lover:* <https://vimeo.com/316257339>

*Mord im Museum:* <https://vimeo.com/316819732>



## 7 | YAPASPHOTO: PROMOTING REGIONAL PUBLIC TRANSPORT AND TOURISM WITH A BOARD GAME

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### ABSTRACT

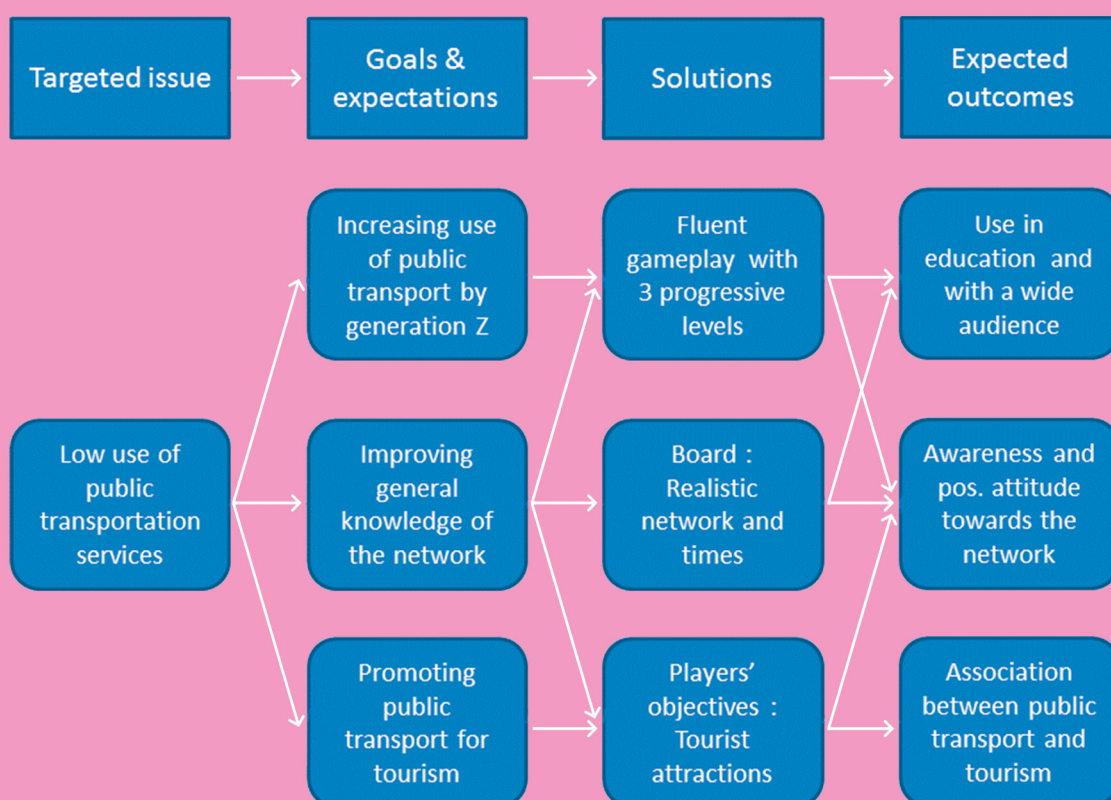
Reducing individual motorised transport use and promoting public transport is an important political and societal objective in the Canton of Neuchâtel. Building on previous initiatives which promoted sustainable development with serious games, we aimed at contributing to this objective through developing a board game picturing both the public transport network and the tourist attractions reachable through it. This game, called YAPASPHOTO, has three progressive levels and was launched in November 2018 and presented to a wide audience. The game efficiency on players still needs to be scientifically tested, in terms of their network knowledge, their attitudes and behavioural change.

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### KEYWORDS

Board game; Public transport; Sustainable development; Tourism; Promotion; Education.

Figure 1 – Theoretical conceptualisation of the project YAPASPHOTO.





## CONTEXT

Educational games, including board games, show an expansion in the last decades, notably to promote sustainable development and sensitize various audiences to climate change (Wu & Lee, 2015). Moreover, there are numerous modern board games related to public transport (see Haffner, 2019, for a list). However, most of these games only picture trains and, to our knowledge, “Ticket to Ride – Switzerland” is the only published modern board game picturing the Swiss railroad network. Furthermore, the vast majority of these train games have no educational purpose and their large geographic scope and game mechanics do not enable a realistic and detailed representation of the public transport network. One notable exception is “Dots & Dashes”, a serious game developed in Delaware to raise awareness on the regional public transit planning (Hacker et. al, 2009). Its authors encourage the transfer of such initiatives to other regions.

The political and societal context in our region favoured a similar project. Indeed, public transport development, promotion and use are priorities of the Plan Directeur Cantonal (République et Canton de Neuchâtel, 2018). In addition, municipalities, transportation companies (TransIN), schools and the RUN association (Réseau Urbain Neuchâtelois) have shown interest in our project.

## TARGETED ISSUES

As stated in the Plan Directeur Cantonal (République et Canton de Neuchâtel, 2018), individual motorised transport is still excessively used and there is a need for a modal transfer towards public transport and “soft” mobility. It constitutes a societal and political priority, but the low use of the existing and rich train and bus network is one of the issues.

The project had to fulfil various expectations of the involved public and private partners. For example, there was a need for a sensitization tool to use both in schools and with the general public. In addition, for marketing and educational reasons, the project had to picture a realistic network and inform players about the interesting touristic places that can be accessed thanks to public transport. Hence, the challenge was to design a simple game to target a wide audience, while keeping it realistic and reasonably comprehensive. Moreover, the partners greatly expected a regional anchorage of the project, in terms of creation, development and production.

## PROPOSED SOLUTION

The project consists of the development, testing, publication and promotion of an educational board game. The prototype, called “YAPASPHOTO, Course en Pays de Neuchâtel”, was originally developed by three students of a technical school of the region (CIFOM-ET). The game finalisation and production were done by the cooperative company “Entrée de Jeux” (2018).

The game represents the public transport network (trains and buses) of the Canton of Neuchâtel, the reachable destinations within the canton and surrounding regions, as well as touristic and cultural points of interest. The game is a race. Players have to move efficiently between destinations. Importantly, there is a realistic system indicating the proportional times of each journey. The scoring system takes into account the number of objectives reached by the players, in terms of reached destinations and visited points of interest.

This game allows the players to (re)discover the regional public transport network, its high density, as well as the ease of access of most major points of interest, including museums and natural sites. It is aimed at a wide audience, including students, to promote the use of public transport in schools and elsewhere.

*[...] this is the first time  
in Switzerland that a  
board game is specifically  
designed to promote  
public transport use.*







Figure 2 – During its launch in November 2018, YAPASPHOTO was played in a train.

## RELEVANT INNOVATION

To our knowledge, this is the first time in Switzerland that a board game is specifically designed to promote public transport use. By focusing only on a small region, this game allows a nearly comprehensive network representation and time needed between two given destinations. Hence, it gives the players an opportunity to learn rather precisely about their possibilities when using the network.

Another innovation is that instead of using plastic or wooden tokens on the board the players use erasable pens on a laminated map to indicate their actions. This adds a dimension of graphic creativity to the players' experience.

Additionally, the game has three progressive difficulty levels. The first is a simple race around the canton. The second adds the possibility of visiting points of interest. The third adds "action cards" that allow players to interact and interfere with others' plans. This progressive aspect is rather uncommon in board games and makes this specific educational serious game adaptable to a very wide audience.

## PROJECT OUTCOMES & RESULTS

The project has been successfully managed, so far. It included final developments: fundraising, tests, graphic design, publishing process, production and distribution. All creators and partners are based in the region. The prototype and final game versions have been tested and presented in several public events, including the "Festival Ludesco" in La Chaux-de-Fonds and the "Printemps de la Mobilité" in Neuchâtel. It has been appreciated by audiences of various ages and expertise regarding board games. Thanks to the partners' support, one thousand boxes have been produced and more than eight hundred have been sold, mostly in the region represented on the board.

## CONCLUSION

YAPASPHOTO appears as a promising medium to promote, among students and general public, the knowledge and use of public transport in the canton of Neuchâtel. This innovative board game has been developed thanks to a wide range of individual actors, as well as public and private partners. We hope this project will contribute to the modal transfer from individual motorised transport to public transport in the region.



## PERSPECTIVES & NEEDS

The game efficiency on players still needs to be scientifically tested, in terms of their network knowledge improvement, their attitudes towards its use as well as their behavioural change.

Many perspectives exist, since its game mechanics can easily be transferred to other cities, regions, or even to the national level. In addition, we are considering live action or digital adaptations.

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# 8 | ST-URSANNE, CIRCUIT SECRET

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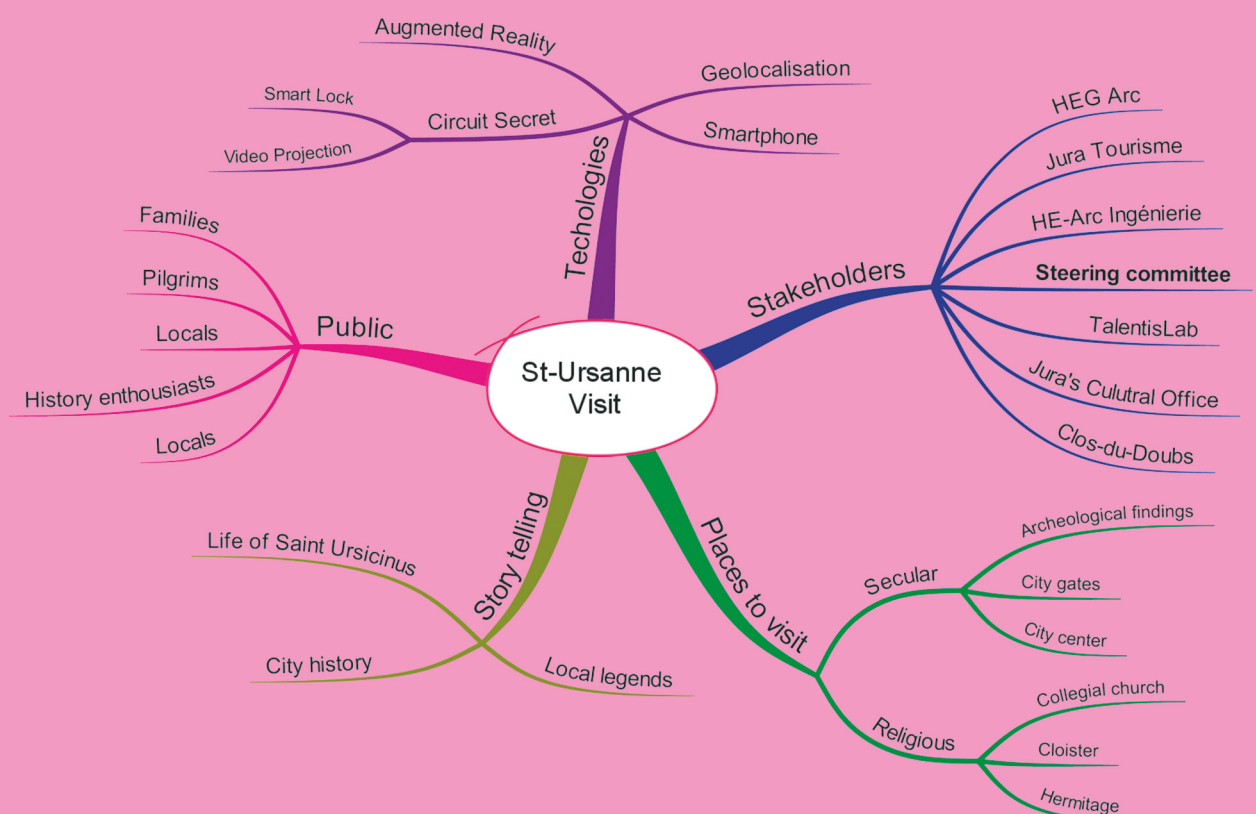
## ABSTRACT

The city of St-Ursanne, located in the Swiss Jura, is a city with a rich historical and religious heritage. According to the legend, the town was founded in the VIth century by Saint Ursinius, an Irish monk. For the 1400<sup>th</sup> anniversary of the death of its death, the ecclesiastic township has created a steering committee to organize events and bring a new dynamic to the city. One part of the actions taken by the committee is to modernize the visit of the town through a location-based mobile app. The innovation of the project is to combine an access management system (Circuit Secret) with video-projection and Augmented Reality to provide a rich and original experience to the visitor of the city.

## KEYWORDS

History; Archeology; Tourism; Serious game;  
Augmented reality; Access management; Historical heritage.

Figure 1: Conceptual illustration presenting the different stakeholders and aspects of the new visit app.







## CONTEXT

St-Ursanne is a picturesque city located in the Swiss Jura. The legend says that in the VI<sup>th</sup> century Saint Ursicinus, an Irish missionary, hermit, and disciple of Saint Columbanus decided to settle there after a bear ate his donkey. He then founded a monastery, around which the city of St-Ursanne grew. The legend is still living in St-Ursanne, the cave in which the saint first settled can be visited in the heights of the town, and the sarcophagus containing its remains is still kept the collegiate church of St-Ursanne. The religious complex includes the collegiate church dating to the XII<sup>th</sup> century and its adjoining cloister, the Lapidary Museum, containing the Merovingian sarcophagi and a crypt, where the remains of the Saint used to lay. More than the religious complex, the city center itself is well preserved, with houses dating back to the XVI<sup>th</sup> century. The city center is accessible from three gates, dating between the XII<sup>th</sup> and the XVI<sup>th</sup> century. The bridge leading to the south gate crosses the Doubs, adding to the striking look of the city.

## TARGETED ISSUES

Despite the beautiful city center and the religious and historical interest of the city, tourism is declining, with fewer visitors each year [1]. The financial situation of the shop and hostel owners is difficult. The decrease of interest for the place also present the risk of historical, religious and spiritual heritage being lost. The 1400<sup>th</sup> anniversary of the death of Saint Ursicinus coming in 2020 is the perfect occasion to bring a new dynamic in the town using the historical and religious heritage of the region. To this purpose, the ecclesiastical township created a steering committee to build this project. The group has a project manager and two scientific commissions. Numerous entities are also taking part in the project: the Haute École Arc, Jura Tourisme, TalentsLAB, canton Jura's Cultural Office, HEG Arc and the Municipality of Clos-du-Doubs. A preliminary study has been conducted in 2016-2017 and has lead to the development of the current project [2].

## PROPOSED SOLUTION

The goal of this project is to increase the visitation of St-Ursanne and provide a better understanding of its historical and religious heritage. The target is not only people interested in those subjects but also families looking for a trip destination and people living in the region, allowing them to discover the city in a new light. The project is split into two parts: the event part for the year 2020 and the sustainable activities meant to stay after 2020. One of the sustainable action to be taken is to modernize the town tour. At present, the visit is done in a very classical way, with a map containing points of interests and a few information on them. This map is available at the tourism office or on a smartphone app and allows no interaction. To make the visit more attractive, the idea is to create a location based "treasure hunt" app, leading the user through the city different key points. The tour will be lead through a narration of the history of the Saint and the city, allowing the user to discover more at each step. The narrative will be adapted to the user, with a child and an adult version, and with an option to turn it off and use the app as a classical town tour app. Combining the historical and archeological assets of the city with its religious and spiritual value, the aim is to lead the user through an adventure, making him the hero of its own story of spirituality and self-discovery.

*This project is a starting point for the future tourism evolution in St-Ursanne managed by Jura Tourisme.*



## RELEVANT INNOVATION

One of the most outstanding technical innovation of this project is the creation of a location-based app with the "Circuit Secret" concept. "Circuit Secret" is a new way of visiting towns [3]. Through access management with smart locks and video projection, the visitor is lead to visit unusual and inaccessible places, each telling its own story. Restricted access allows the creation of artistic installations requiring the specific equipment,



Figure 2: Concept illustration presenting the location-based solution of points of interest.

such as video-projectors and motion sensors. Furthermore, Augmented Reality (AR) will be used to allow people to discover the city in a new light, pointing out archeological discoveries and artistic details. For example, AR will be used on the richly decorated south door of the collegial church in order to give relevant information about the characters appearing in it. Finally, the collaboration between people from diverse background such as the religious community, archeologists, historians, artists, and engineers is a rare and precious experience in the creation of a successful project. This transversal cooperation is meant to be the first step towards a sustainable partnership in favor of the culture of the town. *Fig. 1 illustrates the different concepts and stakeholders of the project.*

## PROJECT OUTCOMES & RESULTS

The concrete result of this project is an app, available on a smartphone, allowing a guided visit of the city and its history (see Fig. 2). The app will be available in three versions: adult, children and informative. The informative version will not contain any narration, and only state the historical facts linked to the different places. The app will also propose a modified version of the trail for persons with reduced mobility and an automatic audio transcript of all the written content for persons with hearing problems. Although the beginning of the adventure will be free, to be able to maintain the physical installations in place, the access to the “Circuit Secret” part of the app as well as some of the AR content will be charged. However, the essential expected result is a renewed interest of the people to visit St-Ursanne, especially of people staying at least one night in the town. With this increased notoriety, hopefully, a bettering of the residential economy and the monetary influx will happen [4, 5]. Lastly, the aim is for the visitor leaving St-Ursanne to have lived an experience where they weren’t just a spectator, but in which they could be an actor.

## CONCLUSION

This project is a starting point for the future evolution of tourism in St-Ursanne managed by Jura Tourisme. The app will be updated along the archeological and historical discoveries in the city and the new visit opportunities that may occur. The workgroup gathered for this project, uniting people from a different background is the base to keep the St-Ursanne project spirit alive, even after the end of the current project.



## PERSPECTIVES & NEEDS

In the current state of the project, funding is still needed, as well as educated people on the historical, archeological and religious heritage of the region. However, the project success lays mainly on the people speaking about the project and coming to visit St-Ursanne next year, people to get involved in the history of St-Ursanne and their own history. The nature of the app and the work group formed around this project forecast for a durable project in favor the the culture of the region.

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THE OCTALYSIS GROUP

SPECIAL GUEST



# VOLKSWAGEN'S GAMIFIED LOYALTY PROGRAM

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## KEYWORDS

Gamification; Loyalty; Octalysis; Car manufacturing; Digital engagement; Mobility services.

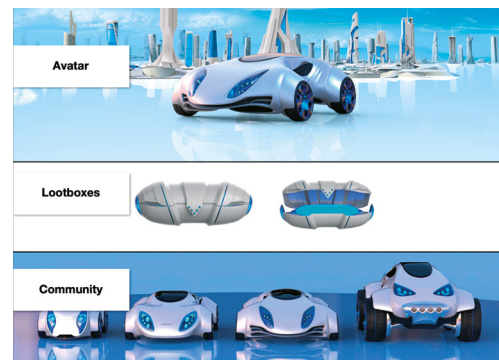
## CONTEXT

Earning loyalty points are the customer retention cornerstone of many companies. Unfortunately, Reward and Loyalty programs tend to be disengaging and linear affairs. Unless you are George Clooney, and spend more time in the sky than on the ground, it is unlikely to reach Superman status with an airline anytime soon. Thus, the interaction frequency within these programs is quite limited.

The mobility sector and many other industries are rapidly changing. In the future, car companies like the Volkswagen Group, will generate less and less revenue from selling cars. The profit margin on electric cars is even slimmer than on combustion-engine vehicles, so these companies need to come up with other ways to obtain income.

Soon, most of their revenue will come from selling mobility services, insurances, repairs, on-the-road food and beverages, non-car mobility... the list is endless. Our car will just be the platform to sell these services, on a daily basis. To change from a once-twice-only customer to a daily user of a car's company services, however, it is necessary to generate a gripping user experience that motivates the customer to interact with its platform on a daily basis. Driving your car needs to become a journey that leads you to mobility sales "touchpoints" in a way that is fun, engaging and profitable for users and company alike.

This is why Volkswagen reached out to The Octalysis Group, to get help to supercharge the gamified design of the new Reward and Loyalty program.



## TARGETED ISSUE

Through intensive discussions with the Volkswagen Group, the Octalysis Group has come to know exactly what the Volkswagen wants for the new Reward and Loyalty Program design:

1. A fun, non-linear experience
2. A room to include multiple touchpoints for mobility services integration
3. A meaningful and engaging social interaction
4. An application that can be rolled out to its 90-million users worldwide

The experience wants that users interact with “Volkswagen” as a brand, product and service provider on a daily basis.

## PROPOSED SOLUTION

As the Octalysis Group wants to show that driving can be fun and rewarding, even while standing in traffic, we need to separate the ‘old way of driving’ from the new and exciting Volkswagen experience.

Most loyalty programs onboard are boring: you get your status, your first points and that’s it. You are on your way to collect points.

BONEO, in contrast, immediately rewards you with Award Points for inputting the right Secret Code, and within seconds your first “Carvatar” comes rolling into view. Now you can drive around and explore. While you drive you see Map Secrets you can collect, and you get your first lootbox as well. Lootboxes drop frequently but irregularly after drives. They drop three kinds of items: experience points, award points, and cool items to improve your Carvatar. Getting items to add to your car, like cooler wheels and headlights, are not just cosmetic additions, they make your car more powerful for the experience.

Fun happens when we focus on creativity, strategy, social interaction and unpredictability. After a few drives, the social aspects of BONEO appear: the user can chat with other users on the map, and see how they are doing. Later comes intensive strategising around occupying maps and combining driving styles in group quests.

## RELEVANT INNOVATION – PROJECT OUTCOMES & RESULTS

The BONEO project is being rolled out in Austria with around 2000 users. We will assess the results of this extensive pilot and most likely redesign and add deepening features for the future program roll-out.

We have only implemented around 60% of all the planned features. The rest will come in 2019: the long-term design features results will be more interesting. There will be more touchpoints with mobile services, more social interactions, more individual quests, etc.

## CONCLUSION

We are really looking forward to the interim results of the first fully gamified reward and loyalty program of a car manufacturer (possibly the first fully gamified reward and loyalty program ever made). The first feedback has been positive but we cannot share any numbers yet.

## PERSPECTIVES

We are transforming the industry’s perspective from a purely function-focused-design mentality to a human-focused-one. We cannot assume that people will suddenly interact with functionality, just because it is there. We need to design for the human inside of us.

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[www.yukaichou.com](http://www.yukaichou.com)

[www.octalysisgroup.com/2018/12/volkswagen-group-empowers-loyalty-program-octalysis-gamification/](http://www.octalysisgroup.com/2018/12/volkswagen-group-empowers-loyalty-program-octalysis-gamification/)

As for the rest, there is internal documentation that we are not at liberty to share due to NDA restrictions. Once more, publicly available information exists and will be published on the [www.octalysisgroup.com](http://www.octalysisgroup.com) website.



# WORKING WITH SERIOUS GAMES: SURVIVING BETWEEN UNSTOPPABLE FORCES AND IMMOVABLE OBJECTS

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## ABSTRACT

This presentation intends to, by making connections to on-going projects from Sweden's largest Game Development and Serious Game development hub, exemplify the application of games in various non-leisure settings as well as the challenges that come with it. The creation and use of games for education, or for societal good, is a goal worth pursuing; but a myriad of hidden challenges underpin and often undermine these efforts. This presentation aims to examine these challenges, and help developers handle them better.

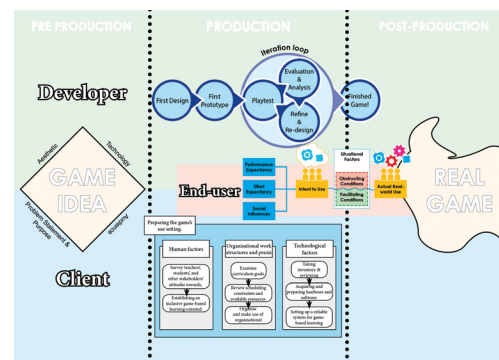
## KEYWORDS

Serious games; Situational factors; Application; Development; End-users; Real-world examples.

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## CONTEXT

The University of Skövde in Sweden has been working with games at a higher education level for almost 20 years. During this period, the field of games and serious games have been continuously changing. As a field, we've seen the birth of both Serious Games and Gamification as a term, and we've seen game technologies rapidly develop in ways that allow games to be used in brand new contexts, for purposes previously considered to be out of the medium's reach. However, even with this progress, there are some persistent issues that continue to colour the ways games are actually used, and which continuously limit games' potential as a societal good. From my own perspective I have worked alongside developers, educators, researchers, and students that have intended to work with games in a wide variety of ways. Whether in a classroom, a museum setting or corporate environments, games do have interesting things to bring to the table – but it is often a difficult process making it a reality. In my work, I have seen the rise, evolution, and (I would argue) decline of Minecraft as an educational tool, and I think it works well as an exemplifier of how even great compelling content, and substantial development budgets, don't necessarily matter if it's out of synch with the pace of work and values held by the teachers, students, and organisations that the games are intended for.



## TARGETED ISSUE

The issue I will primarily be discussing in my presentation will be the issue developers often face when attempting to work towards organisations such as schools, corporations, or governmental entities as primarily market for their games. In short, developers are stuck between an unstoppable force and an immovable object. On the one side, there is the platform holders and hardware developers who continuously pursue marketable newness, cost efficiency, and digital rights management. On the other side, there are the comparatively slow and inflexible organisations that developers hope will buy and use their products. These two sides are not innately synchronized with one another; in fact, they, more often than not, operate completely independently from one another, and platform holders in particular have practices that are completely antithetical to the ways organisations want to work. Serious Games, however, have to work with the technologies provided by



the platform holders to be able to create, market, and distribute their games to the intended organisations. From a game developer's perspective this position is fraught with challenges, and it can sometimes feel like having to mediate between two entirely different species.

## PROPOSED SOLUTION

My solution to this issue is, unfortunately, not a technical innovation or treatment. The truth of the issue is that there is no single solution to be found, as the problem itself is nested, complicated, and its specificities greatly vary depending on situation factors inherent in different use contexts. My contribution to helping developers solve these issues is instead best practice advice that I have collected throughout my decade-long journey of being a researcher and developer of Digital Game-Based Learning. During my presentation, I will describe different working practices that I have employed, sometimes successfully and sometimes with incredibly poor outcomes. I will describe some basic "Serious" use contexts for various game types, and discuss the various hidden challenges one might encounter as a developer when tasked to work with them. Ultimately, I will discuss what types of battles you can win as a developer, and how to be a good serious game developer without losing your sanity.

## PROJECT OUTCOMES & RESULTS

The outcome of my decade-long period of working with games has resulted in a portfolio of both successful and unsuccessful projects. The primary outcome which is relevant for this presentation, however, is the sum of gathered experiences, which I hope to share and discuss with developers at GSGS. An outcome I would like to particularly stress is the one point of frustration that has been present in every Serious Game project I have been involved in: the contextual nature of serious game application, which needs a high amount of engineering requirements and situational factor management during development. Being a Serious Game developer is a far cry from being a game developer – while the fundamental skillsets of creating the software artefact are of course closely related, the biggest mistake new serious game developers make is running their development as a "game development" mission. The game content, its design, its programming, and its aesthetics are all subservient to a more banal truth: the game needs to reliably function for it to be a useful 'tool', which is what Serious Games aim to be to help users achieve the purpose for which they are made.

## CONCLUSION

Working with Serious Games and Gamification in any capacity is challenging. While developers are, of course, never strangers to challenges, the challenges involved in "Serious" projects are often distinct from any other type of game development as they are a merger of not only game design, implementation, marketing, requirements, and end-user analysis but also of situational factors, context dependent variables, platform holder whims, and organisational frameworks. For developers, the frustrating part of this is that many of these factors are often out of their own control; but they can be manageable with the right development models.

## PERSPECTIVES & NEEDS

My perspective going into this topic is as a former (and current "part time") developer, and as a researcher and lecturer on all types of matters relating to Game-Based Learning. In my research, I always aim to let praxis and a grounded real-world approach to guide my work and try to steer clear of making purely theoretical assumptions regarding the way Game-Based Learning might work or its effectiveness. Thus, everything I talk about in this presentation will be heavily grounded in empirical work as well as real-world observations and experiences.

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## SESSION ECONOMY, BUSINESS & POLITICS

15H05-17H35

Games may pave the way towards understanding complex notions and thereby improve many aspects of professional activities or daily life. The “Economy, Business and Politics” session features a series of recent applications deployed in a variety of fields. Alice Aubert (EAWAG) presents a Multi-Criteria Decision Analysis tool that should support citizens in building their preferences on topics they do not master yet. Cyrille Ghiste (CHUV) introduces a new card game dedicated to improving the players’ presentation skills. Sylvie Chatelain (Centre de vie enfantine de la Grangette) discusses a cooperative board game designed to force childhood professionals communicate concisely and efficiently. Ela Pustulka (FNWH) presents a game prototype that could lower the entry barrier to optimization courses. Marikit Taylor (Entrée de Jeux) shows how a role-playing game may attract new customers in a brewery and make them want to come back. The session will hence benefit from diversity in the range of topics, but also regarding the types of games and presenters’ background.



CHAIR: SYLVAIN WEBER | HEG-GE | GENEVA







# 9 | A GAME TEACHING POPULATION-BASED OPTIMIZATION USING TEACHING-LEARNING-BASED OPTIMIZATION

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## ABSTRACT

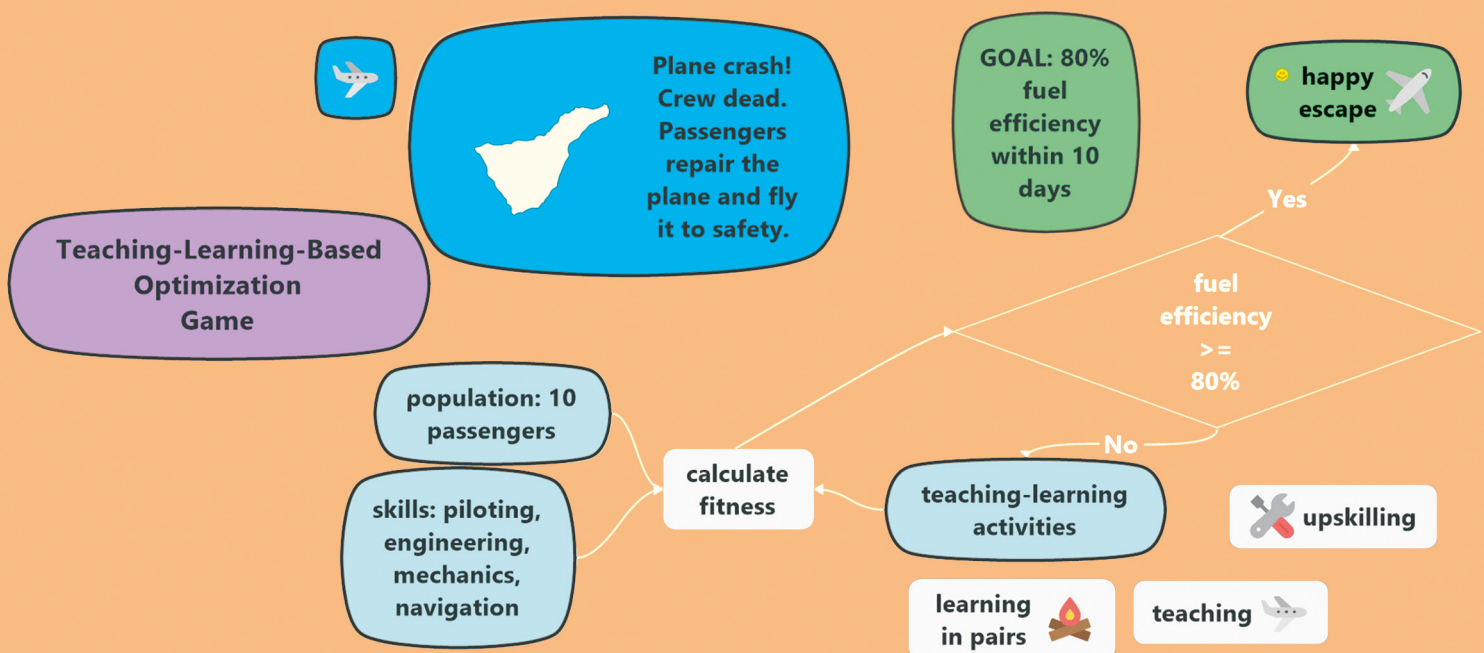
We want to lower the entry barrier to optimization courses. To that aim, we deployed a game prototype and tested it with students who had no previous optimization experience. We found out that the prototype led to an increased student motivation, an intuitive understanding of the optimization principles, and a strong interaction in a team. We will build on this experience to develop further games for classroom use.

