



GSGS'18

3RD GAMIFICATION & SERIOUS GAME SYMPOSIUM

HEALTH & SILVER TECHNOLOGIES | ARCHITECTURE & URBANISM | ECONOMY & ECOLOGY | EDUCATION & TRAINING | SOCIAL & POLITICS

5 & 6 July 2018 | Neuchâtel | Théâtre du Passage | www.gsgs.ch

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ISBN (PRINT): 978-2-940387-22-9

ISBN (ONLINE): 978-2-940387-23-6

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SPECIAL THANKS TO

Montserrat Gutierrez from the HE-Arc,
HES-SO*, for her linguistic expertise

Massimo Monti from the HE-Arc,
HES-SO*, for his precious IP coordination

Agnès Dervaux Duquenne from the HE-Arc, HES-SO*,
for her precious help and advices relative to edition

Noémie Oulevay Rossetti, Andrea Militello,
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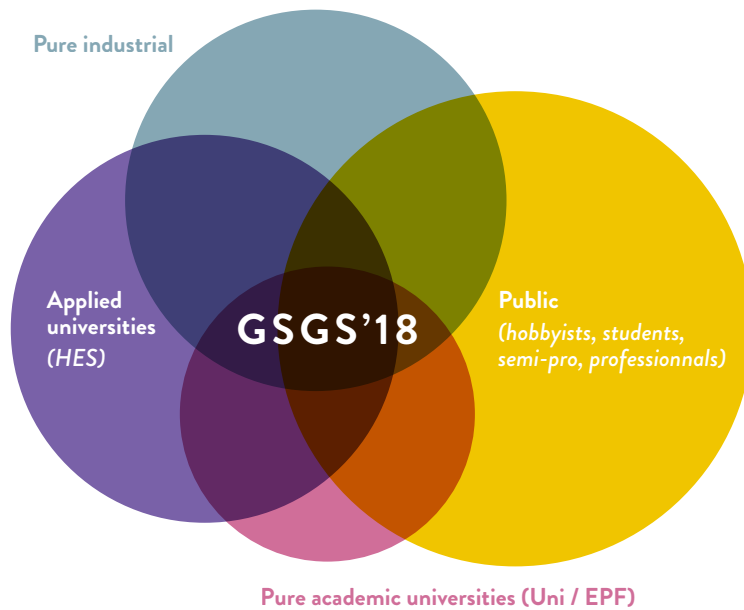
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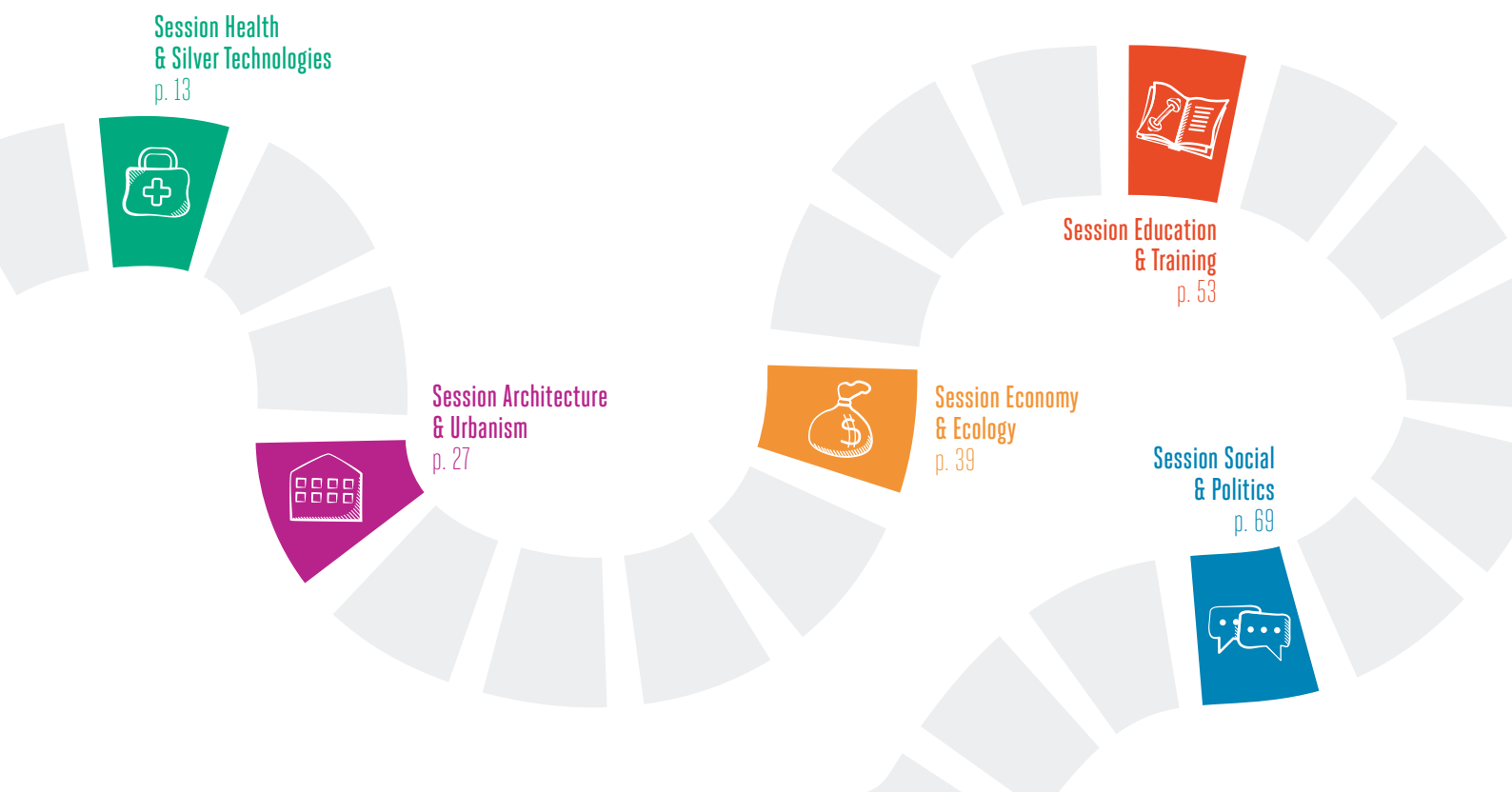
GSGS'18: AN INTER-PROFESSIONAL OPPORTUNITY FOR THE SWISS INDUSTRY

The GSGS'18 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.

GSGS'18: 5 SESSIONS COVERING A LARGE PALETTE OF DOMAINS



DAY 1

7h45–8h15 Café-croissant, Proceedings & Program

8h15–8h30 Welcoming & Intro speech



HEALTH & SILVER TECHNO

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- 8h35–8h50** **1** Development of an early intervention to prevent posttraumatic stress symptoms
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- 8h50–9h05** **2** First steps towards a virtual coach within a SG to prevent MSD
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- 9h20–9h35** **4** Aristotle. Move & learn
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- 9h35–9h50** **5** Introduction to cardiopulmonary resuscitation in virtual reality (VR) actions that save
Vincent Lemaire | Be! Rescuer | La Verrerie **pp. 22–23**
- 9h50–10h05** **6** Virtual Reality puzzle game for Musculoskeletal disorders prevention
Maria Sisto | He-Arc, HES-SO | Neuchâtel **pp. 24–25**

10h05–10h30 Break & demo focus #1



ARCHITECTURE & URBANISM

CHAIR: PATRICK SALAMIN | LOGITECH | LAUSANNE

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- 10h50–11h05** **8** Social Power App: encouraging energy saving behaviour through play, learning and social interaction
Vanessa De Luca | Laboratory of Visual Culture, SUPSI | Canobbio **pp. 30–31**
- 11h05–11h20** **9** Vistom, virtual studios, tools and methods
Tobias Koppeler | Institute HyperWerk FHNW HGK | Basel **pp. 32–33**
- 11h20–10h35** **10** Gamified-ED3D project
Pierre-Nicolas Carron | CHUV | Lausanne **pp. 34–35**
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ECONOMY & ECOLOGY

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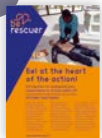
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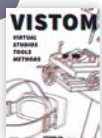
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Haute École Arc ingénierie

SPEECH & SHORT PAPERS





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SESSION HEALTH & SILVER TECHNOLOGIES

8H35-10H30

The potential of Serious Games in the healthcare sector is huge. Serious Games are intensively used both in preventive and curative healthcare approaches. Antje Horsch (University of Lausanne) shows how Serious Games can be used to prevent posttraumatic stress symptoms. Christophe Bolinhas (HE-Arc, HES-SO) describes how a virtual coach can be integrated into a preventive serious game. Francesco Carrino (HEIA-FR, HES-SO) presents an augmented- and Virtual Reality based serious game to enhance mirror therapy. Kevin Rosianu (University of Lausanne) shows a serious game entitled Aristotle which aim is to prevent “sedentary lifestyle” health issues. Vincent Lemaire (Be! Rescuer) presents a VR-based serious game to train ordinary people to be more effective in cardiopulmonary resuscitation. Maria Sisto (HE-Arc, HES-SO) shows a Virtual Reality puzzle game for Musculoskeletal disorders prevention.



CHAIR: VERA BUSTAMANTE | CHUV | LAUSANNE





1 | DEVELOPMENT OF AN EARLY INTERVENTION TO PREVENT POSTTRAUMATIC STRESS SYMPTOMS

**A. Horsch^{1,2}, Y. Vial², C. Favrod², M. Morisod Harari³, S.E. Blackwell^{4,5},
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An emergency caesarean section (ECS) is carried out in cases where mother and/or foetus' life is at risk; thus it represents a psychologically traumatic event for the mother [1]. Even when the baby is born healthy, approximately 25% of mothers develop postnatal posttraumatic stress disorder (PTSD) [2]. Posttraumatic stress disorder consists of four symptom clusters: re-experiencing (including intrusive traumatic memories of the event), avoidance, hyperarousal and negative cognition and mood [1]. This highly distressing psychiatric condition has also shown a negative impact on the baby's attachment relationship and long term development [3].

Recurrent and distressing traumatic intrusive memories are involuntary: sensory (predominantly visual) mental images whose content often overlaps the most distressing moments of the traumatic event [1, 4]. They are the cardinal symptom of PTSD and reducing intrusions in the acute period may thus be beneficial not only for reducing short-term distress, but for reducing later PTSD.

25% of mothers develop postnatal posttraumatic stress disorder (PTSD)



To date, evidence-based interventions on women after traumatic childbirth lack [5], particularly those targeting early symptoms of posttraumatic stress that could improve longer term outcomes [6]. This study tested the effect of a new preventative intervention to reduce intrusive memories of the traumatic event, taking an innovative approach informed by cognitive science of memory consolidation and using a serious computer game rather than a therapist [7].

The aim of this proof-of-principle randomised controlled study was to investigate whether the number of intrusive traumatic memories could be reduced by a visuospatial game (computer game Tetris) carried out during the memory consolidation phase shortly after the ECS. Fifty-six women after ECS were randomized into one of two parallel groups: intervention (usual care plus visuospatial game) or control (usual care). The primary outcome was the number of intrusive traumatic ECS-related memories recorded in a diary during the week following the ECS.

Results of intention-to-treat analyses showed that, compared with controls, the intervention group reported fewer intrusive traumatic memories and had a trend towards reduced acute stress re-experiencing symptoms after 1 week. Per protocol analyses showed significantly less acute stress



re-experiencing symptoms after one week in the intervention group. After one month, significant group differences regarding PTSD diagnostic criteria and avoidance symptoms were found. The intervention was rated as acceptable by the majority of women. This study is a first step in the development of an early and potentially universal intervention to prevent posttraumatic stress symptoms.

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2 | FIRST STEPS TOWARDS A VIRTUAL COACH WITHIN A SG TO PREVENT MSD

Christophe Bolinhas, Nicolas Sommer, Maria Sisto, Stéphane Gobron

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In this paper, we present a first step implementation of a virtual coach with nonverbal communication interactions. The goals are to improve immersion, guidance and user acceptance of serious games that require motivation and feedback communication.

CONTEXT

The first scope of the virtual coach is a project intending to prevent musculoskeletal-disorders in the automobile and watchmaking industry. Today MSD stats refer to losses of billion of euros in France only [6]. Musculoskeletal disorders have multiple sources such as workplace configuration, noise, stress and mood. Here, our focus was solely on posture and movements. An interactive VR game pushes the user to repeat his natural work actions and analyses them by using a Kinect and a Leap Motion; it gives then feedback about his in-game movements and suggests better ones. In this context, the virtual coach comes into play when the game has to interact with the user. It will act as a motivation and will communicate its results to the user.

THE COACH

The coach must act as closely as possible to a real-life coach and have a motivational presence in the user's experience. Therefore it must have human-like reactions and emotions. The virtual coach can be divided into various modules.

VALENCE, AROUSAL, DOMINANCE MODULE

The first module is directly linked to the non-verbal side of the coach. Valence, arousal and dominance are vectors to classify emotions in a 3-dimensional space [2]. The coach implements a system to alter its expression based on those variables and will show the user facial expressions according to the user's results. This module is the first step that immerses the player in the game and creates an emotional connection with him.

INTERACTION MODULE

The second coach-integrated module consists of a system that directly receives input from the user. This module can potentially be used with voice recognition, mouse click and virtual reality input. This piece goal is to enable the user communicate directly with the coach by allowing a bidirectional dialogue. Just like a real-life coach, the virtual coach must listen to the user.

DIALOGUE MODULE

The third module is a dialogue system that will have to work in collaboration with all the coach aspects. Whether text-based, speech-based or both, this is the core of clear communication between the user and the virtual coach. First, the dialogue system has to work in partnership with the VAD (valence, arousal, dominance) module and ensure coherence with the coach's displayed emotions.

FLEXIBILITY

The coach component should be as flexible as possible to facilitate its integration in different serious game projects. The pre-requisites are the following:



- › Be adaptable to different kinds of projects such as virtual reality projects, augmented reality projects, mobile projects or desktop games;
- › Be capable of handling a wide range of avatar displays and their specific animations;
- › Handle various dialogue trees and configuration files that help define the interaction between each module;
- › Be able to map itself and interact with different game scenes, whether 2D or 3D.

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CONCLUSION

The virtual coach is an advanced component of serious games: it is being developed and has challenges to ensure its flexibility. Each module is crucial for a good coaching experience, and the final project goals want to improve user comprehension and regular use of the games where it is implemented. Today's serious games face the need to connect to older and inexperienced audiences. This coach is a key to ease their connection to newest technologies and game-like software that might often be seen as not serious and might repulse users. Our coach will have to run through numerous user tests before reaching its desired state, but we have high hopes that he will help convert people to the world of serious games and improve the user experience.

ACKNOWLEDGEMENT

Many thanks to Mut Horia, former He-Arc student.

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3 | IMPACT - A SERIOUS GAME IN VIRTUAL AND AUGMENTED REALITY TO ENHANCE MIRROR THERAPY

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Mirror therapy (MT) is the main non-pharmacological treatment for Phantom Limb Pain (PLP) in amputees and is also used in stroke rehabilitation. It consists of placing a mirror between the healthy limb and the compromised one. The reflection creates the illusion that both limbs are healthy and the patient is able to move them symmetrically. This proves to be helpful in restoring the normal body image and alleviate pain [1]. To overcome the limitations of an optical mirror (e.g., partial immersion, limited exercises, etc.), researchers are currently proposing to use Virtual Reality (VR) [2] or Augmented Reality (AR) [3] to improve MT. However, to the best of our knowledge, none of the existing works proposes a system that, only using relatively low-cost and off-the-shelf technologies:

- › is able to deal with lower- and upper-limbs amputations,
- › could be used in both AR and VR,
- › offers full immersion with a first-person point of view,
- › proposes serious games specially developed to make MT more engaging.

While the whole system is presented in [4], in this paper, we focus on one of the serious games that we developed: the “IMPACT Music game”.

The game has two goals: first, help make the treatment more engaging and less tiring and second, lead the patient intuitively through the treatment.

The game conception started from a scenario created with occupational therapists at CHUV. The game focuses on a specific type of exercises, in which the patient has to perform movements with both arms or both legs simultaneously.

*AR and VR may help make
the MT more immersive*

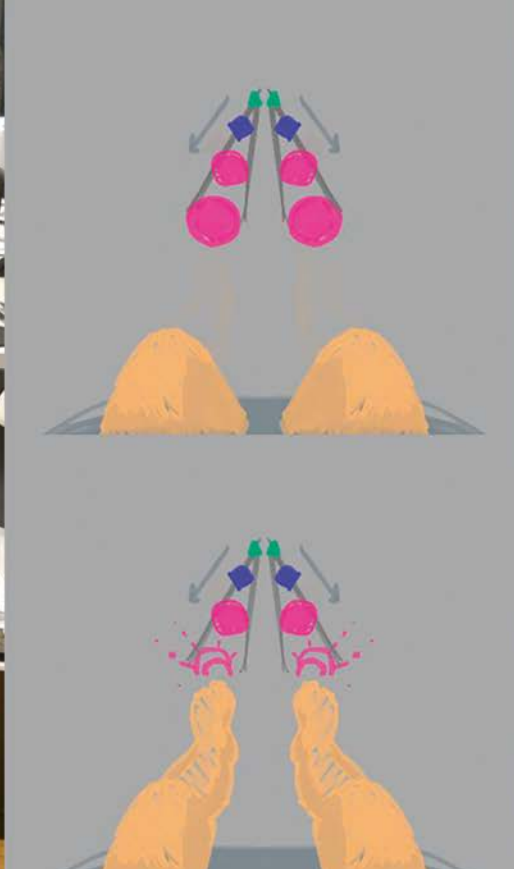


In terms of gameplay, we took inspiration from the famous game “Guitar hero”. When the game starts, pairs of virtual objects move towards the patient and the patient has to hit them with symmetric limb movements at the right time (in synchronization with the tempo of the music). The object shape and color specify the body part that the patient has to use to hit them (e.g. golden spheres are associated to the feet, blue cubes to the knees, etc.). In addition, while the height from the ground depends on the targeted body parts, the horizontal distance between the objects varies randomly (therefore requiring wider or narrower movements).

Currently, it is possible to play the game with three difficulty levels. The levels can be used to lead patients through progressively harder rehabilitation steps. Currently, the difficulty level changes the frequency and the speed of the objects; in the future, it could be used to modify other parameters of interest for the therapists (such as the required precision, the movement range, etc.). At the end of the game session, the given score is proportional to the number of “hits” and the difficulty level.

From the customization point of view, the system allows adding new songs to the system. So, patients can do the exercises while listening to their favorite songs.

Finally, we tested the game with 6 healthy users (1 woman) with heights ranging from 165 to 198 cm.



The goal of these preliminary tests was the detection of possible usability problems (formative usability).

Even if the tracking system could be improved in terms of precision and reaction, the participants felt that the application was easy to use, the gameplay intuitive and the virtual elements easy to detect and locate (to help the users in the task of spatially locating the objects, we cast their virtual shadows on the ground).

The AR experience was in average perceived as slightly worse than the VR experience. During previous tests, we noticed that AR caused higher motion sickness. To prevent it, we reduced the stereo camera resolution (from 950x650 to 640x480 pixels) while increasing the fps (from 60 to 90 Hz). This seemed to successfully reduce the motion sickness but, on the other hand, it created a very obvious contrast between real objects (blurry because of the low resolution) and virtual objects (with sharp shapes and vivid colors).

To conclude, AR and VR may help make the MT more immersive and, therefore, more effective. We believe that introducing our serious game may play an important role in making this treatment not only more engaging but, in combination with low-cost and off-the-shelf technologies, also available for future home care by leading the patient through the different rehabilitation steps. In the next months, the system will be part of clinical trials to evaluate the AR use for PLP treatment.

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4 | ARISTOTLE. MOVE & LEARN

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During the fourth century BC, as he was teaching in the Lyceum of Athens, Aristotle used to walk around accompanied by his pupils. This practice had such a central role in his pedagogical approach that the Greek word *περιπατεῖν*, which means “to walk around”, gave name to the peripatetic school.

Today, as our society faces serious “sedentary lifestyle” issues, we think that walking and moving should become again a central learning element. We decided to use the smartphone technology to transform the University of Lausanne physical space in a big learning space. In the context of Mr. Davide Malatesta’s course “Adapted Physical Activity and Obesity”, we had the opportunity to develop an application offering several pedagogical trails on the campus for students to learn, think and move. Our objective was to create, on a smartphone application, an adaptive pedagogical structure that may be freely used by all professors and assistants in the university.

Student life is characterized by long sitting periods. In the last years, research has shown that sitting has several detrimental effects on metabolism (Hamilton, Healy, Dunstan, Zderic, & Owen, 2008). It is maybe the good time to re-invite movement in learning, moreover because walking and physical activity have positive effects on learning and memory (Erickson et al., 2011), creativity (Opezzo & Schwartz, 2014) and protect the brain from ageing (Cotman, Berchtold, & Christie, 2007). A study has also shown that walking in a natural environment is more profitable than in an urban environment (Berman, Jonides, & Kaplan, 2008). It would thus be sad not to use the marvelous environment surrounding the university with its forests, river and lake.

The goal of our app is to offer trails on the campus, punctuated by posts. At each post the participants are invited to perform exercises, acquire knowledge and answer questions. The students would thus be able to use an innovative and playful learning tool. In the context of the “Adapted physical activities and obesity” class, given by Mr. Davide Malatesta from the Institute of Sport Sciences at the University of Lausanne, we developed three trails; each with a slightly different approach: the first one is based on situated learning where the students visit a neighborhood while learning about it. The second is based on fiction and narration, the students following an audio description of a fatty cell trip in the body. The last one is aimed at learning while experiencing and students undergo different physical activity protocols while learning about them. The core principle of our project is to offer new physically active learning modes!

