LAVAL VIRTUAL

THE VR/AR SPECIAL EDITION

#4 HEALTH EXTRACT

CLINICAL VR
MEDICINE
WELL BEING

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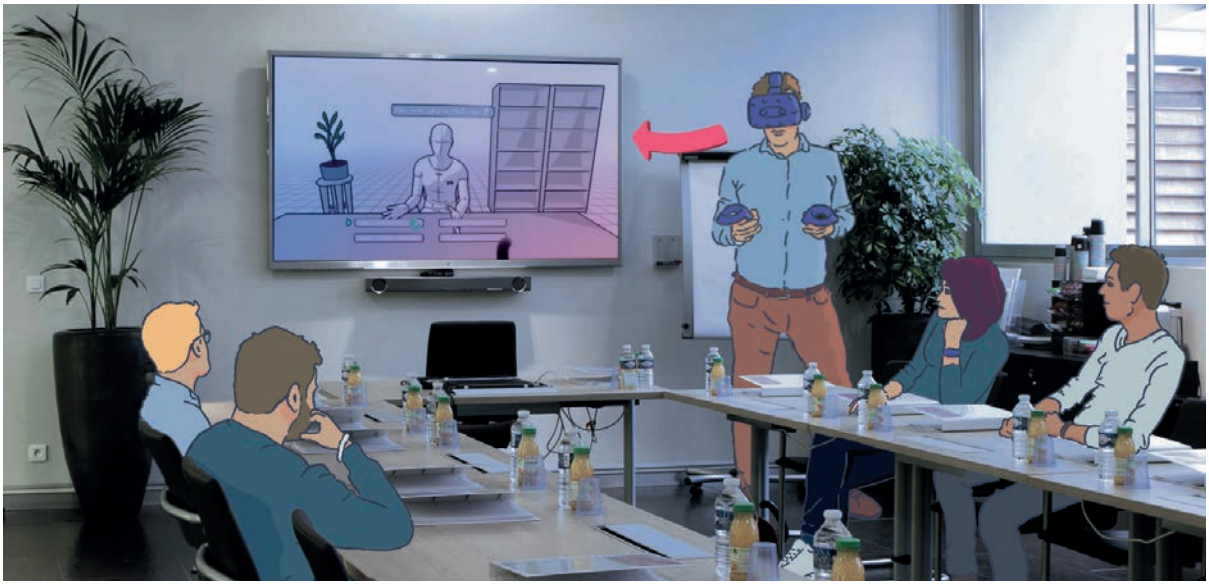
HOW TO DESIGN IMMERSIVE VIRTUAL ENVIRONMENTS SUPPORTING MOTIVATION TO LEARN?

The aim of this article is to propose a conceptualization approach of design of immersive experience 3D contain through a use case developed by IfisLab with the support of SEGULA Technologies. This project addresses the question of the effectiveness of use of virtual reality to design learning situation of soft skills through audit scenarios in the health industries sector. We will explore the question of the motivation to use immersive technologies in the context of professional training sessions for adults.



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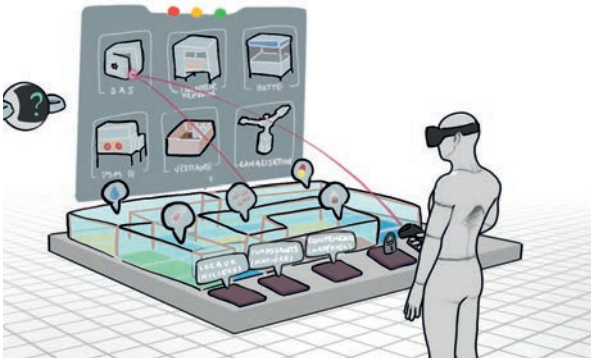
The health industries sector, in particular the pharmaceutical industry, is a highly regulated sector given the drug-related safety issues for the end user, the patient. The evolution of the training methods that are associated with these challenges, especially virtual reality, has led us to ask the following question : how could we use immersive 3D content as a tool to effectively train employees in this sector on an audit issue, involving both work environment analysis skills and soft skills.

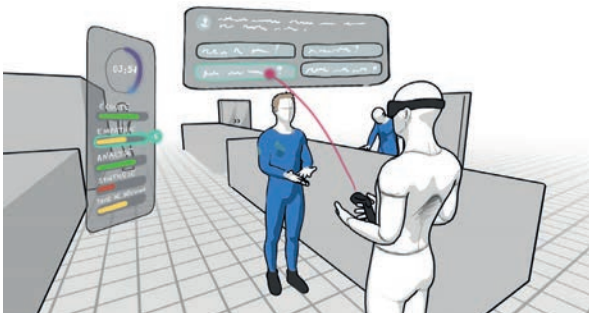
In order to answer this question, we suggest to base our reflexion on research in cognitive psychology, more specifically motivation theories, to design a VR capsule integrated in a three-day training course on audit.The VR design requires thinking carefully about the experiences that will be offered to the learner so that they are emotionally rich and allow for involvement. This approach has an impact on the choice of personas, graphic environments and interaction models.

