

# Extended life: Brain and Technology explained

By Professor Jan Willem de Graaf

Professor of Brain and Technology, Saxion University of Applied Sciences, Deventer, Netherlands

**D**uring this Corona time, I am regularly asked what exactly my professorship is about. I take the opportunity to explain that we are researching the collaboration between the cognitive and emotional functions of the human brain and the technological world (particularly smart technology). An important role is played by adaptability to a rapidly changing world and new opportunities and possibilities when new smart Technology, or new apps, become available, which results in new practices. Lifelong learning, viewed from the discrepancies between brain and technology. Not everything that is technically feasible is teachable, and not everything that can be easily learned is technically feasible.

There are always new possibilities and ditto impossibilities. For example, working online places very different demands on our executive functions (planning, working memory and emotional / motivational colouring) than meeting each other in real life. In physical meetings (at the office, or at school, etc.), the so-called "affordance structure" (coffee machine, corridors, smoking room, etc.) serves as an external trigger for interaction. Philosopher Andy Clark speaks of situated knowledge. When working online, initiatives to interact must be generated top-down (declaratively). Consolidated routines (situated knowledge) are, however, largely based on automatisms (procedural memory: bottom-up). Procedural knowledge ensures that a lot of work can be done quickly and effortlessly. As said, however, they rely heavily on physical situated knowledge (affordance structures) which aren't equally available in online work as in real life. On the other hand, online interaction offers new possibilities, such as the 'online disinhibition effect' (less attention to appearance, such as neat ties and suits and less prestige), resulting in meetings that can be more efficient and substantive. However, the danger of 'Cyber bullying' can arise.

## Brain and lifelong learning

Brain & Technology is about the relationship between mind and technology, so about brain and lifelong learning, and therefore about the extended mind. More generally, humanity uses technology to outsource brain processes (mind) to smart devices, just as we partially outsource our digestion to cooking and skin protection to clothing. So the boundary between body and environment is by no means fixed, partly thanks to technology. A kind of weird way to say it, you could say that Brain & Technology is about border traffic, and about border possibilities and problems.

The second line of my professorship concerns the consequences of technology for people with a brain that works slightly differently than most brains. In such brains, the relationship between brain and its outsourcing through technology is also different. This can arise from sensory limitations. For example, someone who has poor or no vision can learn to navigate through other sensory systems, and this results in a different cognitive functionality. But we also specialize in neurodiversity, often called autism. Many gifted autistic persons are typically strongly focused on structuring and analyzing/classifying their world. Here again a discrepancy: technological development (innovation) is largely based on neurodiverse brains, but due to the complex social organization that characterizes a smart society, many neurodiverse people are still on the sidelines, despite of their often excellent qualifications. In the Netherlands, ITVitae is very successful in offering education and guidance to gifted individuals in the autistic spectrum to work in the high-tech industry. For example, my research group investigates how work, life and friendship can remain in balance with people with a strong focus on structure. Our so-called "beta talent" research (neurodiversity) therefore concerns the brains of technically gifted people. Here too it concerns the relationship between brain and extension (environment, technology) - the extended mind - and here too our interest is that in the extended mind in the context of lifelong adaptation and learning.