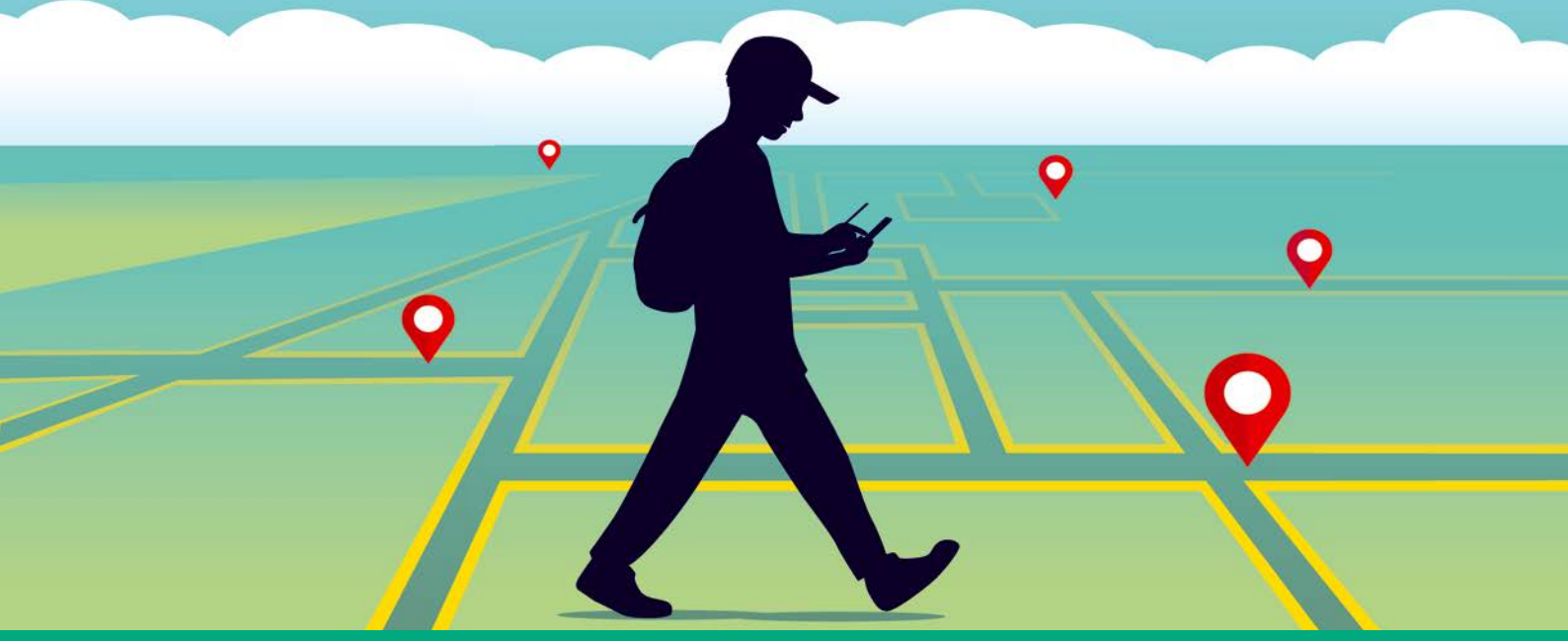
The project was developed in partnership between the sports sciences institute of the University of Lausanne and the HE-Arc (University of Applied Sciences & Arts of Western Switzerland). As we write this paper, the students are on their way to trail number two.

*The core principle of
our project is to offer
new physically active
learning modes!*



ARISTOTLE.

move & learn



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5 | INTRODUCTION TO CARDIOPULMONARY RESUSCITATION IN VIRTUAL REALITY (VR) ACTIONS THAT SAVE

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CONTEXT

Cardiac arrest is defined by a sudden simultaneous interruption of the circulation and respiration, most often (more than 80% of patients [1]) caused by a major cardiac arrhythmia called ventricular fibrillation. According to the «Fondation Suisse de Cardiologie» and quoting from the "Concept of First Responders in the Canton Fribourg", the incidence of sudden cardiac death in Switzerland is in the range of 0.4 to 1 per 1000 inhabitants per year, which corresponds to around 8000 individuals per year throughout the entire country. This type of cardiac cardiac arrest offers, however, extremely good chances of survival and an excellent neurological prognosis, provided that the victim is supported as rapidly as possible by the application of several measures included in the concept of the chain of survival:

- › Recognition of cardiac arrest and alerting emergency services
- › Early cardiac massage (Basic Life Support - BLS)
- › Early defibrillation (Automated External Defibrillation - AED)
- › Advanced Professional Care (Advanced Cardiac Life Support - ACLS)

"In Switzerland the survival rate of cardiac arrest is estimated at 5-10% but this figure may vary according to predictive factors of a good prognosis." [1] 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 person will suffer severe or even permanent brain lesions, while after six minutes death is inevitable.

PROJECT

In partnership with Wanadev [2], a company specialising, I offer to introduce a wide audience to cardiopulmonary resuscitation, through a brief scenario of five to seven minutes, thanks to YouRescue® a high-tech device using virtual reality (VR) [3]. Each participant will be placed in complete immersion in an ultra-realistic scenario where he/she will be both actor and rescuer. The learner will be immersed in an emergency situation where he/she discovers a corporate lobby and sees two people having a discussion. A few moments later one of them collapses on the ground, victim of a cardiac arrest.

There follows a specific procedure which consists in stimulating the victim so as to verify his/her level of consciousness and, in VR coordination with the witness, alerting the emergency services, confirming the emergency number and the address of the premises and then rapidly beginning external cardiac massage (ECM). The defibrillator is brought on by the witness a few moments later. The patches must be placed on the thorax of the victim and then the order issued by the device must be followed, ie trigger the electrical defibrillation and then resume ECM. In a second phase the device is closely linked to a workshop conducted by an SRC [4] certified instructor and intended to hone cardiac massage skills, answer questions and/or orientate the learner to a more advanced training course.

FEEDBACK FROM EARLY EXPERIENCES

At the present stage of development the VR interface and the dummy of the victim are in their infancy. Haptic feedback in this context needs to be developed and refined. Around twenty non-medical professionals tested the system and declared themselves impressed, excited, with a real feeling of being



at the heart of a situation which makes sense and shows the importance of the actions to be learnt and carried out. In spite of some remaining questions, the initial tests proved conclusive and the first BLS-AED training sessions using VR as an introduction should start soon.

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EXPERIENTIAL LEARNING

By means of this project my first intention is to remove negative assumptions, fears or taboos related to the actions of resuscitation among individuals, organizations and employees. This will raise awareness that the first cardiopulmonary resuscitation measures are not merely important but vital while awaiting the arrival of professional services. The innovative, original and powerful tool with its aspect of play will, through total immersion, facilitate the safe and efficient learning of actions that save. Thus the chances of survival of the victim before the arrival of the emergency services will increase considerably. I intend to strengthen the VR concept in terms of the original target audience, but also to expand it by addressing, for example, specific professionals in the field of health (paramedics, nurses, etc.) or those in professions at risk such as firefighters, police, etc. according to the needs of all those involved.

CONCLUSION

I am convinced that the development of andragogical principles (5*) needs to proceed via the improvement or indeed emergence of new pedagogical tools. Virtual Reality (VR) seems to me to represent a future vehicle in the field of health training. This serious game concerns a potentially large number of individuals in all socioprofessional categories.



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6 | VIRTUAL REALITY PUZZLE GAME FOR MUSCULOSKELETAL DISORDERS PREVENTION

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INTRODUCTION

Musculoskeletal Disorders (MSDs) are common occupational diseases in Western countries. In recent years, the MSDs cost represented more than 1 million euros [1], and MSDs were more than 80% of all diagnosed occupational diseases in France [2]. Physical risk factors such as repetitive tasks and awkward postures have been reported as the leading causes of MSDs in various jobs and industries, specifically at assembly workstations [3]. Previous studies have shown a dose-response relationship between awkward posture, prolonged arm elevation, and neck/shoulder disorders [4–6].

Multidimensional ergonomic interventions intend to reduce exposure to physical risk factors, particularly awkward postures. Previous studies proposed interventions on individuals such as participatory ergonomics and training, and the practical approach to prevent MSDs [7–9]. However, the debate issue is the effect of ergonomic training sessions on reducing exposure to physical risk factors and MSDs prevalence [10].

PROPOSED SOLUTION

The use of modern technologies such as Virtual Reality (VR) and Serious Game (SG) needs to be explored to increase the operators' awareness of their gestures and postures in the industrial settings and helps them develop the coping strategy to regulate a task in a way that preserves their health. The aim of this study is, therefore, to produce such a device by combining VR in a SG. This tool would allow the operators to practice similar tasks to the ones they perform at work in a playful setting and have feedback on to their postures.

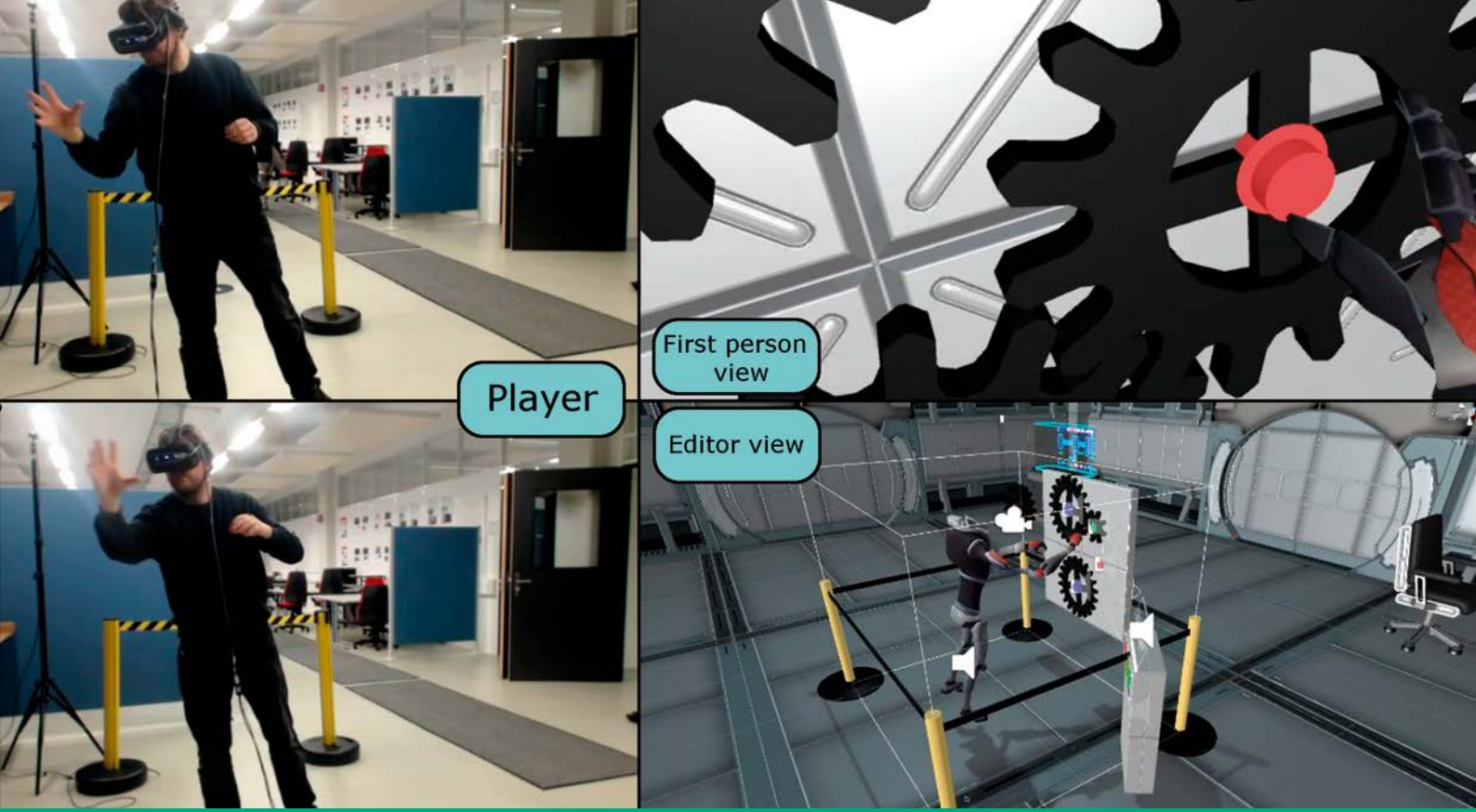
To achieve this objective and for the development of the game scenarios, we created a database

of postures and movements of industrial tasks. The experimental settings were the automobile and watchmaking industries. Twenty automobile assembly operators (8 women and 12 men) and twelve women watchmakers consented to participate in this experiment. We used nine T-motion sensors to measure continuously the upper limb joint angles at a 64 Hz frequency (TEA, Nancy, France). Once participants got accustomed to the devices placed on their body segments and the camera installed near them (5 minutes), we registered ten cycle times.

The proposed solution combines VR and motion capture (MoCap) into a SG. The MoCap technology allows tracking the user and provides real-time posture analysis. The VR combined with SG offers a decontextualization that increases learning and motivation. The imagined game is a gear puzzle game the user has to solve. The different game elements are placed to mimic real problematic work situations. The gear puzzle game has been chosen for its flexibility in size and orientation and for the variety of game mechanics which allows adapting to the different works situations in the automotive and watchmaking industry.

*Different game elements
are placed to mimic real
problematic work situations*





CONCLUSION

This project proposes a new approach to MSD prevention in an industrial context. A SG, based on real-life industrial measurements, has been developed combining Virtual Reality and Motion Capture and provides a decontextualized and motivating environment to raise MSD awareness and training.

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SESSION ARCHITECTURE & URBANISM

10H35-12H20

Within a couple of years, Virtual/Mixed Reality (especially serious gaming and gamification) has gone from speculative to ubiquitous. Professionals can now propose virtual solutions to their clients and interact collaboratively on the virtual model. More specifically, within domains of "Architecture and Town Planning", clients can examine homes and office building, and professional can perform robustness and viability tests to evaluate their solution before construction begins. In this session, we will present how serious gaming and gamification offer great opportunities in more and more complex environments, especially for: urban network development, energy-saving application, interactive VR Software, and gamified emergency department.



CHAIR: PATRICK SALAMIN | LOGITECH | LAUSANNE





7 | A SERIOUS GAME IN MIXED REALITY TOWARDS URBAN NETWORK DEVELOPMENT

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The environment we interact with consists almost of the visible side of what our world is made of. Indeed, a lot of things around us are not directly visible. It is especially the case of urban networks like water or electricity supply, telecom, sewer system, etc. All these public services which are crucial for our societies are voluntarily hidden for esthetic or security purposes. Notwithstanding that state of affairs, working in the public domain induces important costs, spends a lot of time and, very often, results in partial or total destruction of existing infrastructures (intentional or not due to digging or drilling).

In this context the way professionals have to be taught is especially difficult and quite inefficient if we want to teach by example. If a teacher wants to teach how to build a new water adduction system, he (or his school) must have the specific tools to dig a hole into a road to a certain depth while taking care of the existing services - and certainly still in use -, to place the new pipes while observing the security measures, backfilling the trench and rebuilding the road. All these phases last a long time and are very expensive. According to the available time and money, this kind of teaching is impossible even for a single student. And what about a whole class?

New technologies as Mixed Reality (MR) and Augmented Reality (AR) can partially figure out these problems as they insert some virtual information seen by the user in the real world. This virtual continuum gives him the ability of watching virtual things which do not exist in the real world or are not visible to the naked eye. Indeed, MR and AR can emphasize real and existing elements which are not visible like urban networks. Besides, manipulating virtual objects allows using video game mechanisms and therefore benefitting from serious gaming advantages. It is proved that Serious Games and specifically Learning Games - Serious Game designed to support learning - enhance the learning process in a professional context [1]. Thus, the teacher can superimpose virtual objects which represent what he wants the student to consider, like construction elements - new or existing - and monitor his actions. Moreover, taking into account the real environment is hugely valuable for teaching because of the richness of information abounding in the real world, and will help the student understand more easily technical concepts [3]. This immersion will force him to face the real world complexity and will help link abstract concepts to reality. On the other hand, the teacher can also define the exercise difficulty if he considers the student progression and filters what is important or not.

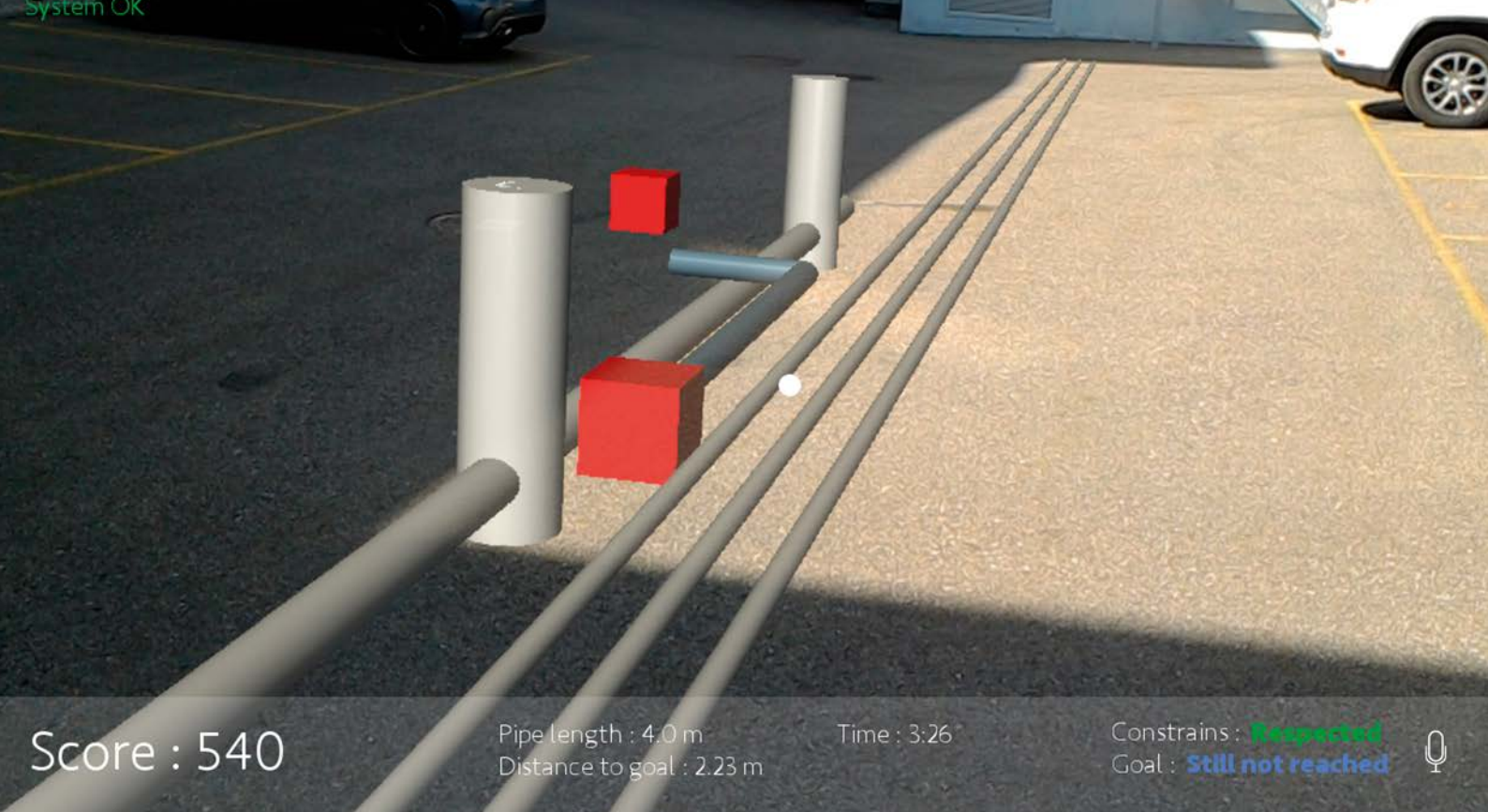
For example, if the main aim is teaching how to cope with a new service network design, the student will progress more efficiently if he can focus only on the exercise aim.

Hence, the teacher will virtually define the constraints the student has to deal with. Then, the student will learn how to build a new service with only the necessary constraints related to it and aligned with his capabilities. All that work can be done without really constructing it and therefore without digging, destroying existing elements or generating all the costs induced by these works [2].

Designed for teaching, the system developed at the HE-Arc as a Mixed Reality Learning Game (MRLG) manages exercise teacher-given requirements like start and end points, existing services,

*Watching virtual things which
do not exist in the real world*





obstacles, mandatory crossing points, etc. The system gives real-time feedback to the student like the old pipes length, if the new pipes stay underneath the ground surface, the time to link the start and end points, etc. The student work results in a virtual 3D model which can be later analysed by the teacher, can be debriefed with the student and will help orienting pedagogy. Teaching becomes more efficient, cheaper and spreadable to a wide number of students because it requires nothing more than a device. Moreover, if necessary, the student can redo the exercises as many times as he wants.

Monitoring the user actions in a real environment like the system is able to do allows training too. Therefore based on these specific skills, the system can be used to improve the knowledge of senior professionals in terms of efficiency or state-of-the-art evolution. Challenging the user with specific scenarios to train specific skills. It is also a powerful tool for new services planning as the system allows comparing several options in real time in terms of cost and feasibility but also complexity and nuisances as the project is directly designed on site. The professional can deal with existing construction not necessarily visible and can take into account some unavailable information on drawings like shop entrances or busy roads for example.

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8 | SOCIAL POWER APP: ENCOURAGING ENERGY SAVING BEHAVIOUR THROUGH PLAY, LEARNING AND SOCIAL INTERACTION

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Collaboration, competition, being part of a community and other forms of peer relations enhance motivation and learning and further engage people in experiences that can ultimately lead to behaviour change [1]. The change can take place in knowledge or attitudes but also in everyday activities and consumption lifestyle. By proposing hands-on and real-life challenges, gamified environments [2] can best motivate to act differently and, at the same time, they can help build concrete understanding of abstract concepts, as in the case of energy consumption.

In the context of domestic electricity consumption, we aimed at investigating the potential of a social gamified app to positively contribute to energy-saving behaviours and favour a social change. To this purpose, we designed the Social Power gamified app and tested it in two Swiss cities (Massagno and Winterthur). Such an app leverages on smart-meter tracked electricity consumption data and social game elements to offer households a pleasant and learning tool to save electricity at the neighbourhood level. Between February and May 2016, forty-six smart meter-equipped households were actively involved in the app-based intervention and monitored along with other control groups. Households were randomly grouped in teams and attributed to one of the two following contexts: the collaborative context to reach a collective electricity saving target of 10% or the competitive context promoting saving as much electricity as possible compared to the opponent city's team. This research investigates the effect that adding social-game inspired elements can have on electricity saving. Behaviours were measured throughout the intervention and for the following year, using mixed methods (smart meters, online surveys and individual interviews), with the aim of collecting both quantitative and qualitative impacts in order to assess changes both in the short and long term.