## KEYWORDS

Explainable AI; Computational Intelligence; Optimization game; Serious game; TLBO.

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Figure 1: A conceptual view of the TLBO game







## CONTEXT

We teach university level optimization courses preparing future business leaders to use artificial and computational intelligence applied to logistics, supply chain management and business optimization. Students are sometimes reluctant to take the course, as they think they will have trouble mastering the material which requires some maths and programming skills. We are now extending our teaching methods with games, aiming to lower the entry barrier to this course. We are also targeting the long-term perspective of developing explainable AI (XAI) [3], via algorithms which justify and illustrate algorithmic decisions, so that the decision makers can trust the software they use. We believe that games will provide a higher motivation, a better retention of new concepts, new improved ways of understanding optimization as well as attract more students. An existing optimization game, Foldit [2], which is used in protein structure prediction, has inspired our game research.

## TARGETED ISSUES

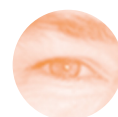
We focus on motivation as this is the first step in securing the student uptake of future courses. We use the Octalysis framework [1] to support game development. Octalysis lists eight core motivational drives and specifies how they can be broken down into game elements. The drives are: meaning, accomplishment, empowerment, ownership, social influence, scarcity, unpredictability and avoidance. The model sees two types of outcome: the white hat core drivers enhance well-being and the black hat core drivers provide immersion and can lead to addiction. There are extrinsic and intrinsic drivers; intrinsic drivers are considered to be more effective. Since improved learning is linked to intrinsic motivation, our game focuses on mastery, autonomy, purpose, and relatedness (team work). Mastery (accomplishment) requires feedback. Autonomy (empowerment) is the players' ability to decide on the next action. Purpose (meaning and calling) contributes to the common good. Finally, relatedness (social influence) is based on cooperation and team work. The gameplay can be divided into four phases: discovery (the story and purpose), onboarding, scaffolding and endgame. The game should be motivating during all four stages and various motivation mechanisms may be needed at different times.

## PROPOSED SOLUTION

We prototyped and evaluated a population-based optimization algorithm game, called Teaching-Learning-Based Optimization (TLBO) [5]. Fig. 1 shows a conceptual view of the game and Fig. 2 the players at play. Plane passengers are stranded on an island and the crew has perished. The passengers need to learn skills to get back to safety and this requires a fuel efficiency of 80%. The

players allocate the passengers to one of five activities: plane, campfire, or upskilling (stargazing, tinkering, building sandcastles). Slowly the players discover that assigning the passengers to the plane and campfire in alternation increases their overall fitness at best and they assign the passengers to those two activities until the goal is reached. The game includes a board, toy figures, and two laptops running the software. Currently a game manager guides the game, but it could be computerized. The game lasts around 45 minutes. A game prototype was used in an experiment comparing a self-study group of two to a game group of two. We studied motivation and team interaction, as those are essential to educational success [4].

*We found out that the prototype led to an increased student motivation, an intuitive understanding of the principles of optimization, and a strong interaction in a team.*



## RELEVANT INNOVATION

During the game introduction our two subjects showed interest and asked many questions showing the need for mastery/ accomplishment /empowerment, meaning, and autonomy. As expected, live social interaction started immediately. The players agreed on a strategy: inventory the skills and assess the impact of various

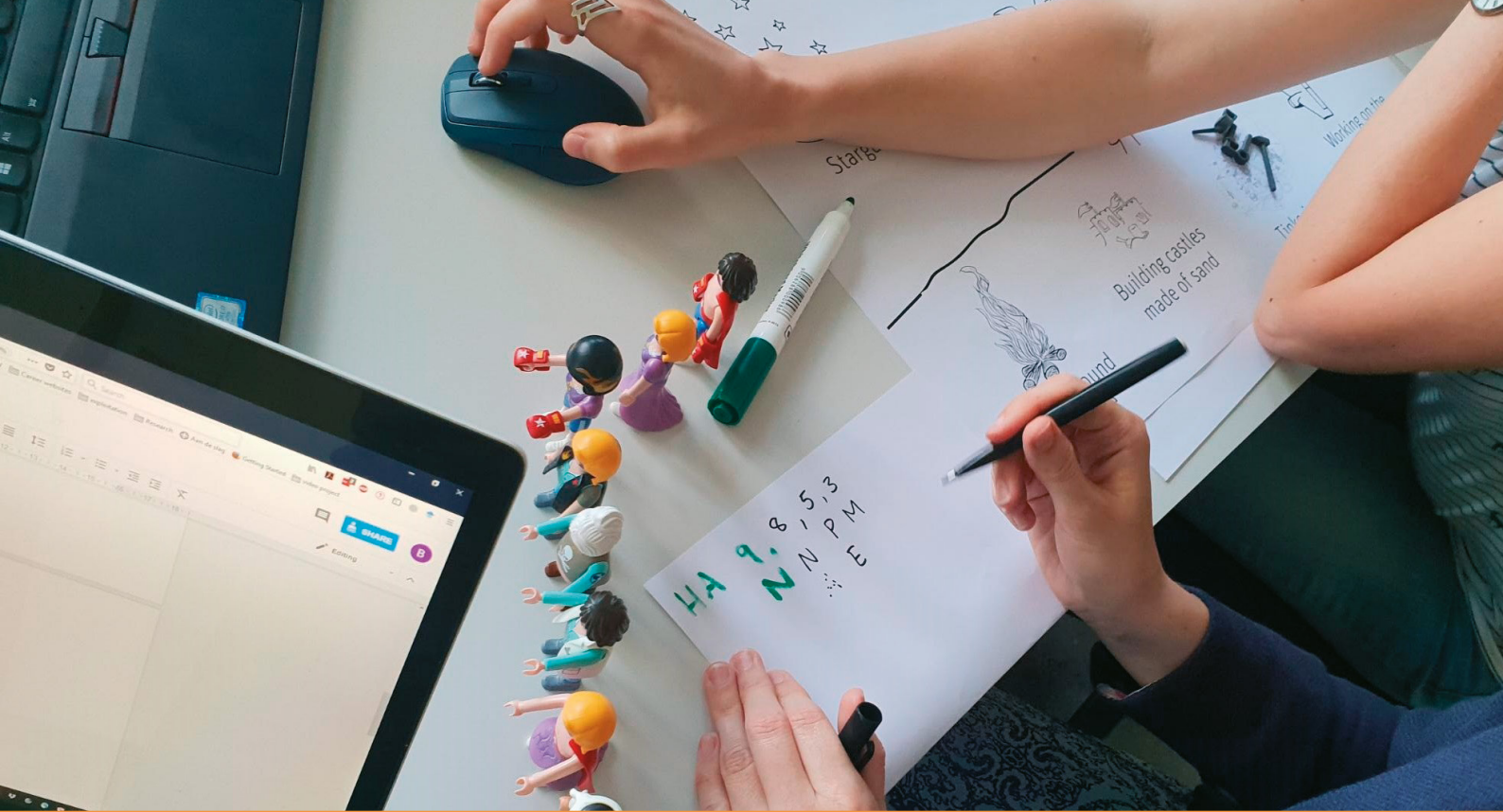


Figure 2: TLBO optimization game result: gameplay

activities. Rounds 1-2: The participants were engrossed and enthusiastic. They recognized that skills evolved differently when the characters were assigned to the campfire (learning). However, they kept their strategy of trying to understand how things work by exhaustive search: the participants asked for a piece of paper to note their observations, revealing immersion. In round 3 the players showed disappointment and the game social layer became visible while they were brainstorming. One said that she expected the characters to be moved around constantly, and thereby unknowingly referred to population dynamics. In round 4 the players were losing motivation, as they could not understand the algorithm. In round 6 they were told that there was a learning and a teaching activity. This information did not help the players. In round 9 the players were told what the teaching and learning activities were. When round 10 was finished and the players did not win, they were disappointed. The end game came in round 11, and a player spontaneously exclaimed that it was an optimization algorithm.

## PROJECT OUTCOMES AND RESULTS

We compared the game play to a self-study group of two who studied a two-page handout at the same time. We then held a discussion involving all four participants. When presented with the short algorithm description used by the self-study group, player A did not seem to understand one of the visualized explanations used in the paper the study group used, even though the mechanics of optimization algorithms were obvious to her after playing the game. This is a very strong indicator that the game significantly lowered the barrier towards integrating the content. The game managed to make the optimization algorithm concept understandable, as it referred to a real-world situation. Another participant added that one learns by failing and recovering, and this dynamics was very well integrated into the game. The post-game discussion also revealed some design flaws. Player B mentioned that a more extensive explanation of optimization algorithms would be required in order to improve the learning experience. Additionally, as the fuel efficiency calculation was not transparent enough, it might have led to the occurrence of the “clueless phase” in play rounds 6 to 10. The players said that the calculation of the upskilling needed fine tuning and that the game was too complex.

## CONCLUSION

Our approach novelty was using a game to make an optimization algorithm accessible to students with no optimization background. And we succeeded as the game motivated the students and guided them to see that teaching and learning have to be done in turn to increase the population fitness. As a prototype, this approach worked and showed a promising avenue for future work.



## PERSPECTIVES AND NEEDS

We need supporting methods and toolsets. We are designing a conceptual project architecture consisting of four parts: a software framework; a selection of optimization problems and solutions for students, business and public; a theoretical framework supporting educational goals and teaching strategies, motivation, and evaluation; and practical outputs including a teaching handbook, ideation cards for game design, and a toolset for game development.

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# 10 | GAMIFYING TO EMPOWER CITIZENS IN ENVIRONMENTAL DECISION-MAKING

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## ABSTRACT

Complex decisions are per se difficult. Multiple stakeholders may have conflicting worldviews and multiple decision aspects cannot all be achieved at the same time. We developed a gamified survey to engage citizens in learning about the difficult trade-offs and about their own views with regard to the relative importance of the various aspects. We thoroughly tested the prototype, and we suggested ways to improve the gamification.

## KEYWORDS

Gamification; Online survey; Environmental decision-making; Preference elicitation; Citizen participation.

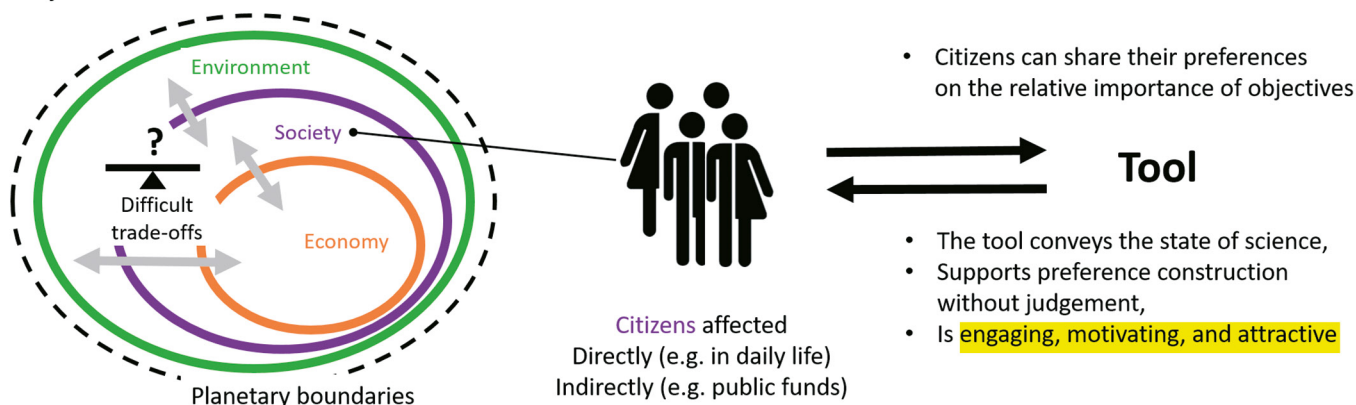
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## How to involve many affected lay **citizens** in complex decision-making with Multi-Criteria Decision Analysis?

MCDAs ensures transparent decision process, covering a wide diversity of objectives

Trade-offs made by citizens reveal different worldviews

MCDAs needs tools enabling two-way exchanges



## Using gamification

The proposed tool consists of a gamified online survey. It includes:

- ✓ GAME ELEMENTS, as motivational affordances
- ✓ LEARNING LOOPS, as learning trigger







## CONTEXT

Some decisions are highly complex: there are multiple trade-offs between environmental, economic and societal aspects. If public funds finance the outcomes of these decisions, citizens are indirectly involved. Furthermore, citizens can also be directly involved if the decision consequences affect their daily life. Those cases require transparent and participatory decision-making processes [1].

Multi-Criteria Decision Analysis (MCDA) is a structured process to ease such transparent and participatory processes. It decomposes the complex problem in manageable smaller parts, differentiating the state-of-the-art factual knowledge from the subjective individual preferences. It makes all the difficult trade-offs explicit, revealing the different worldviews.

However, at best, ten to twenty stakeholders are usually involved, due to time demanding interviews or group workshops, which include tedious exercises for preference elicitation led by an experienced facilitator.

## TARGETED ISSUES

Thus, there is a need for more participatory MCDA, i.e. for MCDA tool(s) that would allow involving many citizens. Such a tool would serve three functions. First, it should provide factual knowledge about the issue at stake and ensure that the citizens can learn about the state-of-the-art factual knowledge on the decision topic. Second, it should support the novice citizen in building his/her preferences, i.e. allow him/her to learn and decide which aspects of the issue are more important to him/her. Third, the tool should elicit the citizen's preference by using of established methods in the field of decision analysis for preference elicitation. The elicitation process should not influence the citizen's judgements and the tool-collected preferences should be reliable.

## PROPOSED SOLUTION

Based on literature on learning in adulthood, gamification and serious games, we proposed a novel concept of a gamified online preference elicitation survey which is meant to (a) enable many novices to engage in the MCDA process, (b) change the cognitively demanding process of preference construction into a motivating and attractive one, and (c) collect reliable preferences.

The game elements are motivational affordances: they trigger psychological effects, which in turn lead to behavioral outcomes [2]. The gamified survey we conceptualized includes a narrative that provides external motivation to answer the survey, and non-player characters who create interactions and relatedness that compensates for the absent facilitator.

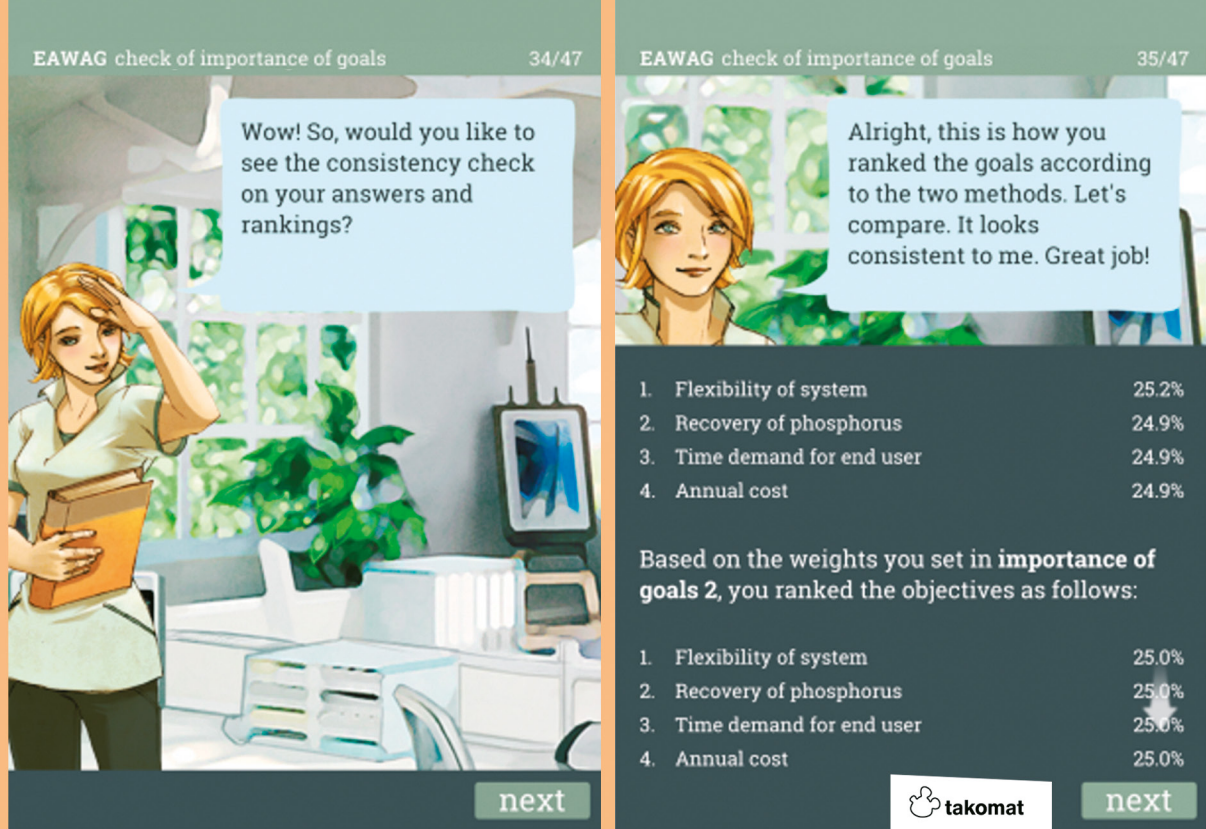
We aim at enhancing learning and preference construction by introducing learning loops, which are based on the consistency checks principle.

*[...] create a tool that enhances learning and preference construction, but achieves it without telling the citizens what to think.*



## RELEVANT INNOVATION

The main challenge was to create a tool that enhances learning and preference construction, but achieves it without telling the citizens what to think. Learning loops raise cognitive dissonance and thus invite the citizen to reflect about his/her preferences. However, there are neither right nor wrong preferences. Thus, learning loops cannot be designed in the same way as most of educational games. The creation of such loops - without directly judging the citizen's answers - is not straightforward. We solved this issue by allowing the citizen to set his/her own reference using a first method of preference elicitation. Then, his/her preferences are elicited again by using a second method and the results are compared to the reference. Through this consistency check, we now can create "win-fail" situations and cognitive dissonance.



Overall, the project itself is innovative, as MCDA is usually not accessible to many novice citizens.

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## PROJECT OUTCOMES AND RESULTS

A prototype for the gamified online preference elicitation survey was developed (by takomat GmbH, Cologne, Germany). We tested it by collecting both quantitative and qualitative data. About a hundred participants took part in the prototype testing.

We compared this gamified survey to a non-gamified survey solely including the learning loops. By using pre- and post-questionnaires, and preferences collected in the survey, we evaluated factual learning, preference construction, and the participant experience.

The evaluation provided a positive and promising proof of concept [3]. Our gamified survey eased factual learning, and preference construction regarding the relative importance of the different issue aspects at stake (in this case wastewater management). Furthermore, no participants “played” with the gamification – no participants tricked the system for the sake of consistency.

## CONCLUSION

The proposed concept is a promising way to make complex decision-making more participatory by including many citizens on difficult topics at stake. We will improve this first prototype in an iterative process: each step including experimental testing. In particular, as discussed thoroughly in the original publication [3], gamification should be strengthened: it should specifically provide more autonomy to the user and enhance his/her control feeling.

## PERSPECTIVES AND NEEDS

We will test a final tool, in a real case, with a large citizen sample. Then, we hope that the positively evaluated tool will be useful in practice. In order to ensure it a broad use, it needs to be adaptable to different decision issues that is why we favor an open-source code. Finally, we envision collaborating with policy scientists to reflect on the use of such a tool for public participation in complex decision-making, i.e. to assess it in line with participation theories [4, 5]. Creating incentives for citizens to use the gamified online survey may differ according to the decision context.



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# 11 DISCOVER THE WORLD OF BFM THROUGH ROLE-PLAYING GAMES

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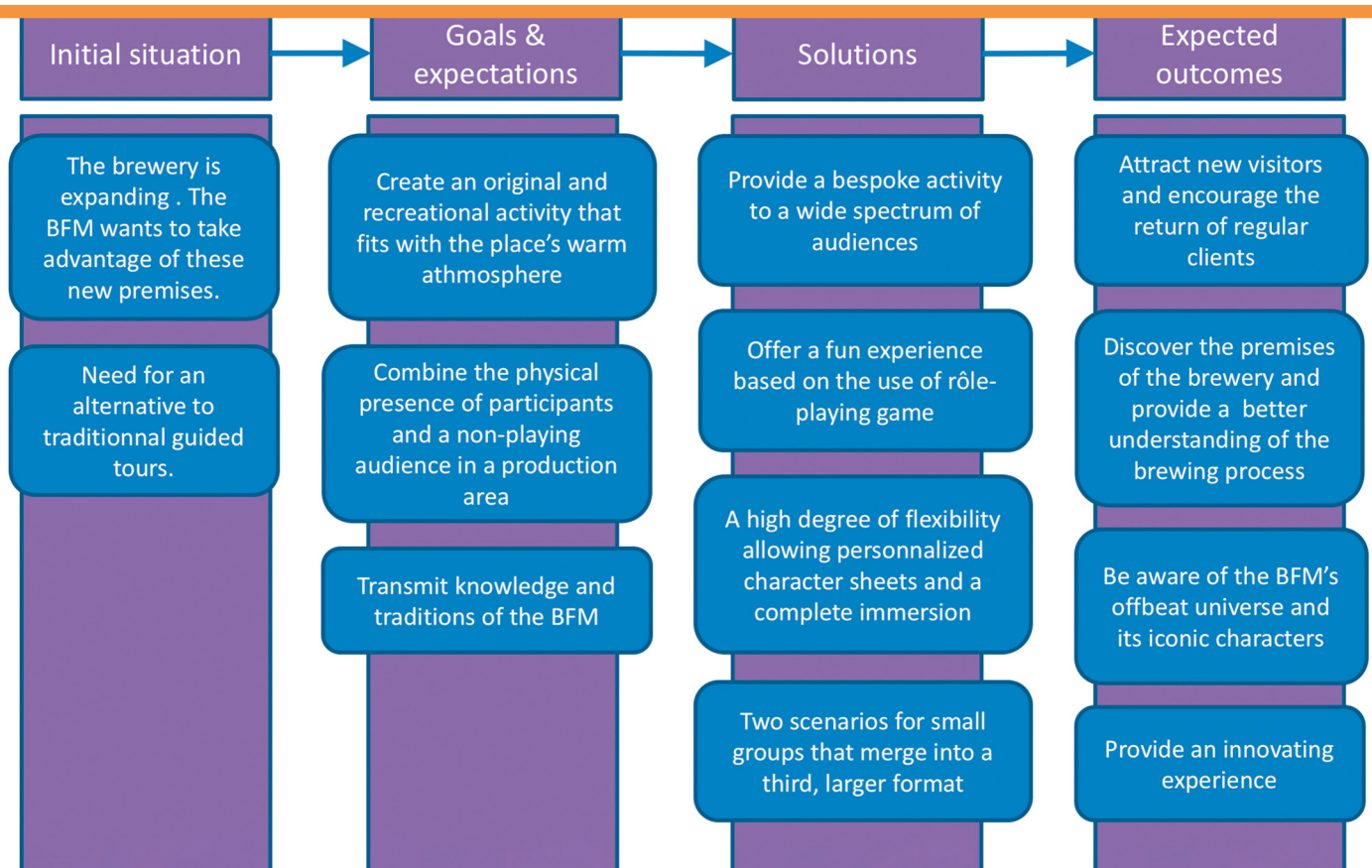
## ABSTRACT

« La Brasserie des Franches-Montagnes » (BFM) offers premises where customers, visitors and employees meet in a warm atmosphere. Beyond its traditional beers, the brand stands out for its rich and offbeat universe. The brewery wants to encourage the return of visitors who have already come in the past. To complete the existing guided tours offer within its walls, three unique role-playing activities are developed. These serious games allow groups of visitors to discover the brewery's culture and emblematic characters in a recreational way.

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## KEYWORDS

Role-playing game; Brewery; Immersion; Communication; Cultural heritage; Story telling; Serious game.







## CONTEXT

“La Brasserie des Franches-Montagnes” (BFM) is established in Saignelégier, Jura. With its spirited image, BFM is to be positioned as a pioneer in Swiss craft brewing. It creates fine, complex beers which are exported in more than 15 countries.

The world famous BFM can be discovered at the brewery, where several open spaces intertwine to create a brewery with its own particular character and identity. These include all the infrastructure necessary for brewing, storage and fermentation, a shop, a bar and an area dedicated to entertainment (stage, cultural events). Here, customers, visitors and employees congregate to enjoy the warm atmosphere of the BFM. The brand has created a rich and offbeat universe of its own, linked to emblematic characters of the brewery.

Following the BFM’s economic development, a new reception area has been established at the heart of the brewery. To make the most of these unusual premises, the BFM has chosen to develop specific offers that take place within its walls. These include an innovative experience based on the immersive practice of role- playing game. These serious game activities are intended to transmit the culture and universe of the “Brasserie des Franches Montagnes” in a recreational way.

## TARGETED ISSUE

For several years now, the “Brasserie des Franches Montagnes” has been offering relatively formal guided tours with identical contents from one time to the next. It also proposes traditional beer tastings, bar service, foosball, darts, a shop and various events (concerts, game evenings, meals, ...). Regulars are also delighted by the presence of 27,6, the brewery’s lucky cat. The aim is now to expand the existing offers to encourage the BFM’s public to return to the brewery, and to attract new audiences such as groups of players.

To do this, it is advisable to develop a short animation concept (about 1 hour) which is both immersive and original. The desired thematic axis for this concept aims to introduce the world of the BFM in a fun way and to describe the various stages of beer production. The transmission of content must be done in a pleasant and recreational way to be in harmony with the warm atmosphere of the place. It is necessary to ensure the well-being of the participants, who must feel comfortable.

As the reception area includes places with different functions, the game must therefore be adapted to the simultaneous presence of participants and a non-playing audience.

## PROPOSED SOLUTION

The chosen solution is proposed by Entrée de Jeux, a cooperative company formed of game authors and historians (among other skills), which has the specificity of creating highly themed role-playing

games that are accessible to the general public. Participants embody emblematic characters inspired by the brewery’s universe and aim to solve different mysteries as they evolve inside the premises. It is mainly a game of communication between players. The “serious” content is distilled via the character sheets. It is spread to the whole group as interactions occur. A short debriefing at the end of the game uses the different aspects of the game as a basis for transmitting more in-depth content if desired.

Role-playing is often overlooked as an immersive learning tool. Its practice has been strongly renewed and democratized in recent years. The social bond forged between participants during the activity allows the pleasant transmission of content within a process perceived as recreational by the players.

The experiments proposed at the BFM are scripted to be as autonomous as possible. A BFM animator presents the game and offers a light coaching. The presence of actors or animators specialized in role- playing games is not necessary. This is an important aspect of maintaining a permanent offer.

*To make the most of its unusual premises, BFM has chosen to develop specific offers that take place within its walls.*





## RELEVANT INNOVATION

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Two distinct role-playing scenarios have been developed. The first is entitled “Red Alex Redemption” and the second “Les Aventuriers de la Bière Perdue”. Their respective formats are similar: 1 hour of animation, 8 to 15 players. One of the innovations is that they are designed to combined to form a third fun experience, offered for groups of up to 25 people.

One of the two role-playing scenarios includes “escape game” mechanisms, in which players have to solve puzzles while playing their character. To our knowledge, such a mix of genres is a first in Switzerland.

The three fun experiences provided to the BFM are coded in a software. It allows the simple and fast export of character sheets that have to be printed. The use of such software is highly innovative and provides a large degree of flexibility:

- › The objectives of the characters vary according to the number of players.  
This added value makes it possible to accept groups varying in size.
- › The character sheets adapt to the names and genders.
- › It is possible to assign specific roles to people who feel more at ease,  
and less demanding roles to more reserved people.

The role-playing games convey the values of the brewery and immerse the players into the world of craft brewing by encouraging their awareness of the steps involved in making beer. By proposing an immersive serious game approach, which takes place in the very heart of a place with multiple uses is very original and stands out from the usual practices.

## PROJECT OUTCOMES & RESULTS

The process of creating the role-playing games took more than a year – time for the designers to immerse themselves in the world of BFM, acquire the knowledge that needed to be transmitted, carry out test games, and propose a game format with three unique experiences, adapted to the brewery and its constraints.

Both scenarios will be showcased in mid-March 2019 at the Ludesco games festival in La Chaux-de-Fonds. The last test games will take place on this occasion. The finalization of the permanent offers is scheduled for April 2019. They will be available in French during the first operating season.



The main outcome is to increase the number of people visiting the brewery by encouraging the return of visitors who have already come in the past.

## CONCLUSION

New and original game experiences complete the BFM's offer to the general public (locals) and visitors of the brewery. Beyond the manufacture of beer itself, the "Brasserie des Franches-Montagnes" is also based on an offbeat universe as well as the use of a unique multi-purpose reception area. The use of role-playing games as a tool for transmitting knowledge makes it possible to value and transmit a rich culture in a pleasant and immersive way to groups of varying sizes.

## PERSPECTIVES & NEEDS

Costume elements will probably be added in the near future to increase the immersive aspect of the game.

After the first year of operation, it is planned to develop the game in other languages (German, English) in order to promote this original offer for audiences coming from beyond linguistic borders. This approach will be coupled with promotional actions.

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# 12 | KNITTING THE CHAUSSETHIC: TO PROMOTE ETHICAL REFLECTION AND TEAM COMMUNICATION

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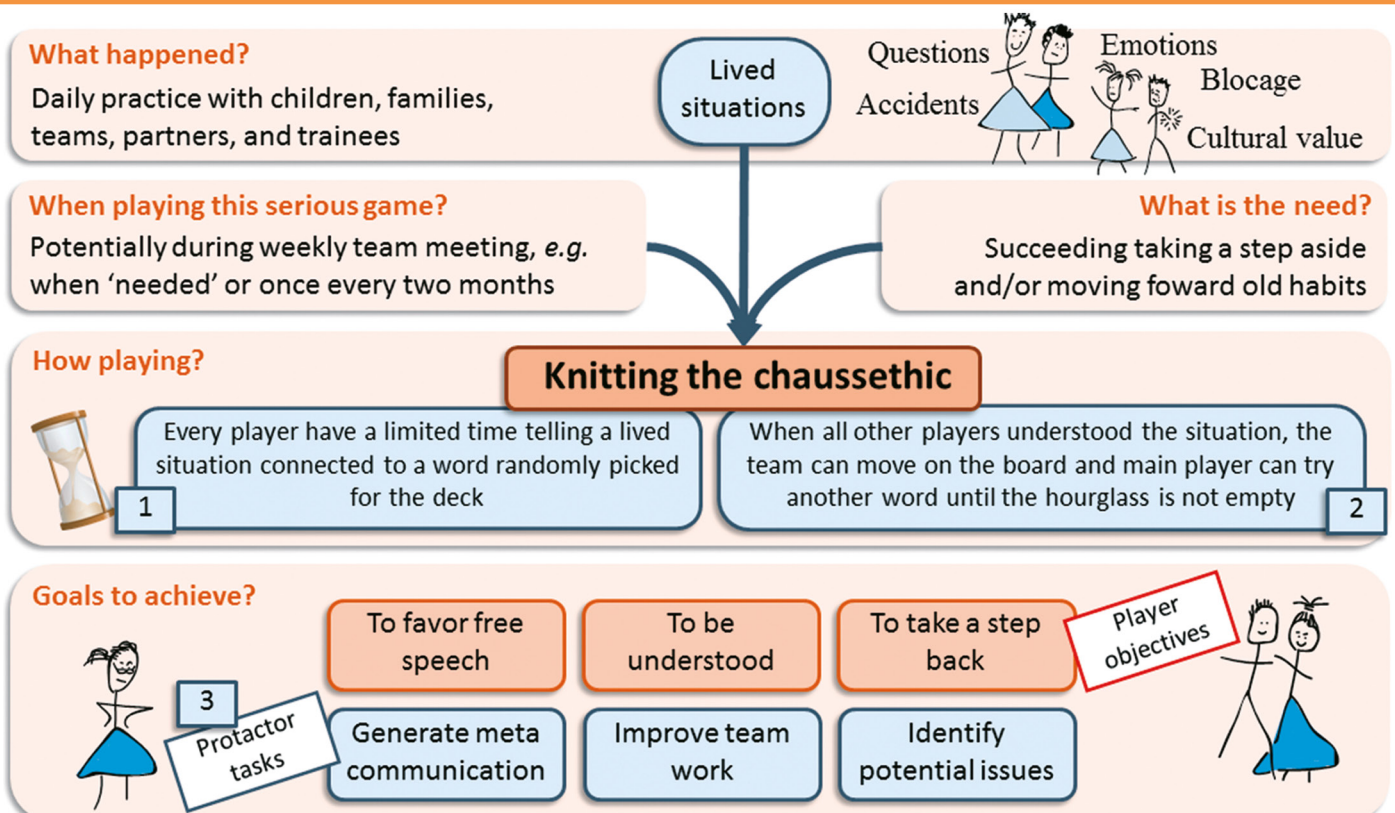
## ABSTRACT

The daily lives of children's professionals are interwoven with complex situations, particularly from a relational, emotional and ethical point of view. In this context, teamwork is an essential resource that is built through exchanges, debates and common reflections. To facilitate collective intelligence and meta posture, it is necessary to have tools that shift professionals from their beliefs and representations by allowing them to question their daily practice. The cooperative game "Let's knit the Chaussethic" is an original alternative to address ethical issues while developing communication skills, solidarity and offering a managerial support tool.

