DR GEORG MEYER: INDUSTRIAL INNOVATION FOR LCR4 HOLISTIC AND HUMAN FACTORS RESEARCH LEAD, EXPLORES THE IMPORTANCE OF HUMAN-CENTRIC TECHNOLOGIES

BACKGROUND

Georg has an academic background in Psychology, specifically, neuroscience, focusing on how we as humans perceive and interact with environments for optimising virtual environments for supporting learning.

WHAT DOES HUMAN-CENTRIC DIGITAL TRANSFORMATION MEAN?

Without taking the needs of people into account, technology is not very useful - It is all about people.

If we introduce new technology and make any changes to processes or ways of working, then we need to consider how we make these innovations fit into the needs of humans.

Virtual technologies are all about the illusion and making people think they are in an environment.

A lot of my work has been within the aerospace industry and extends to a lot of task learning. Tasks and training within industries such as engineering, healthcare and medicine for example are often done face to face, however digital and immersive technologies are a fantastic way to help people learn new skills and extend existing skills.

These skills may not be so easy to learn due to the dangerous environments they lie in, including the handling of nuclear waste or even operating on patients for the first time.

Virtual technologies take traditional environments and remove the real hazards, increasing the safety of users whilst offering greater convenience as part of a more economically feasible way of training.

Human-centric technologies can also be used for precisely measuring our energy consumption and waste levels for assessing how we can reduce our carbon footprint. However, this information is of no use unless we can use it for making and encouraging change from others, allowing them to understand the solution we are proposing.

Taking the information and data available to us through a range of systems, even within traditional manufacturing processes needs to be made accessible to the end-user and this is where human factors come into their own right.

THERE ARE MULTIPLE LINKS BETWEEN PSYCHOLOGY AND VIRTUAL REALITY, BUT WHAT ARE THE IMPACTS AND OPPORTUNITIES FOR RESEARCH?

Many academic and research papers show how immersion and the feeling of being part of a simulated environment can truly make a difference to the user experience. Their enhanced performance includes engagement levels with regards to a task, the transferable outcomes, and the behavioural changes we see are all a result of the the environment we create.

This can be considered abstract, but there are some very concrete examples such as assembly tasks for training. Fundamentally if you create a virtual simulation, you want it to be as realistic as possible, however, in reality, this is very hard to deploy.

Whilst we can present visual information very well, it is difficult to incorporate haptic information. Naturally picking up a tool, will have a weight associated with it and then a resistance when it collides or touches another object, so it determines what we feel and how we can present this information which is relevant to these tasks.

ARE THERE ANY SPECIFIC INDUSTRIES WHERE PSYCHOLOGY HAS PLAYED A KEY ROLE WITHIN AN IMMERSIVE ENVIRONMENT OR WHERE PSYCHOLOGY HAS ADDED AN EXTRA DIMENSION?

I think it is quite hard to think of an industry that is not fundamentally human-centric as everything we do and any endeavour, we undertake is human-centric.

If you build a product, you hope the product is attractive to your customer. If your business focuses on training, you need to consider numerous human factors.

We also need to consider differing perceptions and how humans react to the information presented to them and how can we coerce them into responding positively - this is the challenge and the interesting part.

With regards to designing products, we need to consider how consumers interact and feel. To do this we need to understand how humans perceive depth and distance because if we create and design tools for how parts are placed together but are unaware of how these technologies show depth information, then we inherently run into problems.

If you don't take the human user into account during product design processes, when you evaluate what you have designed through human performance and metrics, you are missing out on opportunities.

WHAT ARE SOME OF THE OTHER BENEFITS OF IMMERSIVE SIMULATION FOR MANUFACTURING BUSINESSES?

The obvious example is training. A virtual factory can enable virtual training of operators with important assembly tasks, enabling businesses to save a lot of time. Other industries including Healthcare such as laparoscopy for example and aerospace, have used and known of these virtual methods for many years. I recently visited a flight museum in Cambridge, which had a flight simulator from the 2nd World War!

Throughout my career, I have had to go through numerous safety procedure videos that are often not very engaging. I often think if we can convert these into an exciting game, where you identify hazards in exchange for rewarding points, training courses will be much more immersive, engaging and improve the user experience, and possibly the result.

Other ways of really enhancing efficiencies involve the design; for many safety-critical sites, there are very detailed and specific training manuals available for staff. We can simultaneously create and generate training manuals through what the experts do when placed within the working simulation, producing all of the specific and necessary paperwork such as instructions, manuals and maintenance documentation, based on the real systems.

I think it would be cool to use a VR factory for both simulations and then for the administration around the factory processes; it is another great way for saving some serious money.

WHAT AREAS OF IMMERSIVE ENVIRONMENTS AND PSYCHOLOGY ARE THE VEC'S TEAM OF HUMAN-CENTRIC EXPERTS FOCUSING ON?

Currently my teams are actively engaged in a project focusing on the rehabilitation of patients after they have experienced a stroke.

Rehabilitation works when you have people conduct repetitive tasks but this can often be a little boring and slow. We try to work on developing carefully designed VR games that patients play to overcome deficits that brain injuries may have caused. These games produce positive outcomes because they are created to be engaging, offering patients a score, which we have found has resulted in really encouraging behaviour with patients becoming competitive. This shows enjoyment from the tasks and highlights the social aspect as some rehabilitation methods can be quite isolating.

Another important aspect of VR Rehabilitation allows us to complete tasks as part of a collaboration, engage with patients from remote locations and encourage greater involvement and access.

WHAT IS YOUR ADVICE FOR BUSINESSES LOOKING TO EXPLORE HUMAN-CENTRIC TOOLS?

One of the largest stumbling bricks can be the idea of something new that can often be daunting and scary to many. Humans are incredibly adaptive so many problems we work on can be solved through complicated and technical solutions, but can often be solved quite simply.

One of the interesting aspects is not only what is technically possible, but almost the opposite; what can we get away with to get decent outcomes.

If you want to take things forward, don't be scared – most solutions are very feasible and not too complicated at all.

Evaluate, evaluate, evaluate!

This costs time and money, but I think it is so important. Carefully evaluate the human response against what you are doing to ensure it not only technically works, but achieves its intended purpose for identifying human behaviour and learning outcomes.

We have many ways of collecting performance data to enhance your processes. Many of us are very rational and we do things with very good reasoning.

It is not about changing people without processes, it is the understanding that is important and often, not that hard.