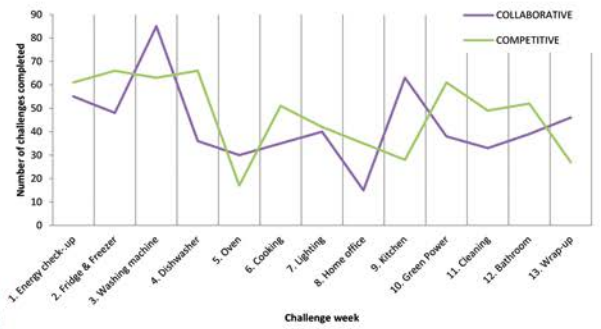
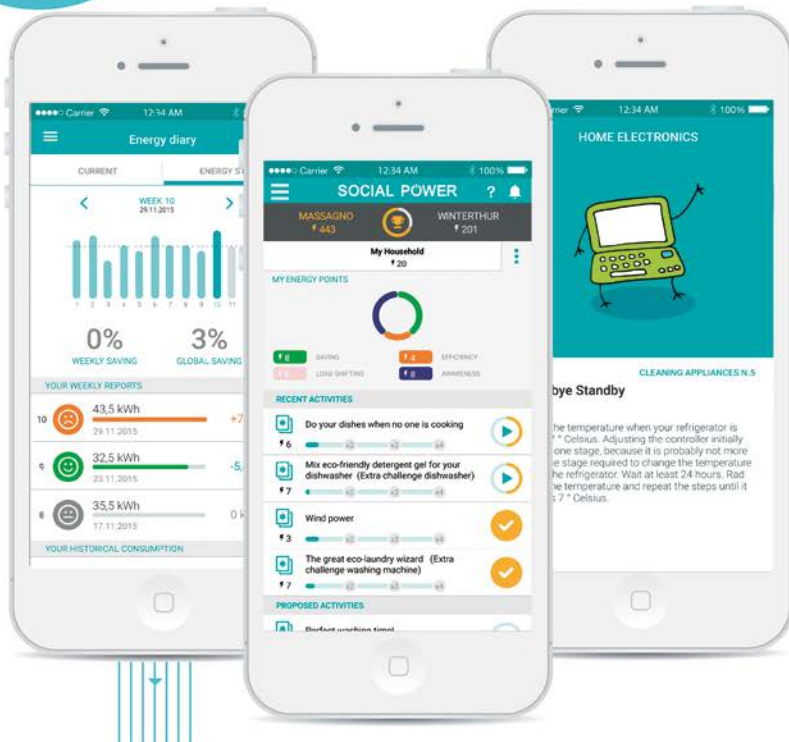
The app offered feedback on the household's hourly electricity consumption data and the main game goal was to reduce one's own weekly electricity consumption with respect to the historical baseline, by completing the weekly proposed challenges related to electricity savings around the house.

To support participating households, the app provided practical guidance on how to optimize electricity use, by means of a series of challenge-related tips. Each week the challenges were thematically focused on a specific appliance and participants earned points for completing them. We included social bonuses when more team members completed the same challenge, to increase the peer pressure and enhance collective consumption awareness. The motivational elements provided for both the collaborative and competitive contexts were presented in the same way within the app, namely feedback on individual consumption, household and team progression, and bonuses at the team level; however, the gamified contexts differed in their social comparison feedback and thus in the leader-board interface.

After the three-month intervention, active play seems to have helped households to link their own real-life actions to such an invisible and abstract element as electricity usage in everyday life [3, 4]. In both game contexts, the short-term change in electricity consumption was successful, respectively a decrease by approximately 8% in both game contexts with respect to the historical baseline

The app provided practical guidance on how to optimize electricity use





50
HANDS-ON
ACTIVITIES

12
GAME WEEKS

4
TOPICS

Efficiency
Saving
Awareness
Load-shifting

University of Applied Sciences and Arts
of Southern Switzerland
SUPSI

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CBT

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AEM

consumption. Additionally, in the same period, the control groups of both cities consumed more electricity. However, in the long term (one year after the intervention), such electricity savings were not maintained.

The experience shows that gamification can be used as a mean to ease behaviour change and motivate learning experiences in the short term. However, for social gamified learning to produce enduring behaviour change impacts in everyday life, more research is needed to get a deeper understanding of the effectiveness of game elements in social learning environments. The project reflects the impact that gamification has to make households aware that energy saving is influenced by the sum of individual behaviours, while confirms the importance of innovative learning tool for achieving behaviour changes.

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9 | VISTOM – VIRTUAL STUDIOS, TOOLS AND METHODS

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INTRODUCTION

The Virtual Studios, Tools and Methods Project – also known as VISTOM – was first launched in 2017 by the HyperWerk Institute for Postindustrial Design at the Academy of Arts and Design in Basel, in partnership with Virtual Valley, the Research Society for Draft Design. Since its inception, we collaborate with students from the Institute for 4D-Technologies at the Technical College in Brugg, and with Proteus VR, a virtual reality lab in Montreal.

VISTOM is an interactive virtual reality (VR) software in which users construct using virtually simulated machines based on real-life construction work. We want to educate people about construction processes and methods and avoid learning software-internal commands. We want to show users how to make a construction and provide them with an intuitive digital platform for creation [1]. So, we have the same universal construction method in the digital and in the analogue world. This work environment is accessible in a multiplayer mode for up to four people; and we hope to increase transparency and interdisciplinarity between different professions.

VIRTUAL REALITY

Accessing a virtual room and being able to view objects in real dimensions, colours, shapes, reflections and different lighting conditions is a huge advantage when visualising a construction. VR not only enables us to simulate these characteristics and experiment with them intuitively, but also to work in a virtual environment by using our hands and bodies. In VR we can simulate real-life processes without using any physical resources. Furthermore, VR enables us to solve real-life problems, visualise them in a more suitable way, and support us in a creative process.

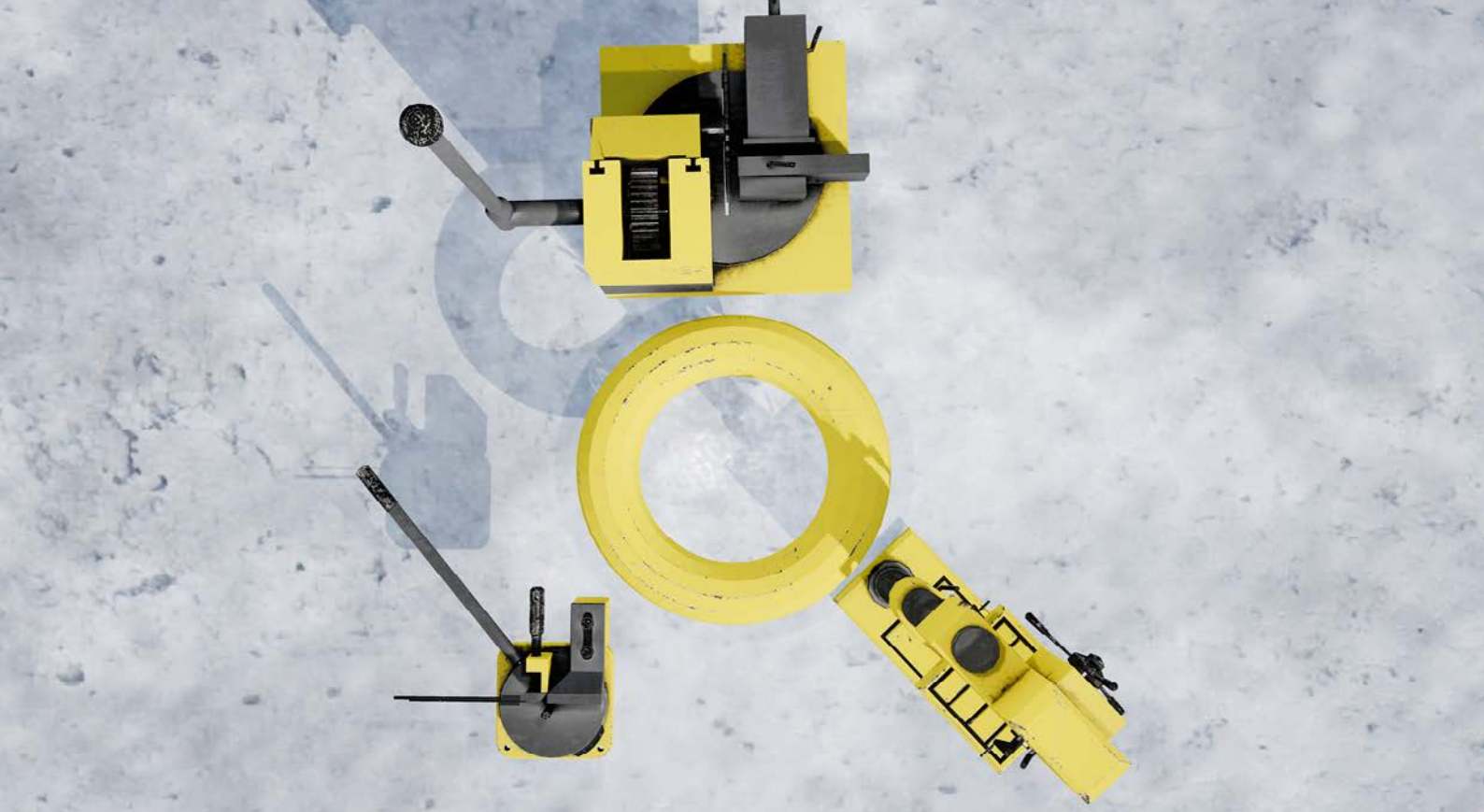
END-USERS

VISTOM targets several types of users: the apprentice who wants to learn about different construction machines and processes; the worker who wants to pilot his constructions without using any resources; and the DIY community who is keen on building independently its own constructions without having the expertise or easy access to a workshop. Furthermore, VISTOM can be used by designers and architects to better understand the difficulties and limitations of craftsmanship, and where and how to overcome them.

VISTOM integrates multiplayer mode, enabling up to four users to access the virtual environment from any geographical location which has many benefits for the design and draft process. For instance, it encourages organic solidarity and societal education [2]. In this case, individual differences are a powerful source of connection rather than a division as VISTOM enables users from different disciplinary backgrounds to come together to solve problems in an interdisciplinary manner and eliminate shortcomings in construction.

GAMIFICATION

We are using gamification as an educative tool to keep in touch with reality and find a suitable balance between resources, cost and time while creating an efficient construction. Through the access to a multiplayer mode, we encourage positive competition between users to find a solution with the best value for money and minimal effort.



SOFTWARE DESIGN

To create a hybrid of “hands-on” reality-based craftsmanship, and a digital design software with all the advantages of both realms, we designed the function to multiply an object with a maximum factor of ten. Furthermore, we implemented the functions “undo” and “redo” as well as “load” and “save your work”. In turn, we reduced the number of repetitive tasks whilst still being able to recognise the required effort. Lack of physical feedback in VR is a problem to be aware of risks and dangers which can occur in reality. Therefore, we implemented signals which indicate whether the user is in danger, e.g. when touching the sawblade [3].

The development and implementation of the diverse machines have been divided into two categories:

- 1) Dividing objects (sawing machine)
Dividing parts of an object (drilling machine)
- 2) Deforming objects (bending machine)

With these categories, the user can experience the main construction methods in a simple yet accurate way. To increase the learning curve and usability, all machines have the same user interface and are designed in a simple way. The machines are positioned in a circle and rotate on input from the controller which enables the user to work efficiently in one spot [4].

CONCLUDING REMARKS

We are leveraging the benefits of virtual reality in design and construction through VISTOM. We envision its use in enabling all types of end-users to experience a complete construction process from beginning to end with all its problems. It will be easy to quickly see the results, verify the functionality and review the weak design points in a collaborative and interdisciplinary approach. .



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- [4] Oculus Medium has an intuitive way of tool selection.



10 | GAMIFIED-ED3D PROJECT

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THE HOSPITAL'S INFRASTRUCTURE

The University Hospital Emergency Departments (ED) are complex organizations in terms of building infrastructure, variety of employment and medical process. Various specific aspects related to these departments are of uttermost importance: **1)** the medical and nursing staff teams are significant, **2)** medical and nursing staff turnover as well, **3)** the clinical activities are highly diversified, and **4)** the time to react, engage and adapt is, by nature, crucial.

THE HOSPITAL, A FEW NUMBERS

The Lausanne University Hospital (CHUV) is a 1500-bed public university hospital that provides primary care to the 300,000 inhabitants of the Lausanne area as well as tertiary care to Western Switzerland (about 1.5 million-population area). The CHUV ED is specifically characterized by an amazing daily activity with more than 60,000 patients hospitalized each year, and initially evaluated by triage nurses. Many of them (~20,000) are admitted for specialized health problems (ophthalmology, gynaecology, psychiatry, etc.) and thus referred from the ED to the specialized clinics or to the ambulatory primary care clinic of the hospital. The remaining patients (~40,000 patients/year) are directly treated in the ED.

THE SOLUTION USED NOWADAYS

The medical and nursing teams involve a significant proportion of junior physicians and nurses, according to the academic missions of education and training. To support juniors' integration, different strategies are classically proposed during their first days in the ED. For example, slide presentations, skill training or simulations of classical emergency situations are commonly used in the CHUV ED.

A gamified 3D simulation of the CHUV ED infrastructure



THE PROBLEMATICS

To involve and rapidly engage medical teams in life-threatening situations, a comprehensive and effective training is offered, even prior to the first ED shifts. Different information media are used, with paper-based documents sent before arrival in the ED: eLearning or Moodle-based videos. Nevertheless, the issues related to the concrete ED organization and architecture are difficult to understand through these tools.

GAMIFYING THE LEARNING PROCESS

This project proposes a gamified 3D simulation of the CHUV ED infrastructure where any new staff member will be able to visualize key places, team functions and key permanent colleagues. The objective is to promote the team involvement of new collaborators as soon as they arrive in the ED and simplify their positioning in the ED infrastructure.



A FEW WORDS ABOUT THE DEVELOPMENT

The resources which were used during the modelling and development process were the actual architect's plans and a great number of photographs taken during the visits to the ED. The plans have been redone with Autocad to ease further manipulation, then exported to 3ds Max to build the walls among other things. Assets representing medical facilities have been added to their respective rooms or positions. Finally, the game mechanics have been implemented using Unity3D, allowing the character to interact with the environment like walking throughout the hospital, checking his position thanks to a map or seeing actual photographs and photospheres of key places. The textures have been rendered and applied using both 3ds Max and Unity3d.

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ARCHITECTURE & URBANISM ROUNDTABLE



Raphael Chevailler



Julia Nemeth



Tobias Kappeler



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SESSION ECONOMY & ECOLOGY

14H15-16H40

Recent technological developments are radically transforming economies both locally and globally. New technologies are transforming conventional economies and creating new ones. Being part of new emerging technologies, Serious Games and Gamification constantly offer new perspectives in terms of product marketing, individual and collective productivity, career management, and lifelong training. The “Economy and Ecology” session will present some recent experiences of exploiting Gamification and Serious Games to support ecological causes and challenges, to improve traditional economic activities and to develop new economic prospects.



CHAIR: BRUNO HERBELIN | EPFL | LAUSANNE





11 | SAVE THE WATER! SERIOUS GAME FOR WATER MANAGEMENT OF CHINESE FARMERS

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“Save the Water” (2017 – ongoing) is a cooperative design and research project between the Institute of Environmental Engineering of the Swiss Federal Institute of Technology (ETH Zurich) and the Subject Area Game Design & Game Lab of Zurich University of the Arts (ZHdK). It is a subproject of the China Ground Water Project between the SDC (Swiss Development Agency) and the ETH.

The main goal of the subproject is to raise awareness of the growing problem of groundwater depletion, among Chinese farmers in Guantao, prefecture of Handan. Accordingly, the games’ main purpose is not to change the farmers’ behavior, but to sensitize them to the problem, spread and gather knowledge and start a discourse [1, 2]. Furthermore, the games should also work as a research tool for on-going ecological and socio-economic research.

The ZHdK team has been developing and researching the game design process of an analog (board) as well as a digital (browser) game, while the ETH team (consisting of Swiss, German and Chinese experts) provided the quantitative hydrological and agronomical framework, having studied and interacted with the groundwater management system in situ in China for many years.

*The board game
“Save the Water” is a
multi-player simulation
about the cropping cycles*



The board game “Save the Water” is a multi-player simulation about the cropping cycles. It initiates decisions concerning the crops (single crop, double crop or greenhouse) and the consequential water resources. Since all farmers/players have a common groundwater pool, the game ends for everyone if the water is depleted by one player. If the groundwater stays on a reasonable level, the person with the largest amount of money (crop yields) wins. Random elements (weather, nature-related events such as diseases) disrupt the players’ strategies and encourage them to discuss individual and common goals among the group.

Since it is very challenging to develop applied games for another cultural context [3], a core design tool was the frequent test playing which helped to shape the game usability. The board game tests were conducted in 2017: first, the play sessions with game design students and ETH staff in Switzerland served to find the appropriate game mechanics. A couple of months later, play tests took place in Guantao, China, with farmers and water administration officials.

Those play tests for the actually targeted cultural frame yielded a variety of important results: it turned out that for the primary target group, the Chinese farmers, the game was too complex and contained still too much text. This raised a major problem, because a large number of the target group cannot read well. The game would therefore need more visual support and have some mechanics cut. Having a Chinese-speaking game master or facilitator, who introduced the game and explained the rules properly, proved to be necessary. Initiated by the game, there were some heated discussions taking place among the players about game strategies and in that sense the game served well as a dialogue tool.



The other target group were the political officials, the decision makers from the water management systems and groups who helped organizing farmers to playtest. Coming from a different educational background, they were more comfortable with the original game complexity. Therefore, for the final production stage there were two board game versions, a simplified and a more complex one.

In the second (and current) main project phase, the digital adaptation development of “Save the Water” is taking place [4]. Even though the browser-based simulation game shares similar game mechanics to the board game, it is primarily a single player game. Consequently, the focus lies less on community-based discussions, but rather on players’ decision making (and the tracking thereof by the researchers), and their acceptance of the agricultural policies and agreements.

Both analog and digital game versions show typical serious game compromises: how to build player motivation, proper challenge and reward systems while assuring scientific sincerity? Having the numerous discussions with members of both institutional project teams, and Chinese test players in mind, this contribution intends to share the lessons learned during the game design and research process.

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12 | AUGMENTED REALITY FOR CONTEXT GAMIFICATION: ESCAPE ROOMS AS EXAMPLES

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Gamification has been proved to be effective and efficient to rise interest and enhance motivation when performing day-to-day and/or professional activities such as education, training, team building and task management [1]. Gamification of real world activities generally requires introducing and manipulating specific objects. Unfortunately, and even if the ideas do not lack, it is often the cost of these objects that represents the major obstacle to their adoption and intensive use. We believe that using augmented reality can provide a solution: reinforce the use of virtual 3D objects, simplify their integration and exploitation in real contexts, substitute real objects with 3D objects can help reduce costs in terms of time and money.

The interest of using virtual ludic objects is largely conditioned by the genericity of these objects and their ability to integrate and adapt to different situations. Two challenges are therefore to be noted: (i) the genericity of the “playing” objects and (ii) the facility to introduce their use. We have tried to define the essential characteristics to ensure these two conditions, and our analyses and reflections converge towards the following five features:

- › Reuse: this criterion is related to the object usability in various scenarios. For example, a virtual balloon, map or puzzle can be integrated in various games and challenges.
- › Personalization: this criterion is related to the ability of customizing a virtual ludic object. Basic customization examples are related to the object size and color, its information language it contains, and so on.
- › Interactivity: this criterion is related to the interaction capacity with virtual ludic objects. To be integrated into gaming scenarios, a virtual ludic object must allow users to manipulate it and interact with it.
- › Interoperability: this criterion is related to how well the ludic object can communicate with its environment. The basic example is its ability to send or receive data.
- › Insertion: this criterion qualifies the integration ability of the object in an existing real environment to become well embedded in this context. The more intelligent and informed the object is, the higher the embedding capacity.

In order to validate our reflections, we worked on the concept of virtual puzzles to enrich classic Escape Room scenes. The motivation for this choice is that Escape Rooms, and despite their high po-

tential for attractiveness, often face a major limitation: the difficulty of varying and multiplying the scenarios. Indeed, varying the scenarios requires furniture, objects and numerous installations which do not allow a good profitability. We therefore thought that using of virtual puzzles combined with generic decors is a path that needs exploring.

Our design work on generic virtual puzzles has led us to define four levels of possible puzzles according to their technical complexities:

- › Context-independent enigmas: they are not dependent on the intended deployment context. They are autonomous and self-functional. They can be plugged into any real scene without any constraint. Simplicity of integration is the main advantage, but the limit is that these enigmas seem to be “parachuted” and offer little coherence with the real target context.

*Virtual puzzles to enrich
classic Escape Room scenes*



HOLOGRAMMES



› Context-constrained enigmas: they are constrained by pre-designed links to the real target deployment context. The links that characterize this type can be mainly one of three variants:

- » Geometric links that condition the object location, orientation and possible movements in the real target environment.
- » Logical links that semantically relate an object to other real objects. For example, a map enigma that references real landmarks in real scenes or digital puzzles that offer a useful numerical solution to unlock a real object.
- » Activation links which in this case enable a virtual enigma to activate real objects (opening doors, moving objects) or conversely to be influenced by data sent by real objects.

Our first mixed, real/virtual, Escape Room prototype, equipped with virtual enigmas, has been developed based on four simple virtual enigmas: three of them are context-independent. The fourth has logical links to other real objects. This first prototype has demonstrated the feasibility and this approach potential. However, various challenges are still to be met. It is important to work on more complex and richer enigmas covering the four above-mentioned categories. It is also important to investigate techniques and algorithms that ease the enigma integration within real Escape Room scenes and scenarios. Finally, we also have to work on the ability to define customizable Escape Room scenarios with manually, semi-automatically or even automatically configurable enigmas.