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## KEYWORDS

Ethics; Deontology; Communication; Management; Teamwork; Early childhood; Meeting; Education; Pedagogy; Children; Family; Children garden; Collective intelligence.







## CONTEXT

In their daily lives, children's professionals face a multitude of sometimes complex situations – precariousness, social isolation, migration, cultural differences – that involve ethical choices [1]. To guide them, they have as tools at their disposal: their job description, the missions of the Lausanne children's institutions, the institution's educational project. However, these documents belong to the prescribed work, so they can at best guide the educational task with children and families; but they say nothing about managing complexity during the activity itself: what are the relational and communicative issues? Are there value confrontations between family and professional? What is the best response to the situation, taking into account the context, emotions, each person's story, the task to be accomplished, etc. [2]? To develop and reflect on their practice, children's professionals have several spaces for exchange: weekly team meetings ("colloquia"), individual coaching interviews, supervision, practice analyses [3]. Despite these spaces, ethical issues remain little put into words and debated. Developing tools to support this reflection on values is therefore essential [4]. This cooperative game was developed in parallel with a reissue of the code of ethics of childcare professionals in the Lausanne daycare network. It is intended for any person or team working with a children's community.

## TARGETED ISSUES

- › Learn to synthesize what you have to say despite the complexity of certain situations and to get to the heart of what really questions or poses a problem
- › Work on several levels: individual / collective, personal / professional, self / others, fact / belief
- › Make choices guided by values where there is neither right nor wrong but a balance to be found all the time
- › Facilitate communication: improve speech flow and develop listening skills
- › Building collective intelligence
- › Highlight individual and collective difficulties to improve support for professionals
- › Putting lightness and traffic back into situations that can be experienced as heavy and frozen or even dead-end through play
- › Reflect on everyday life and identify the underlying or hidden issues in relationships
- › Develop the ability to step back, not to overreact or drown in details

## PROPOSED SOLUTION

We offer a cooperative board game, based on real story telling, that is played, with cards and a pawn, in teams of 3 to 8 participants for a duration of 20 to 30

minutes. The objective is to succeed in "knitting your socks" as a team by explicitly telling as many practical, concrete and lived situations as possible in a minimum of time, starting from words drawn at random. These words all come from the deontology of childhood professionals and the missions of Lausanne's childcare centres. The constraints are as follows:

- › Be able to make yourself understood by your colleagues
- › Respect the categories (among 9 different "challenge" cards)

Among the players, an protactor must be appointed. He is the guardian of time and the guarantor of the framework and objectives of the game. He can relaunch the knitter (the one who tells) if he has difficulty expressing himself. Throughout the game, he takes notes on what he considers essential to keep, on the team's current concerns. At the end of the game, he has 10 minutes to highlight the key elements of what

*"Knitting the Chaussethic" can propose a lightweight space while working on complex and sometimes very sensitive situations.*





has been said through the game, in order to generate metacommunication, improve team work and identify potential issues.

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The team has only one counter and it is the success of each member that will move the entire team's sock (symbolized by the squares on the game board). The "time" constraint makes it possible to bring a rhythm to the game and the playful or challenging dimension, as well as to guarantee everyone's turn to speak. It also allows players to practice telling a story about a situation and the underlying issues by choosing what makes it essential.

## RELEVANT INNOVATION

- › To provide a tool that allows us to work on ethical issues by putting them into words
- › Bring a "time" constraint, often unusual in this professional field which leaves a large place to speech and "endless" exchanges
- › Teach professionals to synthesize their discourse by identifying key issues
- › Bring a playful dimension to a space that can sometimes be emotionally charged in relation to the family situations encountered
- › To offer, through play, a new medium of communication that makes it possible to synthesize thought, identify individual or collective difficulties and then facilitate collective intelligence [5]

## PROJECT OUTCOMES & RESULTS

The first tests of the game, which will not be officially distributed to the 60 host institutions of the City of Lausanne in the spring, are positive. The time constraint, which, a priori, is perceived as an obstacle, brings the playful dimension of the challenge. During the first tests, it was very interesting to note that professionals do indeed have difficulty getting to the essentials, getting lost in details that are often useless. A first result was therefore to highlight and raise awareness of this difficulty, an essential step in improving and thus consolidating professional skills. A second result, more unexpected and always linked to the constraint of time, was highlighted: the fact of having to explain a situation and be understood by colleagues in a given period of time – the "game" dimension comes into play here and therefore the desire to succeed in obtaining points – causes a liberation of thought that sometimes leads the player to become aware of unexplored paths that could provide an answer to the described situation.



## CONCLUSION

In a world used to play, it is surprising to note that there is no game to facilitate collective intelligence and communication. Knitting the Chaussethic can offer a lightweight space while working on complex and sometimes very sensitive situations. This game can be a support for a team, for a management that wants to refine its management or a training tool that could be used with students during training courses. [6]

## PERSPECTIVES & NEEDS

In spring 2019, the game will be offered to the 60 children's institutions in Lausanne. It will be part of an "ethics and deontology" kit that will also include a deontological charter and a bibliography. At this stage, it is important that the teams can test it and make it their own. It is planned to set up "game" afternoons with the team that conceptualized "Knitting the sock") to facilitate understanding, the goals of the game and its possible uses.

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# 13 | COMM'IMPRO: CATCH AND HOLD YOUR AUDIENCE'S ATTENTION AND LEARN TO ENJOY PUBLIC SPEAKING

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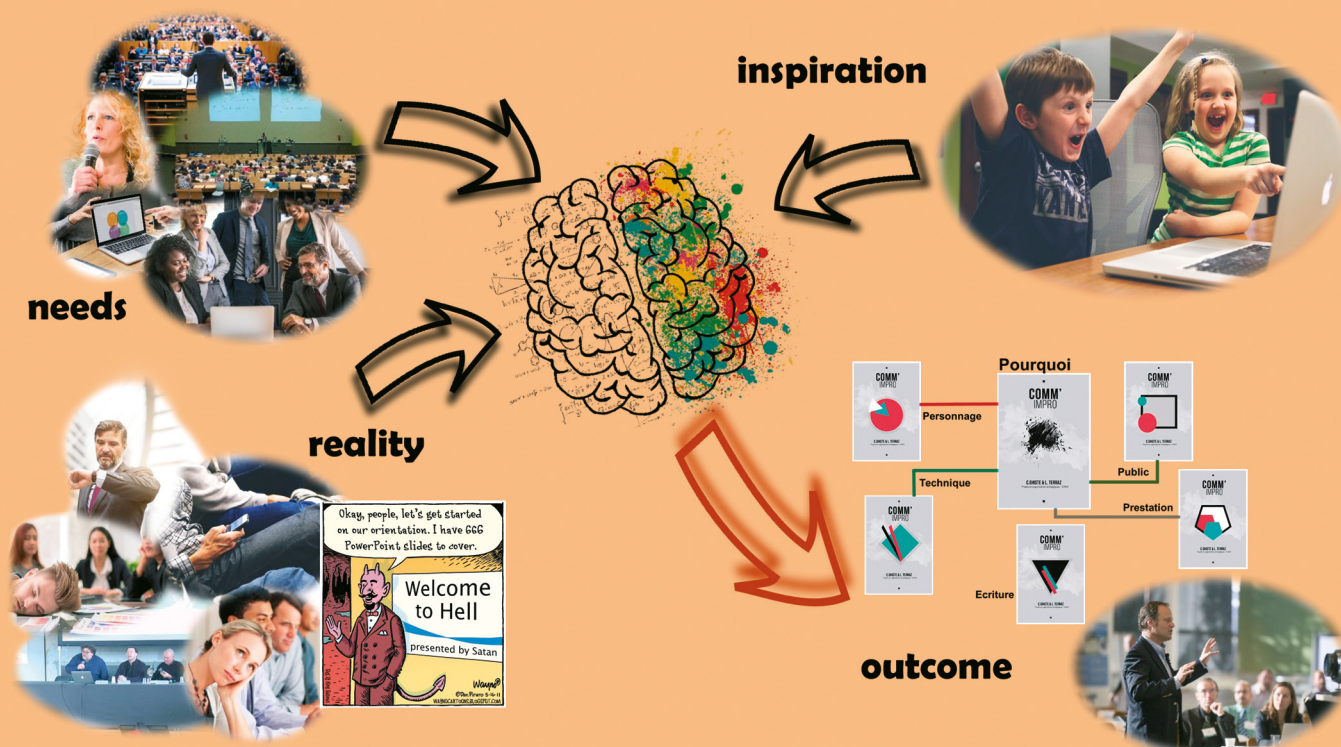
## ABSTRACT

COMM'IMPRO: is a card game to help you learn techniques, concepts and approaches to put you more at ease when presenting in public. Playing this game will make it easier for you to learn how to catch and hold your audience's attention, as well as start to enjoy public speaking.

## KEYWORDS

Public speaking; Card game; Speech; Teaching; Learning; Self-confidence; Presentation; Pitch; Meeting; Communication.

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## CONTEXT

In today's world, we are increasingly called upon to communicate with different audiences in order to share ideas, convince, debate, animate, train or entertain. We are often placed in the spotlight, be it for professional or public presentations, meetings, trainings, speeches or even shows. Our audiences are becoming increasingly difficult to communicate with in light of the sheer amount of information and messages they are exposed to daily.

## TARGETED ISSUES

According to Microsoft, there are more than 30 million PowerPoint presentations written each day [1], and approximately 15 million hours per day spent viewing those same presentations.

How many presentations, speeches or trainings have you sat through? How many have really touched you? How many times did the speaker, his/her message or training content interest you? Or how many times did the speaker put you to sleep?

Whenever speakers need to communicate to their audience (during a presentation, a training, a meeting, a speech or a show) they must clearly communicate their message in an attractive way. However, nowadays many fall short. Worse still, the speaker is perceived as being boring or is obviously uncomfortable with speaking in public (glossophobia, or the fear of public speaking is the most common of all fears, even more feared than death! [2]).

To tackle these issues (effective communication and attractivity), Cyrille Ghiste and Laurent Terraz have developed a serious card game to help improve people's skills in public speaking, thereby transforming boring communications into interesting and informative performances!

Playing this game will make it easier for speakers to catch and hold their audience's attention, as well as start to enjoy public speaking.

*The game teaches techniques, concepts and tips in order to help the speaker improve his presentations quality.*



## PROPOSED SOLUTION

Originally, we had been contacted by a professional association in Project Management to create a 3-hour training to address the above-mentioned issues. We decided to build this training session around the concept of serious gaming, using a card game as the format. This was how the idea of COMM'IMPRO was born.

This card game aims to increase the public speaker's skills in communication and leadership, as well as strengthen his original level of knowledge, through serious gaming. The game teaches techniques, concepts and tips in order to help the speaker improve the quality of his presentations. The aim is to enable the speaker not just to present, but rather to put on a great "show" that will capture the audience's attention from start to end.

## THE GAME CONTAINS THE FOLLOWING:

- › Reminders on the key steps for a successful presentation: preparation, execution and feed-back.
- › A focus on the moments of truth: how to create the script and scenario phases.
- › A tool box of tips, tricks and quotations, useful before and during the speaker's performance.
- › A clear set-up of how presentations should run, thereby demystifying "the performance day".

The card game has been specially designed with 109 cards grouped into five families of 21 cards each and four bonus cards. The five families are: "Person", "Audience", "Writing", "Technique", "Service". Each family has four card types: "Collection", "Action", "Joker" and "Quiz".



There can be one to three individual players or teams of two to six players each. Each team tries to collect as many points as possible by answering questions or play-acting situations based on what is written on their card. They can also get “free points” by collecting “collection” cards. The game winner is designated as the “Gold Performer”.

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## RELEVANT INNOVATION

Existing board and card games positioned to improve public speaking skills, such as Taboo, Pitch Cards and Rhetoric [3], to name a few, work by giving the player a word or a concept that they need to talk about or improvise around. COMM'IMPRO seeks to increase public speaker performance and presentations but does so by bringing together a required dimension variety to perform great oral presentations.

We conducted literature reviews around public speaking (including the “why” [4]) and adjacent fields such as psychology [5] (mental projection), neuroscience (perceptions) [6] as well as research into socio-cultural aspects, technical dimensions (lights, software) in order to collect, analyze and summarize the key elements. This review conclusions led us to create the five families listed above in which we have structured the game around.

When playing COMM'IMPRO, presenters will learn how to:

- › Prepare and write better presentations and the speeches that go together
- › Improve their non verbal language and body posture [7]
- › Observe the public in order to adapt their message if needed
- › Deal with technical aspects such as software, microphone, lighting, scenography [8]
- › Be more confident on the presentation day by working on mental projection, physical and mental preparation.

## PROJECT OUTCOMES AND RESULTS

In November 2018, we finally held our 3-hour training with around thirty participants who were asked to fill out a satisfaction survey by the event sponsor. The results clearly showed that the game, as well as the common theme and support to the training, were particularly appreciated, scoring 9 out of 10. This score is



more qualitative than quantitative due to the small sample size. Some of the comments were: “Very professional”, “Playful”, “Excellent”.

In parallel, a hundred units of the game were produced and distributed to professionals (managers, HR managers, doctors, nurses, communication experts) as well as amateurs (friends and family). In January 2019, we conducted a field test with nine professionals from different backgrounds. It was followed by a focus group where we collected feedback from all of them.

The first important point that participants mentioned is that they definitely felt they were learning while playing the game. The content met their expectations and allowed a great interaction and an enjoyable sharing experience. The choice of using a unique series of cards was judged appropriate. In general, usability and gamification are judged to be good.

We also received several suggestions to improve the game such as increase the quantity of Action cards and review the rules and scoring guidelines for the “Collection” cards to lead to increased exchanges. There were minor comments regarding design and spelling mistakes.

A new improved version is currently under development, taking into consideration the received feedback.

## CONCLUSION

COMM'IMPRO should stand out in its competitive landscape thanks to its holistic approach in addressing the issue that public speakers have today of catching and holding their audience's attention, while learning to enjoy themselves. It would never have seen the light without the whole project team help and unconditional support, as well as the sponsorship of Strategic Projects and Organisation (POS) Departement at CHUV and the partnership of MangoBox Consulting.

Visit our website: [www.commimpro.com](http://www.commimpro.com)

## PERSPECTIVES AND NEEDS

We will test an upgraded version including the various currently in development upgrades with the aim of having a COMM'IMPRO final version by the end of 2019.

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### Movies

*The greatest showman*, Michael Gracey & *The prestige* Christopher Nolan

### General articles and publications about conferences and presentations

<http://www.zen-et-efficace.com/6-trucs-preparer-conference-memorabile/>  
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<https://www.themuse.com/advice/10-presentation-facts-that-make-public-speaking-a-little-less-scary>  
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[https://fr.wikipedia.org/wiki/Logiciel\\_de\\_pr%C3%A9sentation](https://fr.wikipedia.org/wiki/Logiciel_de_pr%C3%A9sentation)  
<http://www.dynamique-mag.com/article/comment-faire-pour-animer-une-conference.5031>

### Exercices and theatre

[www.atatheatre.com/index.html](http://www.atatheatre.com/index.html)  
[www.theatrons.com/exercices.php](http://www.theatrons.com/exercices.php)  
[www.legrimoiredutheatre.com/](http://www.legrimoiredutheatre.com/)

### Gamification

[www.trictrac.net/forum/sujet/votre-definition-d-une-mecanique-de-jeu](http://www.trictrac.net/forum/sujet/votre-definition-d-une-mecanique-de-jeu)  
 And many more...

## SESSION STUDENTS

8H35-11H10

GSGS is giving to the students the opportunity to intervene. This session with its heterogeneous contents is vowed to become, the time of unconventional themes and refreshing ideas! Could SG being used in Education? Our students think so. Can we create empathy? You'll be invited to "explore how it feels like to be in the shoes of the displaced families". And while adults learning is hard what if we could "create a gameplay, which promotes experimentation and emphasizes learning"? Teaching of computer is a key matter so "How to co-design a serious game and an associated pedagogical scenario to help"? Any proof of the impact? Follow the talk on "how a research in a museum reinforced the notion that games are compelling tools to present educational content".



CHAIR: JEAN-PHILIPPE SANGARÉ | SSVAR | GENEVA







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## CONTEXT

I am a student in master media design at the HEAD (High School of Art and Design) in Geneva. I intend to present this work project for my graduation at the end of this academic year. As I wrote my master thesis on the relevance of game design elements for andragogy. I decided to design a serious game to see how to solve the different issues raised during my research. For this project, I focused on the different constraints and difficulties that a student could potentially encounter when learning a foreign language and, more specifically, in English. I realized that often putting learned lessons into practice is difficult and that a certain form of fear is felt about making mistakes or being judged for them.

## TARGETED ISSUES

In order to create a serious game for this project, I decided to focus my research on these initial questions: How to help students to put into practice what they have learnt? How to promote the experiment? How to ensure that the correction is no longer perceived as negative, on the contrary, that it becomes objective and not restrictive? What would a gameplay, which promotes experimentation and emphasizes learning, look like? How can students, at beginner level, correct mistakes that they make themselves? How can we insure that the correction is correct/good? In order to answer all of these questions, I oriented my project in this way.

## PROPOSED SOLUTION

Eventually, I came around to the idea that instead of creating a game to learn new notions it would be interesting to create a game, an experimentation zone, where students could put in to practice the notions that they have already acquired. After all a video game is perfect for making mistakes, starting again and correcting oneself. The idea is, that the experimentation zone would allow players to practice their English, without the embarrassment of making mistakes. They will of course be corrected and in due course could participate in correcting other players.

The game would be in the form of an application on a smart-phone, the player has a robot to whom he must teach English. The goal of the game to train his robot sufficiently so that it is able to formulate complex sentences without making mistakes, Then the latter will test his skills with a mission where he will discuss with a non-player character who can correct the robot if he make too many mistakes.

*For this project, I focused on the different constraints and difficulties that a student could potentially encounter when learning a foreign language.*



## RELEVANT INNOVATION

For this the player begins with a series of three sentences to teach the robot. These are learned through small exercises dedicated to the player. (e.g. put the words in the right order to form a sentence, spot the mistake, connect the words...) These sentences are then integrated into the robot's database. Initially, the robot has only these three sentences, Then, as the game progresses and as the robot improves, new sentences are inserted.

The algorithm used here will be very simple. We learn a sentence, it is inserted into the database. Inspired by the Markov chain, we generate a new sentence according to the given base, then correct the mistakes. The probability that one word will appear after another depends on the correction. The first sentences generated will not make sense. Thus, creating totally absurd conversations which will give the players the possibility to correct them. The more a robot is corrected, the better its sentences will be.



## PROJECT OUTCOMES & RESULTS

In line with my studies for master's degree, I intend to consolidate and present this project for my diploma at the end of this academic year. Therefore, at the moment, I am in the research phase, the results obtain during the research for my master's thesis have largely influenced my work, and the different prototypes that I have developed in the last months. However, the project will evolve, as I now have clear guidelines from which my work will be consolidated.

## CONCLUSION

To conclude, given that I wish to work in the field of game design, this project gives me the opportunity to experiment as well as learn new elements related to learning through gameplay. My goal for June 2019 is to have a working prototype and a clear idea of what the game will look like.

## PERSPECTIVES & NEEDS

However, there is still a long way to go before the game is operational. Currently, I am focusing on the development part of the game and more specifically, generating sentences via the Markov chain. Also, it is essential for me that I research the gameplay and reward system (intrinsic and extrinsic).





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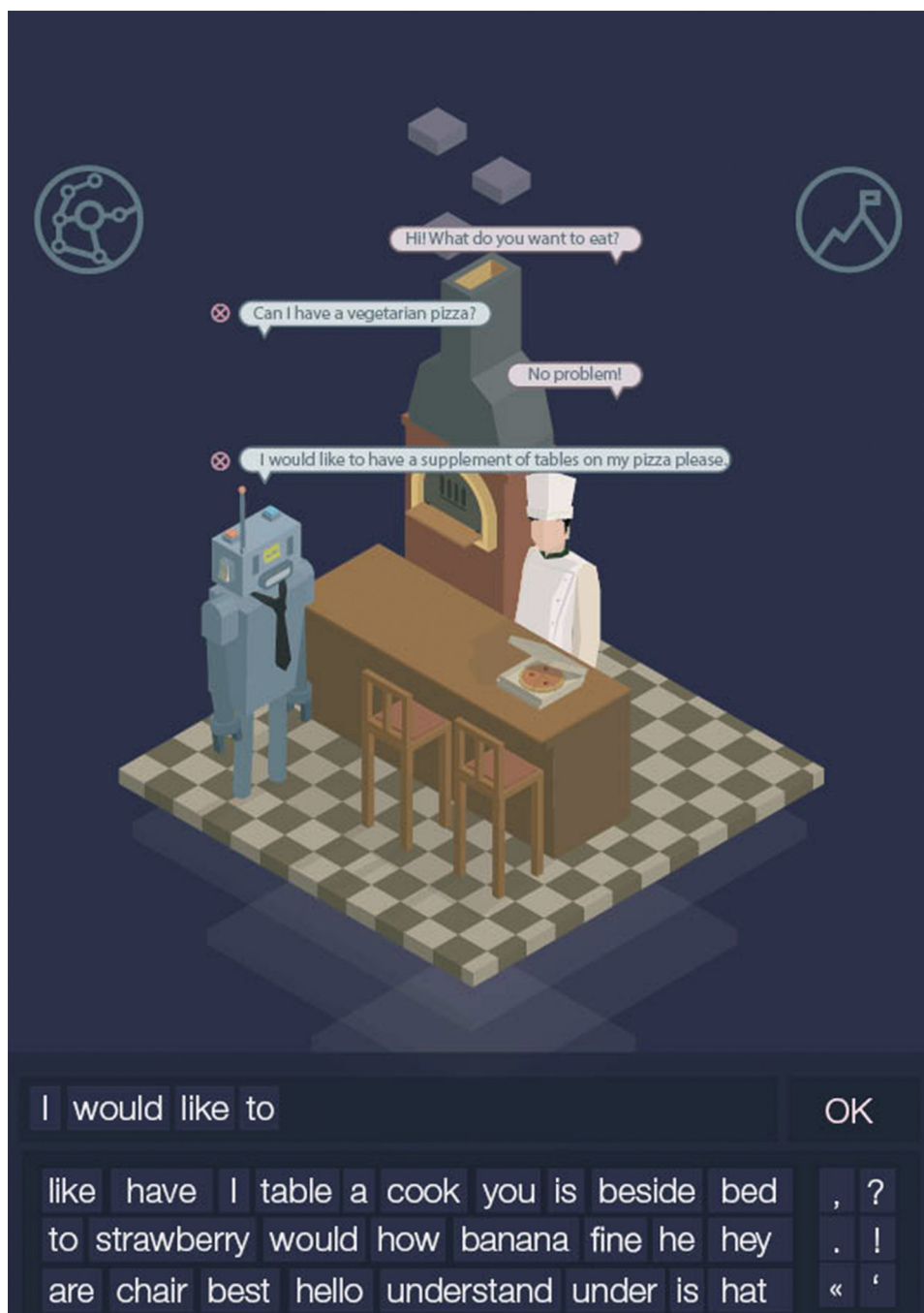
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### Jeu:

*The Witness*, Jonathan Blow, 2016

*Bury me my love*, ThePixelHunt, 2018



# 15 | CO-DESIGN OF A SERIOUS GAME FOR COMPUTING EDUCATION

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## ABSTRACT

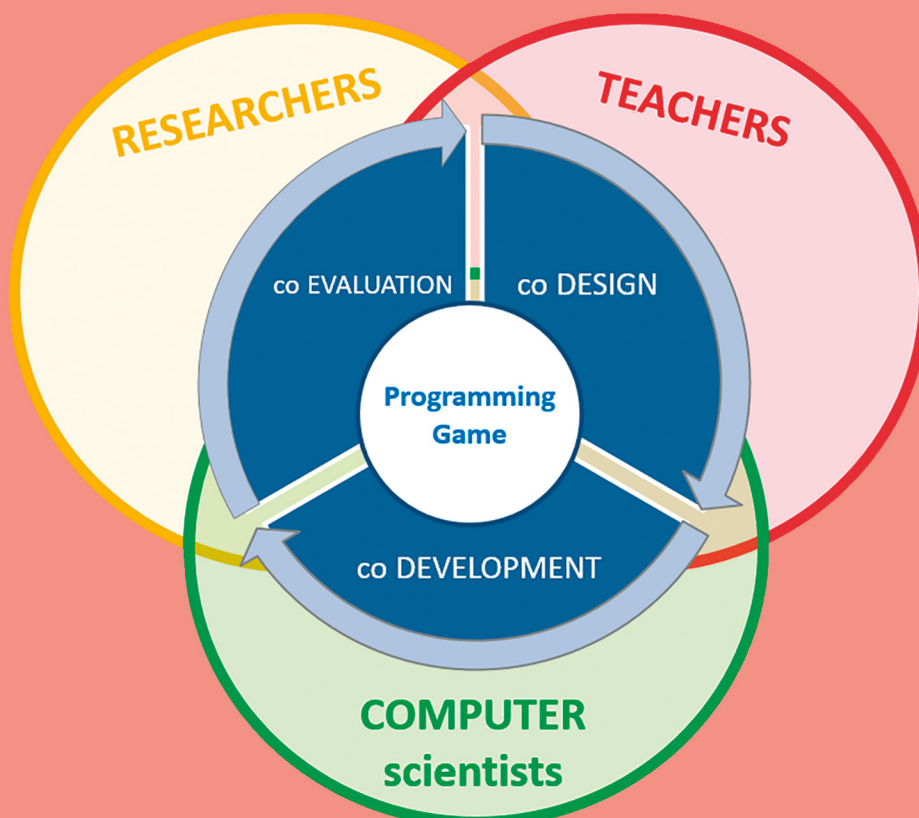
The teaching of computer programming will soon become compulsory in the gymnasiums of the canton of Fribourg. To this end, we are conducting a project to co-design a serious game and an associated pedagogical scenario. This project is carried out according to a design-based research (DBR) involving the collaboration of an interdisciplinary group. In this article, which is based on and extends a recent communication [1], we define the DBR methodology, then analyse the co-design process with the successes and difficulties we encountered. We discuss the factors which facilitated collaboration and ownership of the research by the different members of the group.

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## KEYWORDS

Digital learning game; Computational thinking;  
Design-based research; Collaborative research in education.

Figure 1 - The serious game at the center of the iterative co-design, co-development and co-evaluation process.





## CONTEXT

In September 2019 a programming course will become a mandatory part of the curriculum of first-year gymnasium (preparatory high school) students in the canton of Fribourg (Switzerland). The study plan, which is currently being finalized, will require learning the basics of programming. Teachers impacted by this change are therefore looking for adequate educational resources. Set up at their request and their professional association, the present research is part of the one-year PACT (Playing and Computational Thinking) project funded by the Hasler Foundation. In this research, we are interested in using and improving an existing JavaScript [2] programming game for teaching programming and computational thinking [3]. This project is carried out following a design-based research methodology (DBR) involving collaborative work among the members of an interdisciplinary group.

## TARGETED ISSUES

Design-based research (DBR) is a collaborative research methodology with both a pragmatic and a theoretical focus. DBR has four dimensions [4]: 1) to design learning situations and to be contributive; 2) it is carried out in collaboration with practitioners; 3) it is iterative; 4) it is implemented in ecological conditions (in the classroom). The goal is to test hypotheses by putting them into practice, refining them after an analysis phase and testing them again in a second practical application. In this project, the research objective in the field of social sciences is to model the institutionalization phase, and on the computer science side, to analyze the acceptability, usability and utility of the game. According to Sanchez and Monod-Ansaldi [4], this methodology has the advantage of using already validated theoretical models to design educational resources. It enables monitoring and evaluating the deployment of the solution. DBR involves the collaboration of practitioners, educational researchers and actors such as computer scientists, game and graphic designers. In this context, we are interested in observing the following points that are crucial to DBR: (Q1) What is the nature of the information exchanged? (Q2) Do the actors recognize the skills of the other project members? (Q3) What are the interactions inside the project? (Q4) Does the methodology promote the involvement of participants and their takeover of the project?

## PROPOSED SOLUTION

In this project, an interdisciplinary group has been gathering at the Laboratory of Pedagogical Innovation (LIP) of the University of Fribourg for workshops dedicated to the co-development of resources. The group consisted of 13 persons: 6 computer programming teachers from four different gymnasiums, 3 computer scientists (HEIG-VD/HES-SO), 2 educational researchers (UniFR), 1 graphic designer and 1 game designer (freelancers).

*In this article, [...] we define the DBR methodology, then analyse the co-designing process with the successes and difficulties we encountered.*



The co-design steps in this project are:

1. Identification of the pedagogical objectives to be integrated into the game and the corresponding most common errors made by learners;
2. Identification of the constraints imposed by the pre-existing version of the game;
3. Identification of the target audience and proposals for new game scenarios;
4. Identification of the knowledge progression;
5. Design of exercises for each game level;

```

move()      ?
left()      ?
right()     ?
say(text)   ?
read()      ?

```

## CODE

```

1  var value;
2  move();
3  move();
4  moves();
5  move();
6  right();
7  move();
8  move();
9  value = read();
10 left();
11 left();
12 move();
13 right();
14 say(value);
15 move();
16 move();
17 left();
18 move();

```

## Log

moves is not defined

Figure 2 - Screenshot of the resulting serious game.

6. Identification of game-play traces to be collected automatically for research purposes;
7. Definition of a new graphic design;
8. Development of the pedagogical scenario in which the game will be integrated;
9. In-class test;
10. Feedback, analysis and improvement of the game and pedagogical scenario for the second design iteration.

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Throughout this co-design process, we collected traces of all interactions, whether face-to-face or online: meeting minutes, audio/video recordings and numerous email exchanges. We also filled out a questionnaire to evaluate the motivation and satisfaction of the actors of the DBR.

## RELEVANT INNOVATION

The DBR methodology is the first innovation. The collaboration between computer teachers, computer scientists, game designers, graphic designers and educational researchers aims to design, test and analyze the programming learning game and its use in the classroom. One of the objectives is to analyze the acceptability, usefulness and usability of the game.

More specifically to the creation of the programming game, we identify three innovative aspects.

1. This game introduces to the basics of programming. In the creation process, the computer science teachers took into account the constraints of the study plan as well as their experience as teachers to propose a realistic progression inside the game.
2. During the game, codes written by the players are collected automatically to enable the teacher to monitor each player's activity via a real-time dashboard.
3. Teachers have additional privileges, which allow them to create or modify levels inside the game.

The third innovative aspect is related to the use of the game in a school context. This use requires a discussion phase that takes place after the game and is to be carried out with the students. This crucial debriefing phase is called "institutionalization" and corresponds to work on the knowledge activated inside the game and its development in the form of institutionalized knowledge [5]. One of the objectives of this research is to model this institutionalization phase after a game session.





## PROJECT OUTCOMES & RESULTS

Below we describe the findings for our four research questions.

