AUTOMATON:
A Gamification Machine Learning Project

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INTRODUCTION

This chapter aims to highlight opportunities, challenges and future research on an ongoing development project - the AUtonomous TailOred gaMificATiON (AUTOMATON) - at a gamification start-up for gamified machine learning acting in Scandinavia. Gamification refers to using game elements in non-game situations (Deterding et al., 2011) and has been discussed in various domains, such as crowdsourcing, tourism, computer science, sustainability, software development, health and wellness as well as in business (Helmefalk, 2019). A considerable amount of literature emphasizes these elements being defined as game mechanics (e.g., badge, level, leaderboard, points), supporting various processes while being engaging and motivating (Looyestyn et al., 2017; Reiners & Wood, 2015; Sailer et al., 2017; Wee & Choong, 2019).

During its relatively brief existence, the multifaceted concept of gamification has gained much attention in the last decade in both business and academia (Nacke & Deterding, 2017). Regarding search trends (Figure.1), it has also surpassed its older sibling Serious games, a game designed for purposes other than entertainment such as learning. Ironically, the last decade of gamification hype might be to gamification's detriment. This is because even though several established advisory firms and research institutes (see Burke, 2012; IEEE, 2014) have predicted a promising future for the use of game elements in the non-game context, several of these predictions have failed to actualize.

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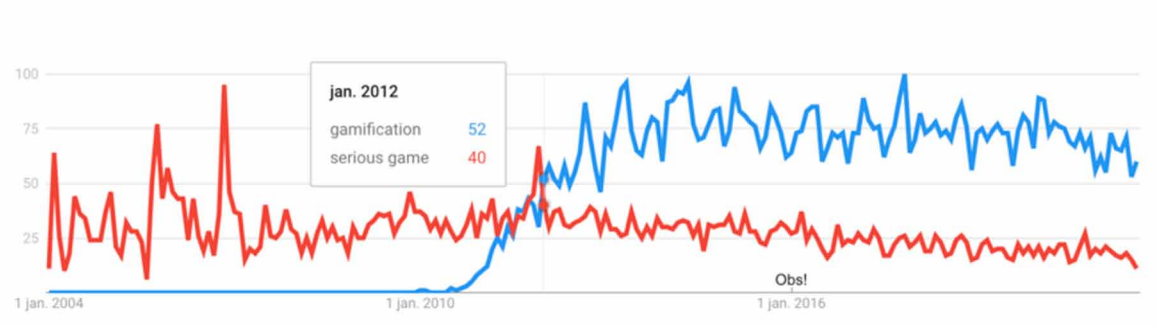
Figure 1. "Gamification" surpassed "Serious Games" in search trends in 2012 (Google Trends, 2021)
(The "Obs!" annotation marks the date of an update in the way search trend data was collected via Google Trends: "An improvement of our (Google) data collection has been applied from 2016-01-01.")



BACKGROUND AND PROBLEM

Gamification researchers have suggested that gamification, probably due to its rapid rise to fame, has largely failed to evolve with the fields that elevated it (Raftopoulos, 2020). Also, even though research on gamification shows promise in several fields (Koivisto & Hamari, 2019), the gamification industry has not yet refined any rigorous and verified standards (Nacke & Deterding, 2017), resulting in an uncertain market in the hands of various gamification consultants – with slim possibilities of developing and validating industry standards due to the many different design approaches (Koivisto & Hamari, 2019). To illustrate, while one industry may apply best practices, standards or solutions that generate promising results, other industries have their own. Consequently, inputs, outputs and data become too eclectic to (dis)confirm the wider efficiency of gamification. Last but not least, gamification scholars and practitioners alike have argued that gamification designs are context-dependent (Palmquist et al., 2021). Transferring a successful design from one context to another can have serious consequences in the gamified situation, affecting the users negatively. A gamified solution that have showed promise in increasing engagement among students in education, may not only be different from other contexts such as health and fitness services, but may also differ from other courses. Needless to say, context is important. This predicament has made gamification demanding in terms of resources such as capital and time; likewise, it makes gamification hard to generalize and scale up effectively. Solving these problems is not a simple matter, but requires long-term methods, designs, systems and technical solutions that aid our understanding how people think, feel and use gamified services.

In a systematic literature review, Khakpour and Colomo-Palacios (2021) investigated the convergence of gamification and machine learning. One of the research questions raised was which aspects of gamification were impacted by developments in the field of machine learning. They highlight various potential implementations, such as user personalisation, as well as adaptation of gamification mechanics during use. Instead of letting users set their preferences at the start of using the system, based on factors which may change as time goes and the users progress, these adaptive processes can offer dynamic and engaging tasks during the whole use. While A.I. and machine learning has gained considerable momentum in Information Technology (IT) and learning, it has as of yet received less attention in the context of gamification. A significant amount of conceptual research has been conducted, showcasing how gamification could *potentially* benefit from utilising A.I.; however, validated and consistent smart gamification products developed for, and deployed in, real-life situations are scarce. To address these