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13 | GAMIFICATION IN TOURISM, AN ANALYSIS OF NEEDS AND EXPECTATIONS

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CONTEXT

Touristic destinations are always interested in getting more visitors to spend one or more days at their locations. On the escape room model, destinations tend to look at visit gamification to attract new visitors or make them come during the low season or weekdays [1]. With the wide smartphone availability as a medium to play games, it could be tempting to create apps for visitors to download and use autonomously [2,3]. However, a more global approach can prevent some misunderstanding and problems during the production phase. Touristic actors and tourists have different agendas and expectations. This paper analyses the needs and expectations of the different actors (regional tourism promotion office, shopkeepers and tourists) who could benefit from a gamified visit using augmented reality in the city of Morges.

CASE STUDY

In this paper, we present a case study relying on a questionnaire and semi directed interviews of touristic actors and potential users for the development of a computerized version of a touristic map using Augmented Reality. The questionnaire was online and anyone could take part. On a total of 139 participants, 28.8% were aged between 19 and 25, 18.7% between 26 and 30, 12.9% between 31 and 40, 10.8% 41-50, 12.9% 51-60 and 15.1% above 60 years old. Even if all age classes are represented, they do not represent the age proportion in Switzerland: 94.2% of the participants were from the French speaking part of Switzerland; 95% of the participants take their smartphone while traveling/visiting; 75% said that they specifically use it for orientation during a city visit. This confirms that smartphone is the right medium for gamification during traveling and visiting. As for the favorite source of information, 24.5% of participants said they preferred digital ways to the traditional paper version (8.6%). However, the majority (86.9%) liked to have a mix of both digital and paper versions. Thus, gamification using augmented reality can serve as a link between both media. To the question "How often do you visit the touristic office at the destination?" 2.9% said always, 20.9% often, 48.9% answered sometimes and 27.3% never. Therefore, more than 69% visit touristic offices. This is good news as visitors can start their game from the tourist office.

Pricewise, 37.4% of the participants said that they would pay between 1 and 5 CHF to get access to an useful and playful app; 33.8% would use it only if it was free; 23.0% said that they would pay between 6 and 10 CHF; only 5.8% would agree to pay more than 10 CHF. In the domain of maps using Augmented Reality, people would like to see historic sites, pedestrian paths, places to park their cars, restaurants and hotels. They would be happy to receive discounts on the app to visit local businesses.

On that front, the local business association is also open to give special discounts to visitors that use the app a lot.

*The public is expecting
more from a destination
and wants to have fun*





From the perspective of touristic officials, gamification through mobile apps could be a solution to attract more visitors. They already get demands from visitors to get more entertainment in the city center, something to do that changes from the normal information panel. Likewise, proposing activities other destinations do not is one motivation to use gamification. Tourism officials also want to make small businesses and shops more visible to visitors in the city center zone. With mobile apps, they want to attract a young public from 16 to 30 years old.

45

CONCLUSION

This paper presents a tourist gamification use case not to discuss about technical issues as such, but to highlight for such development the needs and expectations of the tourist field. As this paper shows, the public is expecting more from a destination and wants to have fun discovering new territories.

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14 | CAREER COUNSELING INTERVENTIONS WITH VIDEO GAME PLAYERS

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Video games are becoming ubiquitous in Western societies. However, they are often considered a useless hobby—if not a dangerous one—and an obstacle rather than a support for the career choice process. Recent studies [1] indicate that playing video games fosters many cognitive, motivational and social skills that are highly valued in the labor market. Therefore, career counseling interventions should be able to capitalize on this popular leisure to boost the vocational choice process of video game players. Through Leo's case this paper will introduce three types of career counseling activities that leverage on video games. Their impact on the career counseling process will be analyzed and discussed.

Leo is a 14-year-old student who must find an apprenticeship for the following year. He is passionate about video games and wishes to become a game designer. His mother made an appointment at the Career Counseling Service of the Psychology Institute of the University of Lausanne. His career counselor was the author of this paper. The whole counseling intervention included five weekly face-to-face one-hour sessions which were video-recorded with Leo and his mother being willing and having signed consent. The first session was dedicated to investigating Leo's history and the reasons for seeking career counseling. This session comprised a qualitative analysis of Leo's video game playing habits and goals. The second and third sessions aimed at investigating Leo's vocational interests and cognitive abilities through usual vocational assessment tools. The third session consisted of a grid-based analysis [2] of the skills Leo had developed and practiced through video game playing. These skills were then linked to those required by existing occupations in Switzerland. The fourth session was devoted to an individualized feedback and interpretation of Leo's assessment results. The counselor taught him the "SuperBetter" method principles [3] to turn his reality into a video game. The fifth and final meeting consisted of evaluating Leo's options and elaborating an action plan. The whole career counseling intervention thus consisted of three video game-targeted activities whose content and impact were carefully reviewed.

*He was developing a lot
of abilities through his
favorite leisure activities*



First, the qualitative assessment of Leo's playing goals and habits allowed the career counselor to show a deep interest in the client's reality, and thus entering his own world. This fostered the relational bond between them, which is an essential component of the working alliance. Second, the skill analysis led Leo to realize that he was developing a lot of abilities through his favorite leisure activities, which pleased and empowered him. Moreover, bridging these skills with existing occupations stimulated the identification of a new domain of interest: architecture, and especially interior design. This occupation was consistent with his self-assessed interests for luxury environments and new technologies, as well as his above-average visual-spatial abilities. Finally, the SuperBetter method helped Leo frame the search of an apprenticeship position in a more positive way. In fact, Leo's bad grades in mathematics represented an obstacle to his plan's success of becoming an interior designer. However, when he was encouraged to see himself as a superhero, he started perceiving his difficulties as "bad guys" he had to fight in order to complete his mission, which he found inspiring and motivating.



These three activities aimed at capitalizing on video game to encourage the career decision-making process. At the end of the career counseling intervention, Leo still wanted to become a video game designer. However, he was now willing to explore other alternatives such as becoming an interior architect. More specifically, it seems that activities focused on video games have several benefits:

1. allowing the career counselor to enter the client's world,
2. emphasizing the client's competences, and
3. bridging the virtual and real worlds so that the virtual world appears more relevant to the vocational choice, and the real world more interesting.

However, more research is needed to investigate empirically the impact of such activities using appropriate quantitative indicators. Their relevance qualitative assessment could also be conducted during a follow-up session with the client. Moreover, the convergence between the training and use of skills in video games and their effective counterparts in occupational activities should be rigorously studied.

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15 | PEARL ARBOR, A SERIOUS GAME FOR ANTHROPOCENE AWARENESS

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CONTEXT

The way visitors access content in a museum is changing thanks to new technologies. For the last 10 years, changing visitors into actors while visiting museums has gained popularity [1]. Gamification and serious games are the central aspects of these changes [2,3]. In this context, The Valais Nature Museum in Sion has undertaken a shift from a traditional natural history museum to a 'nature museum' focused on educating about Anthropocene, a new relationship with nature. To assist this shift, a partnership between ENS Lyon, the HES-SO, HEP Valais, the University of Fribourg and Adventures-Lab SA has been set to create a digital game. The Anthropocene concept describes the time when the activities of humankind reaches a level where these activities have direct impact on geochemical cycles and on biodiversity. Currently, Anthropocene undergoes international controversy to make it a new official geological period. Notwithstanding this controversy, the Valais Nature Museum sees into Anthropocene the opportunity to make visitors aware of the different ecological problems and the impact of humankind on them.

PROPOSED SOLUTION

In this paper, we propose to develop a mobile game accessible via digital tablet. Using augmented reality (AR), the game, playable in groups through multiple tablets, encompasses two

parts representing a relationship change with nature. In the first part, taking advantage of the large collection of already exhibited, stuffed animals in the Valais Nature Museum, players are asked to virtually capture the animals using AR to gain as many points as possible. To catch an animal, players point the digital tablet camera towards a stuffed animal. Using an image recognition algorithm, the game can recognize the animal and proposes to capture or domesticate it. In the game, the number of animals of each species is set for all players. Each time a player grabs or tames an animal, the total number of available animals decreases for all players. To capture an animal, the player must choose one animal already in his/her collection to fight the recognized animal; the outcome of the fight is based on statistical rules. A bigger animal has better chances to win against a smaller animal. If the combat is won, the recognized animal is placed in the player's collection; if not, other players can catch it. To tame an animal, each player has a finite amount of food and tools. Each time she/he domesticates an animal, she/he loses some food or tools.

In the game, the gauge representing the percentage of animals still free is displayed. However, its existence is not directly communicated to the player in order to mimic the humankind unawareness of its action effects on natural resources until recently. The first part ends when the gauge is near 0, meaning that most animals have been captured or domesticated. Before starting the second part, a

The opportunity to make visitors aware of the different ecological problems





museum educator challenges the players by asking why the first part has ended and then tells them that the animal number was finite and they collectively lowered it at each capture and domestication.

The second part aims at increasing the players understanding of the nature by answering questions and setting collectively the nature resources back to normal. The questions are answerable using a multiple choice. All necessary content to answer the questions is available throughout the museum. Each good answer increases the gauge, whereas a wrong answer has no effect. The second part ends when all players have answered all questions. At this stage, the final gauge level is communicated to the players. The combination of both parts acts as an analogy of our History showing the shift from unawareness to awareness of the effect of humankind actions on our natural surroundings.

PILOT STUDY

During the fall 2017, a pilot study was designed to have preliminary results about the game effect on secondary students. The study design followed both parts of the game with the short challenge in between. A video of the interaction among students was used as main data. The video showed that students were more engaged in the visit and were more receptive to the museum staff explanations.

CONCLUSION

Implementation of more engaged museum school visits does not only consist of developing a computerized game. A preliminary work must take place between educators and staff museum to make sure the engagement is there.

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ECONOMY & ECOLOGY ROUNDTABLE



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GORDON BENNETT GAS BALLOON 2D AND 3D -GAME

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Landing as far as possible from the launch place is the goal of the Gordon Bennett and America's challenge gas balloon races. All the teams competing in the race have the same amount of lifting gas (usually 1000 m³ of hydrogen or helium), they choose their flight equipment and embark sand to balance the buoyancy force. The balloonists can only change their altitude by dropping an amount of sand or by releasing some of the lifting gas. The goal is to find the best winds (which differ in amplitude and direction according to altitude) to save their resources (sand and lifting gas) in order to stay longer in the air. The oldest and most famous race of this type is the Gordon Bennett race which took place for the first time in Paris in 1906. In October 2017, the Freiburg-Fribourg Challenge team, with the pilots Laurent Sciboz and Nicolas Tièche, supported by the HEIA-FR and the 4P [1], broke the distance record of 3400.39 km held for 12 years by the Belgian team Berben & Siméons: they reached a distance of 3670.76 km in 59 hours and 35 minutes during the America's Challenge, the second major gas balloon race.

Two different software, based on the Gordon Bennett rules and using the Unity 3D game engine, have been developed at HEIA-FR.

A **2D game** has been created to promote gas balloon races and enable players understand how these balloons work. The game incorporates realistic physics (as described in article [2] or [3]) to change the balloon vertical position according to the gas and sand usage. The difference between the lifting gas temperature and the one of the surrounding air must also be considered as their effects also influence (indirectly) the vertical motion of the balloon.

In the game, the player has to travel the longest distance using the least possible resources. The player must also avoid stormy clouds and maintain his balloon within authorized air corridors. The player earns points for each travelled meter and loses points when sand is dropped or lifting gas released. Finally, the player must land with a vertical speed of less than 10 meters per second, otherwise the balloon crashes and all the collected points are lost. The game is also lost if the player enters a stormy cloud or flies at the wrong altitude while assigned an air corridor.

Several predefined races are proposed and the player can create his own races by choosing the points of departure and arrival. The real earth vertical terrain profile between both points is automatically recovered from Google services. The player can also change the race difficulty by choosing the available amount of gas at the beginning, the total number of areas where flight altitudes are restricted and departure time (day/night).

*Travel the longest
distance using the least
possible resources*





A **3D game/simulator** with the use of virtual reality has been created. This simulator takes into account the physics including the vertical movement thermal effects and the weather forecast for the horizontal motion of the balloon pushed by the wind according to the article [3]. The player chooses the simulation starting point and time. The available weather data as close as possible to this time is then loaded from NOAA's (National Oceanic and Atmospheric Administration) services [4]. NOAA provides weather forecast for a period of up to 16 days for the whole world. The Earth profile and satellite maps are loaded using MapBox [5] services. The landscape is then displayed in the most realistic way. In order to (virtually) fly the balloon, the player uses a controller device to drop sand from sandbags located around the basket or pull a rope that opens the valve at the top of the balloon and releases the lifting gas.

The player can use several instruments to read the position, the altitude (as a GPS would do), the height variation and the speed relative to the ground in order to take decisions to control the balloon route. Two additional measurements are also available: the remaining mass of sand and lifting gas. This information is not available in a real flight and must be estimated by the pilots. Finally, a map showing the distance travelled since the beginning of the flight is also given. In this simulator, the score is related to the bird's-eye distance between launch and landing points. If the landing occurs with too much speed, the landing is considered a crash and the score is not taken into account.

Real pilots have been using that game/simulator and have indicated that it is quite close to reality.

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SESSION EDUCATION & TRAINING

8H35-11H10

The intrinsic motivational factor provided by Serious Games is more and more leveraged in education and training. The learn through play paradigm is intensively applied to develop new approaches to education. Florence Quinche (HEP-VD) shows a game to prevent racism against Roma people. Mathilde Buenerd (HEAD-Geneva) presents how the combination of serious games and quantified self improves our ability to interact. Bettina Wegenast (Fabelfabrik GmbH) explains how Serious Games can help elderly people in retirement homes to interact with each other. Vanessa De Luca (SUPSI) presents a concept to create a design tool that addresses real-world problems toward educational game-based scenarios. Iseli Tabea (Zurich University of the Arts), inspired by movie industry, shows how important messages should be incorporated into a serious game in order to maximize impact on players.



CHAIR: DRAGICA KAHLINA | HSLU - INFORMATIK | ROTKREUZ





16 | LES CHRONIQUES D'ANA

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INTRODUCTION

In september 2017, Migros Engagement mandated the ZHDK (Zurich University of the Arts) and the HEAD – Genève (Geneva University of Art and Design) to produce several games to valorize Swiss museums using video games. (OU The goal of the projet is to use video games mechanisms to create a new way of discovering museumsí permanent collections) The students of the ZHDK are developing their projects for the museum of Aarau, while the HEAD students are collaborating with the MEG museum (Musée d'ethnographie de Genève).

During the first part of the year the class of Media Design at HEAD- Geneva began to work on individual projects until december 2017 at which point the Musée d'ethnographie de Genève chose three projects for further development. « Les chroniques d'Ana » (The Chronicles of Ana) was selected by merging qualitative aspects of three individual projects developed during this first semester. It was at this point that we started working on the project and are currently developing and designing the game with input from Douglas Edric Stanley (HEAD) and external advisors like Cassandre Poirier-Simon (Myth_n).

THE PROJECT

Our project is an augmented reality game that takes place in the Musée d'ethnographie de Genève. The visitor begins by downloading the game on his mobile phone, or borrows an

iPad from the museum. The visitor starts the application to begin the game. The game tells the story of Ana, a scientist travelling through time, stealing objects in order to study them. Due to the clumsiness of her assistant, the objects are scattered all over the world, mixing up periods and civilisations. So the player is requested to bring back the objects back to their rightful time and place.

After discovering the story, the player physically moves throughout the museum, scanning stickers positioned next to various artifacts: by scanning the sticker, a 2D animation is launched in augmented reality next to the artifact. The visitor discovers a scene where a character cannot complete a task because they are missing the right tool. To solve this situation, the player needs to figure out which objects are incorrect, and to exchange them with another element found in another scene.

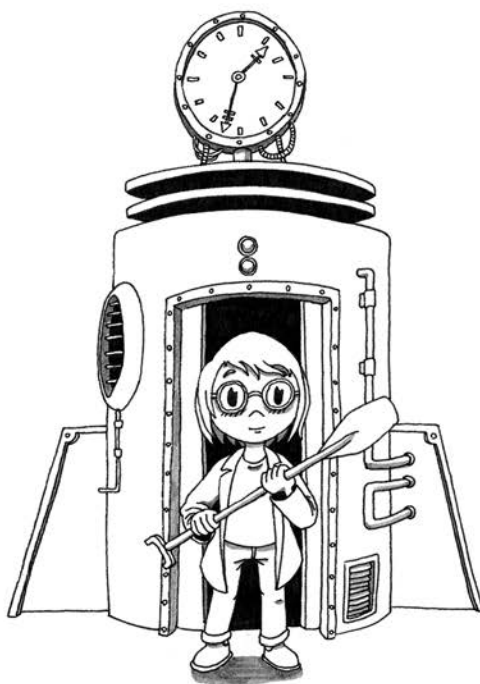
*An augmented reality game
that takes place in the Musée
d'ethnographie de Genève*

**OUR MISSION**

The terms of the project and its scope were provided in the brief. At first, we were asked to focus on the general public, with a focus on intergenerational exchanges and making the museum more interactive. We were also asked to take into account possible future adaptations of the game to other museums and other contexts. One idea from Migros Engagement is to create a toolbox of interactive experiments that will be available to Swiss museums as a whole.

THE CONSTRAINTS

Making a video game that takes place inside a museum involved several constraints that are specific to the place and to the public who visit [1]. At first, we had to choose a certain type of public because it was nearly impossible to create a game that would be enjoyed by everyone [2]. We choose to focus



on the youngest visitors, especially children between the ages of seven and ten. This is an interesting target audience to focus on as it is a relatively difficult group for the museum to reach. Our project has to be both educative and entertaining, and our goal is to capture the attention of the children and inspire an interest in ethnography.

An additional constraint is that of space. We wanted our game to be pervasive, and to adapt to the lighting conditions inside of the museum. With this game, the visitor's journey is no longer linear but evolves according to their quest and to the objects that have been collected. Thanks to this non-linear exploration, we are hoping that it will help avoid crowds during busy holidays and weekends, and to guide visitors to rooms that would not necessarily have interested them in the first place.

Finally, we chose to exclude the sound dimension of our game and this for several reasons: first, we did not want to disturb the other visitors with the use of the speakers, but we also did not want to impose helmets or headphone that would have cut off social links between the players of the same group. But above all, we did not want to cut ourselves off from the non-French speaking public – a considerable part of MEG visitors – nor to impose excessive dubbing fees as we had to respect budget constraints.

CONCLUSION

At the time of writing, the project has entered its pre-production phase, but many questions remain unresolved, including the delicate question of the representation of characters and situations. We must find the right balance between the graphic simplification that is needed for a quick understanding of the situation and the rigor that is required when dealing with historical subjects. We must also test the gameplay mechanics, the interface, and the difficulty of the game using real conditions with our target audience [3]. For this, we are preparing a prototype that will be installed in-situ during the month of October. The input we hope to gain during this test phase will be a great help in improving the game.

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17 | ARCHEOGAME – A SERIOUS GAME IN THE FIELD OF ARCHEOLOGY

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Passing on knowledge on archeology is a challenge for new generations, especially in a time where technology is so predominant. This paper and related talk present an answer to this challenge with a Serious Game (SG) based on Virtual Reality (VR) born from the collaboration of the HE-Arc ingénierie (University of applied sciences and arts of Western Switzerland) and the Nouveau Musée de Bienne (NMB). The NMB focuses on archeology, history and art and also presents temporary exhibitions like the one entitled “Imagine the past” starting in June 2018. Through visual assets, this event offers a critical look on social construction in the past. During this event, we would like to introduce the work of a painter, Benoît Clarys, who proposes an artistic illustration of men and women evolving with tools and artifacts - exhibited in the museum - almost 5,000 years ago in the region of Neuchâtel, Switzerland.

The exhibition features the original work of an invited painter representing an archaeological life scene; the visitors will be able to interact with a virtual representation of objects from this era, which would be too fragile to be manipulated in real life, and replace them in a painting. The objects all come from the Neolithic site of Sutz-Lattrigen, Rütte (Biel's lake), which is listed in the UNESCO world heritage list [6].

Our intention is to instruct visitors thanks to an entertaining experience where end users are immersed in a virtual replica of NMB museum where five ancient objects presented on a table. A large painting, picturing the objects use in a real life scenario, hangs in front of it.

*VR and SG can bring
a lot to the museums*



In this SG, the visitors must match each object with the correct area by replacing them correctly in the picture. By doing so, the objects will “fade” into the picture, revealing the original work of art, and by the end of the game, the visitors will see themselves assigned a score according to their success in assigning the objects and the time taken to complete the game.

As images have never got more preponderant than in today's society, especially with the rise of new technologies, we believe that VR and SG can bring a lot to the museums since they can offer new representations of the past [1, 2, 3, 4, 5]. Can knowledge transmission be more effective through immersion in an alternative reality superposed to our felt and lived reality? Can an immersive experience have more impact than words? These are difficult questions to answer. Nevertheless, the NMB with the HE-Arc ingénierie (University of applied sciences and arts of Western Switzerland) proposed a partnership to create an educational prototype mixing VR, SG, archeology knowledge and art (with Benoît Clarys' work). This VR prototype proposes the visitors to discover and interact with archaeological objects according to four types of paradigms:

- › the real world;
- › the painting as a real object;
- › the virtual environment (VE) representing the real world and augmented with representation of real archeological objects;
- › the representation of the same painting as a virtual object that can be “increased” by user interactions.



Through VR, we want to offer a new pedagogical and sensorial experience and the museum a reflection based on the nearly natural opposition between a two-dimensional painting and VR. We believe this project can raise the following questions: are those new communication media able to transmit more efficiently images from the past? Does the experience develop a deeper understanding of the environment? Or even, will humanity be able of distinguishing the border between material and numerical realities without falling into schizophrenia?

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ACKNOWLEDGEMENT

Authors would like to point out that the 3D design of the artifacts presented in this work have been developed by M. Yassin Guedri.

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18 | HapticBikeTraining Project

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In this paper, we present an ongoing project by graphic artists of the Académie de Meuron and He-Arc Ingénierie engineers: The HapBikeTraining.