Q1. During the meetings, everyone was asked to specify his/her work methodology, constraints and reality. This made it possible to take into account different work methods. DBR therefore fosters interactions, both in terms of content to be taught and encountered constraints.

Q2. We observed that the skills of each protagonist were recognized by the other actors. However, difficulties could arise when the needs of some people collided with the constraints of others. The time at hand did not always allow the desired game content modifications to be made, requiring a negotiation process. Another issue arose when research questions started taking more place: it was difficult for some teachers, as they had not realized that DBR is pursued bottom-up. To summarize, the methodology encourages openness and most often allows for negotiation in order to reach a solution adapted to the needs of each party.

Q3. In this DBR process, participants' relative availability seems to have strongly influenced group dynamics, as well as the time that had to be invested.

Q4. During the meetings, each participant is invited to share his or her point of view and contribute to a more effective outcome. Everyone seems to be involved and gives positive feedback on the project. However, some comments made us think that not all the actors had yet taken ownership of the research and sometimes had reservations about the project.

## CONCLUSION

Our research methodology allowed the design of a programming game encompassing teachers' needs and the reality of the context in which the game is to be used. The resulting solution, the game and the usage scenario, is both a means of teaching and an object of research. The collaborative process is made possible by the participants' differentiated skills. However, success also depends on external factors, such as decisions of educational authorities, over which the team has little control.

## PERSPECTIVES AND NEEDS

We will shortly finish the design of a completely innovative active pedagogy game scenario and update the game to this end. Also, more sophisticated code analysis tools will be added in order to finely assess the quality of students' solutions to exercises. Programming languages other than JavaScript must be supported, in preparation of future teaching requirements. In the longer term, we would like to implement more software support for the DBR methodology around our serious games platform.

## ACKNOWLEDGEMENTS

We would like to express our gratitude to the Hasler Foundation, which contributed to financing the project. We also thank Swan Keller (graphic designer), Sandro Dall'Aglio (game designer) and Cyril Junod (IT specialist) who contributed to the creation and the improvement of the game, as well as the gymnasium teachers Laurent Bardy, Fabian Simillion, Brice Canvel, André Maurer, Laurence Fidanza, who were involved in using and evaluating the game and its pedagogical scenario.

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# 16 | UNRESOLVED: A STEP IN THE SHOES OF THE FAMILIES OF DISAPPEARED

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## ABSTRACT

The lives of the families of enforced disappeared is an ongoing journey of suffering, where they try to find their missing loved ones with barely any support or recognition. Unresolved will give you the chance to explore how it feels like to be in their shoes.

## KEYWORDS

Enforced Disappeared; Empathy; Psychology; Ambiguous Loss; Game; Mobile.

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## JAMILA'S DAILY CYCLE

WAKE-UP + PREPARE BREAKFAST	HOUSECHORES	EVIDENCE	MONEY CYCLE	PREPARE DINNER	CHILD INTERACTION
Accepts	Accepts	Phonecalls	Money Loss	Accepts	Mohammad
children wake up on time, have breakfast & go to school.	<ul style="list-style-type: none"> <li>- clean bedrooms</li> <li>- clean kitchen</li> <li>- clean bathroom</li> <li>- do dishes</li> <li>- do laundry</li> <li>- swipe floor</li> </ul>	<ul style="list-style-type: none"> <li>- Adel</li> <li>- Nadia</li> <li>- Hani</li> <li>- George</li> <li>- Talal</li> </ul>	Bills: <ul style="list-style-type: none"> <li>- electricity</li> <li>- tuition fee</li> <li>- groceries</li> <li>- old debts</li> </ul>	children have a healthy meal & then go to bed.	depends on your response to evidence search and fake news.
Declines				Declines	Ferdous
Fadi wakes up by chance, wakes his siblings up & run late to school without breakfast.	Declines	Police Officers	Fines:	children will be hungry & won't be able to sleep. They will be very loud, causing the neighbors to call the police. You will receive a fine.	depends on your reaction towards social pressure and bullying.
	House stays dirty which affects the health of the children.	Dead body found:	- noise fine		
		- has black watch	- false evidence		
		- is a smoker	Money Gain		
		- has white shoes			
		- has kaki pants			
		Things at Home			
		<ul style="list-style-type: none"> <li>- hair</li> <li>- letter</li> <li>- hate note</li> <li>- Syrian money</li> </ul>	<ul style="list-style-type: none"> <li>- Act NGO</li> <li>- ICRC</li> <li>- government</li> <li>- relatives</li> <li>- child labor?</li> </ul>		
		Validation Needed			Fadi
					depends on your financial problems and how you deal with them.



## CONTEXT

In a world replete with war, we hear a lot about casualties and destruction; however, little do we know about the people who disappear and vanish without any trace. They cannot be declared dead, since there is no proof of death, nor are they considered alive, since they are nowhere to be found. Enforced disappearance is a world-spread phenomenon that has happened in lots of countries around the globe, and is still ongoing in countries like Syria and Yemen. The disappeared are lost between the world of the dead and the world of the living. Their families live their lives in an agonising journey of search filled with social, economic and legal burdens, making their lives even harder, especially without the suitable support and recognition. They suffer from a psychological state called ambiguous loss, which is the most devastating type of loss since it remains unresolved. This state undergoes a ripple effect, affecting differently each member of the family [1].

While I was researching the psychology of the families of disappeared, I noticed that it might not be enough to clearly grasp their emotions. Thus, I decided to go to Lebanon to meet some families in person and conduct interviews in their comfort zones: their homes. The chain of interviews started with psychologists from the “International Committee of the Red Cross”, ICRC, and workers from “Act for the Disappeared”, a Lebanese human right association aiming to clarify the fate of Lebanese disappeared [2]. After sharing with me their history and working strategy with the families, they gave me some family contacts. I ended up conducting a series of ten interviews, but one family was the most inspiring: the family of the disappeared, Nazih Agha.

Nazih, a Palestinian/Lebanese fisherman, disappeared 36 years ago, during the Lebanese war, leaving behind a wife and five children, whose youngest was some months old. I had the opportunity to interview three generations of the family: the wife Jamila, the daughter Ferdous, and some of the grandchildren. Intriguing as it may be, each member was differently affected by Nazih’s disappearance and had his/her own set of emotions and beliefs [3]. Therefore, I decided to take this case study as my main source of inspiration to design a game/ experience that wants to provoke empathy towards these unheard families.

Nowadays, journalists, NGOs and many other organisations are collaborating with especially interactive and immersive designers in order to send a clearer message that can provoke empathy on the viewer. Recent examples are UNHCR’s Finding Home: A Refugees Journey, which is a mobile game reflecting the suffering of Rohingya refugees in Malaysia [4], and ICRC’s Enter the Room, which is an AR experience providing a sense of how it feels like when war is at your doorstep [5]. I was inspired by these examples and the effect they had on their audience. Hence, with Unresolved, I aim to give a platform to the families of enforced disappeared to be heard, and evoke empathy towards them, since one leads to the other.

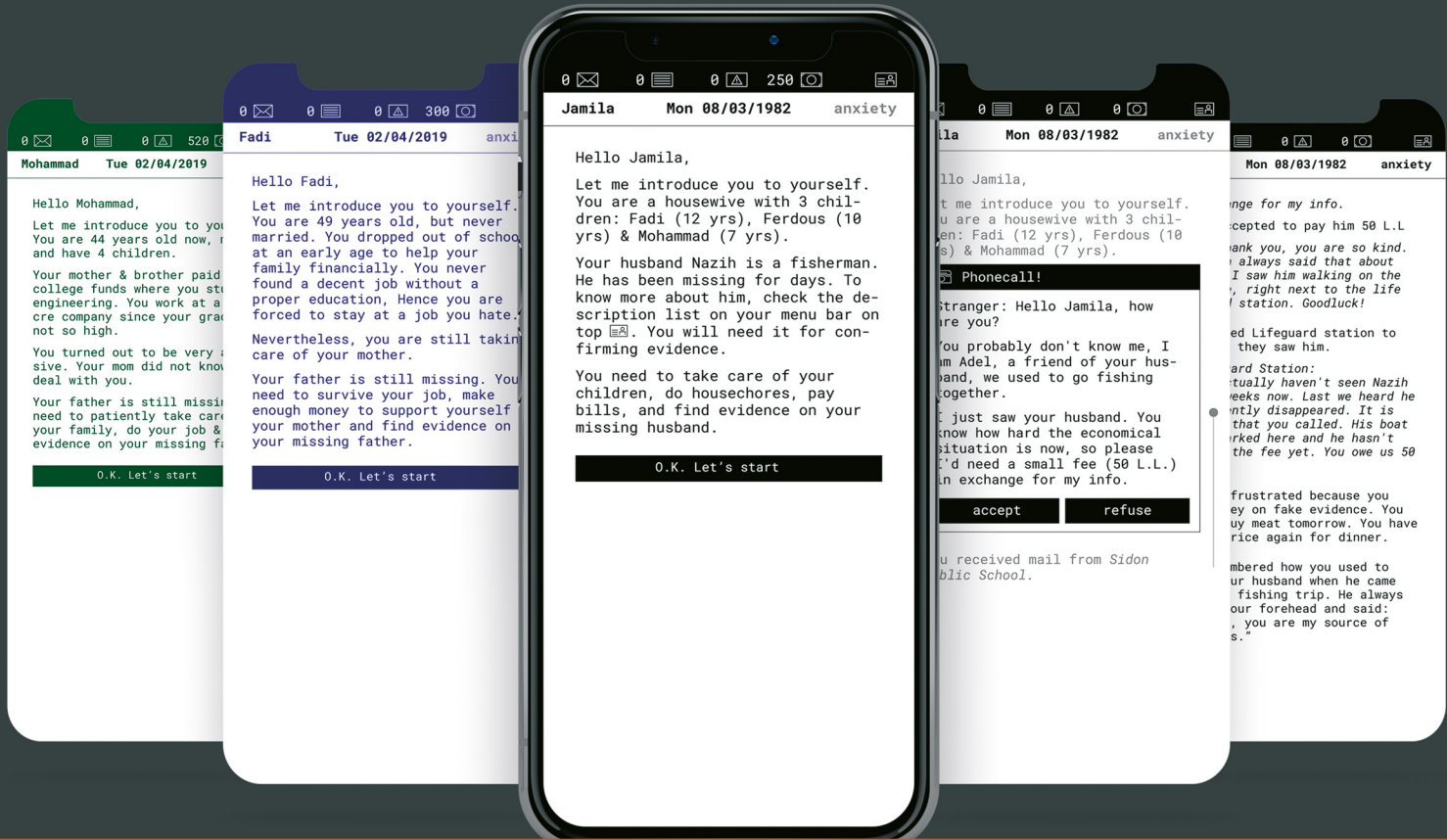
## UNRESOLVED

Unresolved is a text-based mobile game that puts you in the shoes of different family members of an enforced disappeared. You start by playing Jamila, a housewife and mother of three children: Fadi, Ferdous and Mohammad. You are asked to do the house chores, take care of your children, pay bills, and most importantly, find evidence of your missing husband Nazih. During the game, you will have to make frustrating decisions such as choosing which of your children will drop out of school since you do not have enough money to pay the tuition fee, or if the evidence you found or received is true or false, or what to answer when your children ask about their father...

Additionally, the game gives you the opportunity to explore the effects of enforced disappearance on several generations of a family. You will travel back and forth through time and become one of the children whose personality will be highly dependent on three factors: birth order effect on children’s behaviour and personality [6], how you, as Jamila, treated that child, and the decisions made during the game.

*Unresolved will give you  
the chance to explore how it  
feels like to be in their shoes.*





The main goal is to survive the hardship and search for evidence to find Nazih. Whenever the evidence takes you to a promising direction, you will be pulled back by a new event. Spoiler alert: the game is infinite; you can never win nor lose, but the player does not know that. Reflecting on the infinite and frustrating journey of the families of enforced disappeared, who live their lives in a continuous search for their missing loved ones, without knowing if they will ever be reunited.

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## CURRENT STATE & OUTCOMES

It is worth mentioning that this project is the result of a deep, comprehensive research on the psychology of the families of enforced disappeared, where I also studied previous projects done around the subject. *Unresolved* is still a work in progress. The first game prototype has already passed its first user test, and several others have been planned in the process. The results were very fruitful in seeing how people interacted with the game, and how much they felt a connection with the characters, especially Jamila. They also highlighted some issues that needed fixing (e.g. word choice and tonality). But most importantly, users expressed how they felt being trapped in a situation that they could not escape, or in a frustrating decision-making process that was hard to deal with. All of which are successful signs of empathy towards the family members of disappeared.

Since it is text-based, the main focus is on the word choice, voice tonality, sequence and decision consequences. I am collaborating with journalists that have a great experience in storytelling. The story will be woven thanks to my extensive research on ambiguous loss and the conducted interviews, both with practitioners and family members. The story will also include some Lebanese culture elements, such as surnames, street and neighborhoods, food, famous phrases... everything to help the user imagine the story setting.

## CONCLUSION

As a designer, I believe we have certain powers we can use for a good cause. In my case, I want to be the voice of the unheard, the voice of the families of enforced disappeared. With *Unresolved*, I am a step closer to getting empathy towards a group that has remained unnoticed for so long. Of course, I must go on collaborating with my contacts at ICRC and "Act for the disappeared", especially since they can be the platform to advertise and broadcast the game. All of which will hopefully help the user imagine how it feels like to be trapped in a frustrating journey for an unknown amount of time.





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# 17 MUSEUM TALES: A JOURNEY INTO THE DUTCH GOLDEN AGE

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## ABSTRACT

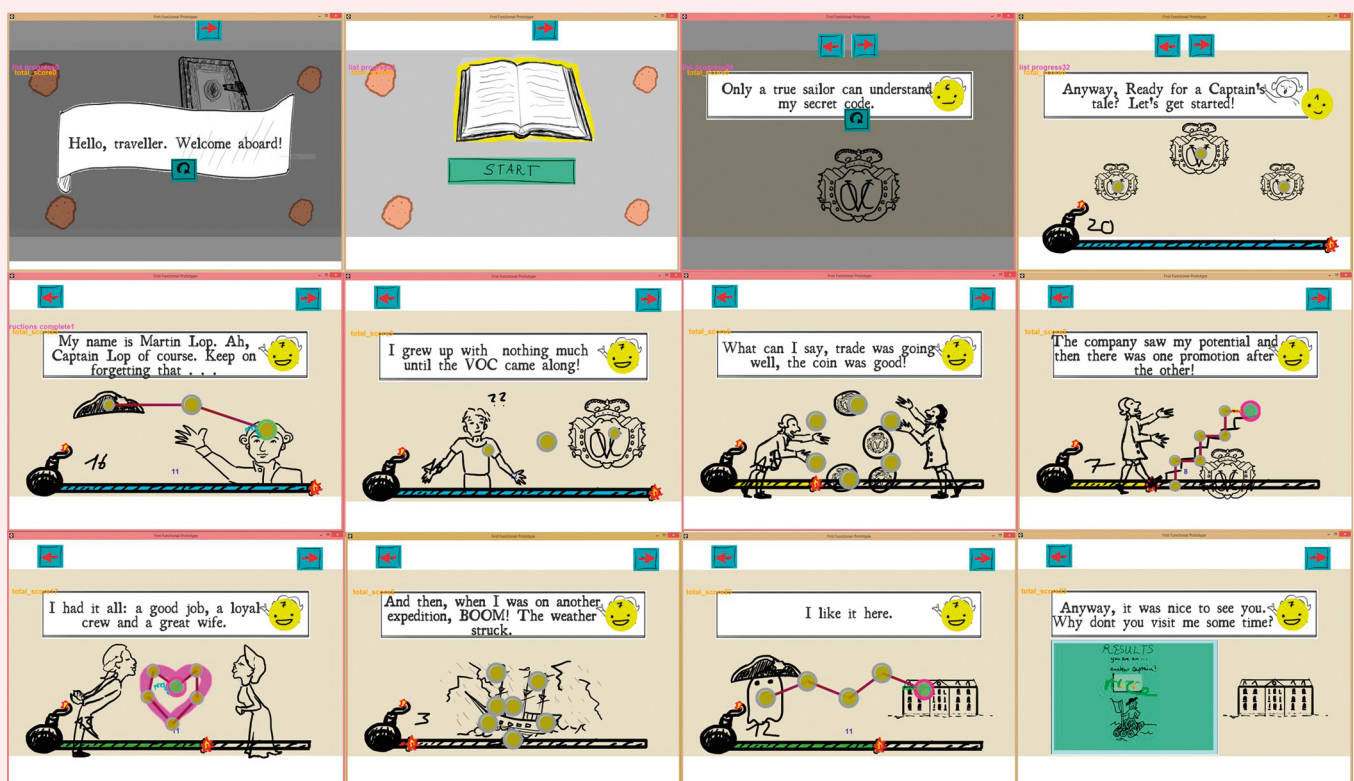
The National Maritime Museum in Amsterdam is known for its strong exhibition narratives and interactive, family-friendly displays. To invite future visitors, they would like to expand their visitor experience beyond the museum's physical location. Over the course of 6 months, 107 children were involved in a narrative game creation and evaluation which tells Captain Lop's story, a historical character featured in the museum's exhibitions. The final evaluation (N=78) was carried out in the form of an A/B test, which compared the game effect (n=41) to that of a traditional website for children (n=37). With an average museum rating of 3.2 out of 4, children who played the game had a better impression of the museum than the control group who scored 2.8. Additionally, there was a significant correlation between the game rating, the perception of the captain and the interest in the Golden Age. For children who visited the website, these correlations were less established.

This research reinforces the notion that games are compelling tools to present educational content and inspire children to learn. For museums, they are an opportunity to create positive visitor expectations for possible customers.

## KEY WORDS

Museum; Pre-visitor experience; Serious games; History; Field research; Children; Maritime.

Figure 1 – First illustrations for the game narrative.





## CONTEXT

The client for this research was the National Maritime Museum in Amsterdam, who strives to show history in a way that speaks to its audience as something precious and relevant. For 100 years, it has been a popular destination for locals and tourists alike. The museum is constantly working on improving its communication strategies towards diverse customer types, and is especially interested in bringing its museum experience to people outside of the museum. Doing so allows them to introduce future visitors to their narrative and set accurate visitor expectations. The specific target audience for this project were Dutch children between 8 to 10 years.

Extensive desk research into museums (eg. Falk & Dierking, 2012), behaviour (eg. Fogg, 2009), user experience (eg. Hassenzahl, 2010), entertainment theory (eg. Vorderer, Klimmt, & Ritterfeld, 2004) and storytelling (eg. Göbel & Wendel, 2016) built the foundation for a design which successfully addresses the museum's needs. Out of the established theoretical framework, design requirements for a suitable prototype were created. Various creative concepts were drafted, one of which was chosen to be developed and evaluated.

This project was carried out as a 2018 graduation project for the Game Design & Development bachelor study program at the Hanze University of Applied Sciences in the Netherlands.

## TARGETED ISSUE

With the emerging trend of museums shifting their exhibitions towards narrative and engaging displays, many of them are now competing with the leisure industry (Belenioti & Vassiliadis, 2017).

While the stories inside the Maritime Museum are well presented and inviting, people only see these unique displays once they are at the museum. To attract visitors and improve the overall visitor experience, the Maritime Museum wishes to introduce future and potential visitors to their narrative of how the sea influenced Dutch history - before they arrive.

## PROPOSED SOLUTION

Literature research and a small survey in the museum led to the creation of a short narrative game about one of the museum's historical characters: Martin Lop, who lived during the Dutch Golden Age, came from a modest background and worked his way up in the VOC (Dutch East India Company). In the game, children complete small patterns while Lop reflects on his adventures. The better the children

perform, the more enthusiastic are Captain Lop's comments on the situation at hand. The game ends with the player guiding Lop's ghost into the Maritime Museum, where he invites them to visit him sometime.

*This research reinforces the notion that games are compelling tools to present educational content and inspire children to learn.*



## RELEVANT INNOVATION

To create accurate pre-visitor expectations, the game references the museum in multiple ways. This section briefly addresses how this is achieved regarding content, visuals and audio.

With Captain Lop being part of the museum exhibitions, the game provides a background for the story portrayed in the installation. At the end of the game narrative, Captain Lop's ghost is introduced as a 'new' museum inhabitant, who can serve as a connection between the game and the physical museum experience. Furthermore, selected exhibition objects have been directly integrated into the game, so that they are recognizable during the visit.



Figure 2 – Collage of elements from the final game prototype.

To evoke visual familiarity, the game interface follows the museum's modern and vibrant brand imagery. The visual interplay of abstract brand logos and complex display objects within the exhibitions is imitated by conveying the game's narrative through the style of historical copper engravings from the 17<sup>th</sup> century. The game character is a stylized drawing of the captain's actor in the exhibition. General stylization is chosen to speak to the young target audience while also establishing visual coherence.

The Maritime Museum plays original tracks in their exhibition rooms. These tracks were used for game music and maritime soundscapes.

## EVALUATION

To establish whether children enjoyed Lop's story, an early prototype version was tested with 18 children. The received feedback was used to improve the prototype in preparation for the final evaluation. During the final A/B test, a weblink sent participants to a traditional website for children with information on the Golden Age, Captain Lop and the VOC or to the game prototype. Respondents of both groups had to complete a survey with identical questions. The children were asked to indicate their interest in the Golden Age, Captain Lop and the VOC but also what they thought about the Maritime Museum and what they expected to see there. The A and B group answers were compared to see if the game would be more effective in creating interest in the Golden Age and the National Maritime Museum than a traditional website.

## PROJECT OUTCOMES & RESULTS

Both the game (B, n=41) and the traditional page (A, n=37) were well received. With an average of 4.1 out of 5, the game rating was higher than that of the traditional page, which had a mean of 3.65 ( $p=0.06$ ).

Interest levels for the Golden Age were almost the same for A and B (A:  $M=7.41$ ,  $SD=1.739$ ; B:  $M=7.32$ ,  $SD=2.079$ ) but the game group gave a higher interest score on Captain Lop (A:  $M=6.46$ ,  $SD=2.34$ ; B:  $M=6.66$ ,  $SD=2.287$ ) and the VOC (A:  $M=7.08$ ,  $SD=1.847$ ; B:  $M=7.46$ ,  $SD=2.292$ ).

There is a positive correlation between the website rating and the scores for Captain Lop [ $r(35) = .293$ ,  $p=0.073$ ], which is significant at the 0.1 level. In group B, there is a very strong positive correlation between the game prototype rating and the interest in Captain Lop [ $r(39) = .423$ ,  $p=0.006$ ], significant at the 0.01 level. For group B, there is also a strong positive relation between the game prototype rating and the interest in the Golden Age [ $r(39) = .388$ ,  $p=0.012$ ], significant at the 0.05 level. This is not the case for the traditional group [ $p=0.19$ ].





Overall, children who played the game had a more positive impression of the museum. This is measured by the 'impression average', which is calculated out of the 'museum interest' score and the general museum rating. For group B, this impression average is 3.2 out of 4 (SD=0.836) and for group A, 2.81 out of 4 (SD=0.995), which is a significant difference at the 0.1 level ( $p=0.09$ ). It is interesting to note that even children who scored the game low still rated the Maritime Museum highly.

## CONCLUSION

Museum ratings given by the game group were significantly better than the traditional group ones. This indicates that the narrative game had a more positive effect on the museum perception than the traditional website.

However, the children's interest scores concerning Dutch maritime history were very similar for both groups. At this point it should be marked that the prototype was not completely realized as originally designed, which if completed, might have led to a different outcome. The fact that the game got a higher popularity rating than the website supports the idea that children would in any case prefer to play a game.

## PERSPECTIVES & NEEDS

More research should be conducted to draw reliable conclusions on the game effect on children's pre-museum visit experience. For future evaluations, a larger sample size will be needed and external contexts for group A and B will have to be as similar as possible. Conducting a before- and after-test or an additional blind test with a third group who answers directly the survey questions, will also increase the research validity.

In the end, a new hypothesis appears:

The better and the more polished an externally accessible "museum game", the more significant the game's positive impact on curiosity and museum impression will be.

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## SESSION HEALTH II

13H35-16H

The current challenges of the Swiss health care system mainly concern the long-term management of chronic diseases, the ageing of the population in good conditions or the empowerment of patients. To face these challenges, it is necessary to develop multidisciplinary, innovative and directly involving patient approaches. The presentations of this session are particularly interesting towards these challenges. Sylvie Cardin et al. proposes an application, aimed at encouraging the maintenance of regular physical activity among seniors, with gamified activities. Richard Wetzel & Tobias Kreienbühl present a prototype of virtual reality diving games, to support breathing exercises in patients suffering from cystic fibrosis. Florent Gluck et al. present a mobile application to train speech production skills in children benefiting from cochlear implant rehabilitation. Nicolas Wenk & Fabio Balli present “open source” breathing games for children affected by cystic fibrosis or asthma.



CHAIR: PIERRE-NICOLAS CARRON | CHUV | LAUSANNE





# 18 FUNSPEECH: PROMOTING SPEECH PRODUCTION IN YOUNG CHILDREN WITH HEARING DISABILITIES

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## ABSTRACT

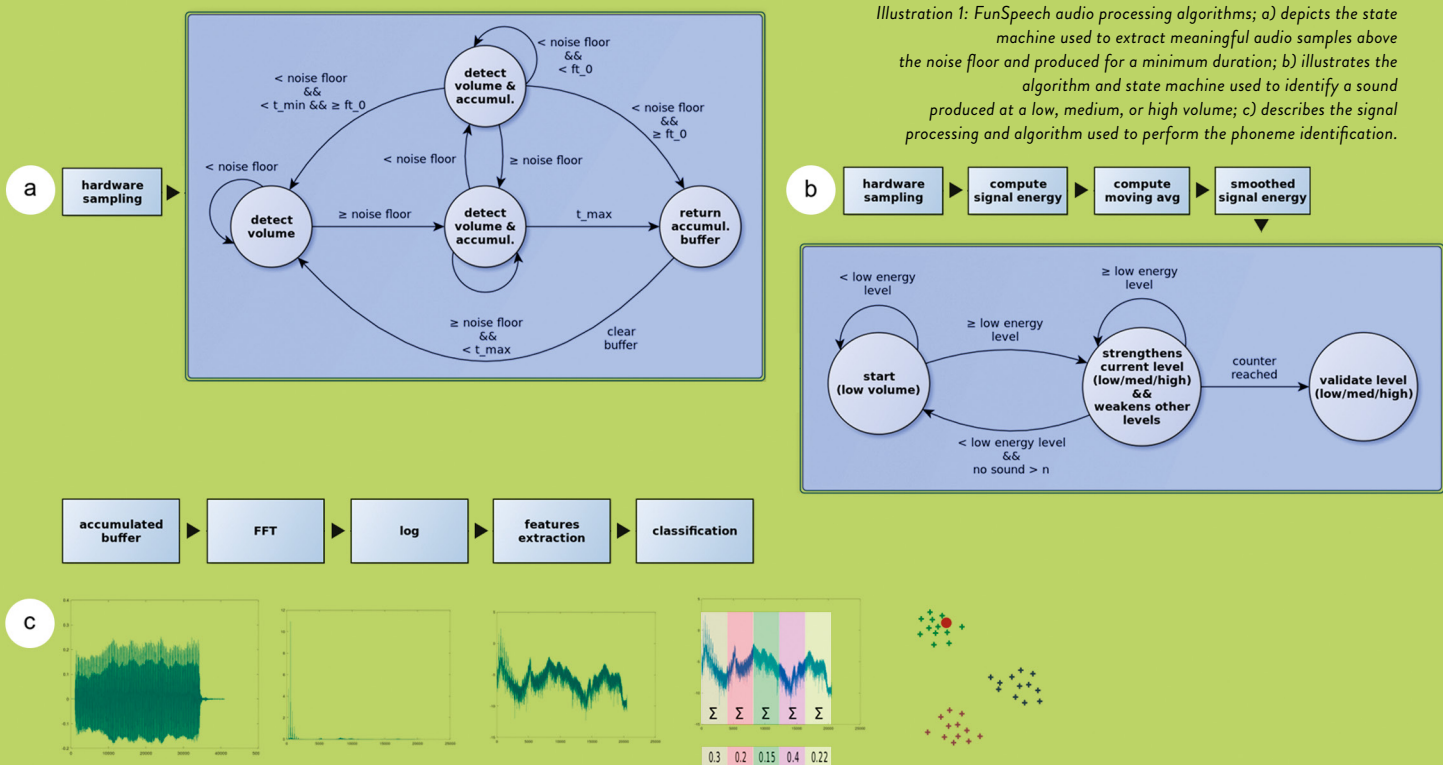
Today, deaf-born infants can be implanted with cochlear implants as early as six months after birth. Studies have shown that early speech practice leads to dramatically improved pronunciation and elocution. We developed FunSpeech, a “serious game” that aims to help very young implanted children to improve their speech production skills by frequent practice. FunSpeech provides an engaging and playful experience that motivates children to practice their speech autonomously as frequently as possible. Signal processing algorithms and classification methods were developed to identify meaningful sounds, volume levels, and first speech sounds. Most games have been tested with good preliminary results in a control population of normal hearing children. This indicates that FunSpeech has the potential to successfully fulfill the gap in applications targeting speech-production skills in very young implanted children.

## KEYWORDS

Sound processing; Phonemes; Unity; Language development;  
Cochlear implant; deafness; Hearing impairment; Serious games; Education.

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Illustration 1: FunSpeech audio processing algorithms; a) depicts the state machine used to extract meaningful audio samples above the noise floor and produced for a minimum duration; b) illustrates the algorithm and state machine used to identify a sound produced at a low, medium, or high volume; c) describes the signal processing and algorithm used to perform the phoneme identification.







## CONTEXT

The cochlear implant (CI) is a device that restores hearing in people with profound sensorineural hearing loss by electrically stimulating the auditory nerve [1]. More than 600'000 people have benefited from CIs worldwide and millions more are expected to benefit from this technology.

An essential factor for successful rehabilitation with a CI is an appropriate acoustic stimulation and training (e.g., speech therapy). This is especially important in young implanted children who need to develop language skills using the degraded information provided by the CI. For this reason, children should follow intensive speech therapy sessions following implantation.

## TARGETED ISSUES

Speech rehabilitation therapy alone is not enough to warrant adequate language development in cochlear-implanted children. It is also of primary importance that during daily life (e.g. at home, at school) children get sufficient and good quality auditory stimulation. This is not always achieved because parents and school staff often lack means (time or qualifications) to achieve efficient at-home stimulation and training. In this context, our group has been working for some years on specific training tools for cochlear-implanted children to help them achieve good quality, at-home rehabilitation. The initial steps focused on developing and testing training software for speech perception in the form of gaming [2]. We currently concentrate on developing a new program to train another fundamental aspect in language development: speech production.

## PROPOSED SOLUTION

A thorough review of the current state of affairs confirmed that no application specifically targeting speech production skills in very young children exist [3]. Here we present a project that aims at fulfilling this gap by developing a mobile application to motivate and train speech production skills: FunSpeech. This application was developed following the principle of “serious games” and targets an un-addressed population of very young implanted children, between two and four years old.

In order to be meaningful and successful, FunSpeech features five mini-games especially designed to address the different sound parameters required to achieve controlled speech production: intensity, rhythm, pitch, and phoneme construction. The gameplay is adapted to very young children cognitive abilities and to be engaging each game provides an immediate visual feedback based on children's actions. To study and analyze the children's progression, clinical data are automatically extracted and collected. The application is multilingual in an effort to reach the largest possible audience.

FunSpeech targets Android tablets platforms and is implemented in C# using the Unity3D framework.

The signal processing and algorithms developed for the various mini-games are depicted on Illustration 1. The audio engine is able to: a) detect the presence of a meaningful sound of a given duration (by opposition to a short noise), b) classify the volume of a sound as low, medium, or high and, c) identify phonemes (e.g. vowels). Interestingly, the algorithm used for phoneme recognition mimics the sound processing strategies commonly used in cochlear implants.

*FunSpeech provides an engaging and playful experience that motivates children to practice their speech autonomously as frequently as possible.*





Illustration 2: four of FunSpeech's mini-games: a) the monkey game, b) the bear game, c) the fishing game, d) the clown game.

## RELEVANT INNOVATION

FunSpeech is an innovating application in several aspects.

