# Gamification to Engage Manufacturers with Servitization

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**Abstract.** Servitization can include many kinds of processes and outcomes depending upon the contexts in which it occurs. This means that servitization is difficult to model accurately in simulations. Games, on the other hand, prioritize the provision of engaging experiences for participants over modelling realistic processes, while Serious Games can combine elements of both games and simulations. Gamification is a more recent term than either 'simulation' or 'serious game' that has been retrospectively used to describe the process of combining game elements with simulation models to create serious games. As the knowledge base of servitization is quite broad, and specific processes of transformation have yet to be verified, serious games and gamification may be more suited to engaging manufacturers with servitization than simulations. Having co-created several gamified software applications based on servitization, we discuss our findings in relation to this process.

**Keywords.** Servitization, Gamification, Software.

## 1. Introduction

Servitization is the process of a business transforming from a product-oriented to service-oriented business model [1]. Servitization can include many kinds of processes and outcomes depending upon the contexts in which it occurs [2]. This could mean that servitization is difficult to model convincingly in simulations. Games, on the other hand, can differ from simulations in this respect, because they prioritise engaging experiences over realistic models [3], while Serious Games can combine elements of both games and simulations [4]. As the knowledge base of servitization is broad, and specific processes of transformation have yet to be verified, serious games may be more suited to engaging manufacturers with servitization than simulations.

Gamification is a more recent term than either 'simulation' or 'serious game' that refers to the process of making something not a game more game-like [5]. It has been retrospectively used to describe the process of combining game elements with simulation models to create serious games [4]. In this paper, we explore different degrees of gamification in several software applications based on servitization, and discuss our findings in relation to this process.

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## 2. Servitization

Servitization is the process of manufacturers providing services through their experience and expertise in production [1]. At a high level, servitization is a shift in mindset; from making products to providing services. By offering services, manufacturers can enjoy stable revenues and offset the risks of economic instability in a competitive marketplace. Yet, despite several decades of research, the process of servitization remains relatively elusive [2].

Successful examples of servitization have been cited extensively, such as the Rolls Royce Power-by-the-Hour model, or Xerox's Managed Print Services [1]. These cases demonstrate the potential value of servitization in disparate manufacturing contexts. Descriptions of the processes of, and pathways to, change in these organizations provide insight into the kinds of transformation journeys companies can go through, which lead to the successful delivery of services. While categories of change can be defined at a high level, however, each organization's journey will be unique based upon a range of factors. Relatively little is known about this complex process of transformation [2].

This presents a dilemma. Academic research can help guide manufacturers through the process of servitization, but the current knowledge base may not be sufficient to convince manufacturers to undertake this process. On the other hand, without insight into the transformation process from the outset, academic research into servitization will not grow to a level where it is universally applicable. A method is needed that encourages manufacturers to undergo the transformation process of servitization based on the existing knowledge base.

## 3. Simulations, Serious Games & Gamification

### *3.1. Simulations*

Simulations allow participants to explore different operational strategies within risk-free environments [6]. Models based upon real-world processes are used in simulations, which react to inputs by the user, and provide the user with feedback based upon the outcome of their actions. This means that users of simulations can explore different decisions and observe the outcome of these decisions prior to committing to them in the real world [6].

Simulations are only as relevant so far as their models are verifiable [3,6]. The accuracy of simulation models depends upon the knowledge base available to inform them. In the case of servitization, it may be possible to simulate established processes based upon existing theories, methods and practices [7]. However, from the current knowledge base it may not be possible to simulate transformation processes accurately. Serious games and gamification present an alternative approach.

### *3.2. Serious Games*

Serious games use technologies and design techniques associated with commercial games to engage users [4]. Commercial games use game mechanics [8], which are similar to models found in simulations, but prioritize engaging experiences over realism. Serious games are distinguishable from commercial games in that their primary function is to inform, train, and/or educate users, rather than entertain them.

It can be observed that academics and practitioners use the terms *simulator* and *serious game* interchangeably in some contexts [6]. Indeed, *simulation game* is also a common term, which confuses matters further. Yet, there should be a distinction related to the extent to which one form is more game-like than the other. Serious games employ features of games that make them more game-like than simulators, whereas simulators do not require these game-like features to function [3,4].

### *3.3. Gamification*

Gamification has been defined as the "intentional use of game elements for a gameful experience of non-game tasks and contexts", though there are no standard, agreed upon definitions [9]. Broadly, gamification is associated with making something that is not a game more game-like, which leads to these engaging, 'gameful' experiences. Though gamification is a relatively new term, it is not a new phenomenon, and the term has been retrospectively applied to design processes in the creation of serious games [4]. Therefore, while the term *serious game* refers to artefacts that are the outcome of a design process, *gamification* refers to the process of making something 'serious' into a game.

Given the contentious nature of the term 'game' [10], and the ambiguous and inconsistent definitions of 'game elements' [9], inconsistencies in the research and application of gamification are to be expected. The ambiguity of the process is problematic for both serious games and gamification. While methods are established for developing simulators based upon the formulation of models [6], the creation of gameful experiences is less systematic. Advances have been made in approaches to designing serious games in recent years [11], but it is acknowledged that designing games is a difficult process to get right.