CONCEPT

Nowadays, keeping a body in healthy conditions has become a life goal for some and a trend for most. Due to a lack of personal time, many individuals invest in home-training equipment such as exercise bikes, cross-trainers, treadmills or rowing machines. Unfortunately, those pieces of equipment give a repetitive experience and do not encourage users to improve their training practice. The project HapBikeTraining offers a stimulating and efficient alternative in the form of a serious game with haptic feedback set on an exercise bike with a screen. Developed with a friendly cartoon-like design, users ride a bike while their avatars evolve in beautiful and various landscapes with variable slope levels and many interactive surprises. To further improve the immersive feeling, during the journey the game adapts the pedalling resistance depending on the environment. We believe that adding fun and consistent challenges to training exercises can stimulate regular customers to improve their training routine and motivate the ones, who find usual training tedious to adopt a recurrent training regime.

SERIOUS GAME

Most of today's smart exercise bikes offer immersion through first-person gameplay. These simulations try to be as realistic as possible and give the user a real cycling race experience. HapBikeT-

raining presents a different approach as it enables the player to make his avatar evolve in a 2D linear world with side-scroller gameplay, similar to Super Mario games. The player must ride through the map as fast as possible thanks to game mechanics such as harder uphill roads, random obstacles such as stones or fences, that will slow down his race progress. Coins and rewards are available through the level to gain some time.

Users ride a bike while their avatars evolve in beautiful and various landscapes



VISUAL CONCEPT

Three visual arts students from the Académie de Meuron have worked on the graphic aspect of the game, their research objective is to enable the user project himself in an environment that is a reality extract and live a fun experience by linking the effort to sensations and emotions.

This game will take the user into an irrational world that will surely get him out of his daily routine.

Three different environments punctuate the journey through different levels:

The player starts the adventure by crossing a post-apocalyptic environment, accompanied by spirits he must collect, and then an infernal and chilling landscape: he must pedal faster to extract himself



from the bad feng shui of these places and thus reach the second level. There, he will be propelled onto celestial bodies in the confines of the universe by riding an interstellar bicycle: if he finds the mushroom, he must eat it to be taken up to the third level, where he will be parachuted onto a magnified and improbable coloured-haloed ground. There, all is sweetness and beauty that the user can enjoy before the arrival. Damn, the trip is already finished.

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CONCLUSION

Some smart bikes already exist on the market with more or less interaction, but the addition of a pleasant and beautiful serious game instead of a simple simulation will significantly enhance the user's interest.

We would like to thank the students of the school of visual arts Académie de Meuron who have imagined and drawn the magnificent environments the players will discover throughout the game.

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19 | ADAPTING TO TYPING IN VR WITH A SERIOUS GAME

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Typing in VR is a recognized challenge for users. The method currently supported by most systems is a large virtual keyboard on which users can type using controllers, pointing at keys and pressing a button to activate them.

Along with others [1], Logitech believes that users can benefit from being able to use a real keyboard to enter text, especially in productivity-driven scenarios, but also in games or chat applications. As the user interacts with the same physical object that he would normally use outside VR, it allows him to ramp up quickly. Over the course of almost a year, in collaboration with external developers, Logitech developed multiple prototypes. In November 2017, we announced “Bridge”, a development kit that enables typing in VR using a tracked physical keyboard on top of which is overlaid an image of the user’s hands as captured by a camera on the HMD.

However, it is known that, even in a real world typing experience, user performance depends on how accustomed he is to the specific keyboard, not only its layout, but also the shape of its keys and even the key actuation mechanism. In this paper, we compared two 5-minute training methods for new Bridge users in a between-subjects design.

The first group, trained using a web browser with a set of given tasks, had to write an email containing a link to a Youtube music video, an item on Amazon they wished to buy, and the link to a Google Maps location they wanted to visit: each with a justification of a couple of lines.

The second group trained using an in-house developed game.

The game scenario was as fol-

lows: a bomb drops in front of the player and a password must be entered before the bomb’s timer reaches zero. The password can be found on the walls surrounding the player. If the user successfully defuses the bomb another one is dropped, whose timer is shorter. Once a bomb timer expires, it explodes and the game ends.

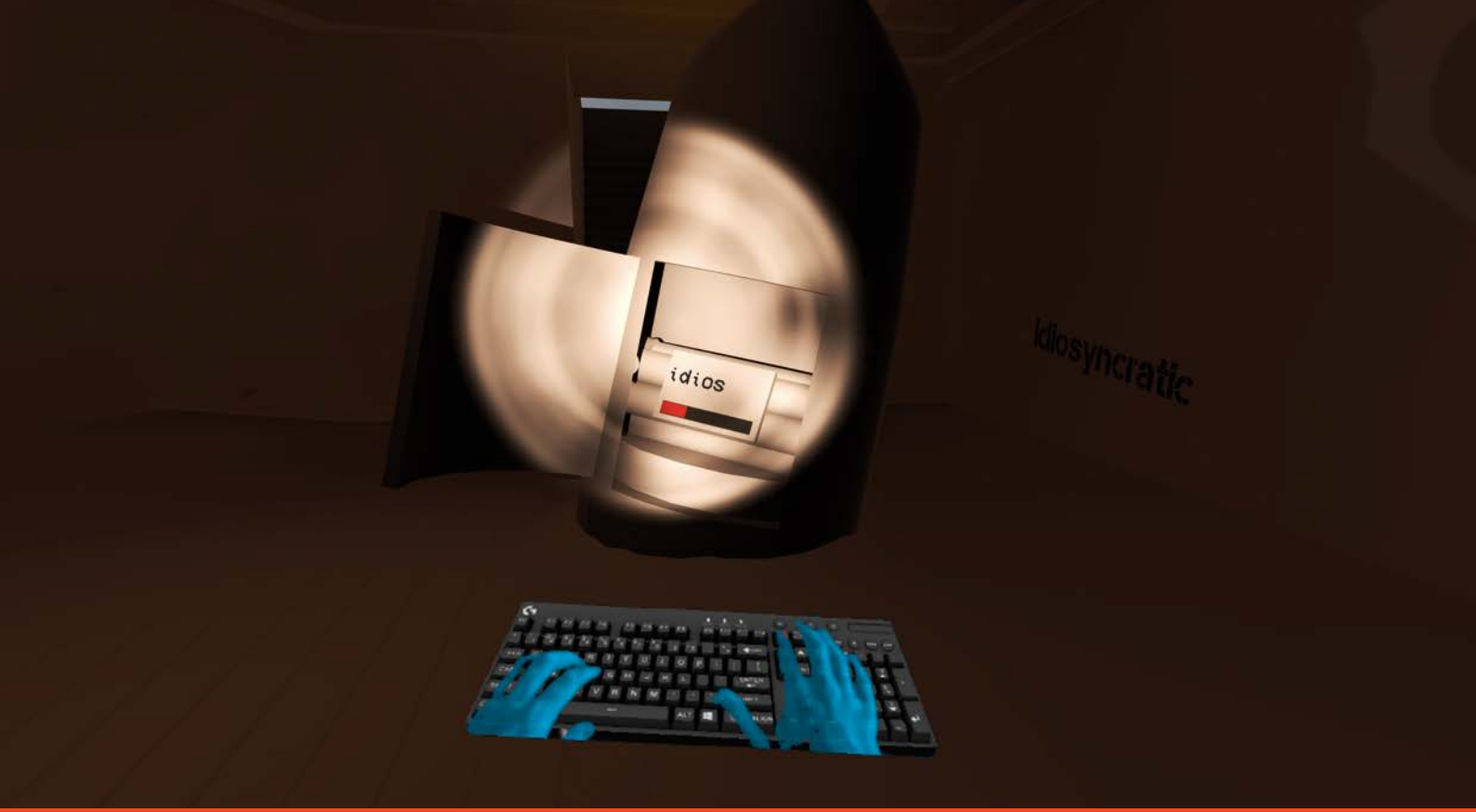
Both the browsing and game training sessions lasted exactly 5 minutes. The game was played repetitively until the 5 minutes expired, while the browsing experience was either cut short if the email could not be sent, or extended by browsing freely.

Before and after the training, typing performance was assessed using an objective text entry metric test [2], and an additional subjective measure was performed after the training, by using a survey based on [3-5]. Our hypothesis was that the most engaging game training would yield beneficial effects on both the subject’s perception of the system and his typing efficiency.

Twelve subjects participated in the experiment and the conditions were randomly assigned in a balanced manner. They were recruited within Logitech and had no previous experience with Bridge while having already been exposed to VR in the past.

*Users can benefit from being
able to use a real keyboard*





Given the relatively small sample size, we chose not to perform rigorous statistical analysis, but rather report trends observed on the data. The most interesting one is that the average words per minute consistently increased for all subjects except three. This confirms that five minutes of training is enough to see an effect on typing performance, regardless of the training method. It is hard to tell whether the latter had an impact on its own, yet we observed that people who browsed saw their corrected error rate dropping more than those who played the game. This might be due to the fact that the browsing training resulted in more typing than the game.

On a subjective level, people reported a higher perceived temporal demand and a lower perceived performance when they played the game, yet they reported being more likely to recommend the system to a friend and felt more accurate using it. We believe that this effect is due to the most engaging and playful game scenario.

To conclude, getting used to a text input method undeniably requires practice. We could not show whether training in an engaging scenario made people more efficient at typing, yet we observed that those who did were more enthusiastic towards the system. In a next iteration of the game we developed, we would like to redesign it in such a way that it involves more typing, so as to enhance its effect on error rate while maintaining its beneficial effects on people's motivation.

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20 | HOW TO CREATE A VIDEO GAME ON PAPER DURING WORKSHOPS DEDICATED TO VIDEOGAMING EXPRESSION?

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A TRIAL WORKSHOP

During a week at Moutier high school, five teenagers (2 girls and 3 boys) took part in a video game creation workshop. The participants were invited to design and produce the content of their own game (game design, level design, visuals, sound elements, narration, dialogue). The technical aspects such as programming and animations were taken care of by the speakers and the teacher.

This way, students were able to learn some basics in game design and then question themselves throughout the creative process. For example, during the character development stage, they were invited to reconsider stereotypical representations diffused through video games and media in general.

The workshop goals were, on the one hand, to help students work and make decisions in a team, as well as develop confidence in their work and give them the feeling of pleasure that creativity can give them; then, on the other hand, to take a critical look at their own practice and consumption of video games. Throughout the workshop, the speakers, the teachers and the students also played together, presented games that made an impression on them and created an open and constructive exchange in a context that was sympathetic to their common video game culture.

A HYBRID TOOL

This experience was made possible thanks to the use of a methodological tool specifically designed to facilitate introductory workshops on the creation

of video games. It is a method that favours a tangible, collaborative and transdisciplinary approach to the creation of video games. It offers space for reflection to the participants who are invited to express themselves through the language specific to this medium without the technical constraints that might slow down their creativity.

This hybrid tool was created during my Bachelor's degree in Visual Communication at HEAD – Geneva, and I am continuing to develop it during my Master's degree in Media Design. It takes the form of a kit containing support files and a digital toolbox. Once filled in and digitised, some of these files allow the generation of "the game designed by the participants."

The use of paper facilitates the process of creation by making each task familiar and accessible. It responds to constraints such as the lack of computer equipment in institutions, or simply to the desire not to use a computer in order to maintain a tangible, material aspect during the manufacturing of an object designed to be manipulated through a screen.

Nevertheless, this method has some disadvantages such as reduced independence in the production process. This is due to the difficulty of understanding creation software like Unity 3d. This is why the method is being expanded to accommodate simpler access tools and more immediate results such as the "Sketch Nation" application or the next game/tool from the Media Molecule studio called "Dreams".

*Collaborative and
transdisciplinary approach to
the creation of video games*





CONTEXTS TO EXPLORE

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This experience, organised with the help of the artist and teacher Larissa Medawar, gave birth to a research and development base on which one can explore the coherence and challenges of a workshop in a school environment.

In addition, other workshops are planned, or are in progress. For example, one of them takes place in Geneva, in a home for young people with difficulties called “Les Écureuils Doret”, a place where I spent a part of my childhood. In this context, it is a creative approach focused on “vidéoludique” expression [1].

Another example is a collaboration with an autistic teenager who has a strong interest in “point and click” games and for surreal universes. In this context, the method has been adapted to create a real exchange in order to give life to his singular aesthetic universe.

Finally, it seems that learning about the gaming mechanics helps develop a critical spirit in players. This is one of the goals of Niels Weber, a psychologist specialising in hyper-connectivity. In his prevention and treatment practices, he invites players to talk about their experiences and feelings when they play. This practice creates a space for dialogue. Being aware of what is happening behind the screen is therefore a way to better understand what is happening, to discuss it more easily, and therefore also to reduce the risks of excessive gaming. This led to a collaboration with Niels Weber on the organisation of workshops with a preventative purpose.

That is why, for the sake of accessibility, the method I have developed aims to be explored in different contexts by constantly adapting to new social constraints, whether temporal or material. This approach is inspired in particular by the formal approach of the design studio “The Extrapolation Factory” [2] and one of the experiences of Pierre Yves Hurel, doctoral student and assistant at the Department of Arts and Sciences of Communication of the University of Liège, who led a socially committed video game creation workshop in 2017 [3].

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21 | SERIOUS VISUAL NOVEL GAME IN HISTORY CLASS: WHAT LEARNING?

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With the development of new technologies in classrooms, video games are becoming an integral part of history teaching, notably through the Assassin's Creed game series (see for example Jarraud, 2015 and Mériaux, 2016).

However, the video game is then assimilated to a medium and analysed as such. Even if teachers place their students in the "situation of being actors" (Soyez, 2015a, 2015b), no concrete study measures the effect of these sequences on students' learning.

We carried out our study with two classes of 17 and 19 pupils of 10th Harmos year (13 to 14 years) of VG (performance-based group at basic level) within a secondary school in Lausanne. The objectives of our teaching sequence consisted in transmitting factual knowledge on the period of Terror, but also in deconstructing the Robespierre "myth" and thus to question the making of History.

The educational sequence of the test class was built around "Robespierre 10th", serious game we designed on the software Ren'Py. The game scenario was developed from a historian work (Obligi, 2016) and illustrations were taken as much as possible from period paintings and prints. In the game, the player is invited to investigate Robespierre's black legend. In order to do that, the player embodies a deputy during the Terror and faces the main events that mark this period. On several occasions, students must position themselves for or against laws or political events and receive immediate feedback to clarify the consequences of their choices.

Ideally, the game should allow the student to build his own opinion on Robespierre.

The teaching sequence of the test class consisted of three successive phases. During the first phase, the students played the serious game

"Robespierre 10th" and synthesised their observations on the various protagonists (Robespierre, the deputies, the people) in a double entry table. In the second phase, the students worked in groups to refine their findings. In the third phase, the pupils carried out an individual exercise in which they had to express their opinion on Robespierre's black legend and justify it using the information from the game. This exercise was evaluated according to four criteria: conformity, accuracy, coherence and completeness. The sequence of the control class took place in two phases: the first was devoted to the lecture course and the summary table and the second to the completion of the individual exercise, identical to that of the test class. In addition, a factual knowledge assessment questionnaire was then distributed to both classes. Two weeks later, the students' knowledge about the Terror was further tested in a written exercise.

The results of the individual exercise that concluded the test and control teaching sequences show that learning has indeed been achieved thanks to the video game. The scores obtained for the conformity, accuracy and coherence criteria are slightly lower for the test class (1.16 pts; 0.63 pts; 0.28 pts) than the control class (1.44 pts; 0.78 pts; 0.47 pts). On the other hand, the general quality of the opinions expressed (completeness criterion) is higher in the test class: 0.75 pts against 0.67 pts. The assimilation of factual knowledge, tested two weeks later, is basically equivalent in both classes.

*In the game, the player
is invited to investigate
Robespierre's black legend*





Robespierre

L'une de ces deux factions nous pousse à la faiblesse [les dantonistes],

Nevertheless, a very large majority (87.5%) of the pupils in the test group indicated that they were able to construct their representation of the historical period more easily than with a classical lecture thanks to the illustrations provided by the game, even if this statement did not hold true in their work. Finally, 80% of the students believe that although the game is mostly text-based, the breakdown into shorter cuts imposed by the game format has been beneficial to their overall understanding.

While we did not observe any significant impact resulting from the use of a visual novel type learning game, it should be noted that the performance of students exposed to that teaching medium seems to be equivalent to the one achieved by participants in a classical lecture setup. On the other hand, the serious game integration in the pedagogical sequence reinforced the pupils' involvement in the task as well as their immersion in the historical period studied thanks to the images and soundtrack. Therefore, video games seem to be a viable teaching medium for the study of a complex historical subject even with students in VG, who are typically less comfortable with this type of material.

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VIRTUAL REALITY, GAMIFICATION AND SERIOUS GAMES: MISSING LINK IN LEARNING EMERGENCY MEDICINE?

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Health care, with its exponential growth in knowledge and increasing demands on the doctors' competences required, needs new and more cost-effective training models [1–2]. Technology-enhanced simulation programs provide learning opportunities for controlled skills practice, without risks for the patient and is consistently associated with large improvements in knowledge, skills and attitudes [3]. However, the high fidelity simulators are expensive, both in terms of initial purchase price and running costs.

More than in other medical specialties, training in emergency care skills is critical for patient safety and is an essential part of undergraduate and postgraduate medical education. Each year, a very large number of professionals attend various emergency care courses that give priority to the initial resuscitation situations of critical patients. Despite the considerable progress in high fidelity simulation, the situations encountered in these teaching sessions are stereotyped and do not allow to reconstruct all the real conditions. In addition, an important point to consider in this context is that the student motivation assessment is often neglected in simulation programs. Yet, it is regularly observed that while learners tend to use them to achieve the learning outcomes required for their certification, they are not very diligent in using them as continuing education [4].

In this lecture, we will try to demonstrate that virtual reality, gamification and serious games are the missing links in the educational arsenal needed by emergency medicine in several dimensions. They offer learning tasks in a realistic, engaging online environment, where learners experience directly the consequences of their decisions. They are expected to confront learners with difficult situations such as natural disasters, terrorism, situations of war or humanitarian emergencies. The interactivity of these new methods and the realistic environment improve the risk perception. They help better understand participants' emotional response. These new methods should also help develop other skills in complex situations frequently encountered in emergency medicine such as announcing a death, caring an end-of-life patient or announcing a difficult diagnosis. Paradoxically, the new learning technologies should help improve the humanizing care. One can expect to put the learning of care beyond the cure in the center of the doctors' and caregivers' concerns. They should also be able to replicate team management situations such as conflict management. Due to their specificity and scalability, gamification and simulation games have the potential to teach knowledge and skills that could typically be acquired in a simulation center but at a fraction of the cost and in the context of a virtual reality.

*Integration of fun and
challenge in games
could reduce stress*





Integration of fun and challenge in games could reduce stress and improve motivation and efficiency.

Moreover, this self-directed learning should enhance the intrinsic motivation because it offers a greater sense of autonomy. If students are intrinsically more motivated to learn, they will probably spend more time learning as part of continuous and sustained training. Besides, the competition element in games is probably a positive factor, because it makes us want to improve constantly. Nevertheless, many studies on serious games discuss proposed elements that are important for motivation and learning, but relatively few describe empirical evidence [5]. One of the main limitations is likely to be practical: expanding the use of these new technologies in learning emergency medicine. Indeed, as for the simulation, they require to devote a considerable time to conceive clinical situations and possible alternatives to expected behavior. The financing of this work and the purchase of these innovations will be a second limiting constraint.

Moreover, emergency medicine is one of the medical specialties that has the most to gain from exploring this missing, innovative and promising link of training.

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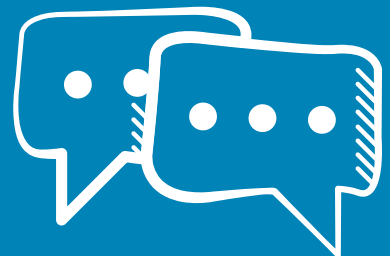
SESSION SOCIAL & POLITICS

13H35-16H

Initiating social change is not easy. Social change often requires informing, sensitizing, convincing, and pushing for action. However, these objectives are difficult to achieve without great motivation and strong involvement of the targeted people, in the short and long term. In this context, Gamification and Serious Games are increasingly adopted as a channel and tool for social change through their ability to capture the attention of players, to retain them over long periods and to involve them emotionally and intellectually. Examples of Gamification and Serious Games serving social or political causes cover a wide spectrum. Fighting against racism, working on social inclusion, preparing society for recent changes, and encouraging cross-cultural exchanges are just a few illustrative examples that will be discussed in the Social and Politics session.



CHAIR: MELA KOCHER | ZHDK | ZÜRICH





22 | A GAME TO PREVENT RACISM AGAINST RROMA PEOPLE

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Switzerland approved the ECRI (Economic Cycle Research Institute) general policy recommendation n°3 in 1998 “Combating racism and intolerance against Gypsies/Roms”, which “encourage awareness-raising among media professionals, both in the audiovisual field and in the written press, of the particular responsibility they bear in not transmitting prejudices when practicing their profession, and in particular in avoiding reporting incidents involving individuals who happen to be members of the Roma/Gypsy community in a way which blames the Roma/Gypsy community as a whole” [1].

Despite this recommendation, racism against Roma people is still a widespread phenomenon. It is founded on shared beliefs about this particular human group. A recent Newsletter [2] of the Swiss

federal commission against racism points out that media treatment of affairs including members of Roma communities generates negative representations in the public, confirming other studies [3–4]. Many racist stereotypes concerning Roma people circulate and have an impact on discriminations towards this group. For this reason, lots of Roma people in Switzerland have to hide their identity [5].

The development of a serious game showing the diversity of Roma people is an attempt to break down these stereotypes by showing that they have very varied life-stories and ways of life. Teenagers (12-16 years old) are the serious game target audience. There is actually no existing serious game on this topic and little teaching material concerning this kind of racism.

This project includes the participation of game designers, an interaction designer, a specialist of poverty and social studies, a photographer (Yves Leresche), a teacher educator and the Roma Foundation. The project is financed by Innosuisse. It started in 2017 and will end early 2019.