First, no other serious game tackles speech production promotion in young children with hearing disabilities.

Second, FunSpeech addresses a novel and difficult population: that of very young, hearing-impaired children who start with absolutely no speech production skills. On the one hand, it has the potential to significantly improve cochlear implant outcomes, which considerably impacts the child's life in the long term. On the other hand, it provides a unique opportunity to gather fundamental information about how speech production skills are developed, which will ease the set-up of pertinent therapeutic interventions.

Third, it presents an innovative educational approach, in which vocally-performed actions are directly translated into visual responses in the games, so that the child receives an immediate and direct visual feedback.

## PROJECT OUTCOMES & RESULTS

The first version of FunSpeech has been successfully developed for the Android platform. It runs on a tablet, allowing the game to be easily accessible to children, medical staff and parents.

Five mini-games, working on different necessary parameters for accurate speech production, have been implemented:

- › The “fishing” game: designed to explore and control the effects of voice production and rhythm. The game is composed of swimming fish and a fisherman. The goal is to produce a sound at the right time in order to catch as many fish as possible.
- › The “helicopter” game: designed to explore the effect of pitch production. The child controls a helicopter with the pitch of his/her voice.
- › The “monkey” game: designed to help children explore and control the effect of voice intensity. The goal is to make monkeys disappear by producing sounds at a specific volume for a given time.
- › The “bear” game: designed to help children control their voice intensity. Bears cross the screen at various distances. The goal is to call as many bears as possible by producing sounds at the correct volume.
- › The “clown” game: designed to train the production of the first speech sounds i.e. phonemes (e.g. vowels) produced by young children. The goal is to successfully repeat random phonemes. Upon success, a clown claps and presents a dancing animal.



Four of the developed mini-games are shown on Illustration 2. The “monkey”, “bear” and “fishing” games have been tested with good results in a control population of normal hearing children. The “clown” game requires a large set of young children samples to train the algorithm. Given the difficulty to obtain such samples, the first version of FunSpeech was trained on a small set of adult samples instead, leading to sub-optimal results.

## CONCLUSION

Using games with an educational purpose has proven to be a successful treatment strategy in disabled populations. Indeed, clinicians and cochlear implant manufacturers have started developing game-based mobile applications to help patients reach optimum outcomes. However, speech production and very young children have received very little attention from the field. Promising preliminary results show that FunSpeech has the potential to successfully fulfill this gap. Furthermore, the strategy used in this innovative solution could potentially be applied to other fields, such as promoting communication skills in a variety of syndromes.

## PERSPECTIVES & NEEDS

Presently, the training set of the Clown game is composed of adult samples only. Much better results would be obtained by training the algorithm on a large population of young children samples. The classification method could also be improved. More advanced classification algorithms will be explored in the future.

Although the outcome of testing FunSpeech on hearing children was positive, the games must be tested on a population of implanted children instead. The impact of young implanted children using the FunSpeech application on a regular basis (e.g. on a daily basis at home) will have to be measured over a long period of time in order to assess its effectiveness as a speech therapy strategy.

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# 19 | PROTOTYPING A VIRTUAL REALITY DIVING GAME TO SUPPORT BREATHING EXERCISES TO TREAT CYSTIC FIBROSIS

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Cystic fibrosis is a chronic lung disease severely lowering life expectancy. Treatment requires daily breathing exercises that are repetitive and not very engaging. We aim to increase the motivation for these exercises with a virtual reality diving game.

## ABSTRACT

About 1,000 people in Switzerland and 70,000 to 100,000 people worldwide are affected by cystic fibrosis (CF), a genetic disorder that mainly affects the lungs. An important part of their lifelong treatment consists of airway clearance exercises. These have to be performed daily in order to remove excess mucus from the lungs. In order to make this exercise more motivating for the patients we are working with a physiotherapist to develop a serious virtual reality game. We measure the breathing with an incremental pressure sensor attached to the Positive Expiratory Pressure (PEP) device and use it as main interaction mechanics. The players then explore an immersive virtual reality underwater world, and the diving activity naturally promotes the required constant and calm breathing.

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## KEYWORDS

Virtual reality; Serious game; Breathing; Cystic fibrosis; Health; Therapy; Health game.

Figure 1. Motivators and project goals for the serious virtual reality diving game.

### Cystic Fibrosis – genetic disorder mainly affecting the lungs

- Produces sticky mucus in the lungs
- Increased risk of lung infections
- Severely lowers life expectancy
- Affects about 1,000 people in Switzerland and 70,000 to 100,000 worldwide

### Treatment - daily airway clearance exercises to remove excess mucus

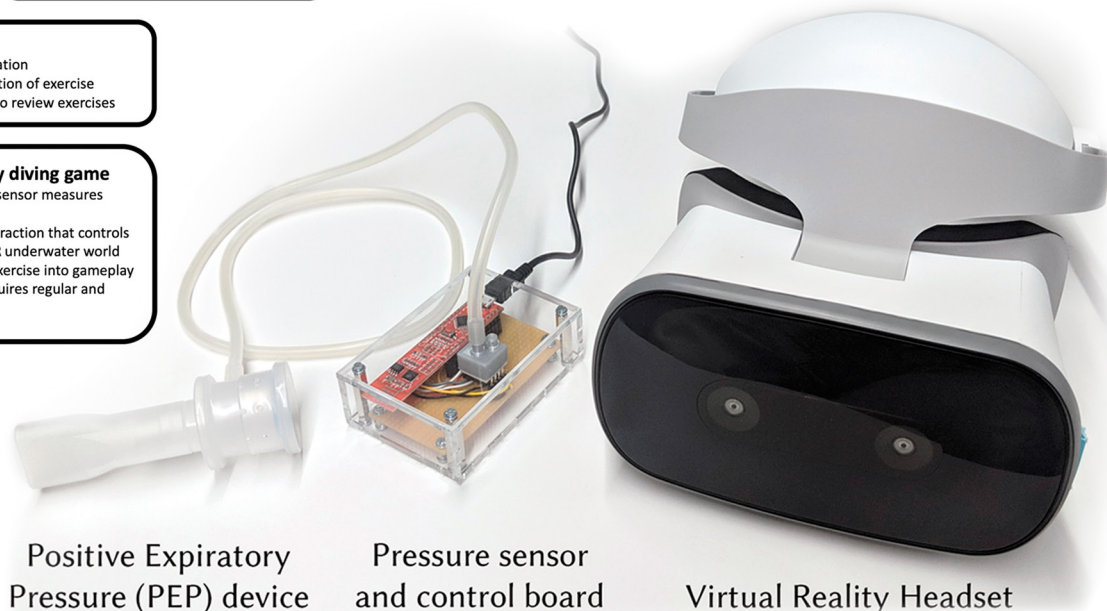
- Ten to fifteen minutes of breathing into tube-like positive expiratory pressure device
- Repetitive and not very engaging
- Requiring attention to exhale correctly

### Project goals

1. Improve patient motivation
2. Promote correct execution of exercise
3. Allow physiotherapist to review exercises

### Serious virtual reality diving game

- Incremental pressure sensor measures breathing activity
- Breathing as main interaction that controls movement through VR underwater world
- Diegetic inclusion of exercise into gameplay as diving naturally requires regular and calm breathing



Positive Expiratory  
Pressure (PEP) device

Pressure sensor  
and control board

Virtual Reality Headset





## CONTEXT

Cystic fibrosis (CF) is a genetic disorder that mainly affects the lungs. It is an incurable disease and requires lifelong treatment. CF leads to the production of stickier than normal mucus in the lungs which is therefore hard to clear. This leads to an increased danger of lung infections and irreversible damage to lung tissues, severely lowering life expectancy. About 1,000 people in Switzerland are directly affected by cystic fibrosis and 70,000 to 100,000 worldwide.

One way of treating CF is regular airway clearance to remove any excessive sticky mucus from the lungs. This is done under supervision of a physiotherapist who decides how long and frequent the exercises have to be conducted, typically once or twice a day up to three to four times during an active infection. The exercises consist of breathing into a Positive Expiratory Pressure (PEP) device that provides different resistance levels and last ten to fifteen minutes or even longer. In a typical session, the amount of repetitions, length of exhalation and resistance are adjusted to activate the different airways areas in order to clear the mucus.

The exercises themselves are repetitive and therefore not very engaging for the patients while requiring attention to exhale correctly.

We are working with a physiotherapist who has specialized in the treatment of cystic fibrosis and we propose a virtual reality diving game to support these exercises (*Figure 1*).

## TARGETED ISSUES

As the breathing exercise has to be conducted multiple times daily, it is impossible for a physiotherapist to supervise all of them; they can only provide guidance once or twice a week. However, it is the patient's responsibility to train regularly and correctly. Our work therefore revolves around the following three main issues:

1. Improving patient motivation to actually perform the exercise many times a day.
2. Promoting the correct execution of the exercise.
3. Allowing the physiotherapist to review these exercises.

The work discussed here focuses on the first two aspects aiming to foster motivation by increasing the enjoyment from the exercise while ensuring that the exercise is conducted properly. The third issue was out of scope for the current prototype but could easily be added at a later stage.

## PROPOSED SOLUTION

Breathing is a type of physiological input [5]. To measure breathing, we connect an incremental pressure sensor to the PEP device. The sensor itself is hooked up to an Arduino board which then sends the data via a wireless connection. To display the game during the actual exercise, we discussed different options. Obvious solutions were to use a laptop/PC or a smartphone/tablet. As the PEP device needs to be held in hand, it meant that the smartphone would have to be propped up as it would not be possible to hold a second device. In order to increase engagement with the game and minimize distractions, we decided to use a stand-alone virtual reality headset to deliver the game content. This would allow the player to be fully immersed in the experience. *Figure 2 (top) shows the final hardware setup.*

A more challenging question was how to use breathing as a game mechanics. Here, we considered two main possibilities:

*We have developed a prototype for a VR game that supports airways clearance techniques necessary to treat cystic fibrosis.*



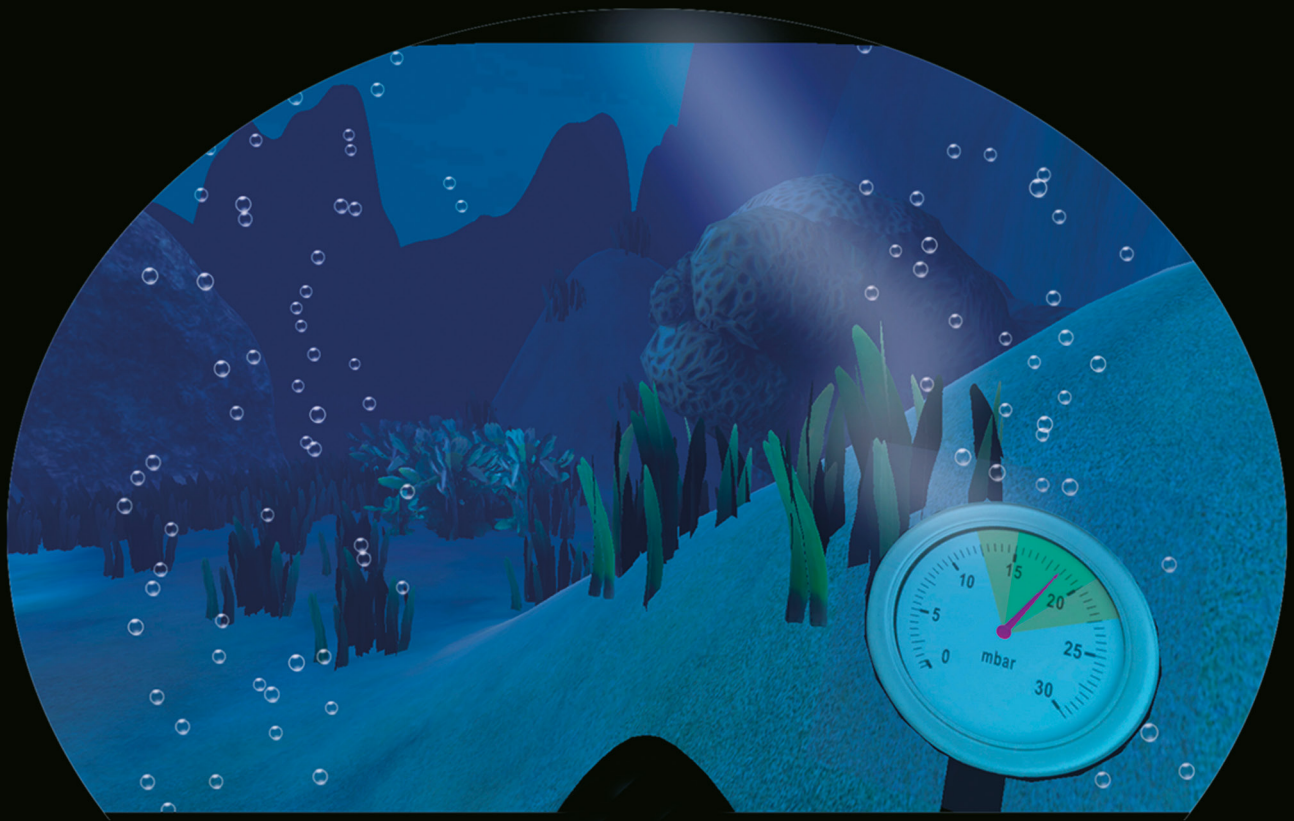


Figure 2. Positive Expiratory Pressure (PEP) device, incremental pressure sensor on Arduino board and stand-alone virtual reality headset (top). Exploring the underwater world while performing the breathing exercise (bottom).

1. The patient conducts the breathing exercise which is tracked by our system. Afterwards, the player receives a reward that could range from simple points and badges (e.g. Duolingo) to more complex virtual items (e.g. Zombies Run);
2. The breathing is used as the actual game mechanics, i.e. to control an avatar or to otherwise influence the game world.

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For our prototype we decided, after consultation with the physical therapist and based on lessons learnt by Balli [2], to develop a game that would embrace the breathing as directly affecting gameplay (variant 2).

## RELEVANT INNOVATION

Virtual reality has been successfully used in health games [4], for example to treat anxiety while monitoring breathing [7]. The interplay between physiological input and virtual output creates an immersive and natural experience for the players. Non-VR breathing therapy games exist in different contexts [1,3,6] and also to treat CF [2]. All of these games have to overcome the challenge of turning breathing into a meaningful input for the game. After consulting our physiotherapist partner, we decided it would be crucial to promote the correct breathing patterns during the game. This constraint is not found in the other breathing games. When performing the exercise, a patient must employ different breathing patterns in various phases to mobilize the mucus in different parts of the airways. For example, in a typical exercise a patient would exhale 8 to 10 times for 8 to 10 seconds each in one phase, followed by another phase of 5 to 7 exhalations of 5 seconds each. This basically prohibits gameplay that would require dynamic reactions from the player – something almost all video games are built around. This required us to develop game mechanics that naturally correspond to the breathing exercise itself while creating meaningful gameplay. This is crucial for health games success and identifying, testing and evaluating such different gameplay elements and their suitability will help future game designers.

## PROJECT OUTCOMES & RESULTS

Our prototype is an underwater exploration game (see Figure 2, bottom). The airways clearance exercise is interpreted in the game as breathing while diving and allows the player to swim forward. When diving, one has to breathe in a regular and rather controlled way – which allows a diegetic inclusion of the breathing exercise as gameplay. This makes the interaction natural and believable at the same time.



The game is separated into different phases which correspond to the breathing exercise ones. The player is instructed in each one to adjust the breathing tube resistance level, the repetition number and how long he/she should exhale. The player is allowed to tweak these parameters if desired. Based on these settings, we calculate a “diving distance” and once it has been reached, the player is rewarded by, for example, chests that reveal treasures or clams containing pearls. The underwater world itself consists of canyons, arches, underwater plants, different schools of fish swimming by, small wrecks and other elements. While exhaling, air bubbles appear that rise to the surface. Furthermore, the player has the task to collect trash scattered in the underwater world which currently provides rudimentary gameplay.

The game is played while wearing an immersive virtual reality headset. Initial patient feedback indicates that it positively affects the breathing exercise by visualizing the breathing itself, guiding the patient through a full set, and providing clear goals. Areas for improvement are diversity of the underwater environment, better control over the dive itself and additional gameplay elements.

## CONCLUSION

We have developed a prototype for a virtual reality game that is supporting airways clearance techniques necessary to treat cystic fibrosis. An incremental pressure sensor connected to a PEP device acts as the input for the players. The design goal of promoting the correct breathing patterns was achieved by letting players explore an underwater world where out-of-game breathing is used as in-game breathing while diving.

## PERSPECTIVES & NEEDS

To measure our prototype success, a long-term study with several patients will be necessary. We are also planning on developing different breathing game variants to appeal to different player and patient types, potentially also expanding the scope beyond cystic fibrosis. The ultimate project goal is to publish the game and accompanying technology to make it accessible to as many patients as possible.

## ACKNOWLEDGEMENTS

The work described here was partially funded by an Innosuisse innovation cheque.

We would also like to especially thank our physiotherapist partner, Thomas Schumacher, for making this project possible in the first place and for his continuing enthusiasm.

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# 20 | GAMIFICATION TO IMPROVE ADHERENCE IN HOME-BASED ACTIVITIES FOR SENIORS

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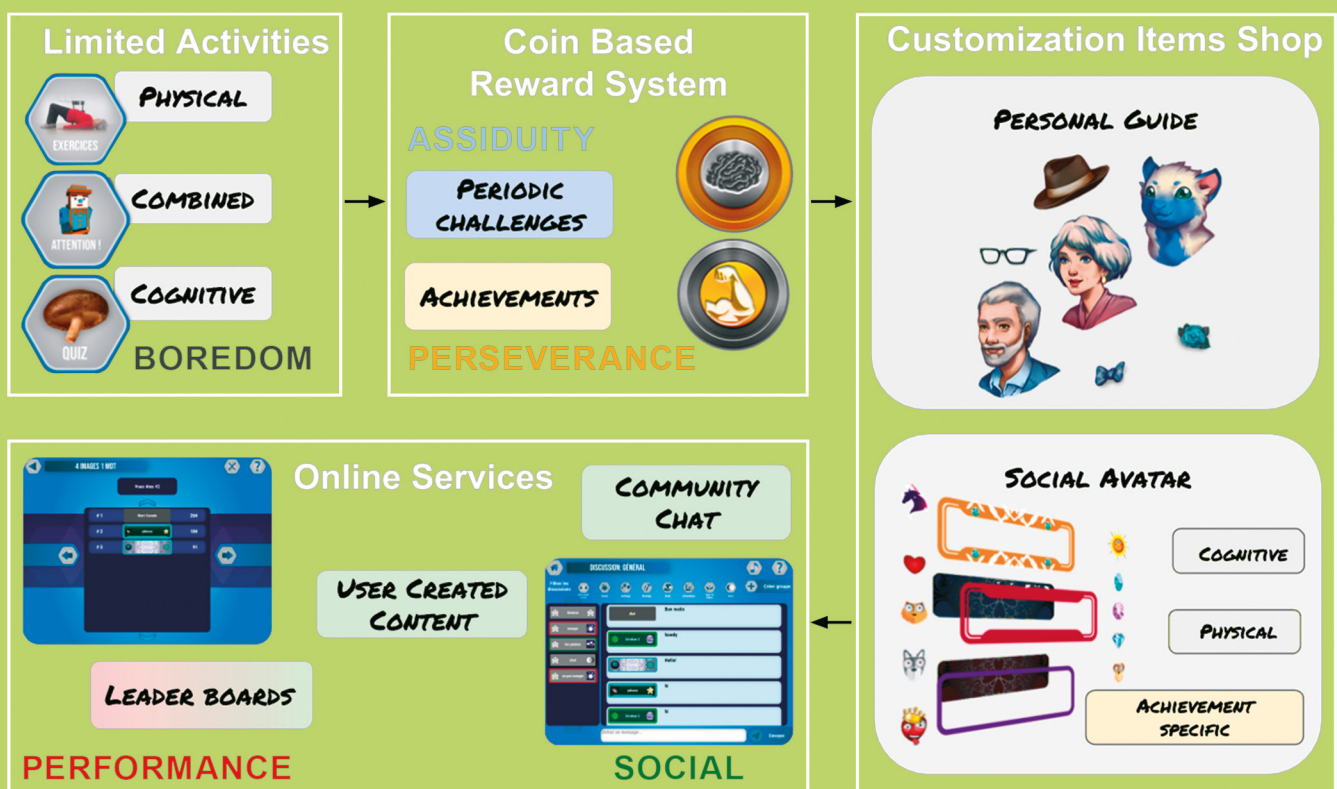
## ABSTRACT

In the context of the "Stay Fit Longer" European project, aiming at developing a tablet application with gamified activities that prevents cognitive and physical decline in seniors, we implemented different gamification strategies for studying adherence in the elderly population. Using proven mechanism from the mobile entertainment industry, such as daily activities, leader boards, achievements, temporal limitation and reward system for customization of social avatars, we are measuring the usage and performance of 120 subjects in Belgium, Switzerland and Canada during the next 18 months. We expect that one of the greatest motivation factors comes from intrinsic rewards of their social environment by being congratulated by their relative for their dedication and performances.

## KEYWORDS

Healthy aging; Serious games; Casual games; Rewards; Motivation; Isolation; Self-management; Adherence; Home training.

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## CONTEXT

According to the World Health Organisation (WHO), the world's population over 60 years old will nearly double between 2015 and 2050. Consequently, a growing number of people will be affected by neurodegenerative diseases, such as Alzheimer's.

Some retirees become less active and have less social contacts. The best available strategy for healthy ageing is early prevention to delay the age-related symptom onset of physical and cognitive decline. Several studies (Litwin 2018, de Rezende 2014) show that the risk factors for faster cognitive decline include: sedentarization or lack of physical activity, lack of cognitive stimulation, and social isolation. Knowing these risks, it is thus important for seniors to stay active after retirement.

One of the main strategies to increase adherence is gamification as studies have shown that it has been successfully used on younger audiences (Amari 2014). However, we do not know yet which gamification strategies work on an older population.

In this paper we present the developed solution within the project frame "StayFitLonger", supported by the European program Active Assisted Living. "StayFitLonger" aims to develop a tablet application with gamified activities that prevents cognitive and physical decline in seniors and allows optimal ageing and long-term independence at home.

## TARGETED ISSUES

The activities proposed by the application have been specifically designed by medical experts to reach therapeutic goals for the targeted elderly population. The training program is composed of various physical and cognitive activities, while also allowing social interactions between users. Gamification strategies have been added to increase user adherence to the overall application during a 12-month period.

The aim is to encourage users to follow the clinician-recommended dose for each activity, without overworking themselves especially in physical activities. Since people of this given age bracket (60+ years) are extremely heterogeneous in abilities and interests, it is necessary to let them self-manage their training by allowing them to set their own goals, choose exercises of their interest and motivate them in that direction. As the target population is the least likely to use spontaneously technology to ease everyday life, it is thus essential to provide an application, developed specifically with this population in mind, that gives a good user experience.

The long-term use intended for the application is another particularity of our case as it will be used in a clinical study for its validation and will last 12 months.

*The best available strategy for healthy ageing is early prevention to delay the age-related symptom onset of physical and cognitive decline.*



## PROPOSED SOLUTION

We have implemented several gamification elements in the application: first, by using extrinsic rewards in the form of resources or coins: users can unlock content, which is a strategy commonly used in casual gaming. Two dedicated types of coins have been implemented to promote both physical and cognitive activities.

In gaming applications, the implementation of daily quests, achievements, and limitation strategies invites the user to come back frequently. As users can choose freely what activity they want to perform, coins are given when they follow the recommended dose set through periodic challenges. The limitation system prevents the user from performing the same activity too many times to avoid physical fatigue and running out of cognitive content too quickly. Rewarding long-term adherence is done through leveled achievements.

As the application will be available to a potentially frail population, we have only chosen extrinsic reward commitment. Performance scores are also presented as public leaderboards for the different activities.



To test the efficiency of extrinsic rewards, the overall cost and gains have been adjusted to be accomplished in six months of use. Also, users can choose to spend coins to customize their personal guide's appearance and their username display in social rooms (chat system).

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## RELEVANT INNOVATION

This project main innovation is the implementation of traditional gamification strategies from the casual mobile world to a wellness application dedicated to the elderly. The implementation of both extrinsic and intrinsic rewards has balanced both the therapeutic constraint support as well as the maximization of the user adherence to the application.

By customizing their username decorations (borders, backgrounds, and icons), users can display expensive items or some that can only be obtained through high-level achievement to show their commitment to the program.

As part of the cognitive exercises, users can create new content quizzes and image concepts that can be shared with others. For this purpose, we have developed a moderation system and a liking vote mechanism for users to rate peer-created content.

## PROJECT OUTCOMES & RESULTS

A closed beta version has been released among a group of 128 people recruited in 3 different countries (Switzerland, Belgium and Canada), participating in a randomized clinical trial whose therapy adherence will be assessed during 12 months. The long-term therapy adherence assessment, which measures the training amount and regularity, is the main interest of the "StayFitLonger" project.

It measures the participants' progression in the different challenges, achievements and gives their performance score in each of the different physical and cognitive activities. These results can later be correlated to the clinical study outcomes. The participants are also asked about their gaming and technological habits in order to study the different gamification tool acceptance in gamers vs. non-gamers. Since gamification for seniors still hides many unknowns, this study will give some insights about the efficiency and reception of standard motivational tools used in casual mobile games in the senior population. It is possible that some strategies fail to work with certain people, while others might prove very efficient in increasing motivation. The goal is to be able to find a motivational tool that is appropriate for the largest portion and not only for the very competitive and performance-driven individuals, who would already perform well on mainstream apps.



## CONCLUSION

This technical paper presents different gamification strategies and approaches implemented in a tablet application that provides cognitive and physical activities for seniors. The planned randomized clinical trial will provide general trends of the different gamification strategies effects on senior adherence to the exercises. This implementation goal is rather to study the elderly behavior and their relative interest in different gamification approaches than build a formal experimental plan or, on the opposite, develop the most efficient reward mechanism.

We expect that one of the greatest motivation factors comes from intrinsic rewards of their social environment by being congratulated by their relatives for their dedication and performance. Future developments should aim at better integrating the developed activities in the elderly daily life routine and directly bridging with the existing social networks used by their peers and relatives.

## ACKNOWLEDGMENTS

This work is supported by the “StayFitLonger” project (AAL-call-068-2017) of the Active and Assisted Living (AAL) programme.

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# 21 | BREATHING GAMES – FREE/LIBRE AND OPEN SOURCE GAMES FOR RESPIRATORY HEALTH

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## ABSTRACT

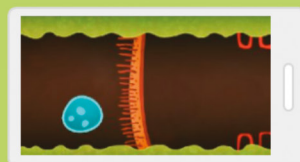
Breathing Games brings together and share resources to make knowledge and technology in respiratory health playful, accessible, and customizable.

## KEYWORDS

Breathing games; Respiratory health; Free/libre and open source; FLOSS; Cystic fibrosis; Respiratory disease; Children; Creative commons; Therapy; Breathing exercises; Community-based health research; Game jam; Hackathon.

Picture credits: breathinggames.net

## 2. Freely adaptable games and hardware



education  
eg. airway function



self-screening  
lung capacity test · asthma



treatment  
therapy · cystic fibrosis

## 1. Collective creation, participatory research

## 3. Data commons to inform policies







## CONTEXT

Around the world today, 9/10 people are breathing polluted air and 2/10 live with a chronic respiratory disease, such as Asthma or Cystic Fibrosis (CF). According to the Lung Association [1], in Switzerland, 1/2700 newborn is affected with CF. The consequences of this disease go from everyday life adverse effects, lethal body function deterioration, passing by life-threatening crisis.

CF is known as the most frequent genetic disease in Caucasian population [2]. Since 2011 in Switzerland, systematic CF screening is done on every newborn [3]. This is a progressive lethal disease that, in addition to other symptoms, causes a mucus thickening leading to chronic inflammation in the airways and permanent damages to the lungs. Thanks to daily respiratory therapy, medication and transplantation in the worst cases, the lifespan of the people affected increased from 20 years old in the 1980s to 50 years old nowadays [2].

## TARGETED ISSUES

Early in life, children must understand their disease. CF progressively deteriorates many body functions, but these can also suddenly decrease or improve depending on external factors. Children should learn how to evaluate their own body functions to understand their capacities, and how they are impacted by the environment.

Current therapy consists of home-based respiratory exercises done twice a day including airway clearance techniques (ACTs). The goal is to help detach the mucus stuck in the airways, so it can be coughed up, reducing the risk of obstruction, inflammation, or infection. These exercises are the most time-consuming treatment-related activity, and almost half of the affected children poorly adhere to them [4].

Finally, CF is a rare disease, and each person is differently affected. People who live with CF generally avoid meeting each other, in order to avoid germs or bacteria transmission. CF does not attract many researchers, and investments remain often focused on genetic research in the private sector. Educational contents regarding this disease are often country specific and limited. Efforts are needed to encourage the affected ones to transmit their knowledge to others and communities and groups to contribute to the well-being of CF sufferers.

## PROPOSED SOLUTION

We developed a connected breath-through controller, while aiming at the same benefit as currently-used therapy device and measuring the same respiratory variables, that can be used with a computer or a smart-phone. Among other benefits, this device can be interfaced to SGs aiming to create lasting interest and enjoyment during physiotherapy exercises. This would address one of the major issues in therapy: adherence.

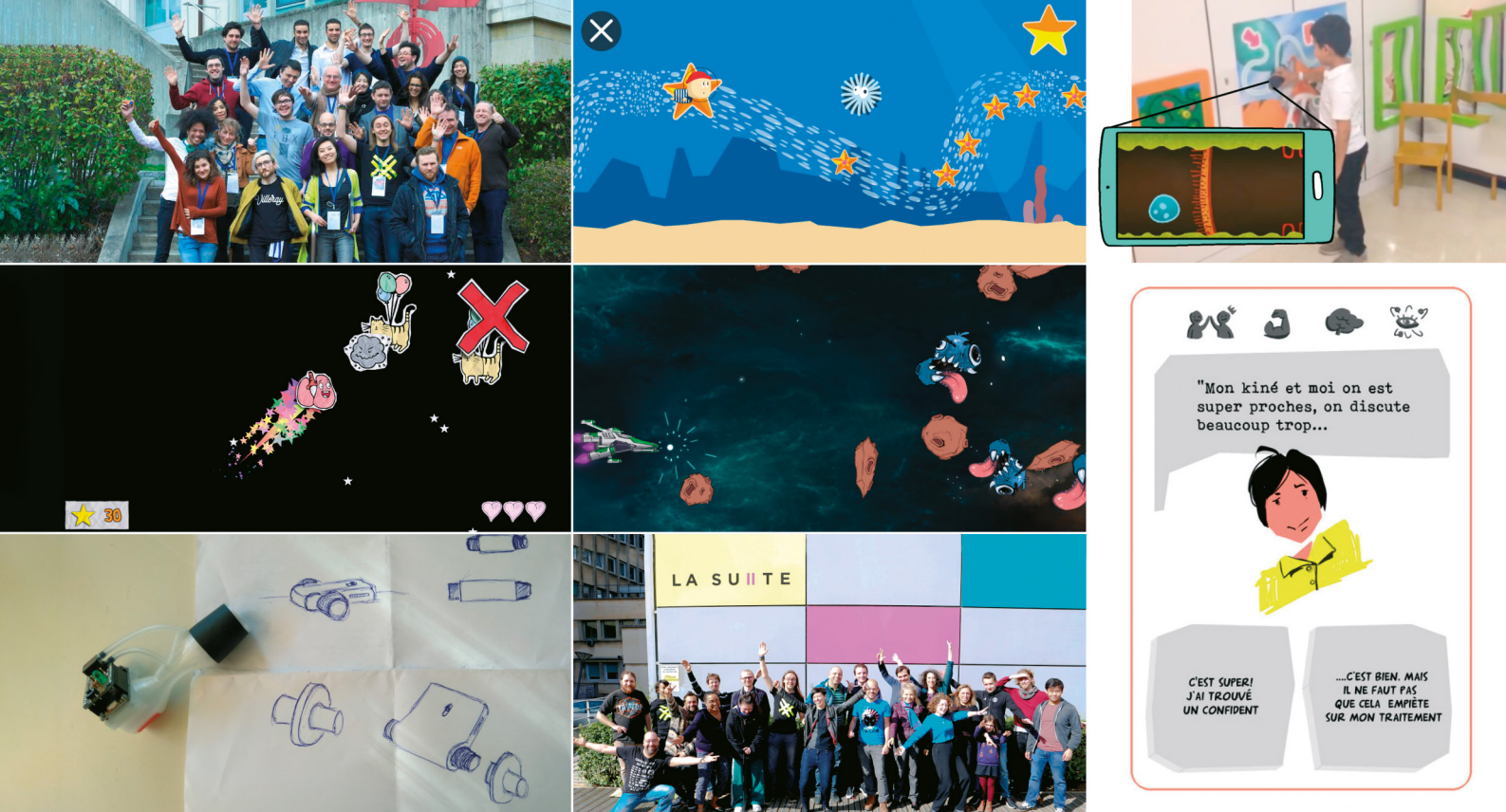
*[...] the latest want to build richer, playful contents that potentially deviate from strict patterns but favor adherence and time spent in caring about themselves.*



Launched in 2014, “Breathing Games” “mutualizes resources to make respiratory health knowledge and technologies enjoyable, accessible and freely adaptable.” [5] It is a global initiative collaborating with researchers spread in Switzerland, Canada, France, and Italy.