WHAT ABOUT MOTIVATION?

The question of motivation to learn is more crucial in this training context as the scripting of this type of experience needs a strong focus on the learner. The challenge is to create an optimal interaction environment between the person and the object of learning and choose the appropriate device to make a real life immersive experience.

Therefore, two forms of motivation approach seem to us to be essential to consider during the content design phase: on one hand, the motivation to learn, to be more aware of the object of learning, in other words, the concern for the content of the training. On the other hand, the motivation to use this





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type of technology as a medium to learn.
The theory of self-determination (Deci and Ryan, 2000, 2002) focuses on the degree to which an individual's behavior is self-motivated and self-determined in different contexts, particularly in the learning process.
It assumes that the satisfaction of the three basic psychological needs, which are autonomy, competence and social relations, generate a self-determined motivation, in other words an intrinsic motivation linked to the pleasure of learning and to the individual interest in the content of the training (Yennek & Fenouillet, 2016). Therefore, this theory seems insightful for the design of immersive 3D content, which we will illustrate in the following. In practice!

HOW TO SUPPORT AUTONOMY?

During the immersive experience, the scenario should ask the question of the level of guidance to be offered by the 3D environment. Should we give the learner the effective choice to build his training course and thus participate in the design of his experience by his actions ? In order to give choices and support learners autonomy, it is possible to act on variables like the use of decision-making trees when interacting with personas, as well as the possibility of having support at the start of the experience (presence or not of a facilitating personas, visual or sound elements that guide in the virtual environment towards points of salience, the possibility of being in free exploration mode...).

HOW TO SUPPORT THE PERCEPTION OF COMPETENCE?

We have set up a real-time feedback system visually represented by a skills gauge built based on a soft skills repository. The quality of social interactions with people (empathy, decision-making, assertiveness...) is materialized by a fluctuation in the skill gauge, which gives feedback allowing the learner to interact more effectively with the environment and readjust their behavior to better perform.

HE NEED FOR SOCIAL INTERACTIONS:

The idea is to provide content that allows people to feel connected with others in the learning experience. In our context, the content of the VR capsule is an integral part of the training and allows feedback through the device that presents the experience to other participants by projecting it on a screen in real time. The user experiences will also be recorded to generate case studies that will be used to facilitate face-to-face interaction with other participants.
Another experience that we are considering is to design a VR capsule where two participants are connected at the same time, with the roles of the auditor or the audited, depending on the situation, and the use of microphone-based communication as an integral part of the experience.

FROM MOTIVATION TO LEARN TO MOTIVATION TO USE VR TO LEARN

The Technology Acceptance Model (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) appears to be the most widely used model in the literature to clarify the fundamentals of the use of Information systems (Lim, Saldanha, Malladi & Melviller, 2013). This model answers to a concern of institutions or companies, which, despite implementing highly available and functional technologies, observe that their use is not always effective, as this "under-use" can lead to considerable costs (Fenouillet & Kaplan, 2012). Recently, this model has been used to connect the VR development with consumer acceptance, and return on investment for this technology (Manis & Choi, 2018).
Both the perceived usefulness of a system and its perceived ease of use predict the attitude towards technologies, which has an impact on the intention to use the technologies, this variable being related to the effective use of the technologies. In particular, we considered the dimension of perception of ease of use of VR, in other words the individual's estimated perception of the cost/benefit ratio associated with this technology. For this purpose, we have scripted a timespan to become more familiar with the VR environment in a decontextualized content to reduce the cost dimension related to the cognitive effort required to use this technology.

NEXT STEPS?

The next step will be to include in the technical design a transversal approach to be able to provide several versions of this module in an industrialized way for other soft skills development. Stay tuned!

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Training future health professionals, preventing cancer, evaluating cognitive skills, diagnosing musculoskeletal disorder risks, training dentists, visiting places, detecting eye disorders, creating a living environment lab, swapping with patients to develop better soft skills, blood transfusion training, treating burn-out, addressing PTSD, stepping inside the aortic valve, using collaborative immersive environment, practicing sport for rehab, launching a new drug, forging the missing link in surgical education, training medical emergency teams, rethinking anesthesia, helping vulnerable people, assisting neurosurgeons, helping low vision patients, improving mental health : these are the possibilities available to you by discovering the use cases in this publication written by health professionals who use VR or AR technologies.

Because immersive technologies also contribute to improving the health of your patients, whether you are residents, physiotherapists, surgeons, dentists, nurses, engineers, technicians, hospital managers, clinic directors, psychologists, pharmacists, occupational therapists, nurses' aides, academics, students, training managers or patients: this Laval Virtual magazine is made for you.
Enjoy reading it!

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