This video game is original because it includes original research material collected by the Roma Foundation and by the photographer: interviews of Roma living in Switzerland, life stories, statistics, media reports, photos. This material shows that most of the Roma are not beggars [6] as the media tend to show, but people fully integrated in the Swiss society, speaking the country languages, working, studying, having a variety of activities and relations. They also contribute to the society at different levels: economic, cultural and social.

With this game teenagers are expected to discover different life stories of Roma people in Switzerland. The game characters are inspired by real people. The objective of the serious game is to show the variety of situations and origins of Roma people in Switzerland, but also to inform on this population social situation in Europe. The pupils will discover the discrimination Roma suffer from and their actual situation in several European countries. The players will also learn elements of the Swiss and European legal system (residency permits, naturalization laws, working permits, refugee status).

There is actually no existing serious game on this topic





The game also gives a focus on the way popular media (TV shows, newspapers, Youtube) can impact on our representations of a population. The players will have to compare this information with other sources. The purpose of this design is to develop critical thinking skills.

The game design also includes deliberative aspects as the video game is linked to a debate session which will be held in the classroom. The students will have to confront the information they have collected during the game with the stereotypes and generalisations transmitted by the media.

The challenge in building this kind of game is to offer attractive gameplay and design as well as an accessible content for young people, which was one important question dealt with the graphic representation of characters in the game, as we wanted to avoid transmitting visual stereotypes. Another difficulty was to include original material (video testimonies) while respecting the interviewees' anonymity.

The other challenge consists in helping teachers to include pedagogical activities on this subject. As this subject is highly emotional and the negative stereotypes are widespread, they might be afraid of discussing that kind of questions. They also have very few skills on this topic, that's why the game will include elements that organize a constructive discussion on this topic (inspired by the philosophy of children methods) and specific pedagogical material will be proposed to help teachers to integrate the game in history lectures, citizenship education and French lessons.

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23 | OPTIMIZED TALK : WHAT FUTURE FOR DIGITAL PERSONAL ASSISTANTS IN THE COMMUNICATION FIELD?

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In 2018, many apps provide us with services to improve our writing or communication skills. Let's think about software or web extensions like "Grammarly" or "Hemingway" that help us "communicate more efficiently". Or "My Automated Conversation coach" (MACH), a virtual assistant developed at MIT in the effective computing laboratory, with the goal of helping people to practice social interactions in face-to-face scenarios. Or also, autocompletion tools now included in every keyboard, and automatic answers included in Gmail or Google Allo.

These services rest on providing us with advice and personal statistics. Between giving us constraints and data to "quantify ourselves", they can be seen as a form of communication gamification.

Behind these personal assistants, there's the assumption that there's a need of a more efficient communication. Is efficiency an interesting criterion when we talk about communication, especially when it's informal communication with people we care about? I argue that it's not, especially for two reasons.

First, to quote Barthes, because "[...] clarity is a purely rhetorical attribute, not a quality of language in general, [...] but only the ideal appendage to a certain type of discourse, which is given over to a permanent intention to persuade" [1]. Clarity or expressivity are not fundamental properties of language. They are qualities inherited from the art of rhetoric, that could occult other communication aspects such as honesty or spontaneity. Secondly, because "bad" writing habits like misspelled words, too long sentences or too many adverbs do more than conveying information. They express a facet of our education, our current mood and personality.

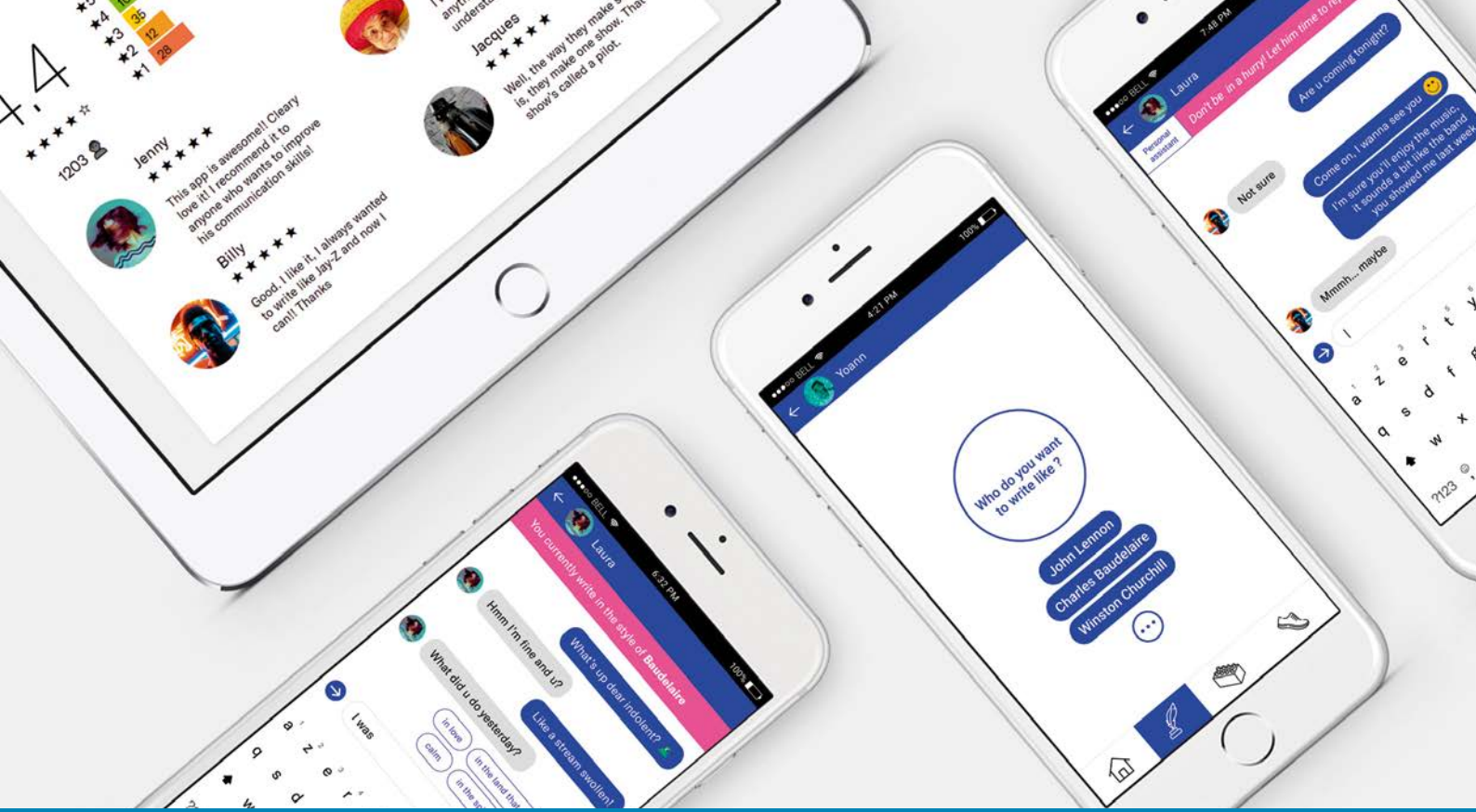
So if communicating more efficiently is not the point, what could be? As an interaction designer, I approached that question from an interaction design point of view, in the field of user experience.

A fictional instant messaging app with uncommon features



The digital personal assistants I mentioned are all apps or software. The way they work rests on algorithms, in other words, on sets of rules to be followed to solve a problem. Recently, new algorithm types gain importance in domains difficult to approach with a traditional programming way such as natural language processing or recommender systems. These algorithms, called "machine learning" algorithms, can learn from the user behaviour as they are able to offer a more personalized user experience. And in the end, they redefine the relationship between humans and machines, by creating new kinds of user experiences [2], for example, discovery-focused experiences. If they are used for recommender systems (such as Spotify Discover Weekly or Amazon recommendations), it is because they are particularly good at feeding curiosity, they enable alien ways of thinking and of imagining, what we could call an "algorithmic imagination" [3].

Concretely, how to apply those principles to real apps and assistants? To demonstrate that, I created "auto-chat", a fictional instant messaging app with uncommon features that leverage machine learning algorithms. This app is not a product intended to be commercialized, but an invitation to think about alternative uses of technology, by asking the question "What if...?" [4].



What if... you could write in the style of someone else? For example famous writers and politicians, or even someone you know like your mom. This would allow the user to discover new words and new ways of writing, and also bring a bit of humor and surprise in conversations. It could nudge the user to act out of his comfort zone and experiment with unexpected kinds of writing. This feature could also be used as a tool to help people open their own cultural bubble. Imagine a fifty-year-old man who could have recommendations that stimulate him to write like a fifteen-year-old teenager.

What if... you could manage your own vocabulary? You could see which words you use the most, and discover related words. Or even ask the app to prevent you from using certain words (for instance "Hi!" or "What's up?") to force you to be less automatic in the way you talk.

What if ... you could have recommendations based on your current mood? Let's imagine a personality manager that could give different recommendations depending on the user's mood. For example, I want to hit on my crush and I want my recommendations to help me to be a bit more spicy than usual.

And what if ... you could download conversation templates? Sentences pre-written by communication experts intended to achieve a certain goal, like finding a place to crash or seducing a girl.

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24 | BRINGING PEOPLE IN RETIREMENT HOMES TOGETHER WITH COMPUTER GAMES

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THE IDEA

While her mother was living in a retirement home for people with dementia, Bettina Wegenast, the initiator of "Myosotis-Games", spent a lot of time with her. Farewell time. She wanted to spend this time as positively as possible. But how? Offers that relatives and residents can use together are scarce.

Back in the days, Dorothea Wegenast always liked to play. So they tried it with well-known games like "Ludo", but unfortunately to no avail. The rules were no longer clear, the material was too small or the play rounds lasted too long. That's when Bettina Wegenast began to bring her tablet-computer along on visits. Her mother quickly got intrigued with the so far unknown device. The intuitive control and the joy of "always something happening" motivated her immensely.

However, it wasn't easy to find suitable games. It soon became obvious that computer games, specifically tailored for this target group, were needed. Not games that predominantly therapeutic properties, but games that are fun and which are customizable to differing abilities and could include personal media-materials. The idea to include photos, films or music to which the players have a personal connection, shall ultimately promote the desire to play and engage in conversations while doing so.

PROJECT "MYOSOTIS"

Together with Marco Soldati from the FHNW specific projects for students in computer sciences were offered. Since the autumn 2015, FHNW students majoring in "computer sciences with profiling in iCompetence" can write their Bachelor-Thesis on the subject of "games for the elderly and their relatives".

One of the first teams, Anila Bircher and Markus Recher, developed a personalized, digital adaptation of "Ludo", which is not about winning, but about discovering as many family photos as possible.

Souzan Alhenawi and Viviane Bendjus developed a game on the topic of "Cooking and Food", which won the first prize in the field of "Lebenshilfe" at a competition sponsored by the Walder Foundation.

DEVELOPMENT PROCESS

The games are developed with Unity and are preferably played on the largest available tablets (21-27 inches). The development is iterative, i.e. new approaches are continuously tested with the target group. As our games shall promote playing together and initiate communication (and not be a form of occupational therapy) the following questions are fundamental to our development process:

- › Is the gameplay easy to understand and inviting?
- › Does the graphic fit the design for this target group?
- › Are the handling and game controls intuitive and appropriate?
- › Is the game stimulating communication and togetherness?
- › Based on the field experiments, the games are continuously improved.

CURRENT STATE

What started as a small project has meanwhile become a "strategic initiative" at the FHNW. Together with the "Fabelfabrik", Bettina Wegenast's company, various institutes are researching and developing



the topic of "Games for Generations" over the next three years. Another project partner is the BFH, Department of Health, aF & E care.

The BFH investigates three questions:

- › What structures and processes are needed in retirement homes, so that these games can be used by nurses?
- › What are the necessary skills to be able to use games promoting communication and social interaction with people suffering from dementia?
- › Which ethical questions arise from the application?

OUTLOOK

2019, the Stadtmuseum Aarau will focus on the topic "Games". And during the month of March, the "Fabelfabrik" together with the "FHNW" will be hosting a one-month "Games for Generations" event. All insights and games will be incorporated into a "Mysosotis" -Startup, which develops and distributes games particularly suitable for people with dementia.

CURRENT OFFERS

The "Fabelfabrik" offers afternoons in retirement homes, where retirees and visitors can play the "Mysosotis" games, as well as other, already existing, suitable tablet games. These afternoons are strictly play-only, and no research or testing is taking place. Here we do what we ultimately aimed for: create an opportunity for joyful playing and communication.



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- Sanavita *Lindenpark*, Windisch <https://www.sanavita-ag.ch/>
- Stadtmuseum Aarau <http://www.stadtmuseum.ch/>
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25 | LEARNING FROM THE REALITY: INLIFE GAME-BASED SCENARIOS FOR SUSTAINABLE AND INCLUSIVE BEHAVIOURS

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Raising awareness among young people and children and encouraging a change in their behaviour regarding serious issues that impact on life quality is a key for a sustainable future. Among educational communities and academic research, various attempts take place to foster Gamification and Internet of Things (IoT) as effective methods to improve fast learning and increase student engagement and motivation by turning learning into fun and interaction [1, 2, 3]. The implementation of such innovative approaches remain secluded to experimental projects [4, 5]. The InLife H2020 project combines the benefits of traditional education methods and the advantages of IoT to create meaningful learning environments. Those IoT gamified scenarios, which address the education of young people and children with special needs, are presented here.

The goal of such a project goes beyond promoting sustainable actions: it attempts to create a design tool that addresses real-world problems toward educational game-based scenarios. The link between users' actions, game elements and IoT events is implemented toward sensing devices and human actuators. Two real world game scenarios developed with InLife Platform are spread in 3 countries (Greece, France and Spain) to test and evaluate behaviour change by incorporating real-life behaviours into gameplay experiences. The two playable instances of IoT gamified applications are: ICEBERG for the promotion of pro-environmental awareness and AKSION to enhance the social inclusion of autistic kids.

ICEBERG (Incubate Changes in Environmental Behaviour through an Educational yet enteRtaining Game) is a combination of a Role-Playing Game (RPG) and a strategy game, developed in an ice-world scenario. The main creatures living in the game environment are yetis and other non-playing animals (penguins, polar bears, orcas, seals, etc). When the player's behaviour in the real environment is respectful of and efficient in sustainable actions (energy and trash saving), the incentive system rewards the player with new virtual items. By managing resources, the player can make the ice-world grow.

*A design tool that addresses
real-world problems
toward educational
game-based scenarios*



AKSION (Autistic Kids Social InclusiON) is a serious game designed for children with autism and other related to special needs (Autism Spectrum Disorder). It wants to foster social inclusion by supporting social skill development in both digital and real situations. In AKSION an astronaut travels around unexplored planets while learning about the inhabitants' traditions and social behaviours. The key aspect in this game is to teach children how to recognise and react to different kinds of emotions in order to better understand the different aspects of social inclusion.

Both game instances stimulate users to play in real life and in the game world exploring the impact of real actions through an extended game interface. Teachers can use the platform to set learning goals and monitor progress and achievements. A Learning Analytic Model (LAM) is implemented within

IoT education gamification

the InLife platform to assess the behavioural change. LAM collects, compares and visualises data from both in-game and real-life activities. It is responsible for the data model and rewarding actions.

The experience suggests a number of design elements that should be considered to develop game-based learning scenarios:

- 1) learning goals and evaluation metrics;
- 2) game goals and their link to real-life actions;
- 3) experience API traces to configure the networking IoT level;
- 4) analysis model responsible for the data analysis scalability;
- 5) visual interfaces for an easy-to-use learning management tool.

The InLife's challenge replies to a prominent need of a customised and adaptive learning system to ease sustainable awareness and social inclusion. More research is needed to further develop new educational frameworks which could involve public, design and educational actors by providing platforms such as gamification and IoT.

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26 | BAYHEM – AN OFF-THE-WALL LOOK AT GAMES WITH PURPOSE

Tabea Iseli

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During my work on "AVA", a puzzle game about women in tech, I searched for a good way to talk about gender bias in a game. One method was a quite off-the-wall approach: I looked at Michael Bay movies to get inspiration from a style which was completely different than my own.

INTRODUCTION

The initial point of my research was a series of video essays by Lindsay Ellis about Michael Bay's Transformers movies. In these essays, Ellis stated she believed Bay to have a political view he illustrates in his movies [1], even though he himself says otherwise [2]. This thesis was really interesting to me, because it touched a subject which is important for the development of serious games and games with purpose: what is the right amount of words in a message? And how subtle must the message be for the game to still be enjoyable?

METHODS

With that in mind, I started to compare Ellis' description of Michael Bay's opinions with his movies. I wanted to find out which techniques he used to communicate his ideas and if it was indeed intentional or if there was no deliberate intention on Bay's side, and what might have led to Ellis' own assumption. I started to watch Bay's movies and analyses thereof to get a deeper understanding of his work. Since I wasn't interested in proving or disproving Ellis' statement, I only noted the techniques and what they might communicate, not the precise frequency in which they were used. The subtexts Ellis was pointing out were:

- › "Male protagonist eager to push back against own inadequacy"
- › "Soldiers good, government bad"
- › "Minorities are loud and that's funny"
- › "[Sexist/racist] portrayal of women and minorities"

RESULTS

Bay's movies are mostly action movies, which could be described as shallow. The narrative in his work is oftentimes incoherent and could be replaced by any other generic action plot. Bay's strength, in my eyes, is spectacle and the action sequences. His combination of different film techniques – for example parallax, vertical actor's movement, low camera angle and slow motion to create an epic moment – not only create complex, unique and expertly-made shots, but also lead to a strong visual impact on the viewer. Tony Zhou notes in his Video "Michael Bay – What is Bayhem?" [3] that A) Bay has a need to make every image dynamic, B) he cannibalizes on his own previous work and C) Bay creates a form of spectacle that a majority wants to see. For me, the first two points lead to the third one: Michael Bay's movies are some of the most action packed, wild and dynamic movies of our time, he uses the same style over and over, and thereby creates a cinematography where people know what they can expect.

DISCUSSION

Bay's habit of complex shots, fast cuts and dynamic scenes create an overwhelming atmosphere. It is almost impossible to keep up with the happenings on the screen. In other words: the visuals supersede



the story, because the impressive images are the only thing that remains after the viewer leaves the cinema. This means that Bay becomes the master of the film's message, even if he is not necessarily listed in the writing credits. And here's where Ellis' thesis comes back into play: if Bay depicts a topic in a certain way and makes it memorable, it might stick. His movies are full of heroic and epic shots of soldiers or cops, so it is understandable that Ellis sees the subtext of "soldiers [are always] good". If the camera is repeatedly lingering on a female character's chest and bottom, the portrayal can indeed be described as sexist. One point that neither Ellis nor Zhou touch in their analyses, but seems very important to me, is the complexity of the statements. When I was writing down Ellis' list of subtexts, I noticed how simple most of the phrases were. This was probably partly due to the way Ellis wanted to portray Bay, but there surely is an underlying truth. Bay understands his target audience. He understands that this audience wants simple stories and tons of explosions. And regardless to its intentionality or not: he understands that if, at all, this audience is only amenable to simple messages.

CONCLUSION

This last sentence might seem obvious or gratuitous, but I think there is some wisdom in it. Critics and academics despise Bay for his "low art", forgetting that there is potential in creating something with mass appeal. And by potential I don't mean the potential to earn a lot of money, but to talk to a huge audience. To me, this is an essential insight as a developer of games with purpose. With the pretense of a complex and sophisticated message, developers exclude automatically a huge percentage of potential recipients. We should ask ourselves if we want and need to do this trade. Does my message only work if I paint the whole detailed picture or can I distill it to a simpler, central statement by breaking it down into several smaller, more comprehensible parts? The credo "reduce to the max" is very popular among designers, maybe we should do that with our message too. And become, in a good way, a little bit more like Michael Bay.



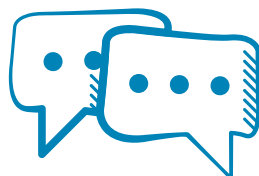
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SOCIAL & POLITICS ROUNDTABLE



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LEGO® SERIOUS PLAY® - PLAY WITH A PURPOSE

Why play? Playing is the best way for people to imagine, interact and learn, especially when they face complex and uncertain challenges. And when we play on an important topic, like business, we can enrich everyone's quality of life at work: communication is easier, social bonding is strengthened and an atmosphere of increased insight, confidence and commitment is created.

The origin - Looking for a tool to unlock innovation within the company, the LEGO® Group realized that a solution might be found in the LEGO® System itself. The LEGO® management team then collaborated with Prof. Bart Victor and Johan Roos from IMD, the well-known business school of Lausanne, to develop the method.

Why use LEGO® bricks? LEGO® SERIOUS PLAY® [1] begins with the assumption that the answers are 'already in the room' and invites participants to 'think with their hands' to build their understanding. Every team member takes part and everyone has a voice. The material makes it easy for participants to put together satisfying models representing what they wish to communicate. They do not need significant technical skills: the LEGO® System is familiar to many.

Why make things rather than just talk? Research has shown that the making process can lead to much more valuable, insightful and honest discussions. [2-3]. This creative, reflective process prompts the brain to work in a different way and can unlock new perspectives. Indeed, the building and collaborating process often produces insights which simply would not have appeared in regular discussions.

The idea that we need to 'think with the body/hands' has gained support from a convergence of new psychology and neuroscience evidence. These theories emphasize that cognitive processes such as learning and memorizing are strongly influenced by the way we use our bodies when interacting with the physical world. The use of LEGO® bricks support these processes, because a system with an inherent logic and a set of constraints that can be grasped can support endless possibilities. LEGO® bricks are easy to pick up and yet enable development, experimentation and expansion. Our mental work is helped by the visual reminders of different significant aspects of a problem. The process of reflection while seeking to translate thoughts into metaphors is a helpful process to access new and/or different information in the mind. It also helps to externalize thoughts, feelings and experiences, thus giving the possibility to look at them from an outside view and consider that they can be acted on.

The process structure - A LEGO® SERIOUS PLAY® workshop typically takes from three hours to two days and should be run by a facilitator to get the group's dialogue to serve its purpose and reach the goals. The process advantages lie in its building, reflection, collaborative learning cycles and in its flow.

What is 'flow'? The flow theory, developed by Mihaly Csikszentmihalyi [4], states that individuals gain most from a learning or developmental process when they are committed to the process and enjoy it. It is imperative for participants' engagement in a developmental process that they experience 'optimum stretch' in terms of cognitive and emotional involvement.