Our goal is to bring together and share resources to make knowledge and technology in respiratory health playful, accessible and customizable. By means of participative events (game jams or hackathons), we bring professionals from various fields together, such as clinicians, designers, programmers, graphic designers, musicians, and also people suffering from respiratory diseases. We create in common SGs and other therapeutic and educational materials.

By creating open material in a participative manner, we aim to sensitize everyone on the respiratory diseases public health challenge. By producing free, open, accessible and customizable content we hope to fill the gap regarding respiratory health material within and between countries.



Picture credits: breathinggames.net

## RELEVANT INNOVATION

The project innovates at different levels:

First, transforming the treatment into a game, so that the affected ones can give a new meaning to the exercises they have to do.

Second, encouraging the affected ones, their parents, caregivers, and other interested people in developing the games collectively, so that the different stakeholders' needs are taken into consideration.

Third, documenting and sharing the games and their source code under free/libre and open source licenses to encourage communities to further develop the games, adapt them to their specific needs, and get an understanding on how such technologies can be developed.

## PROJECT OUTCOMES & RESULTS

Since 2014, more than 250 people have contributed, 4 research articles published, 3 student projects realized, and 19 game jams or hackathons held to produce free/libre and open-source contents. Today, 19 games have been prototyped, 13 of which are in development. Different SGs use a dedicated device or an API. A pilot study is planned to test three SGs in Switzerland. The most recent game jams were held in Paris and Geneva in March 2019, during the Open Geneva festival.

The developed SGs have different purposes. Eight of them target education, to discover or rehearse knowledge about the diseases, for young people with a disease or their surroundings (e.g., family, friends). Five of them target specific CF ACT exercises [6]. The challenge was to develop a playful experience for precise respiratory therapeutic exercises.

Based on the received feedback on these five exercise-based SGs, four more have been developed aiming at more generic breathing exercises. They put the priority on the playful aspect rather than the strict reproduction of the therapeutic exercise patterns (without ignoring all their medical basis). This allowed expanding the initiative to other diseases, such as asthma for future studies in Italy and Canada. The last two SGs created in Paris with young adults suffering from CF focus on fostering a positive mindset, attractive storytelling around self-care despite new autonomy (leaving family, college...), and share the skills they developed through living with CF.



## CONCLUSION

In the last five years, “Breathing Games” has involved more than 250 people and produced 17 SGs addressed to children with respiratory diseases. These SGs aim at sharing knowledge or increasing adherence to therapeutic exercises. While the first SGs focused on translating strict physiotherapy exercises in SGs, the latest want to build richer, playful contents that potentially deviate from strict patterns but favor adherence and time spent in caring about themselves.

## PERSPECTIVES & NEEDS

Most of the developed devices and SGs are still in development by voluntary contributors. Some educational SGs have triggered interest in other external parties and are on their way to their first use in clinics. And many more are still to come, like three game jams and hackathons planned in the coming months.

We are always looking for passionate game designers, developers, artists, or clinicians to join this initiative and become new ambassadors for respiratory health.

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# RECLAIM – CRITICAL DESIGN AND PUNK GAMIFICATION IN THE URBAN ENVIRONMENT

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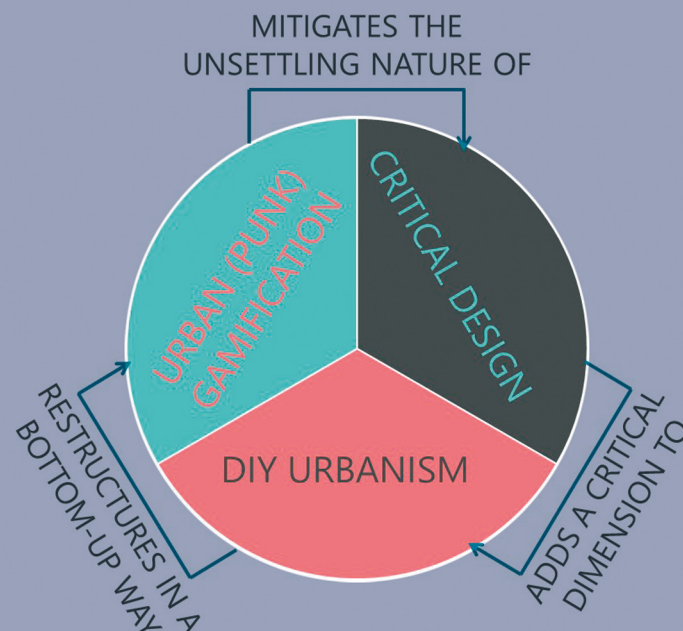
## ABSTRACT

ReClaim is a MSCA-IF research project aiming to build a concrete and methodologically sound framework on how to use playfulness and games to make cities more liveable and inclusive and to empower citizens to reappropriate urban spaces.

## KEYWORDS

Urban gamification; Punk; Critical design; DIY urbanism; Pervasive play.

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## CONTEXT

Play has always had its place in the city. Many playful phenomena use the urban spaces as their playground: from simple games like “don’t walk on the pavement lines” to traditional practices such as the carnival, to street sports, to contemporary location-based games such as Pokémon Go. Today, however, city-play is acquiring a new, important dimension: it is seen, more and more, as an antidote to the anonymity of the urban environment [1], as a counterbalance to the technocratic approach to smart cities (transforming them in Playable Cities [2]) or as a tool to promote prosocial and sustainable behaviours (The Fun Theory).

## TARGETED ISSUE

City residents feel increasingly powerless and disconnected in face of the changes brought by globalisation [3] and by the ICT revolution [4]. This is even more critical to vulnerable populations, in a moment where the right to the city of lower classes, minorities and immigrants is often questioned.

As urbanization progresses quickly (since 1999 more than half of the population lives in cities, and in Europe around 75% of the population lives in urban areas) innovative, sustainable and efficient solutions are direly needed.

The success of urban AR games such as Pokémon Go, together with the ongoing ludicisation of culture, suggests that play could be a possible solution to these issues.

## PROPOSED SOLUTION

ReClaim outlines a framework for urban gamification articulated around three main arguments:

1. Urban play seems to reinforce the perception of “city ownership”: it is an activity that requires immersion and light-hearted engagement and is able to build communities around shared experiences. Play emerges as a powerful tool capable of promoting senses of ownership, community, and belonging which all contribute to improving urban life and the well-being of citizens.
2. If broken windows theory claims that urban disorder leads to increased crime rates and lower quality of life, city-play – thanks to the links of play with fairness, trust, and sharing – can be a catalyst of positivity, making urban spaces feel more friendly and safe.
3. Urban gamification can (and often does) work also as a political statement. Cities are spaces of semiotic, social and political conflict, with an extreme power imbalance when it comes to the power of writing the city. In the citizens’ fight for the right to the city [5] play appear to be a tool for peaceful but impactful actions in urban areas.

## RELEVANT INNOVATION

In order to address these dimensions, a solid approach to the gamification of cities is needed. However, gamification has been accused to be exploitative, and even its more ethical and well-crafted approaches and implementations tend to be top-down and paternalistic.

ReClaim, therefore, proposes a different approach, that of Punk Gamification, linked with tactics such as situationism critical and participative design, DIY urbanism and pervasive play [6]. Punk gamification moves the attention from game elements and rules to the freedom that is afforded to play and its imaginative and make-believe implications. In this way, punk gamification can be used to empower the citizens and offer them tools to reappropriate the public spaces, instead of attempting to manipulate their behaviour or motivations as it is often the case with traditional gamification.

## PROJECT OUTCOMES & RESULTS

While the framework elaborated within ReClaim aims to have also an applicative side, it can already be used to understand existing cases of urban gamification. Activities such as pride parades, parkour, flash mobs, Google Street View photobombing or Park(ing) day can be approached from this approach, as they are all playful, bottom-up, critical and used to make strong statements about the use of urban public spaces. On



the other hands, urban games such as Cruel 2 B Kind or Wayfinder Live have similar effects on the urban fabric – enriching it with playfulness and allowing new forms of interaction between citizens – and can be equally understood as forms of urban gamification.

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## CONCLUSION

The application of the framework to existing activities of urban gamification and to urban games allows a deeper understanding of these practices outlining. The framework helps shed some light on their context and highlights the common traits between activities that, at a first look, could seem rather different. Lastly, ReClaim has also elaborated a typology of these actions focusing on their most fundamental elements [7].

## PERSPECTIVES & NEEDS

The goal or ReClaim is to map the existing actions and approaches to urban gamification in order to build a theoretical framework and a set of guidelines and best practices for future projects.

The next step will be a series of expert interviews that will allow to reinforce the framework with the hands-on experience of organisers of activities related to urban playfulness.

## ACKNOWLEDGMENTS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement N° 793835.

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# "SG4MOBILITY" – SERIOUS GAMES AND GAMIFICATION PRINCIPLES FOR ENVIRONMENT-FRIENDLY MOBILITY BEHAVIOR

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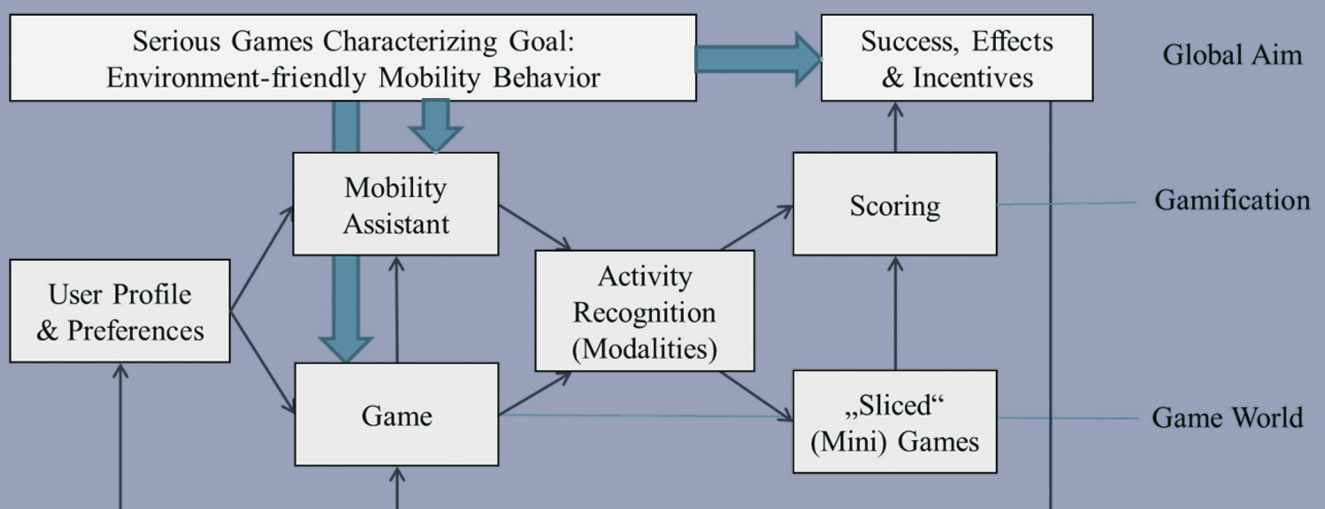
## ABSTRACT

This contribution describes the "SG4Mobility" approach aiming to foster environment-friendly mobility behavior in a playful manner. Serious Games and gamification concepts and principles are used to motivate and reward users for taking public transport means or bicycling instead of private car usage. The underlying concepts for the SG4Mobility app are location-independent. During the course of the research project, content in the form of mini games have been created and are tested in Offenbach as part of the Rhine Main region

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## KEYWORDS

SG4Mobility; Serious Games; Gamification; Mobility; Transport; Climate; Activity Recognition; Intermodality; Awareness; Education; Culture; Tourism.





## CONTEXT

Nowadays, climate, energy, security, mobility, health or education represent public relevant topics, both for the wealth of individuals and the society. The 'Fridays for Future' activities address the ongoing climate change and underline the strong need to change mobility behavior [1], especially the switch from private car usage towards more environment-friendly transport means/modalities. The showcase of 'Viaggia Rovereto' [2] has proven that the idea of a playful approach towards a mobility behavior change works: During a five week experimental study, the amount of private car usage has significantly decreased from 49% to 21%. Inspired by that study and previous work by the Serious Games group at TU Darmstadt towards Sliced Serious Games [3] (see also Figure 1), the collaborative research project SG4Mobility has been set up with mobility experts from the Frankfurt University of Applied Science, the Serious Games group at TU Darmstadt (tackling the gaming and technical aspect) and the two small media enterprises wer denkt was GmbH and Rösch & Associates Information Engineering GmbH being in charge for implementing the SG4Mobility app. The SG4Mobility project (643/18-66) is supported by the State of Hesse and the House of Mobility and Logistics (HOLM) in its action line 'Innovations in Logistics and Mobility', funded by the Hessian Ministry of Economics, Energy, Transport and Regional Development.

## TARGETED ISSUES

The overall aim of SG4Mobility is to support environment-friendly mobility in a playful manner using gamification [4] and Serious Games [5] principles. This includes different aspects: On a global view, it addresses a societal relevant topic (climate, environment) and aims to create awareness for this topic. Closely related, both a learning effect about the effects of transport modalities in terms of energy (CO<sub>2</sub> emission) and a health effect (physical activities during travel) are intended. Furthermore, users are inspired to explore cities and learn more about the 'neighborhood' of their usual routes and attended places (culture, tourism). From a conceptual perspective, the main issue is to create an inspiring mobility app with a compelling gameplay and fair scoring for the heterogeneous user group – basically all kinds of smartphone users – ranging from digital natives (younger audience, grown up with digital media and games, 'always on') to the older audience (e.g. mid-age commuters, not necessarily game affine). Technically speaking, the main challenges include not only the accurate activity recognition (transport modality, gesture recognition for physical exercises), but also the cost-effective creation of appealing, adaptive game content – considering both the heterogeneous user characteristics and the different transport means.

## PROPOSED SOLUTION

The concrete outcome results in the SG4Mobility app as educational game environment with the following elements and working principle:

- › The app is used to collect mobility data of users and, vice versa, to present location-based mini games and scores to the users.
- › SG4Mobility so far has been conceptualized for Android systems only. The smartphones are used for activity recognition, i.e. both for the detection of transport means and the recognition of physical exercises.
- › The game world is the real, physical space. A map is used for general navigation purposes and to show the locations of mini games via points of interest (POI).
- › As soon as a user reaches the specified radius for a POI, mini games or physical exercises can be activated respectively coins are automatically collected when reaching POI.
- › A gamification module is responsible for all scoring mechanisms including metrics for awarding users for environment-friendly mobility behavior, solving mini games (quizzes, physical exercises) or collecting coins by visiting geo locations.
- › The mobility data and results of executing the mini games are stored in the backend of the SG4Mobility system and retrieved from that place for visualization purposes (scoring, ranking). Hereby, in order to guarantee data protection for the personal data collected, the technical and organizational measure of 'pseudonymization', which is explicitly mentioned in the GDPR Art. 25, is implemented in accordance with Art. 4 of the GDPR.

**FILL IN**

Map Satellite

JOHANNESVIERTEL

Stall Park Herrngarten

Hessisches Landesmuseum

Technische Universität Darmstadt

Rheinstraße

Rudolf-Müller-Anlage

WOOOGSVIERTEL

Map data ©2018 GeoBasis-DE/BKG (©2009), Google Terms of Use Report a map error

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- › CO<sub>2</sub> Savings as indicator for environment-friendliness – how much energy has been saved compared to emission from car usage?
- › Modalities provides a second point-based score considering distances and transport means. In contrast to CO<sub>2</sub> Savings, the underlying scoring mechanism does not consider concrete emission rates, but relies on generic modality factors for the different transport means/modalities.
- › Mini Games represents a score for cognitive exercises in the form of location-based quizzes.
- › Exergames corresponds to a second form of mini games: location-based physical exercises.
- › Coins provides an additional score for collected 'Points of Interest' (POI), i.e. visiting/passing geo-referenced POIs without playing a mini game or doing physical exercises.

## PROJECT OUTCOMES & RESULTS

For the creation of mini games and placement of coins, authors (i.e. primarily traffic planners or personnel staff of a tourism office) define geo-referenced locations/areas (POI, geo fences) on a map, where the mini games can be played and coins can be collected. For the creation of the mini games itself, a set of game-based interaction templates are available in StoryTec Web (e.g. 'Multiple Choice' or 'Puzzle'). The authors

only need to select the type of a mini game (*see left part of Figure 2*) and fill the templates with images and texts. Hereby, for each location, one or more mini games can be specified.

First internal user tests with of the SG4Mobility App are very promising: The technical feasibility of the overall system and its modules has been proven. Users are seeking for additional content/mini games. Physical exercises are also well received 'in principle', whereby some users are somehow sceptic and hesitant to do physical exercises in the public space anticipating weird reactions by other surrounding people. The offer for collecting coins (points) seems to be fully accepted by bicycle riders.

## CONCLUSION

SG4Mobility provides mechanisms and concepts to support environment-friendly mobility behavior. The concrete result of the 14 month lasting project represents the SG4Mobility platform with the SG4Mobility app as central component and interface to the users. The app is realized as educational game environment with the physical space as game world and geo-referenced areas (POIs), where quiz-like mini games can be played. Additionally, users are invited to do physical exercises and to collect coins (without playing games) at other types of POIs. Activity recognition modules are integrated for detecting transport means/modalities and correct processing of physical exercises. Scoring with underlying metrics is available for mobility behavior (which distances have been covered with which modalities/transport means), the mini games, physical exercises and collecting coins. Hereby, special emphasis is set on educational aspects to create/increase awareness about the effects of mobility behavior in terms of emission rates (CO<sub>2</sub> footprint) for different modalities in general and to foster environment-friendly mobility behavior of individuals in particular. Apart from personal feedback, generalized information is provided in form of leaderboards/highscore lists among all participating users on a daily and weekly basis.

## PERSPECTIVES & NEEDS

Next steps include comprehensive studies in order to derive profound qualitative information referring to the question about the effects of game-based approaches towards environment-friendly mobility behavior (change). This also includes the creation of a sophisticated number of mini games in the testing area as well as the geographic extension of the area towards the complete Rhine-Main region.

Further technical research will be investigated for improving the accuracy and precision of activity recognition. On the game design side, qualitative and quantitative scoring results from studies will be used to reconsider the scoring metrics for individual scores and to improve game balancing in general.

On the organizational side, the collaboration with transport service provider, traffic planner and city marketing and tourism experts will be further cultivated.

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## SESSION EDUCATION & TRAINING

13H35-16H

This Education & Training session highlights the importance of interdisciplinary learning, unique and collective experimentation in virtual & non-virtual games, as well as collaborative and co-creative methodologies. Dominique Truchot-Cardot (Institut Santé La Source) presents an experience in integrative learning nursing using Playmobil® toys. Dominique JACCARD (HEIG-VD) helps Bachelor students to make the link between their studies and their future career through multidisciplinary serious game. Benoit Le Callennec (Personal project, Lausanne) makes us “guess who” are the major historical characters with strong impacts on humanity, with a stimulating game of cards. Phil LOPEZ (EPFL, Lausanne), through neuroscience, brings with MRI and virtual reality postural solutions for a better game design. Ralf MAUERHOFER (Koboldgames GmbH) helps to establish close links between researchers and serious game designers to align the workflow-project, using guidelines.



CHAIR: NATHALIE JUNOD | HEG-GE | GENEVA

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## 22 | PLAYMOBIL® TOYS IN NURSING BACHELOR, THE BEST WAY TO ENCOURAGE INTEGRATIVE LEARNING: AMAZING?

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### ABSTRACT

Beyond play, toys, whatever they may be, are more than just an entertainment and the way they are used deeply influences many aspects of life.

The toy, as a device but also as an associated activity, is epistemic, since it can be perceived and used as a “scientific” tool to analyze what makes sense.

Why and in what way can gamification introduction in the nursing Bachelor program via Playmobil® toys encourage and evaluate integrative learning through mediation?

### KEYWORDS

Playmobil® toys; Serious toy; Integrative learning; Nursing bachelor.

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## GENERAL CONTEXT

“You can discover more about someone in an hour of play than in a year of conversation.” Plato

Most young mammals have been observed playing: turning things, such as pebbles, into toys.

This seems innate in some living observed species like mammals (great apes, felines ...), and especially in humans where toys have a history probably as old as civilization itself.

Indeed, according to Gilles Brougère (in “Play and Learn”), when learning the game is accomplished, the latter must be referred to both as a singular individual experience and a form of collective participation, a culture.

This could explain, totally or partially, that adults use toys and games to strengthen social bonds, teach, remember and reinforce what they learnt in their youth, discover their identity, exercise their minds and bodies, explore relationships, evaluate their skills, and decorate their living spaces.

## SPECIFIC CONTEXT

But beyond play, toys, whatever they are, are more than just an entertainment and the way they are used deeply influences many aspects of life.

Toys differ from games by the hyperflexible interpretation they can produce. A toy is not governed by playrules or predefined usage repositories; except for safety rules, it doesn't meet performance or success objectives.

Gilles Brougère, in his book “Play and Learn”, returns in the first place to a phenomenological approach of the toy, evoked in his entertainment aspect and described as the possibility for the individual to play at will with his own pleasure: “The play would be a search for enjoyment”. Based on the flow theory, he develops the notion of optimal experience, that of a self-centered activity in which the individual feels a kind of dynamic well-being and self-confidence. The toy would then be a discovery space of this type of experience, to which it would offer a privileged framework and device.

The toy, as a device but also as an associated activity, is epistemic, since it can be perceived and used as a “scientific” tool to analyze what makes sense.

A tool to analyze the subconscious with a high transitional added value, referring to the meaning described by Dr. D. Winnicott.

## PROPOSED SOLUTION

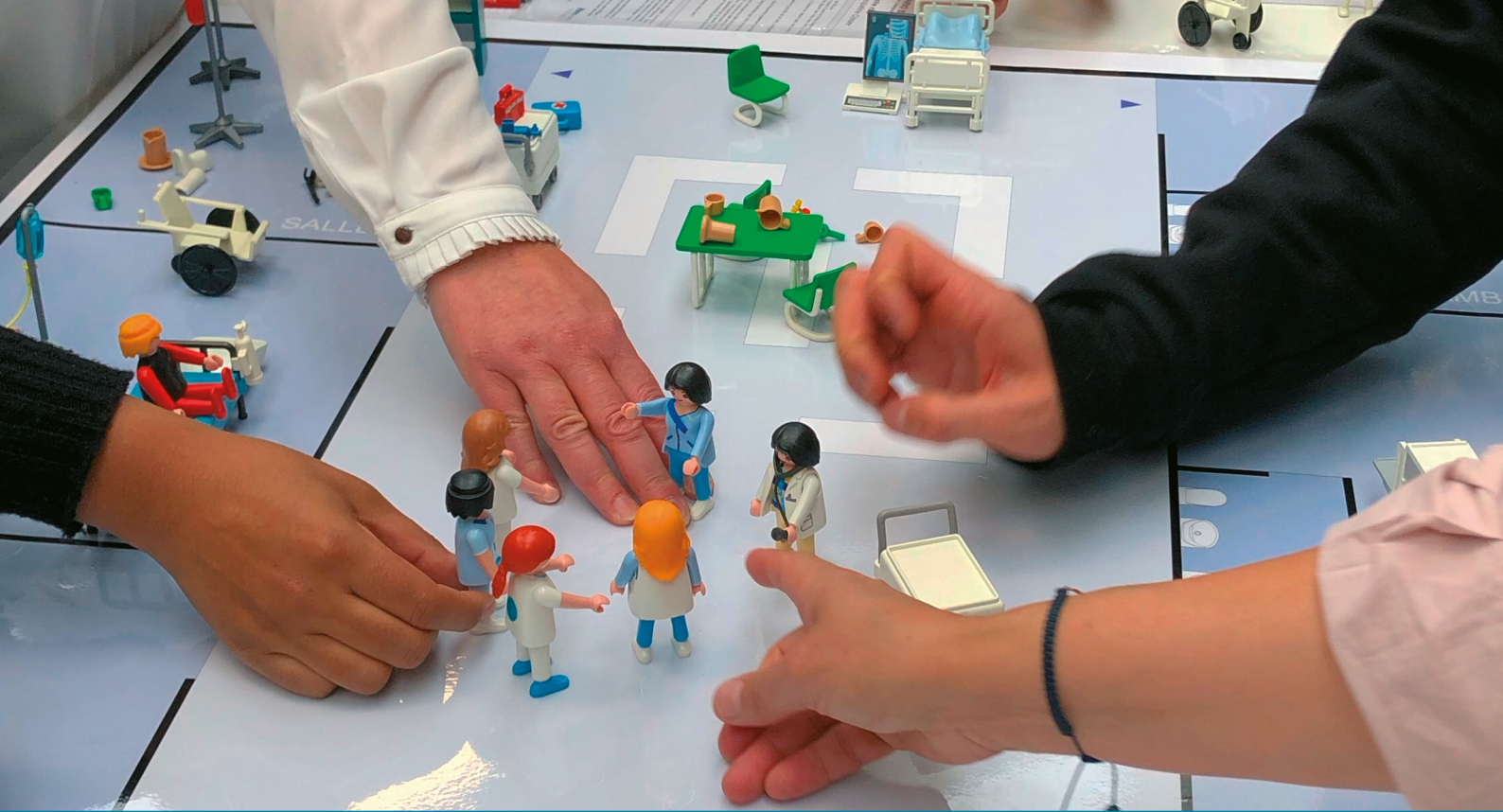
We have chosen to propose our students pilot experiences to play sequences, of a visual precision facilitating immersion and especially inexpensive, with Playmobils® because they have the advantage of being easy to carry and implement.

For the past three years, we have included in our interprofessional health care course (in collaboration with the Lausanne Medicine

Faculty) a Playmobil® simulation exercise: we created a Playmobil® Emergency Response Service Plan and established patient cases from reports of serious adverse events. Each student had a Playmobil® and a definite role to play patient, caregiver, family ...). We then performed a simulation which included a briefing, reflexive contextual elements and a debriefing. All the games and debriefing sequences were filmed.

*[...] gamification introduction  
via Playmobil® toys,  
in the nursing Bachelor  
program, [to] encourage  
and evaluate integrative  
learning through mediation.*





## PROJECT OUTCOMES AND RESULTS

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The sequences proposed during the third year of nursing Bachelor, enabled participants to implement integrative skills related to the collaborative ability to solve complex problems, innovate, communicate, mobilize multidisciplinary knowledge and critical thinking as well as design and implement both behavioral and technical solutions.

It was and it is the first experience with toys in the nursing Bachelor program.

Our first feedbacks, obtained from the crossed observations of the teachers supervising this experiment and external observers, are very encouraging about:

- › a major emotional involvement of the participants.
- › a very strong transfer of thought and action from the participants to the Playmobils®
- › but also transfers made from Playmobils® to the participants during the debriefing

The real added value of our immersive approach, emerging in the wake of our pilot experiences, is the global assessment of the behavioral and technical skills integration (related to the role of the nurse) which our students must master at this stage of their learning, the Bachelor's degree, and that the usual summative or formative evaluations are struggling to quantify.

But it also proves to be a very powerful tool to assess the four-dimensional care theories knowledge (the patient, the caregiver, the multidisciplinary context and the family).

## CONCLUSION

Our students at the end of their Bachelor's degree must show a complete mastery of the care techniques, but also of the theories of analysis, perception and patients support and their entourage, called care theories. The toy, and especially the Playmobil® toy, as a social and cultural construct, but also a transformer of external elements into new meanings, has thus a huge education and evaluation potential.

We must now continue our research to propose a learning process taxonomy in a gamified approach and more specifically through a toy mediation.





## PERSPECTIVES AND NEEDS

We now hope to entrust our video recordings (1 Tera) for a behavioral and educational analysis in the context of a master's or PhD work.

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## 23 | MEDIA SERIOUS GAME - A SERIOUS GAME AS AN INTRODUCTION TO HES STUDIES

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### ABSTRACT

When entering a bachelor's program, students are confronted with a new academic environment. To help them discover this environment, in the bachelor's degree in "Media Engineering" at HEIG-VD, we have developed the Media Serious Game: an integrated concept that includes virtual and real simulation environments. The Media Serious Game is used during the first course of the curriculum and allows students to discover both an example of their future profession as new pedagogical forms. Overall students' evaluation of this course is very good.

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### KEYWORDS

Serious game; Co-creation; Active pedagogy;  
Experiential learning; Higher education; HES; Media engineering.



## CONTEXT

When entering an HES bachelor's degree program, students are confronted with a new environment. Beyond the new teachers and fellow students, the great change lies in a more intense study pace, new pedagogical forms and a greater responsibility in the organization of studies.

Meanwhile it is necessary to build a first vision of what a future job could be to understand its relation to the classes attended. This implies a drastic change from what has been previously experienced, particularly during the apprenticeship.

## TARGETED ISSUE

In the bachelor's degree class in "Media Engineering" at HEIG-VD (Engineering and Management School of HES-SO), students starting their training discover a multidisciplinary study plan and a varied professional future. The understanding of the link between the educational curriculum and the future professional activities is gradually developed over the three years of studies. However, in the first part of the studies it may be difficult for many students to make the link between the different subjects taught, as well as the link between these subjects and the future professional activity. This can be a source of demotivation (Howard, 1989; Valle et al., 2003).

## PROPOSED SOLUTION

In order to target these issues it was decided, during the new "Media Engineering" study plan conception, to internally develop a new digital resource: the Media Serious Game (Aldrich, 2003).

The basic idea was that this Media Serious Game would be used during the first couple of weeks of study to allow students discover an example of their future profession, understand its multidisciplinary aspects, and make the connection between their future career and the study plan for the three Bachelor years. A working group of teachers and assistants developed the Media Serious Game. The latter is an integrated simulation concept, including a virtual simulation environment (software simulation accessible online) and a real simulation environment (face-to-face role-playing, teamwork, document production, presentations).

A "teacher interface" has been developed to enable teachers involved in the exercise to monitor the students' work progression.

## RELEVANT INNOVATION

Innovation lies both in the development process and its implementation. The development process, from design to implementation, was carried out collaboratively by a multidisciplinary team including computer scientists and teacher and assistant representatives from the various subject fields to be integrated into the Media Serious Game. It is thus an example of a complex co-creation (Westera, Nadolski, Hummel, & Wopereis, 2008).

This process began with the definition of pedagogical and general objectives to be reached with the Media Serious Game. These shared objectives then served as a guideline for subsequent developments. The collaborative development was supported by the use of the Web Game Authoring System (Wegas), developed by the AlbaSim research team at HEIG-VD.

*[...] this Media Serious Game would be used during the first couple of weeks of study to allow students discover an example of their future profession, understand its multidisciplinary aspects [...]*



### 3. Mise en oeuvre



Phase suivante >

ACCUEIL

ACTIONS

MAIL 2

HISTORIQUE

Vos actions 8

TRI PAR: Toutes Actions à effectuer Actions faites

Locaux

Identifiez plusieurs possibilités pour les locaux de votre entreprise.

Équipement des locaux

Vous pouvez choisir entre différentes options d'équipement de vos locaux (chaises, bureaux, bibliothèque, etc.)

