

Digital Addiction: Gamification for Precautionary and Recovery Requirements

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Digital Addiction (DA), which includes Social Networks addiction, online/offline gaming addiction, etc., includes the excessive, compulsive, impulsive and even hasty usage of software and computing devices [1, 2]. In contrast to traditional addictions, such as alcohol addiction, DA can exhibit similar symptoms, such as mood modification, salience, tolerance, withdrawal, conflict and relapse [3]. Although some types of DA, e.g. those to social networks, are still subject to research whether they are formally a sort of addiction as stated in the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), such usage is becoming practically a serious issue. Cheng and Li [4] suggest that 6% of the world's population has Internet Addiction. In South Korea, the government estimated that 2.1% of those aged between 6 and 19 are affected by Internet Addiction and require treatment [5]. According to a 2009 report by the China Youth Association for Network Development, of those internet users between 6 and 29 years old and living in an urban area, approximately 14.1% meet their (mainland China) Internet Addiction diagnostic criteria; which equates to approximately 24 million people [6].

Despite a growing body of evidence that DA is a serious issue, neither software engineering literature or practice have established restrictions or norms to deal with the addictive nature of software, nor to aid addicts recovery from such addiction. Currently, the burden of responsibility is put on users themselves. In contrast, this paper argues that software could, and probably should, also offer mechanisms to treat addictive usage styles. Indeed, some solutions have been already tried. For example, from 2007, China introduced an anti-online gaming addiction system to restrict players under 18 spend less than 3 hours a day playing digital games. However, this approach has limitations, e.g., many teenagers manage to use adults' IDs to register accounts for online gaming to avoid such a restriction.

Furthermore we believe that if mechanisms to reduce the likelihood of addiction or reduce the addictive behaviours could be integrated into the software, this would be perceived by users as beneficial. Therefore, our solution is to use motivational approaches, rather than restrictive ones, and to embed these within the software to enable interactivity with users. Gamification, the use of game elements (e.g., points, badges, avatars, etc.) in a non-game context, is a software-based technique towards motivation and behavioural change [7]; and has the potential to cater for the paradoxical requirements listed in [2]. These paradoxes are mainly about the inevitable conflict between the desire for a healthy usage style and the fear of reducing the attractiveness of the software product, and of being controlled when accepting a software-based treatment service, e.g., labels and warning messages.

To validate our observations, we interviewed three experts in human factors in computing and other three experts in traditional addiction, namely drug and alcohol

addiction, in the UK. While the study is still on-going, preliminary results showed four clear requirements for addicts when receiving advice and warnings to change their behaviour. First, addicts generally like to take advice and share ideas within a peer group and dislike hierarchy-based treatment. Second, addicts generally like to avoid being controlled, even when it is clearly for their benefit, and prefer to be the decision makers. Third, treatment should be non-obtrusive, e.g., the social network and game should maintain its general look and feel when we augment it with an anti-addiction layer. Fourth, the treatment should be generally positive and addicts should see the reward, or what they avoid, when following the advised behaviour.

Based on these initial findings, we advocate that software-based motivation, i.e., gamification, is a natural option for the precaution and recovery procedures related to DA. For instance, a progress bar and avatar can be used to warn users of an excessive use. The software-mediated peer-pressure is potentially useful for recovery from DA. Peer recognition and mutual commitments could be seen and implemented as game elements to encourage certain usage styles. Future work on the topic will explore this new family of requirements for people with DA and how to meet these requirements through software-based motivational approaches. Our ultimate goal includes methods and tools for systematic requirements engineering to handle DA at the precaution and recovery stages. Characteristics mentioned in [3], such as denial of reality, tolerance and conflict make this research challenging and call for novel requirements engineering approaches, e.g., for elicitation and validation and ensuring trustworthiness. In addition, alignment and compliance of DA treatment with other requirements, such as privacy, usability and health care regulations, is one of the challenges to explore. This, amongst other things, means that we will need to develop constructs that model a treatment and its inter-relations with other requirements and analyse properties such as consistency, side-effects and completeness.

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