The LEGO® SERIOUS PLAY® concept - The process builds upon a learning process that ensures that people take ownership of their own learning and then learn the most. This learning process implies three basic phases that participants move through in a spiral: Challenge - Building - Sharing.



When and why to use LEGO® SERIOUS PLAY®?

- › Team building;
- › Creating a shared mindset;
- › Understanding each other's point of view on a deeper level;
- › Having effective and constructive discussions where everybody is listened to;
- › Unleashing creative thinking;
- › Working out the best solution to a shared problem.

What can be achieved in organizations?

- › Strategy development and exploration;
- › Organizational development;
- › Innovation and product development;
- › Change management;
- › As well as scenario development and testing, mergers and acquisitions, branding, turnaround and restructuring, market entry, operational efficiency and competitive analysis.

The LEGO® SERIOUS PLAY® method offers a creative approach to innovation and enhances business performance by putting the focus on unleashing play in order to unlock the human potential within organizations [5]. It unlocks collective intelligence to work out meaningful solutions to real problems.

It is also an ideal Swiss army knife for efficient and fast-moving forward teams that want to play with LEGO to foil the EGO!

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DEMO & POSTER



LET'S PUT SOME GAME IN YOUR WORK !!

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Come to our stand and discover our examples of serious games intended for corporate clients. Surfing on the recognized mechanics of the game world, gamification guarantees a maximum involvement from your employees. By giving everyone the rewards they need in return of their success in the game, you ensure maximum motivation from players and keep their attention. Thus, the players live, intensely and of their own free will, a gamification experience, which makes it an ideal support for education or training.

ESCAPE ROOM 1A-3T

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We have noticed that nowadays we are all keeping and producing a lot of data every day: for example, all the pictures that we take all the time. It is becoming a big effort to delete most of them and we are storing everything in the cloud or on USB keys by fear of losing a part of our lives. The main point of this reflection is that we are not even noticing that all this conservation goes somewhere and spends a lot of energy, ruining the planet little by little. In response to that, we have decided to produce a work that will sensitize the population to that issue.

This project is an escape game, based on the data preservation question. The story takes place in a near future: 2045. All the gamers are locked in a «prison cell» because they have exceeded the data number which the government gives them every year. They have 30 minutes to leave the place. If they want to succeed they will have to delete some real data one their own cell phones.

REAL-TIME SENSING FOR RULA IMPLEMENTATION IN A MUSCULOSKELETAL DISORDERS PREVENTION SERIOUS GAME

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Real-Time sensing for RULA implementation in a MSD prevention SG

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ABSTRACT

Musculoskeletal disorders (MSD) are causing major socio-economic damages to several industries in Europe. The symptoms of these disorders are often identified in a late stage, which leaves very narrow room for prevention. In order to assess workers' exposure to musculoskeletal disorders risks, we present, in this paper, a method and the enabling technologies to implement a well-established approach in ergonomics named Rapid Upper Limb Assessment (RULA). Kinect technology as well as RealSense technology have been evaluated for this implementation. Further, 3D geometric algorithms have been developed to transform the joint angles provided by the sensing technologies in RULA rules that assess human postures and gestures. The poster paper shows a full integration of these algorithms in a musculoskeletal disorders prevention serious game (SG).



Musculoskeletal disorders are causing major socio-economic damages to several industries in Europe. The symptoms of these disorders are often identified in a late stage, which leaves very narrow room for prevention. The HE-Arc ingénierie is conducting, together with UTBM in France and industrial partners, an Interreg research project whose aim is to conceive and develop a serious game which intends to prevent musculoskeletal disorders for automotive and watchmaking industries.

In order to assess the trainee exposure to musculoskeletal disorders risks, we present in this paper a method and the enabling technologies that implement a well-established approach in ergonomics named Rapid Upper Limb Assessment (RULA).

Kinect as well as RealSense technology have been evaluated for this implementation. Furthermore, 3D geometric algorithms have been developed to transform the joint angles provided by the sensing technologies to RULA rules that assess human postures and gestures. The poster paper shows a full integration of these algorithms in a musculoskeletal disorders prevention serious game.

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

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Seamless integration of coarse and fine movements for fluid interaction in SG

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ABSTRACT

Serious games for rehabilitation, prevention or training scenarios often require full body motion tracking for immersive and fluid interactions. In particular, coarse body motions like upper body and arm movements should be sensed and tracked at the same time as finer motions like hand and finger gestures. Unfortunately, no unique and packaged solution or technology exists to sense and track both types of gestures and motions. Technologies like Kinect or RealSense are highly relevant when it comes to track coarse body motions. They, however, fail to precisely capture and track finer gestures like fingers'. On the other hand, technologies like Leap Motion excel in detecting fine motions, but they are not able to do the same for coarse body motions. In this work, we present an integration of both kinds of technologies in order to cope with both body motion types. The integrated solution is demonstrated in a real and running serious game intended to prevent musculoskeletal disorders for automotive and watchmaking industries.

CONCEPT



Serious games for rehabilitation, prevention or training scenarios often require full body motion tracking for immersive and fluid interactions. In particular, coarse body motions like upper body and arm movements should be sensed and tracked at the same time as finer motions like hand and finger gestures.

Unfortunately, no unique and packaged solution or technology that senses and tracks both types of gestures and motions exists. Technologies like Kinect or RealSense are highly relevant when it comes to track coarse body motions. They fail, however, to capture and track precisely finer gestures like fingers'. On the other hand, technologies like Leap Motion excel in detecting fine motions, but they are not able to do the same for coarse body motions.

So, in this work, we present an integration of both technologies in order to cope with both body motion types. The integrated solution is shown in a real and running serious game intended to prevent musculoskeletal disorders in automotive and watchmaking industries.

TRIP AGAINST THE CLOCK – A HISTORICAL ROLE – PLAYING GAME ACROSS THE JURA MOUNTAINS

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Trip Against the Clock is a historical serious game based on interpersonal communication. Travel between Tavannes and La Chaux-de-Fonds aboard the “Watchmakers’ Train” for an extraordinary trip! This live action role-playing game is based on historical facts and takes place on board a moving 1950s train. The plot evolves around the renegotiation of a Collective Labour Agreement in the 1960s watchmaking world. Players incarnate watchmakers, CEOs, politicians, journalists, etc.

The game is unusually flexible as it is available to groups ranging from 25 to 50 players, in French, English or German, thanks to a specifically developed software. Trip Against the Clock is the work of “la Coopérative “Entrée de Jeux””, which ensured its scenario, game design and production. It is on offer at the “Chemins de fer du Jura”, in partnership with and with the support of “La Traction”, Jura & Trois-Lacs, arcjurassien.ch, “la Loterie Romande”, the Swiss Confederation as well as Neuchâtel, Jura and Bern cantons.

SPLASH PUB - SMOKING PREVENTION TOOL FOR YOUTH

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Splash Pub is a serious game made by the “Information Center on Smoke Addiction Prevention” (Centre d’information pour la prévention du tabagisme) (CIPRET-Vaud) in partnership with a digital communication agency. It intends to make young people (13-15 years old) aware of the tobacco advertising ubiquity. In this game, young people are immersed in a shop where they must spot advertisements for tobacco products.

Using marketing in points of sale is an effective way for the tobacco industry to promote tobacco products. Young people are particularly vulnerable: their exposure to point-of-sale tobacco advertising positively influences their perception and attitude towards these products and encourages them to smoke. Helping young people to develop a critical mind against advertising is a public health issue.

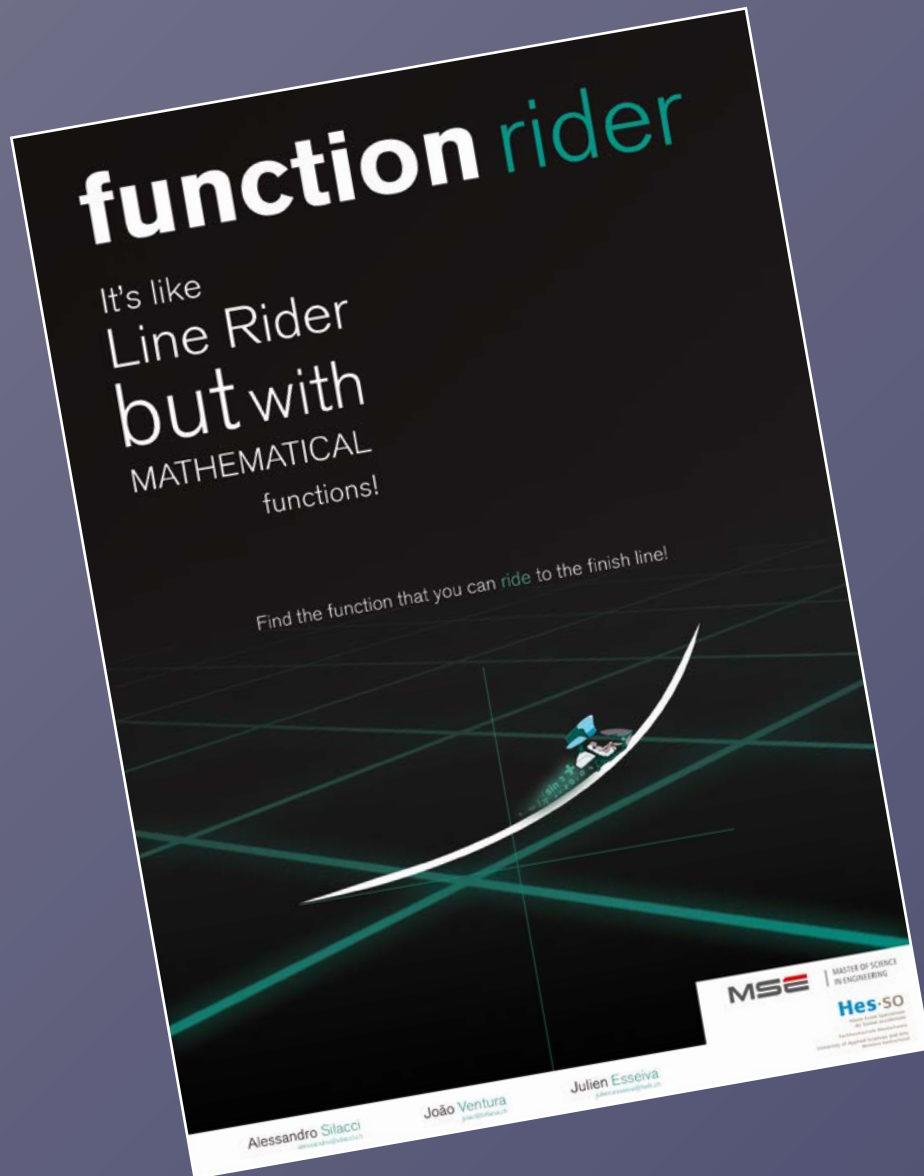
Splash Pub is a serious game that can be played as a virtual reality experience (HTC Vive virtual reality headset), also available on tablet. A video is available on the following website to discover Splash Pub in pictures: www.cipretvaud.ch

FUNCTION RIDER

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Function Rider merges two aspects: math and puzzle solving. In a 2D Tron™-like world, the user must create a path for the motorcycle to reach the end line and, to attain the finish line, he must use a mathematical function that will be drawn.

This project is intended for people learning mathematical functions or having a solid grasp of the subject but wanting to test their knowledge; a minimal knowledge of the matter is required. Users face different situations and the idea is for them to understand what would be the best function to reach the objective without getting stuck on obstacles. By using the game, players would understand the general behavior of a function and thus learn each parameter incidence.

The game uses the Unity platform and is mostly designed to be used on a desktop computer. The more it will be used and the better the best fitting function will be identified and its parameter roles understood.

INTRODUCTION TO CARDIOPULMONARY RESUSCITATION IN VIRTUAL REALITY (VR) ACTIONS THAT SAVE

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Cardiac arrest is defined by a sudden simultaneous interruption of the circulation and respiration, most often caused by a major cardiac arrhythmia called 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.

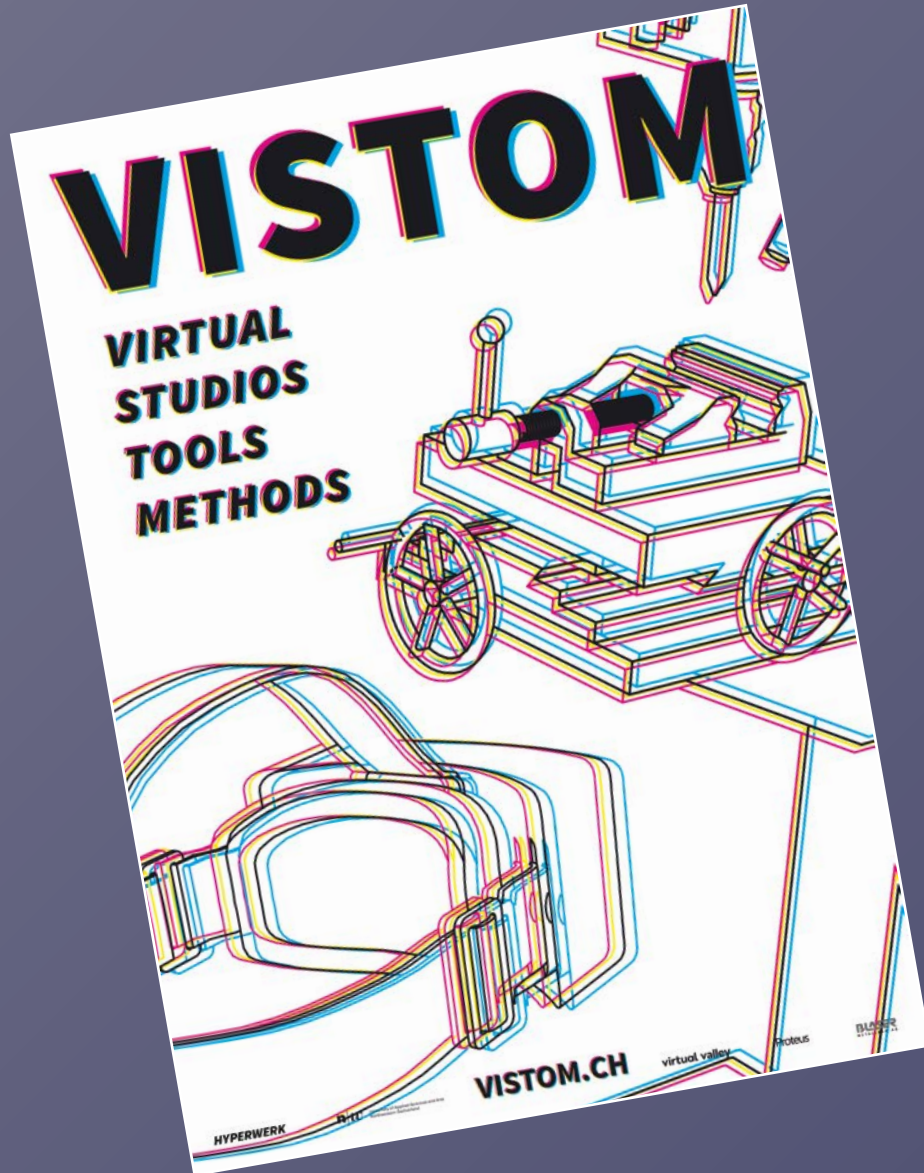
I offer to introduce a wide audience to cardiopulmonary resuscitation, thanks to YouRescue®, a high-tech device using virtual reality, by placing each participant in five minutes in complete immersion in an ultra-realistic scenario where he/she will be both actor and rescuer.

VISTOM, VIRTUAL STUDIOS, TOOLS AND METHODS

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We are currently developing a VR software with which you can build constructions by using virtually simulated machines based on real-life construction work, like metalwork and carpentry. Our vision is to educate people on construction processes and methods. We want to avoid learning software-internal commands which can only be used within a specific software and can't be applied in real construction processes. Instead, we want to learn how to use real machines. This 'workshop' environment is accessible in a multiplayer mode. This way, we can increase transparency and interdisciplinarity between different professions. This is a students' collaboration project between the Institute HyperWerk at the Academy for Arts and Design in Basel and the Institute of 4D Technologies at the Technical College in Brugg, Switzerland.

VIRTUAL REALITY PUZZLE GAME FOR MUSCULOSKELETAL DISORDERS PREVENTION

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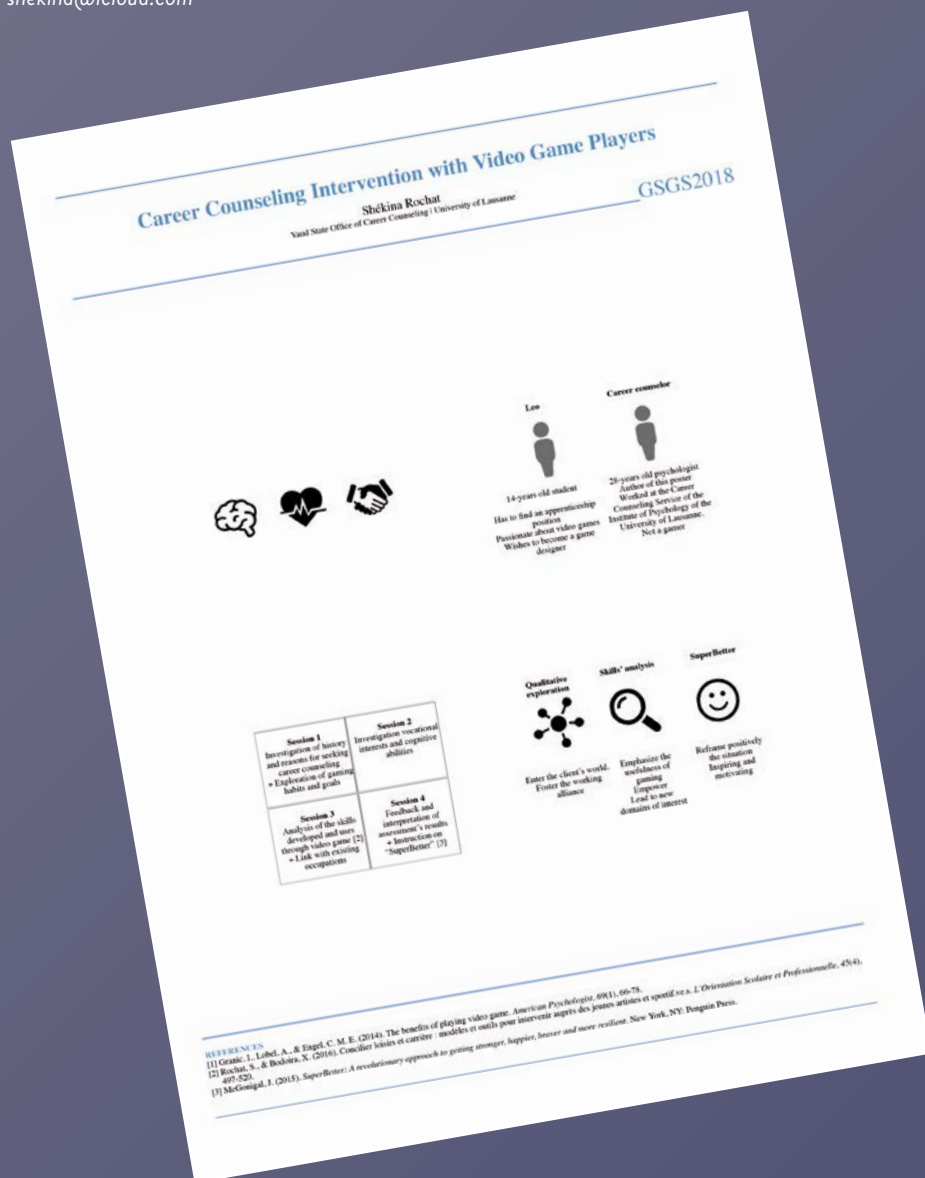
Musculoskeletal disorders are one of the big public health problems nowadays. Solutions are sought through ergonomic changes in the work environment and advice given to workers on how to protect themselves. Virtual Reality and motion tracking can be powerful tools to enhance the training given to the workers, combining these new technologies into a Serious Game. Inspired by real work situations, the game intends to teach the user to reproduce movements and postures commonly encountered while working. The game in itself is a puzzle game, where the user has to align gears correctly in order to make the system rotate. To complete a level, the user must solve the puzzle while maintaining correct positions and postures. This should show the user the danger some incorrect behaviours represent and help him change them while staying entertained and motivated.

CAREER COUNSELING INTERVENTIONS WITH VIDEO GAME PLAYERS

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Video games are often considered a useless hobby—if not a dangerous one. However, recent studies indicate that playing video games helps develop many cognitive, motivational and social skills that are highly valued in the labor market. Therefore, career counseling interventions should be able to capitalize on this popular leisure to foster the vocational choice process of video game players.

Through a case study, this paper introduces two types of career counseling interventions that leverage on video games. First, the skills acquired through video gaming can be identified and matched with suitable career alternatives. Second, playing at “SuperBetter” (McGonigal, 2015) can help clients reconsider their vocational challenges in a more playful way. Results underline the potential of these approaches in fostering the vocational choice process.

Reference:

McGonigal, J. (2015). *SuperBetter: A revolutionary approach to getting stronger, happier, braver and more resilient*. Penguin Press.

