

# Digital Motivation, Digital Addiction and Responsibility Requirements

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**Abstract**— Digital media can utilise game and behaviour change mechanisms to enrich engagement and user experience and increase their retention. Such mechanisms can also be used within the business software so that performance and quality of work are enhanced, e.g. gamification. While the positive side of these advances is recognised, there is little acknowledgement about their potential adverse effects on well-being. With recent research showing evidence of some digital media usage patterns being problematic and meeting the criteria of behavioural addiction, questions on the ethics, practices and responsibility of software companies are on the rise. Unlike alcohol, digital media can be designed to sense and react to problematic usage styles. This invited talk discusses why and how the software engineering community would need to take part in designing for conscious and informed technology usage.

**Index Terms**— Digital Motivation, Digital Addiction, Responsibility Requirements, Responsibility by Design

## I. DIGITAL MOTIVATION

Digital motivation refers to the use of technology-assisted solutions to boost or change attitude, perception and behaviour, about certain goals and tasks, individually or collectively. Examples include gamification and persuasive technology mechanisms such as leaderboards, feedback, points, and badges based on monitored performance. Our research showed that digital motivation solutions could negatively impact well-being, triggering a poor work ethic. A reward and motivation system has a complex nature due to personal, social and organisational factors and calls for new methods of design and testing when automated. Intrinsic motivation may reduce when extrinsic motivation elements, introduced via gamification, are applied. Reactance, anxiety and pressure may also occur when people feel they are being persuaded strongly to perform in a certain style, e.g. via a timer and real-time peer-comparison.

## II. DIGITAL ADDICTION

Certain individuals who use games and social media, which are typically equipped with a range of digital motivation techniques, have exhibited symptoms of behavioural addiction such as mood modification, conflict, relapse, tolerance and salience. World Health Organization has recently recognised gaming disorder, opening the door for questions about whether gaming companies would need to be further regulated. We note that games are also included in social media, not necessarily explicitly as games but rather through more subtle forms including socialisation (likes and shares), competition (badges and num-

ber of followers), exploration (news and timelines), alternative reality (personas, avatars and profiles), etc. Hence, the call for further regulation could be extended to social media as well. The ‘pull to refresh’ mechanism and the following seconds of anticipation on social media are eerily similar to pulling the lever of a slot machine and tentatively waiting to see the “win”.

## III. RESPONSIBILITY REQUIREMENTS

Recent data protection regulations, such as the EU General Data Protection Regulation (GDPR), emphasise citizen’s rights about *automated decision making including profiling* so that citizens are informed about it and helped to modify and restrict it in accordance with their own wishes. Also, the right to *data portability* enables citizens to obtain and use their data for their own purposes on different services. Making digital behaviour data typically used to optimise digital media attractiveness and immersion, accessible through Application Programming Interfaces to parties authorised by the user, is not a common practice. Enabling such real-time access to such data paves the way for other services to help digital wellbeing, possibly through using them for parallel motivational techniques meant to increase the conscious and self-controlled nature of digital usage.

We argue the demand on the software industry to “play fair” with data by designing and enabling 3rd parties to design awareness and conscious usage services to be run in tandem with their products. To enable this speculated picture of future digital media, challenges still to be resolved include:

- How to elicit and validate *transparency* requirements about automated decision making and profiling so that digital persuasion can be explained and consented to?
- How to elicit and validate *digital well-being risks and requirements* and their inter-relation with software design features and other requirements? A range of behaviours and attitudes found in problematic behaviours such as trivialization, denial and relapse, make classic elicitation methods simply invalid.
- How to design digital media in a way that makes it possible to *assess and establish culpability* in case a claim arises that negative life experiences and harm are partly caused by the use of digital media and its persuasive and addictive elements?
- Given the inter-disciplinary nature of the problem, what is the *nature of software engineering team*? This includes its set of expertise and roles, their governance and interactions, and their decision-making processes.