Équipement informatique hardware

Vous pouvez choisir entre différentes options d'équipement informatique hardware, comprenant des éléments tels que ordinateurs, écrans, imprimantes, scanners.

Équipement logiciel

Vous pouvez choisir entre différentes options d'équipement en matière de logiciel (suite bureautique, design, maquetage, développement web, etc.)


Engagement ressources design & comm.

Vous avez la possibilité d'engager une ou plusieurs personnes dans le domaine Design & Communication.

Contrats

Vous parlez de votre projet d'entreprise à des amis qui font leurs études de droit à l'Université de Fribourg. Ils vous rendent attentif à l'importance de la partie juridique de votre projet. Les contrats de travail, les conditions générales, les contrats à proposer à vos futurs clients, etc.

Engagement d'une ou plusieurs personnes en ressources design & communication



Sandy

Designer

Après un CFC à l'Eracom, Sandy a travaillé pour une agence de publicité pendant 3 ans. Elle n'a pas beaucoup d'expérience dans le web, mais souhaite développer ses compétences dans le domaine. Son portfolio montre une belle créativité.

Disponibilité 100 %

Coût totaux (salaire + charges) 5'300.- / mois x 13 mois

Budget temps pour entretien et engagement : 1

Proposer un entretien >

LIQUIDITÉS

- 9'900

MOTIVATION ÉQUIPE

100

BUDGET TEMPS

36

## PROJECT OUTCOMES & RESULTS

Our overall experience shows that the co-creation of serious games benefits from clear common objectives and a collaborative development platform.

The first use of the Media Serious Game took place in September 2018. The simulation was used during 10 half-days over a 2-week period. Five professors and teachers participated in the animation of the different phases of the course and the simulation. The overall student evaluation of this first course of the curriculum is very good.

## CONCLUSION

The creation of the Media Serious Game validated both the methodology and the co-creation platform for the development of a multidisciplinary serious game by several professors. This experience also shows that a single serious game enables the achievement of multiple objectives such as the discovery of the study plan, new pedagogical methods and the development of a team spirit in the classroom.

## PERSPECTIVES & NEEDS

On the basis of the first evaluations by students and professors, it will be possible to further improve the developed serious game.

In a more general perspective, this experience shows that it is possible to develop and use an integrating serious game as an introduction to an academic course.





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# 24 | PANTHEON: MAJOR HISTORICAL FIGURES SUMMARIZED INTO SMALL & FUN TO PLAY CARDS FOR CHILDREN

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## ABSTRACT

We present PANTHEON: a game summarizing major historical figures biography into small, fun and tangible playing cards. The objective is twofold:

1. Keeping children away from screens by offering a fun card game.
2. Stimulating their curiosity by letting them read short biographies of important historical figures with a major impact (good or bad).

## KEYWORDS

Collectible card game; Historical figures; Education.

119

1

Name and period of existence

2

Place of birth and rank

3

Illustration

4

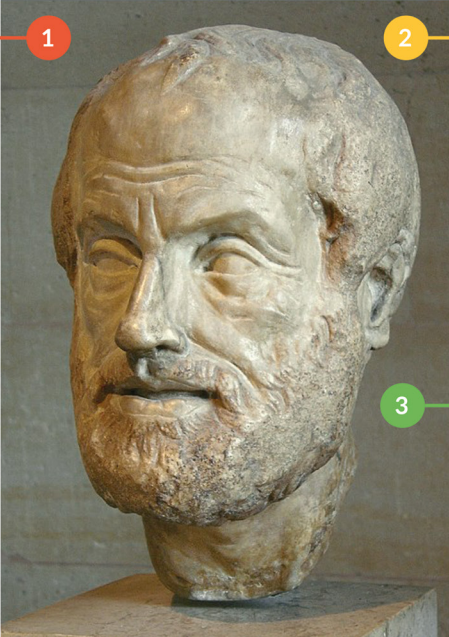
PHILOSOPHER

Aristotle

Greece

-384 / -322

0001



Aristote est un philosophe grec de l'Antiquité. Il est l'élève de Platon et est influencé par Socrate.

Selon lui, la science peut être théorique, pratique ou productive.

Il écrit l'Organon : un ensemble de traités dans lesquels la logique est détaillée et présentée comme un outil pour faire avancer la science.

Il est considéré comme le premier à pratiquer les sciences naturelles.

Il découvre que les dauphins ne sont pas des poissons, mais des mammifères.

Il établit une description détaillée de la ruche qui restera inchangée pendant plus de 2'000 ans.

Il est le maître d'Alexandre le Grand, fils de Philippe II de Macédoine, qui est son ami.

Il fonde une école philosophique qui s'appelle le Lycée.

Selon lui, les êtres naturels sont constitués de 5 éléments : la Terre, l'Eau, l'Air, le Feu et l'Éther.

Il démontre que la Terre est ronde.

Simplified bio

5

Category

## CONTEXT

As parents, one of our responsibilities is to limit how much screen time our children get every day. Unfortunately, however focused we are, they will spend too much time online (i.e. games, cartoons, etc.).

Nevertheless, recommendations are clear: no screen time before 2 and 1-hour maximum up to 5 [1].

Our role as parents is to provide our children with high-quality media, which is not an easy task. Therefore, the more we distract our kids from screens, the better it is.

Popular card games such as Pokémon may have partly solved this issue. Indeed, they drag our kids into games where they have to use tangible objects (i.e. cards).

Games with a physical aspect tend to stimulate imagination and encourage collective play. However, the educational value of playing Pokémon is somewhat limited. Knowing Pikachu's attacks will most probably have a small impact on our kids' day-to-day lives as they grow up.

On a more personal note, my younger child started to ask a lot of questions around 6 years old. While I could easily answer them at the beginning, I quickly had to notice my own lack of knowledge on many subjects ranging from greeks philosophers to scientists and writers.

For that reason, I decided to proactively read Wikipedia pages on people he might be interested in. I would then be prepared to tell him about the story of Alan Turing, Socrates or Eratosthenes and explain when and how they deeply changed Humanity.

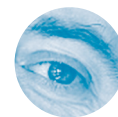
But getting up to date on different historical figures takes a tremendous amount of time because the information on Wikipedia is extremely dense and factual.

## PROPOSED SOLUTION

PANTHEON is a card game based on major historical figures with an important impact on the course of Humanity (both positive or negative). On the front side of the card, we display factual information about the figure, and on the back side, we describe the character's life in few relevant points.

1. Just after the illustration, the focal point becomes the **name** of the character. The name is followed by the character's **period of existence**.
2. Next to the name is the **country or region** from which the character originates and the **figure's ranking** according to MIT Pantheon's people ranking [3].
3. The front side of the card is represented by an illustration depicting the character.
4. At the bottom of the front side, there is the category in which the character is most famously known for.
5. On the back side, we describe the character's life and accomplishments in few points in a simple and accessible language. The different details range from the most important one to the least important one such as anecdotes.

*PANTHEON is a card game  
based on historical figures  
with an important impact on  
the course of Humanity.*



Finally, one important aspect was to draw as many connections between characters as possible (Aristotle with Alexander the Great or Avicenna and Galien, etc.).

Based on this concept, we devised the first game called "Guess Who".

First, each player chooses a predetermined number of characters. Then, at each turn, one player gives one hint to the other; if the opponent correctly guesses who the character is based on the hint he was given, he scores 1 point.



After correctly guessing the character, the player must correctly insert the card between the other cards on the table according to their birth date. The player gets 1 additional point if the card is correctly positioned chronologically with respect to the other cards.

It is important to note that our intention is not to enforce any set of rules. In particular, we encourage people to experiment and test what works best for them. Similarly as what happened with Pokémon, we hope that people will proactively invent their own game with their own set of rules.

## RELEVANT INNOVATION

Up to our knowledge, this is the first time such a volume of relevant information (i.e. Aristotle's Wikipedia page) is filtered and summarized into accessible playing cards.

Limiting the space available for the characters' mini-biography forces us to only keep what's truly essential about them.

As De Saint-Exupéry said: "Perfection is achieved, not when there is nothing more to add, but when there is nothing left to take away." [4]; and this is especially true for a card game designed for children where being clear and concise is extremely important.

## PROJECT OUTCOMES & RESULTS

Up to now, 4 decks of 30 cards (as depicted in the Figure below) have been produced:

Each card is 70mm x 121mm (Tarot format). Our goal is to quickly reach 50 characters and examine early traction with children.

Several games have been tested so far, and we clearly understood from different trials that game duration is a major factor that we must take into account.

"Guess Who" for example should be limited to 6 characters in order to avoid exceeding younger kids' attention span. It is interesting to note that this game seems to attract adults as well.



## CONCLUSION

A Pokémon-like card game focused on historical characters with a major impact on Humanity could be a good solution to reduce screen time for children in a fun way while helping them learn live facts about major historical figures. Such a game is also highly-scalable as new characters and topics can be added.

## PERSPECTIVES & NEEDS

The main need is to focus on the content and to extend the deck with more characters. We will also test new designs to maximize kids' attention span.

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# 25 | MRI AND I: HOW I AM LEARNING TO DESIGN GAMES FOR A MAGNETIC RESONANCE IMAGING MACHINE

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## ABSTRACT

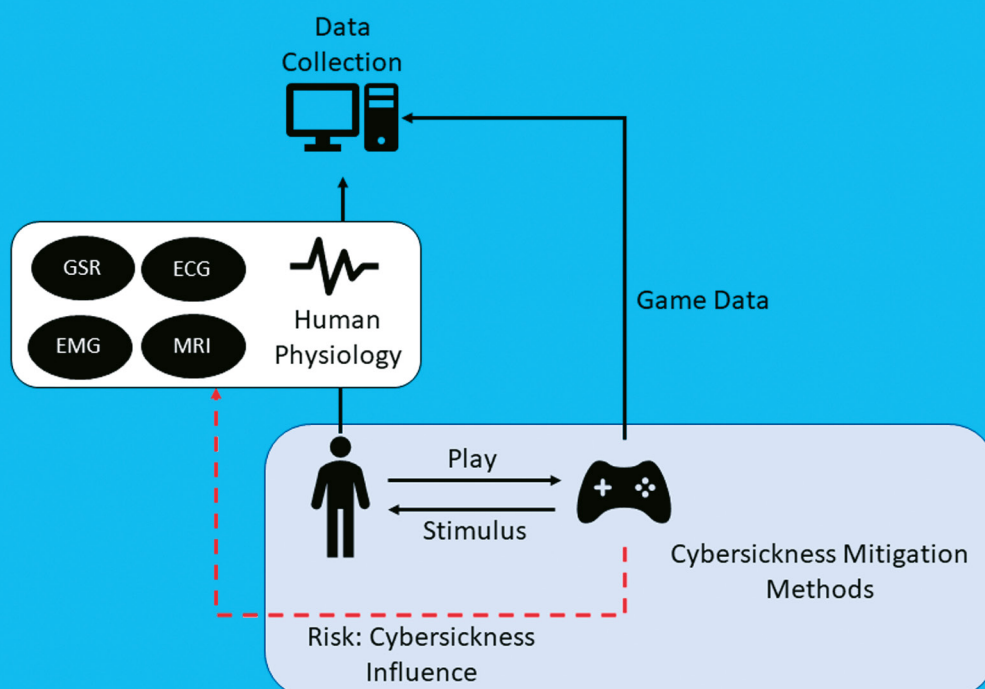
The advancements in Virtual Reality (VR) have attracted a lot of interest in the neuro-scientific field due to its ability to stimulate a wide variety of brain phenomena. However, when designing VR experiences for an MRI machine a wide variety of limitations and physical constraints must be considered or face the risk of severely hindering the experience and consequently the quality of data collected.

## KEYWORDS

Virtual reality; Digital games; MRI; Neuroscience; Motion Sickness.

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Figure 1 - VR experiences can induce Cybersickness, adding noise to human collected data. This project intends to explore game design ideas that can mitigate this risk.



## CONTEXT

Digital games and Virtual Reality (VR) are capable of challenging and immersing players into a wide variety of experiences. Unlike other mediums such as film, players have direct agency in the virtual world and can often decide or react to the changes that occur in this virtual environment. As such, this medium has attracted a lot of interest in the neuroscientific and psychological field, where the focus is on the study of a wide variety of human brain phenomena. Some examples include using games to stimulate emotion [1] or to understand how the brain learns directly from play [2]. Thanks to new technologies allowing the usage of VR in Magnetic Resonance Imaging (MRI) machines, e.g. the VisualSystem by NordicNeuroLab, this is now possible to accomplish.

One of the main attractions of games (i.e. interactivity) is also one of its core problems for MRI: they require parts of the body to be standing still, which can be quite challenging when the medium is interactive. This is especially true for MRI machines, where individuals are expected to be lying-down with their head completely motionless for a duration of approximately 30 minutes. Thus, such a constraint raises important challenges when attempting to design VR games for such experimental protocols: i.e. lying-down posture, where the head and torso must remain motionless for the entire duration of an experience.

Thus, this project proposes several game design paradigms and challenges which are directly applicable to these constraints, including innovative proposals, and already available game design solutions from literature and re-adapting it for the MRI.

## TARGETED ISSUES

The current development of new input devices and VR has seen digital games gradually transform itself from being exclusively played while being seated to a more interactive standing activity. Although playing lying-down is possible for regular play (i.e. without VR), several problems arise when attempting to do this for VR and especially the constrained conditions of an MRI machine.

The first problem that arises is the perspective shift, which increases the risk of motion sickness in players. Even though this topic has been a heavily researched [3, 4, 5], there are still certain aspects that have rarely been touched upon such as how posture can increase (or reduce) the risk of nausea. This is particularly important as motion sickness can seriously hinder the player's experience and even force them to stop.

The second problem is on the limited movement and space available for players to play. Thus, games must be designed specifically with a limited amount of interactivity, while still providing the intended experience. Motion controls are difficult to be used effectively as players do not have much space to work with and their head must remain motionless. Complex button mappings and controllers should also be avoided as players will rely solely on the spatial location of each button rather than looking at the controller.

## PROPOSED SOLUTION

Several game design choices will be explored testing the most comfortable control schemes, game mechanics and game-playing perspectives. The initial phase will explore simple one-button games with very simple control schemes, different player camera perspectives and action speeds. Examples include visual effects such as reducing the Field of View [4]; or even designing games directly with this perspective in mind simulating the experience around the posture itself. This is important to fully understand if visual design choices could potentially mitigate the risk of motion sickness, while using a very simple control scheme.

*Constructing a digital game for experimentation is already a difficult task without considering the MRI constraints.*



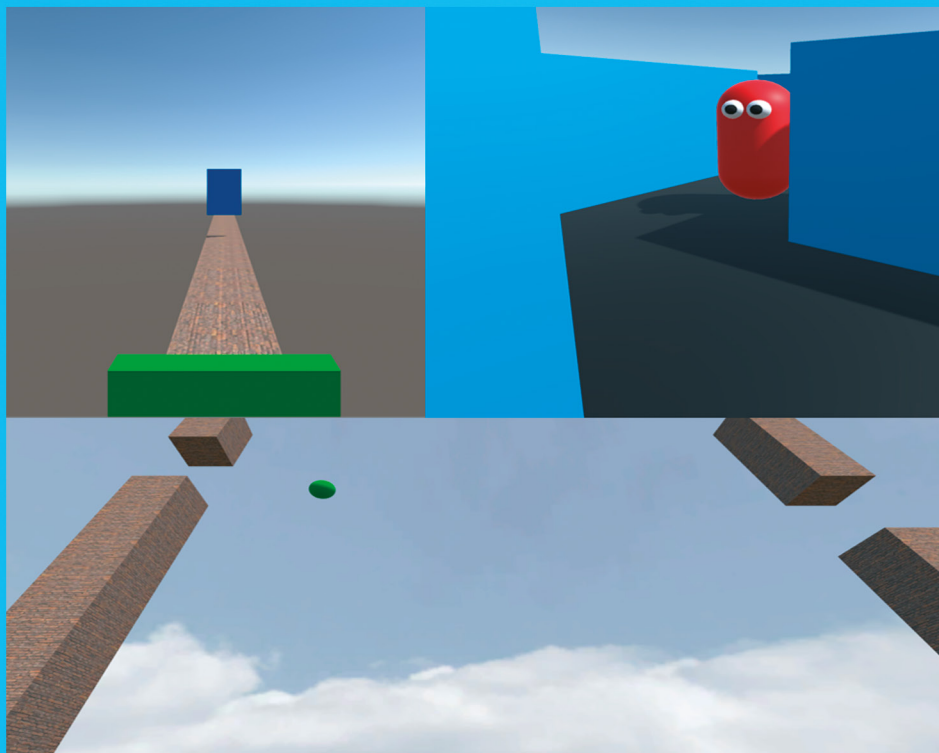


Figure 2 - Several game design ideas being explored and piloted. Upper Left: Forward Momentum (Exclusive) Movement; Upper Right: Multi-Directional Movement Incl. Head Rotation; Lower: No Movement

Furthermore, it will also be important to understand how camera motions may also directly influence the motion sickness problem. Initial experiments will analyze games with a static camera and with a moving camera, allowing players to take direct control of it during play. An automatically controlled camera solution will also be tested.

Lastly, the complexity of the games themselves will also be investigated. The reasoning is that more complex scenarios may be required given the experiment intended. As such, different control schemes will be explored such as arm motion controls viable for MRI, different controller types, button configurations and eye-tracking.

All games developed will be thoroughly evaluated through typical play testing and prototyping methodologies [6], while motion sickness will be evaluated through the Simulator Sickness Questionnaire (SSQ) [5].

## RELEVANT INNOVATION

The usage of MRI analysis in the field of neuroscience has been prevalent for quite some time, however only recently has the field been interested in the usage of games as a medium of stimulating and studying certain characteristics of brain activity. Thus, it makes sense to view these experiments through a game design perspective as the strength of games derives from the experience it conveys to the players. A poor gaming experience can lead to a frustrated or bored player, and unless this is the exact experience the experimenter wishes to study, can it provide unintended consequences to the specific experiment in question. So, this work intends to minimize certain side-effects, which may surface due to the unorthodox way of play and the constraining aspects of MRI.

Additionally, this work intends to offer additional methods and solutions for individuals who are incapacitated or present limited movement due to clinical factors. Literature has already studied the impact VR can have on individuals as a medical tool [7] and providing additional methods and solutions could potentially offer a wider range of experiences and game activities.

## PROJECT OUTCOMES & RESULTS

By the end of this work we intend to offer further insight on how to avoid and potentially mitigate the risk of motion sickness while experiencing VR in a lying-down posture; or at the very least have a clearer understanding of what can and cannot be done playing lying down. Furthermore, we also intend to directly explore the design aspect of the VR experience, by exploring the interactive and game design aspects of the simulation itself and understand what the limitations are of designing experiences specifically for this posture.



Additionally, a set of game design paradigms will be put forward allowing future experiments which intend to use digital games to have a clearer picture on how to implement their own solutions, easing the entire game design process. In fact all games developed during this study will also be made available through our internal open source network allowing experimenters to directly use and alter the developed games for their own studies.

Lastly, this project intends to provide a game design expertise in the field of neuroscience, by directly providing knowledge on playful interaction, challenge and aesthetics. Constructing an interesting playing experience is no easy task, as a lot of aesthetic choices need to be considered besides the interaction. Examples include the visual, narrative and sound aesthetics and the game mechanics, which contributes to the overall experience the player is going to have.

## CONCLUSION

Constructing a digital game for experimentation is already a difficult task without considering the MRI constraints. They need to have a degree of parametrization, and ideally should captivate the players in the fulfilling the task at hand. Thus, it is important to offer a perspective of certain conditions experimenters should avoid and apply to effectively develop an effective gaming experience for MRI or other situations where lying-down is a necessity.

## PERSPECTIVES & NEEDS

Developing a game for research is a balance between gameplay and the experimental focus. Although the game itself is a means to an end, it still requires careful planning and design as the data itself is obtained directly through this playful interaction. Thus, any unintended side-effects that may originate must be mitigated or risk adding noise, or worse, discarding the data collected. Furthermore, this interaction must provide, or lead to the necessary human reactions necessary for the case study. As such, this work proposes looking at research games from a game design perspective capable of constructing an experience that is engaging and provides the experimenter with the tools required to adapt it to his needs.

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# 26 | GUIDELINES FOR AN ITERATIVE WORKFLOW BETWEEN RESEARCHERS AND GAME DEVELOPERS

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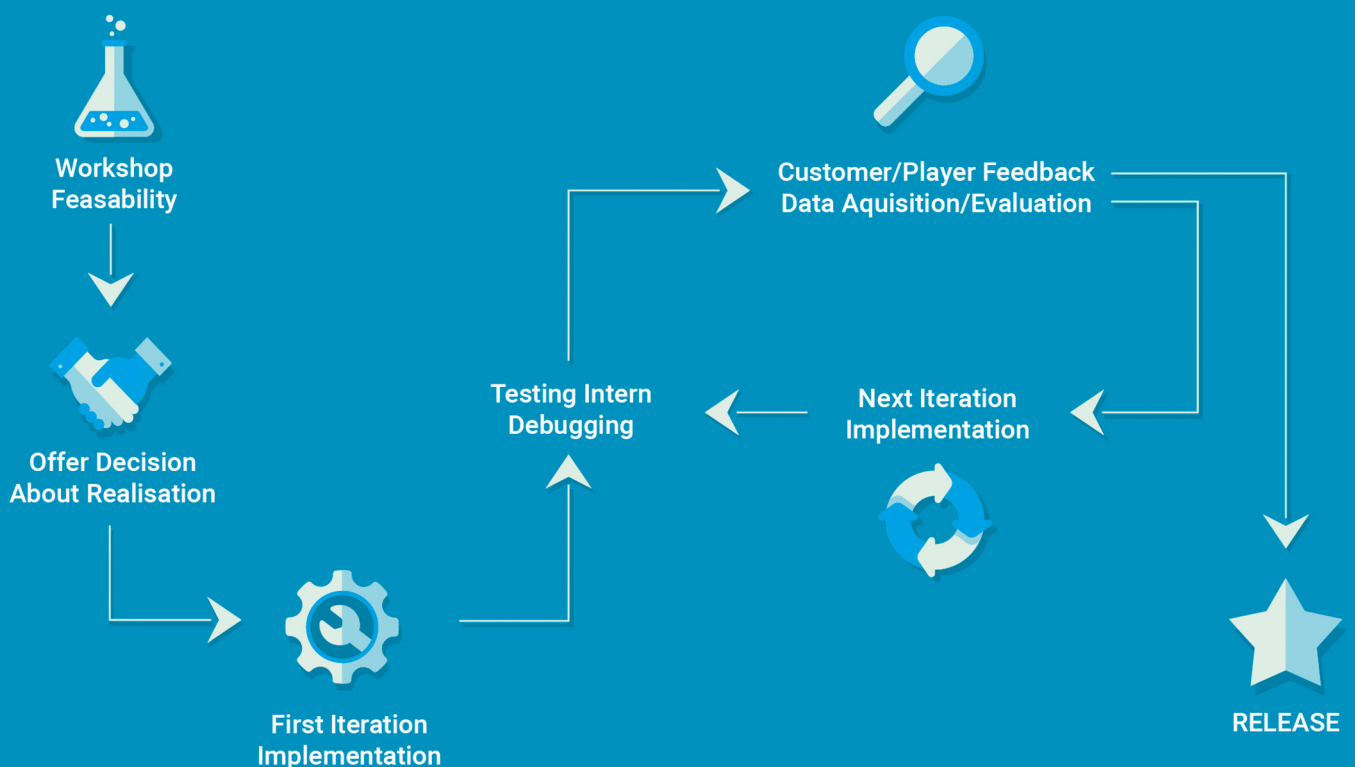
## ABSTRACT

In this paper, we talk about the collaboration challenges faced by researchers and game designers and how we address these problems through synchronizing the iterative process and our guidelines.

## KEYWORDS

Project management; Guidelines; Development; Workflow; Game design; Research; Iterative; Experience; Communication; Serious games; Co-operation; Transdisciplinary.

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## CONTEXT

During the last seven years, Koboldgames GmbH worked on several different scientific serious games with a lot of project partners (for more details about the games see “Game Project References”). This was a great opportunity to look at similarities and patterns within these often quite complex collaborations and their effect on the outcome of the respective project.

In order to create a good scientific serious game, both researchers and game designers need to get out of their comfort zones. Often both parties already rely on an iterative workflow, but they set different priorities. The goal is to align these slightly different processes by using the benefits of each side to their full potential.

## TARGETED ISSUES

Imagine a research group that has the idea to use a game for a scientific purpose or a game development company that wants to dedicate its next game project to a serious purpose. Most of the time each group does not have all the necessary knowledge to bring this project to a fully working product by itself: some kind of cooperation is necessary.

The basic workflow is often the same, both commonly rely on iterative processes, yet there are notable differences because researchers and game designers face different obstacles. Researchers primarily want to test a hypothesis and therefore need experimental data as soon as possible, while game designers want to shape a well-functioning user experience, which is a process that needs time and many iterations. For example, when we were working on the serious game “uFin: The Challenge”, the researchers’ goal was to collect data on the in-game decisions. Of course, they wanted the data as soon as possible, but on the other hand, the game had to be very immersive in order to get more authentic decisions from the players. So the priorities were adjusted to add more details to the world first, and afterwards collect data.

Another issue is that sudden priority changes due to new findings are common in research, but the game needs to maintain a consistent and intuitive user experience.

Often, in bigger research projects, project time and budget are segmented due to their origin nature, but as a developer you depend on financial and time constraints to be able to progress and plan. Additionally, it takes time for both parties to communicate with each other and synchronize their vision and knowledge.

*The goal is to align these slightly different processes by using the benefits of each side to their full potential.*



## PROPOSED SOLUTION

Many of the core issues are addressed by using an iterative development process [Fig. 1]. Some of the most common iterative development methods are SCRUM [1] or DSDM [2]. The project system choice should heavily depend on the developers’ knowledge. Many adaptations of the named methods have benefits for different team compositions. These out-of-the-box processes are a great starting point but they cannot substitute a lack of personal experience. Iterative development processes are well-documented and -researched. This is where the idea of guidelines, based on practical experience from our collaborations, comes in. The solution is basically compressed experience in an easy-to-use format.

The main goal should be to help interweave these two similar, but nonetheless separate processes. The guidelines should serve as a tool that can be used during collaboration, as a starting point for discussions, as an advice for decisions or as a reminder. They should not serve as hard-and-fast rules: each project being different. Therefore, they should induce questions to which each team must find its own answer.

In order to be easy to use, the guidelines need to be effortlessly memorized and have a structure that can be assigned to the respective project phase.

## PRE-PROJECT



### „To The Moon“ - What are the project goals?

All parties need to be aware of the core project goal. There use case of the product. Is it a tool for immersive data gat visualization of a complex process? Is it a flashy showcar the possibilities of a newly developed machine?



### „A game?“ - Is a game the right choice and why?

Check if a game really is the right product for the reser This is an important decision in order to apply your rr approach and at the right place.

For example, the reason to collect data in a gamifie social desirability bias with the help of immersion. importance of immersion, they can make better de fact and e.g. prioritize quality over quantity when immersion.



### „Who's boss?“ - Fields of expertise and decider

Within big and diverse teams with a lot of stakr of expertise and decision competences are pr creative freedom within specified boundaries process.

## PRODUCTION



### „Think iterative“ - What is the core? W

Start with a simple prototype and get group and all the stakeholders. The sr back for improvement. Sure, you need development process it is best to us bility and control risk.



### „Are we there yet?“ - Fast iterations: frequently share the progress with all project participants

You need to be able to adapt on many fronts due to new discoveries. It is manda tory that all fields of expertise are included in these adaptations and we want to keep this communication overhead as small as possible. This frequent sharing also concerns the project management parts like time plans and budgets to avoid misunderstandings.



### „It's just a tool!“ - Flexible data input/output is mandatory for experimenting.

You need to be able to use a research tool in a flexible way to give room for experi- menting and there must be an output for further analysis of these experiments. It is a great benefit if the input parameters of the product can be adjusted in a fast way, therefore create configuration systems that are easy to use. To evaluate these ex- periments there needs to be a high-quality data log that matches the requirements of the researchers.



### „Share your testing groups“ - Align test sessions, specify the desired results

For example, when the researchers conduct a pretest to evaluate the scientific part of the product, the game developers can use this opportunity and give the partici- pants a questionnaire as part of the pretest to gain additional knowledge about the game experience. It is important to clearly define the desired answers in order to maintain a mana- geable data set and to prevent unnecessarily long testing sessions.

## POST-PROJECT



### „The end is not the end“ - Evaluate the product and the process

That is nothing new, but often not given enough thought and time. This is where all team members can grow and learn lessons for their next cooperation. It's an opportunity to identify techniques and approaches that worked and devise steps to ensure they're used in the future. And also allow to recognize project achievements and acknowledge people's work.

## PROJECT OUTCOMES

After several iterations and many discussions, we created this document [Fig. 2] with guidelines to support collaboration between scientists and game developers. Each point raises some questions and with the help of short, catchy names and matching icons we provide tools to remember each advice and reference for the discussion.

It is vital that scientific and developer teams work closely together in an iterative cycle. The more knowledge both parties have on their counterpart's process, the better. These guidelines do not work as rules, but they should be used in a supportive way or to engage in discussion on the workflow with the project partners. Thus, we think it is best to discuss these topics with all team members on equal footing and try to avoid falling into the employer/client roles as we see in classic contract work.

The most recent guideline sheet is available on our webpage free for download and use ([https://www.koboldgames.ch/docs/workflow\\_guidelines.pdf](https://www.koboldgames.ch/docs/workflow_guidelines.pdf)). We encourage you to contact us with suggestions or criticisms.

## CONCLUSION & OUTLOOK

Although these guidelines are based on real life experience, they are basically compressed experience and information that can help bring these wonderful cross-disciplinary projects to their full potential by accessing all involved parties knowledge. We are aware that every team and every project is unique, but our guidelines are flexible enough to fit into different kinds of situations. These kinds of collaboration are quite recent and while there is not much existing experience, we see a huge potential.

This consolidated and short guideline version is not intended as a step-by-step approach on how to actually apply this advice to a specific project, but proposes important points to think about.

Based on the positive feedback about the guidelines, we plan to update them with every future project, and we would like to keep on making this experience available to everyone that can benefit from it.





## GAME PROJECT REFERENCES

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Developed for: University of Zurich (Center of Ethics and Department of Banking and Finance) and the Zeppelin Institute Friedrichshafen (Economic Psychology and Leadership)

"Plunder Planet", <http://www.koboldgames.ch/project/plunderplanet>

Developed for: Senior Researcher Anna Martin-Niedeecken and the Zürich University of Arts

"Fresh Food Runner", <http://www.koboldgames.ch/project/freshfoodrunner>

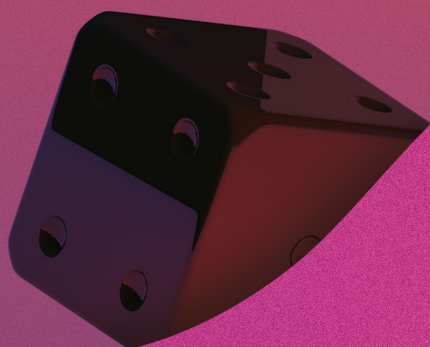
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DEMO  
& POSTER



# METADRIVE

Manuel Schmalstieg<sup>1</sup>, Swann Thommen<sup>1</sup>, Anthony Fleury<sup>2</sup>

1: Independent artist, Switzerland

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Metadrive lies at the crossroads between digital arts, video games and cinema.

The main goal behind this installation is to invite the participants to guess the title of a fantastic movie through one of its famous roads. The players have to walk a path on Google Maps Street View using the arrows on the floor, and of course have to pay attention to the landscape around them!

Imagined by the artists Manuel Schmalstieg and Swann Thommen, Metadrive was realized in collaboration with the Haute École Arc Ingénierie, being the diploma project of Anthony Fleury.

# COMM'IMPRO MAKES IT EASIER FOR SPEAKERS TO CATCH AND HOLD THEIR AUDIENCE'S ATTENTION, AS WELL AS START TO ENJOY PUBLIC SPEAKING.

**Ghiste Cyrille, Terraz Laurent**

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Come to our stand and play COMM'IMPRO: a card game which makes it easier for speakers to catch and hold their audience's attention, as well as start to enjoy public speaking.