HAPTICBIKETRAINING PROJECT

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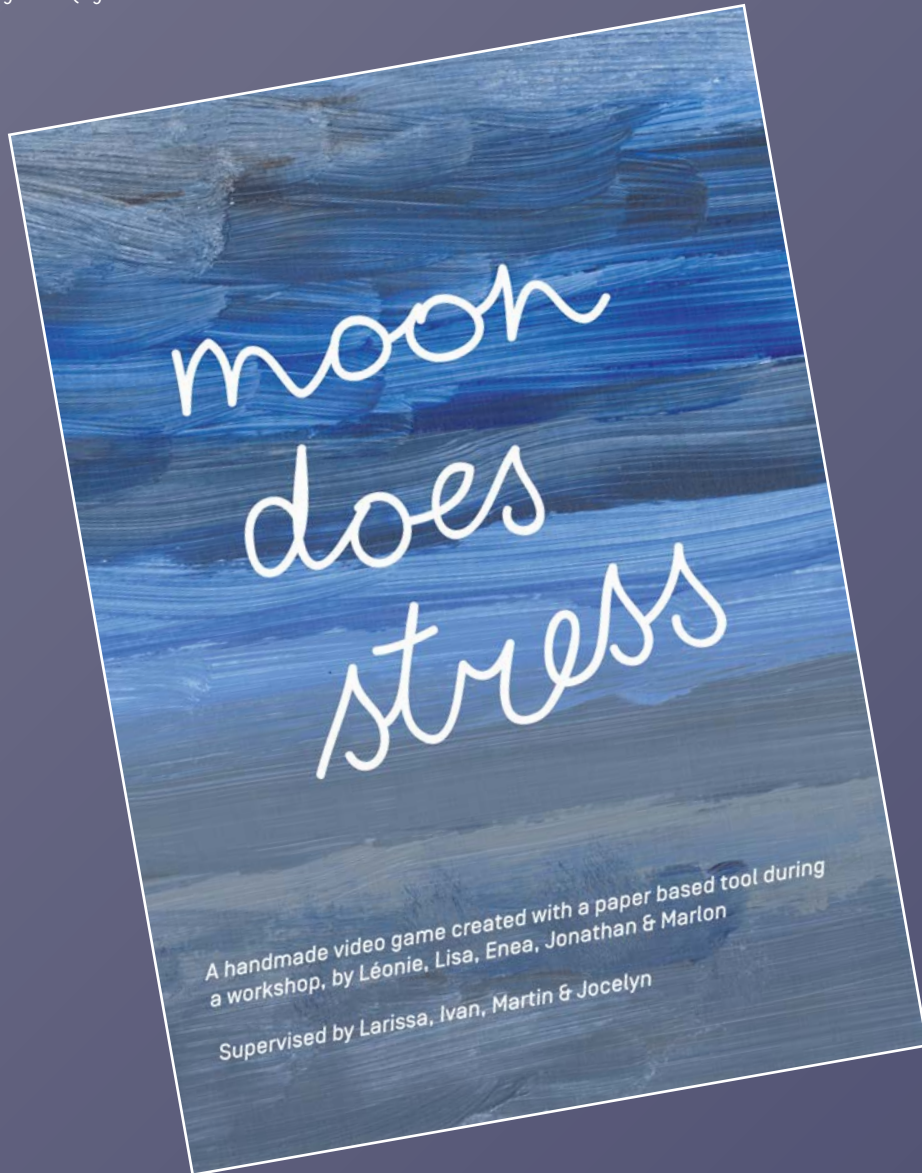
Nowadays, keeping a body in a healthy condition has become a life motif for some and a trend for most. Due to a lack of time, individuals have invested in home training exercises such as training-bikes. Unfortunately, such devices are repetitive and do not encourage user to train better. This project offers a much more stimulating and efficient alternative as it consists of a serious game with haptic feedback set on a training bike with a screen, elaborated with a friendly cartoon-like design. Users ride a bike while their avatars evolve in beautiful and various landscapes at different slope levels and surprises. To improve the immersive feeling, the game adapts the pedaling force during the journey depending on the slopes. We believe that adding pleasant and consistent challenge to training exercise can stimulate regular customer to improve training exercise and motivate the ones who remain undecided due to a lack of entertainment.

HOW TO CREATE A VIDEO GAME ON PAPER DURING WORKSHOPS DEDICATED TO VIDEOGAMING EXPRESSION?

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"Moon Does Stress" is a handmade video game created by five teenagers from "l'École Secondaire de Moutier" during a workshop supervised by Ivan Gulizia, Larissa Medawar & Gweebit Prod.

The participants were invited to design and produce their own game content (game design, level design, visuals, sound elements and dialogues) using a paper-based tool. While the technical aspects such as programming and animations were taken care of by the invited artists and the teacher.

The result is a multiple-ending adventure game about a girl lost on a weird island inhabited by friendly dancers (some of them are famous). Will she manage to escape or will she prefer to live with them on the island?

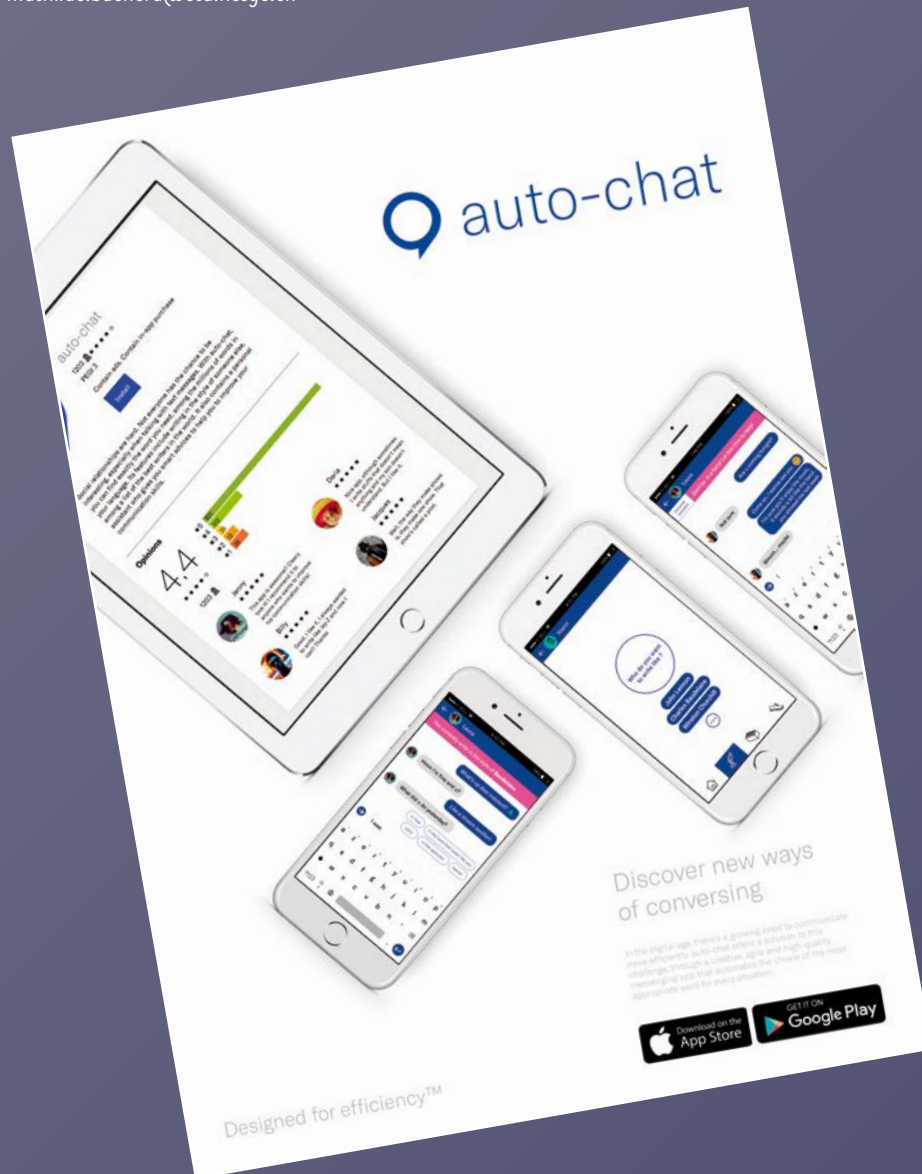
To get additional information or to play the game : www.ivangulizia.com/moon-does-stress

OPTIMIZED TALK: HOW PERSONAL ASSISTANTS AND QUANTIFIED-SELF CHANGE THE WAY WE INTERACT?

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“Auto-chat” is a fictional instant messaging app with uncommon autocomplete features that leverages machine learning algorithms. This app is not a product intended to be commercialized, but an invitation to think about technology alternative uses by asking the question “What if...?”.

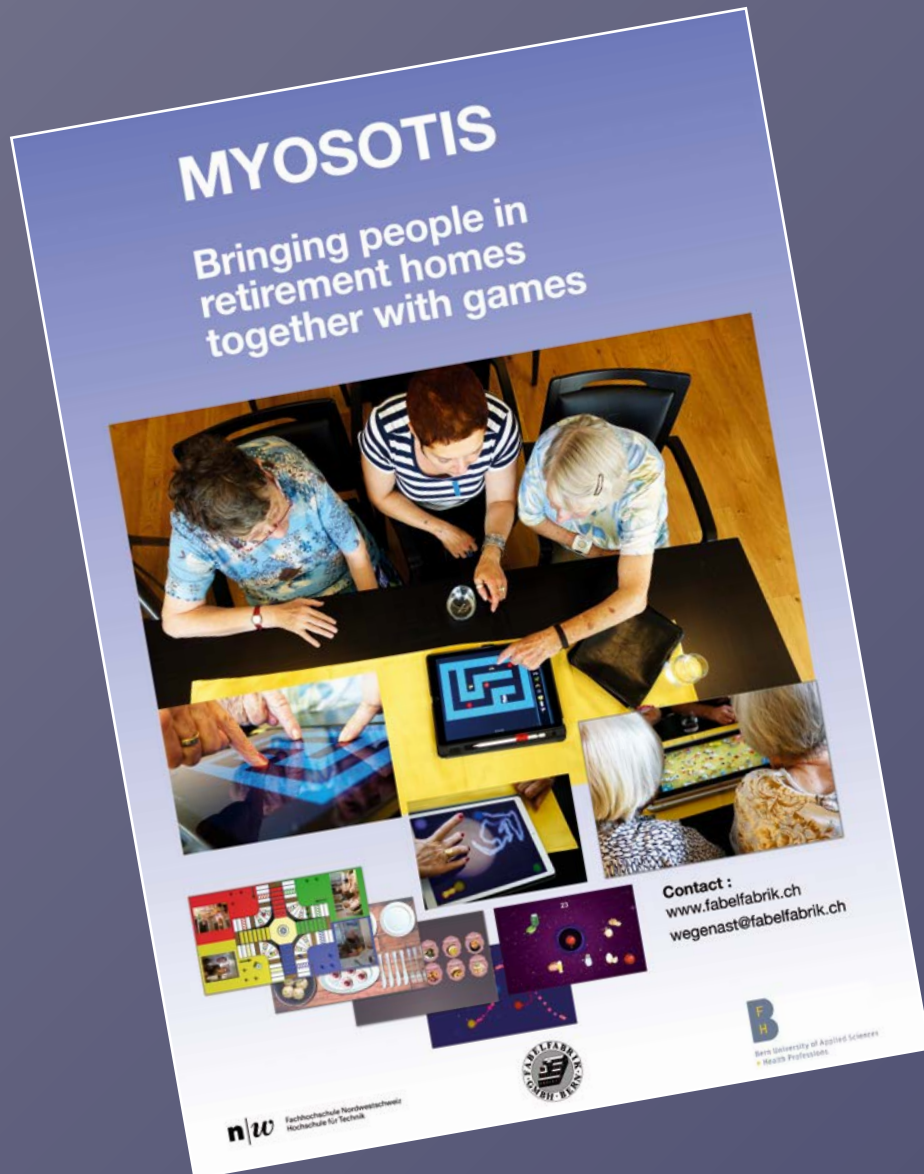
What will the algorithmic future look like? Will technology allow us to become more honest or manipulative? How much agency do we want to keep? How could our electronic devices add a little spice to our conversations?

HAVING FUN IN RETIREMENT HOMES: MYOSOTIS

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Myosotis is a project started in 2015 by Bettina Wegenast from Fabelfabrik GmbH and Marco Soldati from Fachhochschule Nordwestschweiz and aims at creating computer games for elderly people and their relatives.

The games include pictures, film clips and sounds from the life and environment of the elderly people. Often these personalized media trigger communication between the players. Our ultimate goal is to motivate relatives, children or adults, to visit their parents or friends living in a retirement home more often and spend some funtime together. The games are created at first hand for entertainment and do not pursue any therapeutic or diagnostic objectives.

Within the last years computer science students at FHNW have created more than 15 game prototypes running on a 27" tablet computer. All of them have been tested in several retirement homes. In our talk and our paper we will summarize our experience with our current games and discuss our plans for the future.

GORDON BENNETT GAS BALLOON 2D AND 3D-GAME

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The Gordon Bennett cup is the world oldest and most popular gas balloon race. The first race departed from Paris in 1906. The aim of the contest is simple: fly the farthest distance from the launch site with a balloon inflated with the same quantity of buoyancy gas (hydrogen or helium). The balloon altitude is controlled either by reducing the ballast (sand or water) or by releasing the buoyancy gas via a valve.

In October 2017, the Freiburg-Fribourg Challenge team supported by the HEIA-FR and the 4P broke the 12-year-old distance record and set a new one with a distance of 3670.76 km travelled in 59 hours and 35 minutes at the America's Challenge, the second major gas balloon race.

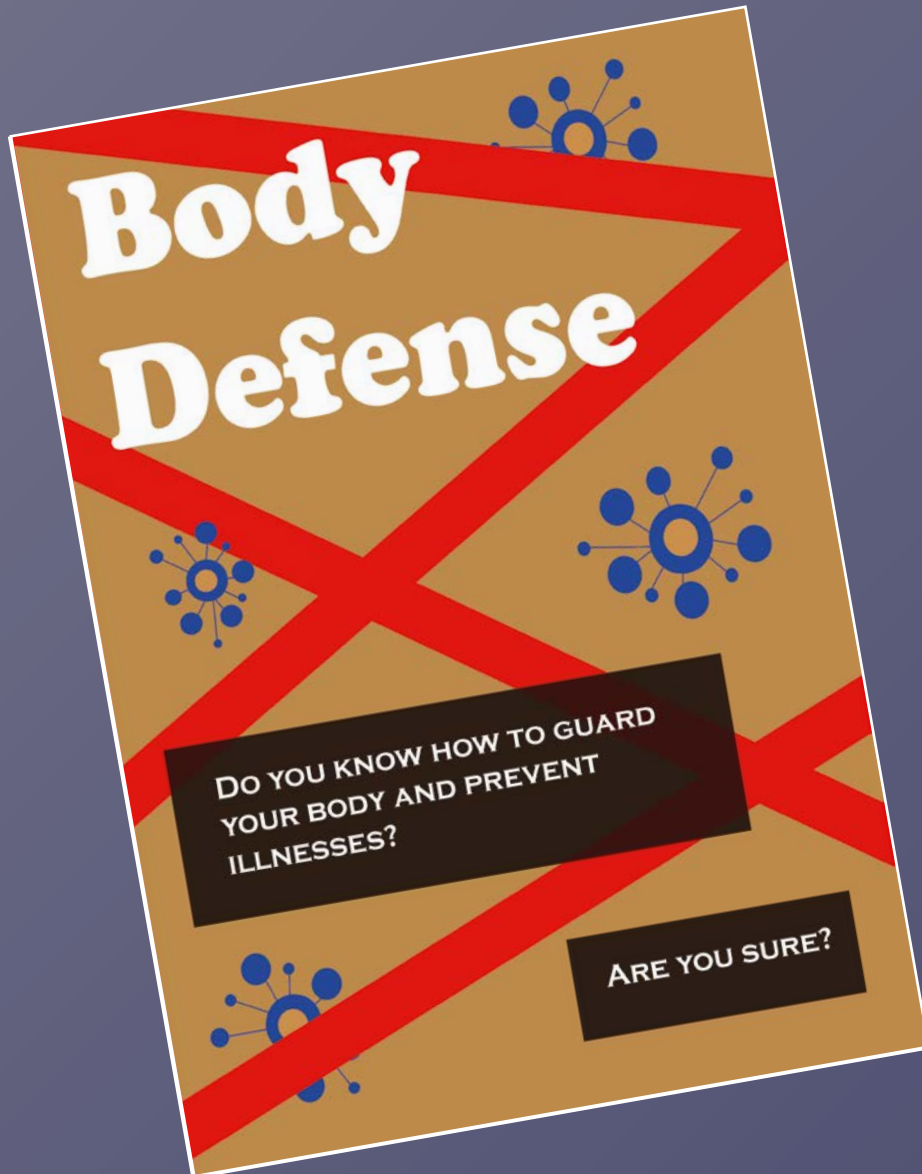
At the HEIA-FR, two distinct applications have been developed (using the game engine UNITY), based on the rules of the Gordon Bennett and a physical gas balloon model.

BODYDEFENSE

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What type of medication should you take when you have a cold, or when you're coughing? It's very easy to get lost between the different types of illnesses and remedies. How about the use of antibiotics? I feel just fine, do I really need to listen to my doctor and take all my pills?

BodyDefense helps you understand how your body combats illnesses and how different medicines interacts with these viruses or bacterias. Learn by giving your body the tools it needs to stay healthy and learn how viruses can be defeated.

ARCHEOGAME

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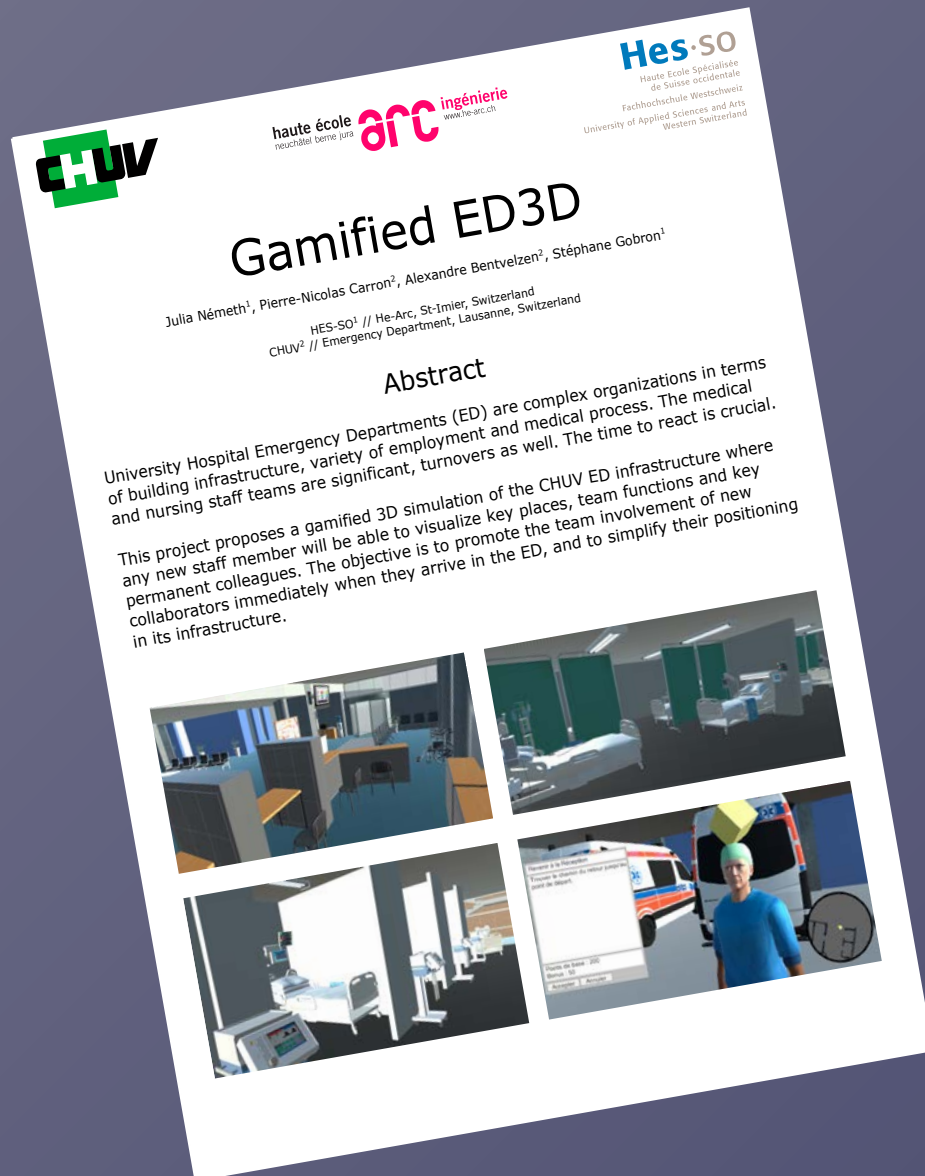
ArcheoGame is a pedagogical-oriented project, in collaboration with the Nouveau Musée de Bienne, which aims to get children and young visitors attentive to our ancestor life, and, more formally, to notions of paradigms: real world, realistic rendering, and cartoon like rendering. As the exhibition features original work from an invited painter representing a Palaeolithic life scene shown in virtual reality using a HMD, visitors will be able to interact with a virtual representation of objects – too fragile to manipulate in real life – and replace them in a virtual painting. The intent is to inform players while providing an entertaining experience.

GAMIFIED ED3D

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Welcoming many trainees, doctors and nurses in training, the Lausanne University Hospital's emergency department prepares its new collaborators by providing them with a large amount of hard-copy documents as well as many videos. During their first days, the supervising staff assists their integration using different means such as presentations or emergency simulations. However, the complex organization in terms of building infrastructure over a very large surface is difficult to comprehend for someone who has never been there before thus the high risk to get lost. This project is a proof of concept proposing a playful application in the form of a Serious Game where the future employees will be able to familiarize themselves with the emergency department through a 3D simulation.



BEST
DEMO

BEST STUDENT
CONTRIBUTION

BEST
ORIGINAL
IDEA

GSGS'18

A W A R D S

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.

The winners of GSGS 2018 will be awarded a trophy which they can interact daily as well as hack it from the inside to make it their own.

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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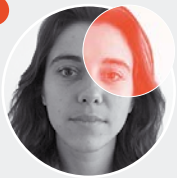
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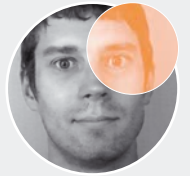
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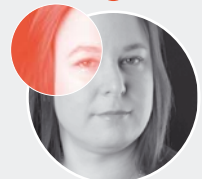
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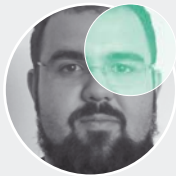
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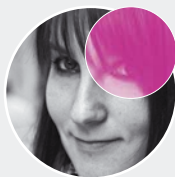
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ISSN (PRINT): 2297-9093

ISSN (ONLINE): 2297-914X

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