Recent advances in gamification stress the importance of design activities that identify games features suitable for the people interacting with them [12]. While the design of simulations should impart knowledge of existing practices in a manner participants can grasp, successful gamification should draw people into existing contexts through engaging and persuasive design [13]. In the case of servitization, there may not be sufficient knowledge to impart to participants through simulation. Gamification, however, could draw participants into the servitization debate, if done properly.

## 4. Gamification for Servitization

Following the hypothesis above, a series of software applications designed to engage users with servitization were created in collaboration with game developers, with different degrees of gamification. These games were *Drilling for Success*, *The Boardroom Game*, and *Unlock Your Insight*. Some of the opportunities and challenges identified through this process of co-creation are discussed in relation to each game below.

### *4.1. Drilling for Success*

Drilling for Success was co-created by the Advanced Services Group (ASG) at Aston Business School and the software company Eyesparks following a co-design event hosted at the Advanced Manufacturing Research Centre (AMRC) in Sheffield. The concept of the game was based on the quote "People don't want to buy a quarter inch

drill, they want a quarter inch hole" attributed to Theodore Levitt, which has been associated with arguments for servitization [14]. Running with this concept, Eyesparks created a game wherein the player must tap targets on panels to drill holes and fulfil orders submitted to them by virtual clients. By buying into a servitized offering provided by the manufacturer of the drill, the game is made easier, and the player is introduced to the potential of advanced services.

At a high level, the concept of the game demonstrated both appeal and relevance. However, while the software company could quickly identify how the drilling concept could be translated into a fun, serious game, difficulties emerged when aligning the game mechanics with a convincing representation of servitization. Through several co-creation workshops, the fun aspects of the game were aligned with the requirements of portraying a servitized approach. The outcome of this process was a serious game that portrayed a model of advanced services consistent with the theory and appropriate for the context.

### *4.2. The Boardroom Game*

The Boardroom Game was co-created by ASG and the company Legendary Games following a co-design event hosted at the AMRC. In collaboration with colleagues at ASG, Legendary envisaged a boardroom scenario wherein different members had vested interests in different aspects of the business. In this scenario, the player takes on the role of the Managing Director, and makes decisions based upon the advice she receives from the other board members. The concept of the game was inspired by the decision-making processes of servitization, and Legendary produced a framework that allowed players to generate revenue based upon decisions they made in the game.

In the process of co-creating the game, ASG simplified its mechanics. This resulted in the removal of the profit and loss formulae that Legendary created. The reason for doing this was that it was difficult to design decisions that corresponded with the specificity of the model. The model Legendary created would have worked well for a gamified simulation; allowing decisions to control the revenue generated. But a concern was that some decisions would have an impact upon profit and loss in the short and long term, which is not necessarily the case in many transformation processes. Instead, the framework for decision-making was kept, but feedback was provided as suggestions given by characters within the game rather than as outputs of a profit and loss model.

### *4.3. Unlock Your Insight*

Unlock Your Insight was the result of a collaboration between ASG and Columbus Global, and developed by Eyesparks. Columbus had identified the potential for a workshop activity designed by ASG to be disseminated digitally in gamified form, and agreed to work with ASG to accomplish this. The outcome was Unlock Your Insight; a tool that helps users visualize their competitive strategy. It accomplishes this by asking a series of questions of the user and sending her a report showing how her current and future competitive strategies relate to servitization. The sequence is gamified through graphic feedback related to the scenario of cracking open a safe.

The process of creating Unlock Your Insight involved collaboration between all stakeholders from the outset. Development was facilitated by the existence of a workshop activity that contained a series of steps that could be translated into gamified interactions. Digitalizing these steps was quickly resolved through rapid prototyping with stakeholders. Gamification required care; as the expectations between different

stakeholders needed to be kept balanced with the game mechanics. Once the scenario was agreed, the ways in which the sequence could be made more appealing became straightforward, and the graphical feedback elements could be made consistent with the theme.

## 5. Discussion

The applications described above demonstrate different degrees of gamification in the development of software applications. In Drilling for Success, the imagined scenario inspired by the Levitt quote had fun elements that could be embellished with a model for servitization, but getting the balance right between the game mechanics and servitization knowledge was time consuming. In the case of The Boardroom Game, this balance was achieved by reducing the level of gamification to avoid any issues related to the perceived realism, and indications as to the suitability of servitization were given via text rather than through the outputs of the game's model. In Unlock Your Insight, the involvement of stakeholders throughout meant that the level of gamification was kept appropriate; which was subtler than the other games.

In each of these examples, feedback from usage has been positive, and preliminary findings indicate that persuasive design can convince users of the benefits of servitization. The co-creation of these games indicates that further work is needed into a framework for balancing gamification with servitization theory. Achieving this balance could facilitate the continued engagement of manufacturers with servitization, which will in turn contribute valuable insight into transformation processes.

## 6. Conclusion

The benefits of servitization are undermined by the uncertainty of transformation. The range of knowledge related to servitization may not be of sufficient depth to inform simulation models, but games and gamification can be used to entice manufacturers. However, there are challenges associated with balancing game mechanics with servitization theory. Once these are overcome there is an opportunity to engage manufacturers with servitization through gamification.

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## Appendices

To access the research data/gamified software supporting this publication, see http://doi.org/10.17036/researchdata.aston.ac.uk.00000199, http://doi.org/10.17036/researchdata.aston.ac.uk.00000200, http://doi.org/10.17036/researchdata.aston.ac.uk.00000201

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