This card game aims to increase the public speaker's skills in communication and leadership, as well as strengthen his original level of knowledge, through serious gaming. The game teaches techniques, concepts and tips in order to help the speaker improve the quality of his presentations. The aim is to enable the speaker not just to present, but rather to put on a great "show" that will capture the audience's attention from start to finish.



# FUNSPEECH

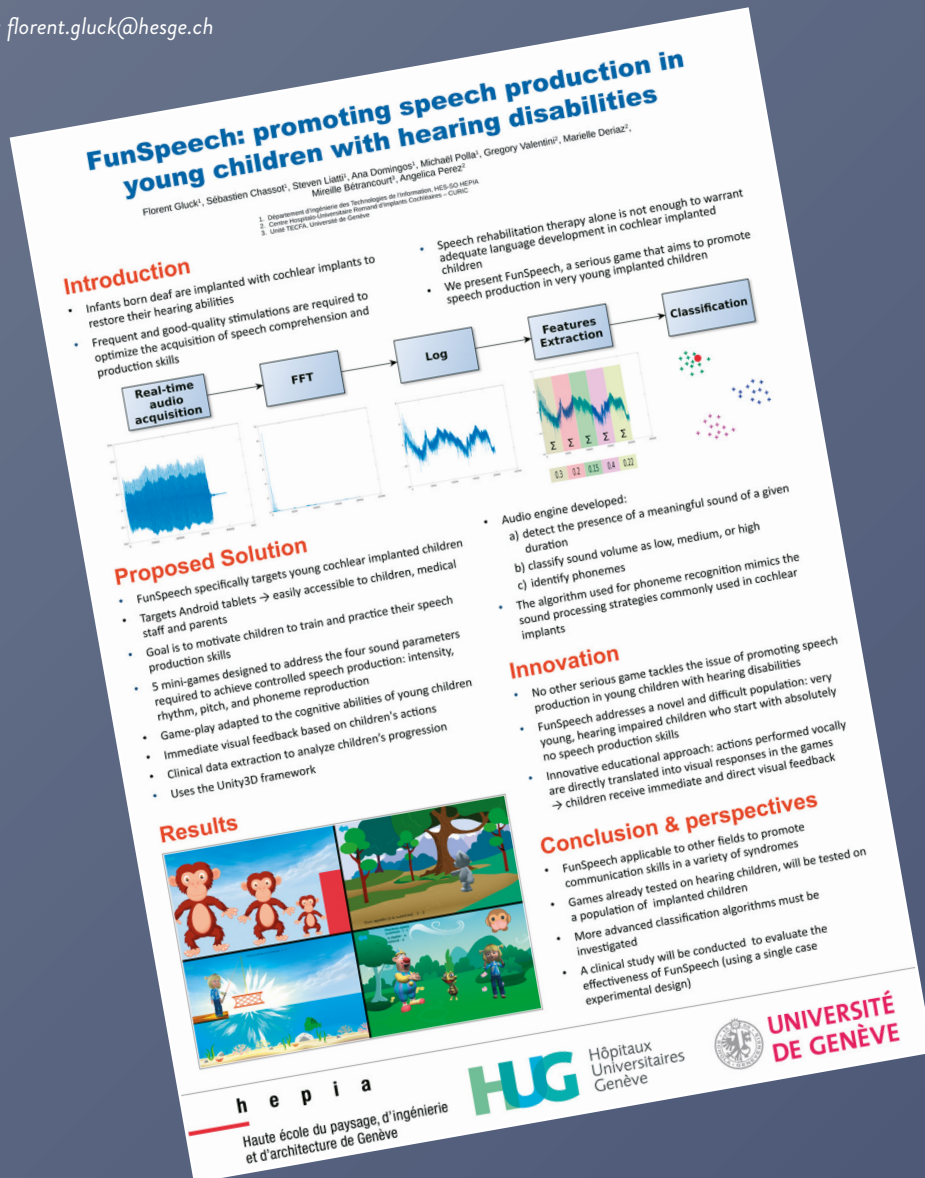
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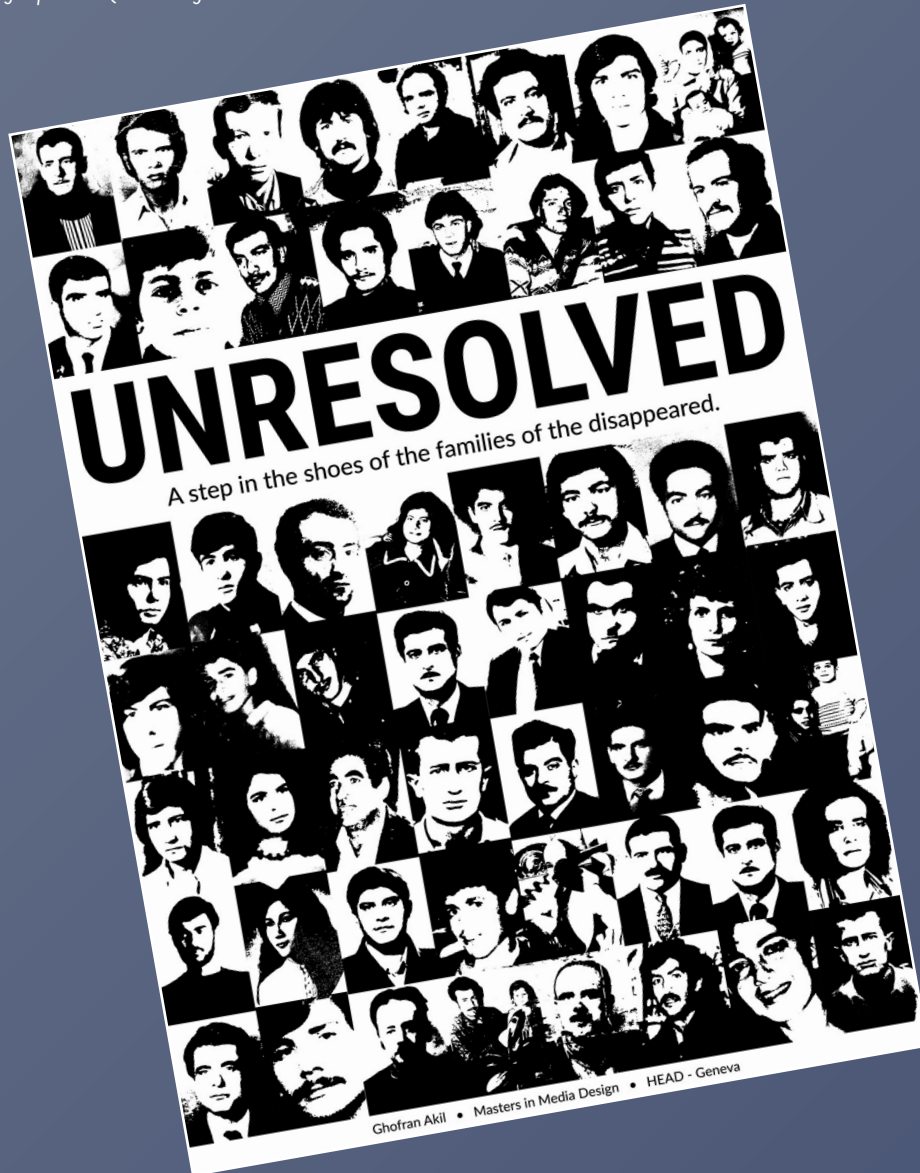
Today, infants born deaf can be implanted with cochlear implants as early as six months after birth. Studies have shown that early speech practice leads to dramatically improved pronunciation and elocution. We developed FunSpeech, a “serious games” that aims to help very young implanted children to improve their speech production skills by frequent practice. FunSpeech provides an engaging and playful experience to motivate children to practice their speech autonomously and as frequently as possible. Signal processing algorithms and classification methods were developed to identify meaningful sounds, volume levels, and first speech sounds. Most games have been tested with good preliminary results in a control population of normal hearing children. This indicates that FunSpeech has the potential to successfully fulfill the gap in applications targeting speechproduction skills in very young implanted children.

# SEAMLESS INTEGRATION OF COARSE AND FINE HUMAN MOVEMENTS FOR FLUID INTERACTION IN SERIOUS GAMES

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The enforced disappeared are those who go missing, usually in war and conflict. Their families try for decades to find them but unfortunately mostly reaching a dead end. In this frustrating journey of search, relatives suffer from a psychological state called Ambiguous Loss, which undergoes a ripple effect, affecting each member differently. Thus I created Unresolved, an experience aiming to shed the light on this global issue, hoping to provoke empathy with those unheard families.

Unresolved is a text-based mobile game where you start by playing Jamila, a mother of 3 and a wife of a disappeared. You need to take care of your children, do house chores, pay bills, and search for evidence to find your husband. During the game, you will be forced to make frustrating decisions. At a certain level, you will travel through time and become one of your children. Their persona will be dependent on how you, as Jamila, treated that child and the decisions you made in the previous levels.

# YAPASPHOTO: PROMOTING REGIONAL PUBLIC TRANSPORT AND TOURISM WITH A BOARD GAME

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Visitors are welcome to discover the material, rules and gameplay of the serious board game YAPASPHOTO. Its board represents the network of public transport (trains and busses) of the Canton of Neuchâtel, the reachable destinations within the canton and surrounding regions, as well as touristic and cultural points of interest. The game is a race. Players have to move efficiently between destinations. Importantly, there is a system realistically indicating the proportional times that each journey takes. The scoring system takes into account the number of objectives reached by the players, in terms of destinations reached and points of interest visited. Moreover, YAPASPHOTO offers three progressive levels, allowing for its use with a wide audience, as well as an adaptation of the duration of the game.



# PfuQS

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PfuQs is an app game to share between parents and teenagers aged between 11 and 15 years old. The main goal of the game is to engage parents and teenager to share knowledge, exchange thoughts on smartphone and linked themes, but more importantly to promote mutual understanding. The game is designed to be played for three weeks. The players will receive every day either a quiz or a challenge to take up together. Once a week the game invites both parents and teenagers to play a role game in which they have to put themselves in each other's shoes.



# UCLOE

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For the U.C.L.O.E. project, I focused on the different difficulties that a student could potentially encounter while learning a foreign language. I realized that often putting the learned lessons into practice is difficult, and that a certain form of fear is felt when making mistakes or being judged for them. The goal of the game is to train a robot sufficiently until it is able to formulate complex sentences without making mistakes. The idea is to favour a field of experimentation where the players will be allowed to make mistakes with less concern.

The demo presents the most important parts of this serious game. However, it will not show the game as a whole. Indeed, it is in progress and will not be finished until some time. Thus, the demo is a preview of the gameplay. The goal is to understand how the game works, how we interact with the characters, the scenery, how to correct the sentences, and how the non-player character tells us the mistakes we made. Finally, the demo is a preview of a game that will be richer in the future.

# ART LOVER

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“Art Lover” is a flirt machine which enables a conversation between visitors and a museum object via iPad. If the visitors perform to the object’s liking in the multi-linear conversation, they might get a “kiss”, i.e. a secret word. If the visitors choose the wrong answers, they are rejected. The museum exhibits (such as a hair dresser’s chair) have voices and their part of conversation is being heard, while the possible questions or answers of the visitors can be read on the iPad screen.

The installation aims at fostering curiosity and sparking the imagination of an exhibits “life”, which otherwise remains invisible to the visitor.

# BREATHING GAMES – FREE/LIBRE AND OPEN SOURCE GAMES FOR RESPIRATORY HEALTH

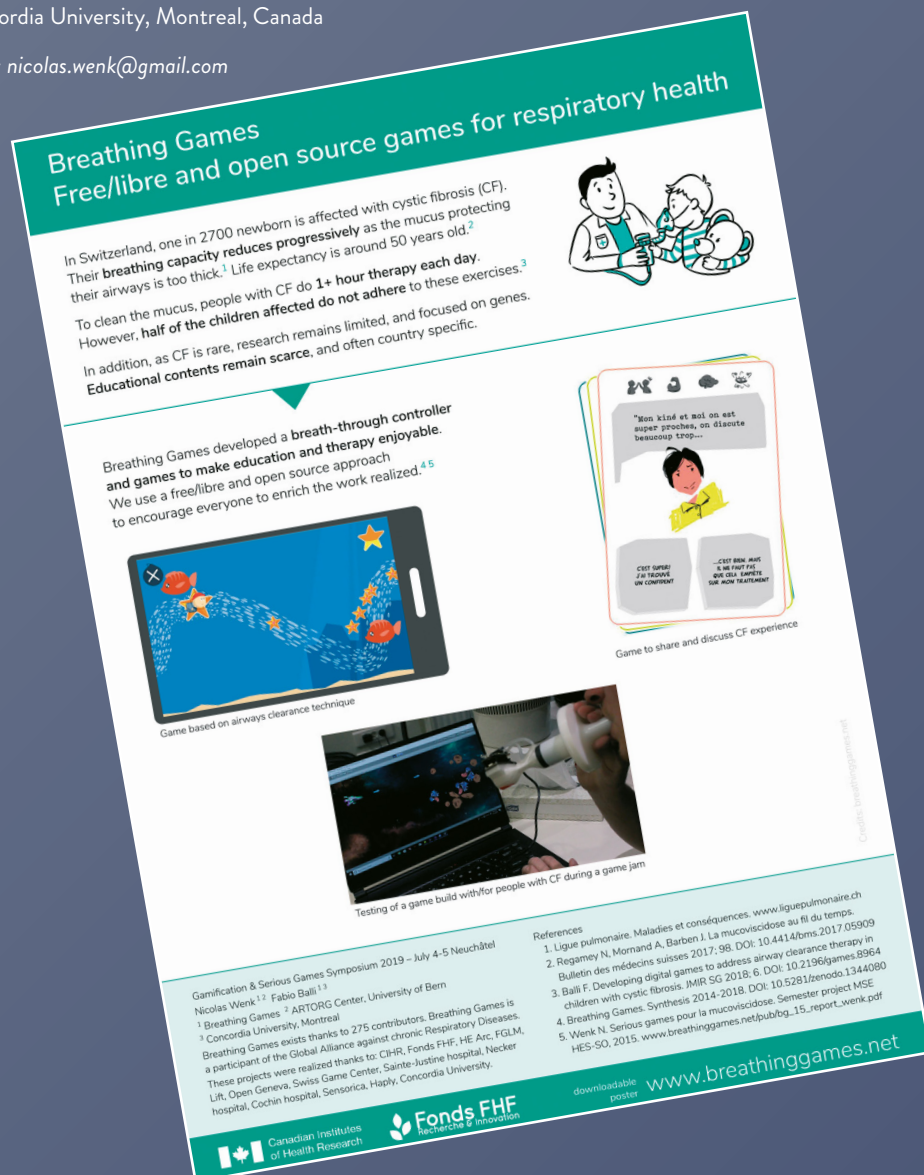
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**Breathing Games**  
Free/libre and open source games for respiratory health

In Switzerland, one in 2700 newborn is affected with cystic fibrosis (CF). Their **breathing capacity reduces progressively** as the mucus protecting their airways is too thick.<sup>1</sup> Life expectancy is around 50 years old.<sup>2</sup>

To clean the mucus, people with CF do **1+ hour therapy each day**. However, **half of the children affected do not adhere** to these exercises.<sup>3</sup>

In addition, as CF is rare, research remains limited, and focused on genes. **Educational contents remain scarce**, and often country specific.

Breathing Games developed a **breath-through controller and games to make education and therapy enjoyable**. We use a free/libre and open source approach to encourage everyone to enrich the work realized.<sup>4,5</sup>

Game based on airways clearance technique

Game to share and discuss CF experience

Testing of a game build with/for people with CF during a game jam

Canadian Institutes of Health Research

Fonds FHF Recherche & Innovation

downloadable poster [www.breathinggames.net](http://www.breathinggames.net)

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Since 2014, Breathing Games brings together and share resources to make knowledge and technology in respiratory health playful, accessible, and customizable. Based on 19 game jams or hackathons, more than 275 contributors produced 19 SGs and a breath-through controller. Dedicated to children and young adults with respiratory diseases and their relatives, the SGs address multiple aspects of the respiratory diseases: educational contents, enjoyable experience in physiotherapy exercises, generic breathing exercise, or sharing one's experience of the disease.

# PROTOTYPING A VIRTUAL REALITY DIVING GAME TO SUPPORT BREATHING EXERCISES FOR TREATMENT OF CYSTIC FIBROSIS

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**Prototyping a Virtual Reality Diving Game to Support Breathing Exercises for Treatment of Cystic Fibrosis**  
Richard Wetzel and Tobias Kreienbühl  
Ludic Lab Lucerne / Immersive Realities Research Group  
School of Information Technology  
Lucerne University of Applied Sciences and Arts

**Cystic fibrosis (CF) - genetic disorder mainly affecting the lungs**

- Produces mucus in the lungs that is stickier than normal and prone to infections
- Makes clearing mucus from the lungs harder
- Risk of irreversible damage to lung tissues
- Severely lowers life expectancy
- Affects about 1,000 people in Switzerland and 70,000 to 100,000 worldwide.

**Treatment - daily airway clearance exercises to remove excess mucus**

- Breathing into Positive Expiratory Pressure (PEP) device with different levels of resistance
- Ten to fifteen minutes, length of exhalation and resistance are adjusted
- Repetitive and not very engaging
- Requiring attention to exhale correctly

**Project goals**

- 1. Improve patient motivation
- 2. Support correct execution of exercise
- 3. Allow physiotherapist to review exercises

**Solution**

- Serious virtual reality game
- Exploration of underwater world

**Measuring breathing activity**

- PEP device connected to incremental pressure sensor
- Sensor data transmitted wirelessly via Arduino to stand-alone VR headset
- Simplistic filtering of sensor data
- Manual configuration in software (chosen resistance, desired repetitions, desired length of exhalation)

**Breathing as main interaction**

- Diving naturally requires regular and calm breathing
- Allows diegetic inclusion of exercise into gameplay
- Breathing makes players swim forward and enables exploration
- Simple tasks and rewards to not distract from breathing exercise

The work described here was partially funded by an Innosuisse innovation cheque. We would also like to thank our physiotherapist partner Thomas Schumacher.

PH Zürich/Schweiz



About 1,000 people in Switzerland and 70,000 to 100,000 people worldwide are affected by cystic fibrosis (CF), a genetic disorder that mainly affects the lungs. An important part of their lifelong treatment consists of airway clearance exercises. These have to be performed daily in order to remove excess mucus from the lungs. In order to make this exercise more motivating for the patients we are working together with a physiotherapist to develop a serious virtual reality game. We measure the breathing with an incremental pressure sensor attached to the Positive Expiratory Pressure (PEP) device and use it as the main interaction mechanic. The players then explore an immersive virtual reality underwater world, and the diving activity naturally promotes the required constant and calm breathing.

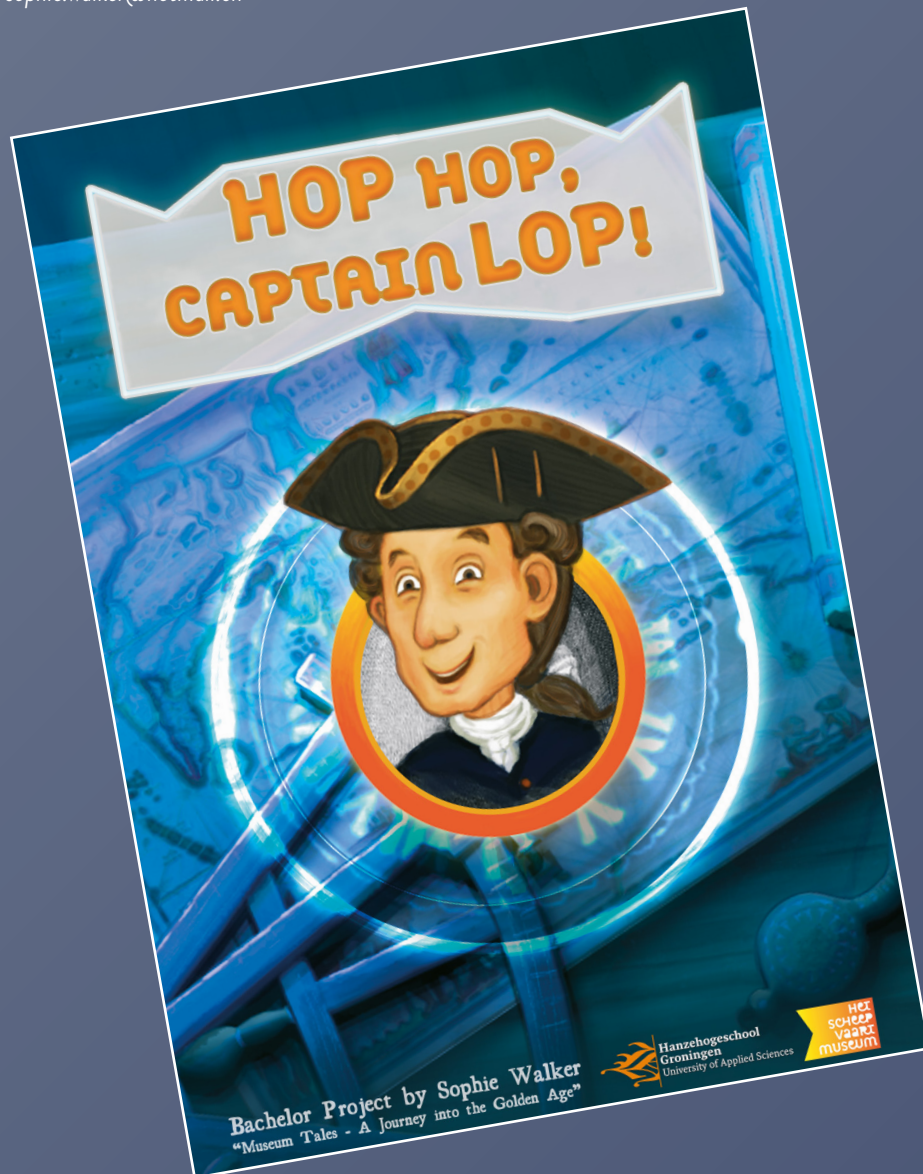


# MUSEUM TALES: A JOURNEY INTO THE DUTCH GOLDEN AGE: HOP HOP, CAPTAIN LOP!

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Ahoy sailor! All hands on deck for a seafaring adventure from the 18th century to the present! Discover the story of Martin Lop, captain in the Dutch East India Company. Take on the role of destiny as you witness young Lop climb the ranks.

This game prototype has been created and evaluated for the National Maritime Museum in Amsterdam, within the context of a 2018 bachelor project for the Hanze University of Applied Sciences in the Netherlands. It was developed as an educational game for children between 8 to 10 years. The project won the Communication, Media & IT department's Thesis Award and the Graduation Student Showcase.

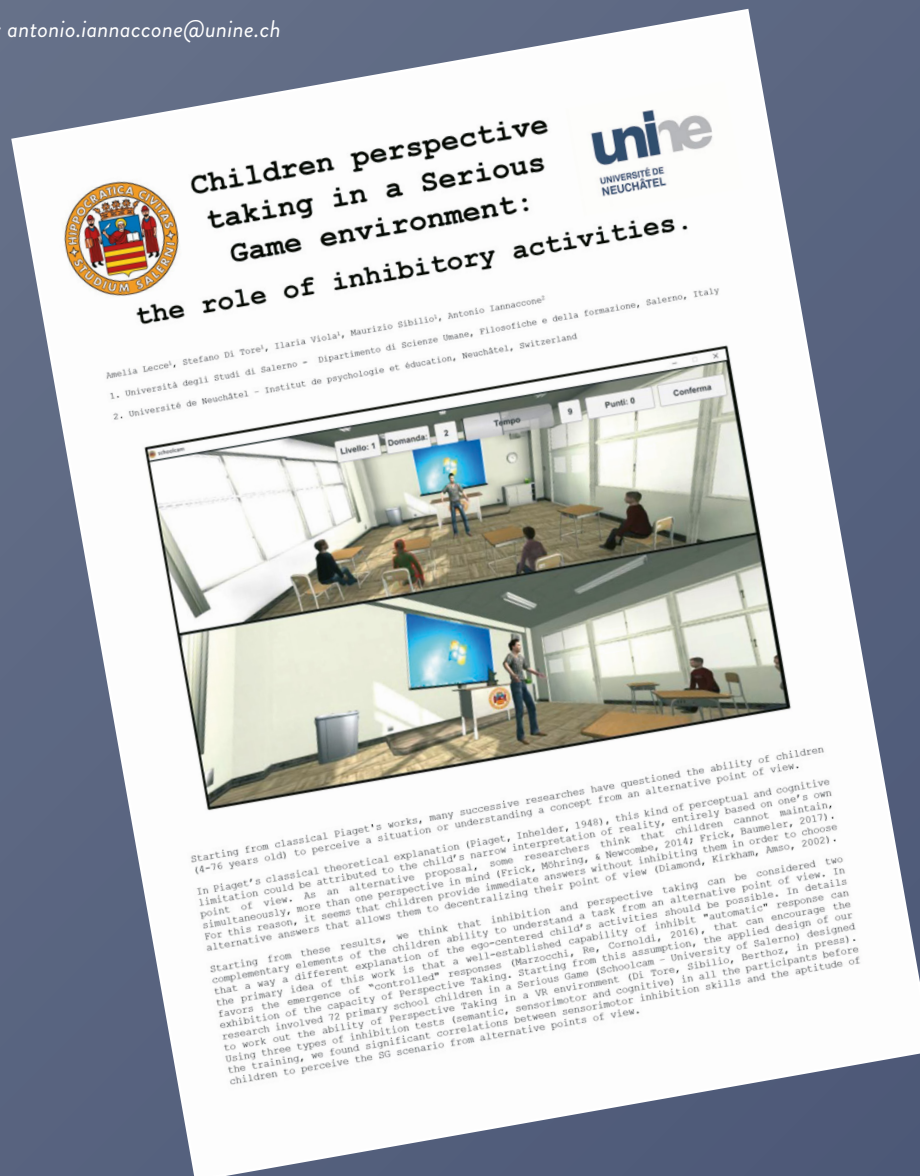
# CHILDREN PERSPECTIVE TAKING IN A SERIOUS GAME ENVIRONMENT: THE ROLE OF INHIBITORY ACTIVITIES

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Starting from classical Piaget's works, many successive researches have questioned the ability of children to perceive a situation or understanding a concept from an alternative point of view. In Piaget's classical explanation (Piaget, Inhelder, 1948), this kind of perceptual and cognitive limitation is attributed to the child's perception of reality, largely based on one's own point of view. Moreover, some researchers think that children cannot maintain, simultaneously, more than one perspective in mind (Frick, Baumeler, 2017). For this reason, it seems that children provide immediate answers without inhibiting them to decentralizing their point of view (Diamond, Kirkham, Amso, 2002). Starting from these results, we think that inhibition and perspective taking can be considered two complementary elements of the children ability to understand a task from an alternative point of view. In details the primary idea of this work is that a well-established capability of inhibit "automatic" response can favors the emergence of "controlled" responses (Marzocchi, Re, Cornoldi, 2016) encouraging the emergence of the perspective taking. The applied design of our research involved 72 primary school children in a Serious Game (Schoolcam – University of Salerno) designed to work out the ability of Perspective Taking in a VR environment (Di Tore, Sibilio, Berthoz, in press).

# ALCODRIVE

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In Switzerland, the maximum quantity of alcohol contained in blood must not exceed 0.5‰ (= 0.5g/litre). Alcohol affects our cognitive performances such a coordination, tracking or reaction time, already after 0.3‰.

Vision impairments usually occur as well: the eye muscles are much slower which can result in blurred vision, reduced field of view, night vision and colour perception deterioration. Moreover, when we feel euphoric, we tend to take more risks than in our normal state.

This application simulates the reaction time decrease and vision impairments when drunken driving. Each time the driver finishes a lap on the circuit, we add another glass of wine to the system.



# INTRODUCTION TO CARDIOPULMONARY RESUSCITATION IN VIRTUAL REALITY VR ACTIONS THAT SAVES

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**be! rescuer**

**Be! at the heart of the action!**

Introduction to cardiopulmonary resuscitation in virtual reality VR

**ACTIONS THAT SAVES**

Cardiac arrest is defined by a sudden simultaneous interruption of the circulation and respiration, most often caused by a major cardiac arrhythmia, ventricular fibrillation. This type of cardiac arrest offers, however, extremely good chances of survival and an excellent neurological prognosis, provided that the victim receives early support via several measures. Cardiac arrest is thus a vital emergency needing to be dealt with extremely rapidly by the first witness of the situation (First Responder). After five minutes, if no measures are undertaken, the victim will suffer severe or even permanent brain lesions, while after six minutes death is inevitable. I offer to introduce to a wide audience to cardiopulmonary resuscitation, thanks to YouRescue® a high-tech device using virtual reality, by placing each participant in five minutes in complete immersion in an ultra-realistic scenario where he/she will be both actor and rescuer.

[www.berescuer.ch](http://www.berescuer.ch)



# SPEAKERS, CHAIRS & MODERATORS



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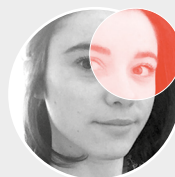
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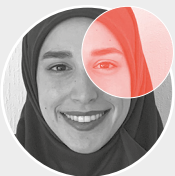
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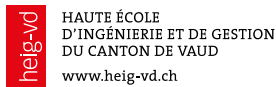
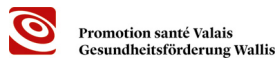


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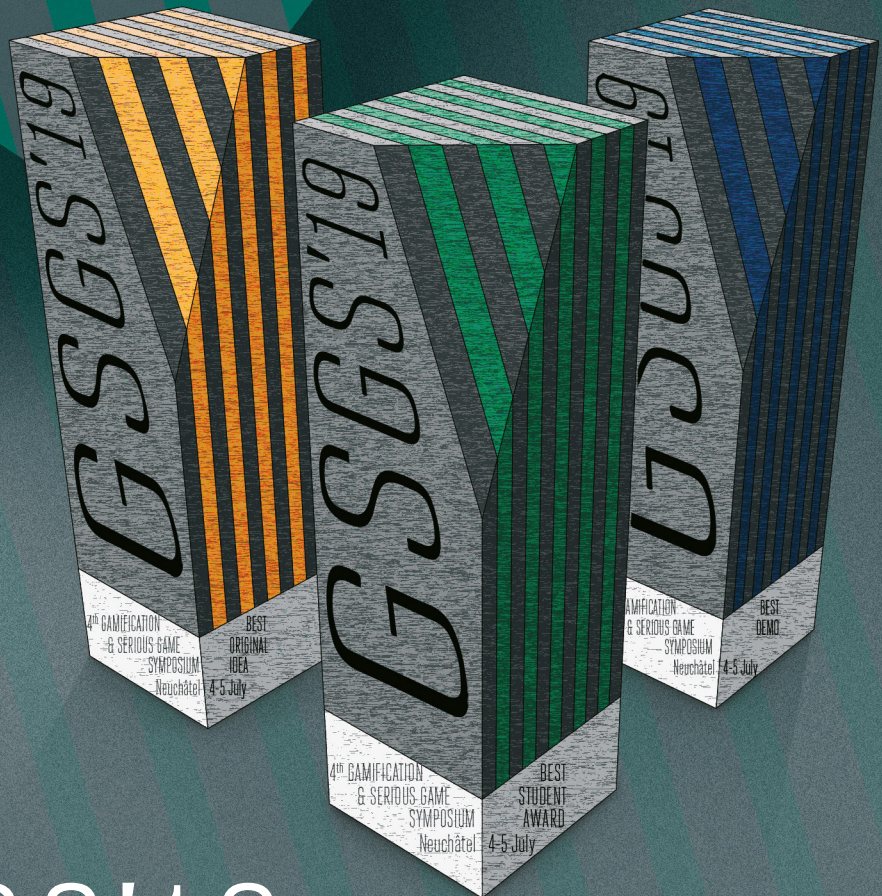
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# GSGS'19 AWARDS

Play as a way to (re)create memories of a successful and gratifying moment. Playfulness can help human memory now days give back the feeling or sensation that one has lived before.

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The trophy will take shape as a totem which users can play with and not only put as a decoration. The modularity of its pieces creates an infinite combination of shapes for creating a new object every time the winner interacts with it.



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