Development and preliminary evaluation of a serious game to communicate a digitally enhanced advance service (DEAS) offer

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RESEARCH MOTIVATION

DEAS are a cluster of high-value business models that focus on the delivery of outcomes rather than products to customers (DEAS NetworkPlus, 2020). Advance Service offers can be challenging to communicate and limit businesses understanding in the value and benefits. This can be costly both for customers and service providers. This has initiated researchers to explore innovative digital technologies to enhance the communication, education and engagement of customers about DEAS offers (DEAS NetworkPlus, 2019). This work employed Serious Games as an innovative technology to research if DEAS offers can be communicated to current and future customers, whilst engaging and educating them about the DEAS benefits. Thus, this project was developed in collaboration with the Howden Group which are a global engineering business who focuses on providing their clients with industrial air and gas handling assets (Howden Group, 2021). Howden provided their DEAS "service agreement" offer, as an industry example. This offer was split into services and benefits, recommended to the player as controls, perks and upgrades in the game. The game simulation challenges the users with random equipment malfunctions, forcing them to select appropriate DEAS solutions and learn in a chaos-based scenario.

CONTRIBUTION TO THEORY AND PRACTICE

 Current literature identifies few research opportunities that employed Video Game-Based learning techniques to convey the concept of servitization (Petridis, Baines and Shi, 2014; Andrews and Baines, 2017; Andrews et al., 2017; Guang et al., 2017; García-Magro et al., 2019). The work carried out in these studies seen some success in communicating the benefits of servitization to manufacturers through adopting game-based learning. However, the methodologies adopted have been predominantly gamification of content rather than creating a serious game. Although gamification is a powerful model it has some limitations with the gaming aspect of the final output. Gamification is restricted to the pre-existing content and material to be gamified, rather than a game specifically built for play and learning. The play element of the game can be seen as a superficial add-on. Alternatively, studies that utilised the Serious Game approach attempted to convey the concept of Servitization to manufacturers (Petridis et al., 2014; Uren and Petridis, 2015). However, the approach adopted was unsuccessful in teaching the intended learning points. The systems presented in these papers focus more on educating/conveying the overall Servitization concept rather than a specific offer for a business. Furthermore, most of the previous work has attempted roleplaying simulation experiences, which can be complex to learn and play. Additionally, such simulation games can be lengthy to play which can limit players' engagement.

RESEARCH METHODOLOGY

The proposed work adopted the serious game model over gamification, making it possible for the game to be developed with a unique play experience centred on Howdens DEAS offer. The game design enforces the players to learn through experience and highlights the practical use of servitization offered by Howden. Whilst learning about these benefits and using them effectively the player can

improve their score as they progress in the game. Moreover, this allowed experimentation with the dissemination of the content to be communicated and develop a well-suited game for the intended target audience (Howden Employees and Customers). The design and development of the game resulted in alignment of the Howden DEAS offer to be mapped in to the game. An educational/simulative value was given to each of the main actions and goals the player has complete. Furthermore it was difficult and ineffective to feature every benefit of the DEAS offer in to the game. This was due to several of the upgrades/ perks becoming too similar and not providing significant improvements to the player's progression. Additionally, this was needlessly extending the game length and providing too much information for the player to remember, the number of upgrades were reduced to six upgrades. These were designed by combining multiple services, and benefits in to key game upgrades. Alignment of Howdens DEAS offer with the Learning Outcome and Game Upgrades is demonstrated in Figure 1. This research employed an iterative game design methodology to research, design, develop and test the game. This allowed the level of to be developed in incremental phases which enabled constant improvement and necessary changes by gathering feedback from playtests throughout the development of the game. Quantitative means were used to establish the effectiveness of the prototype.
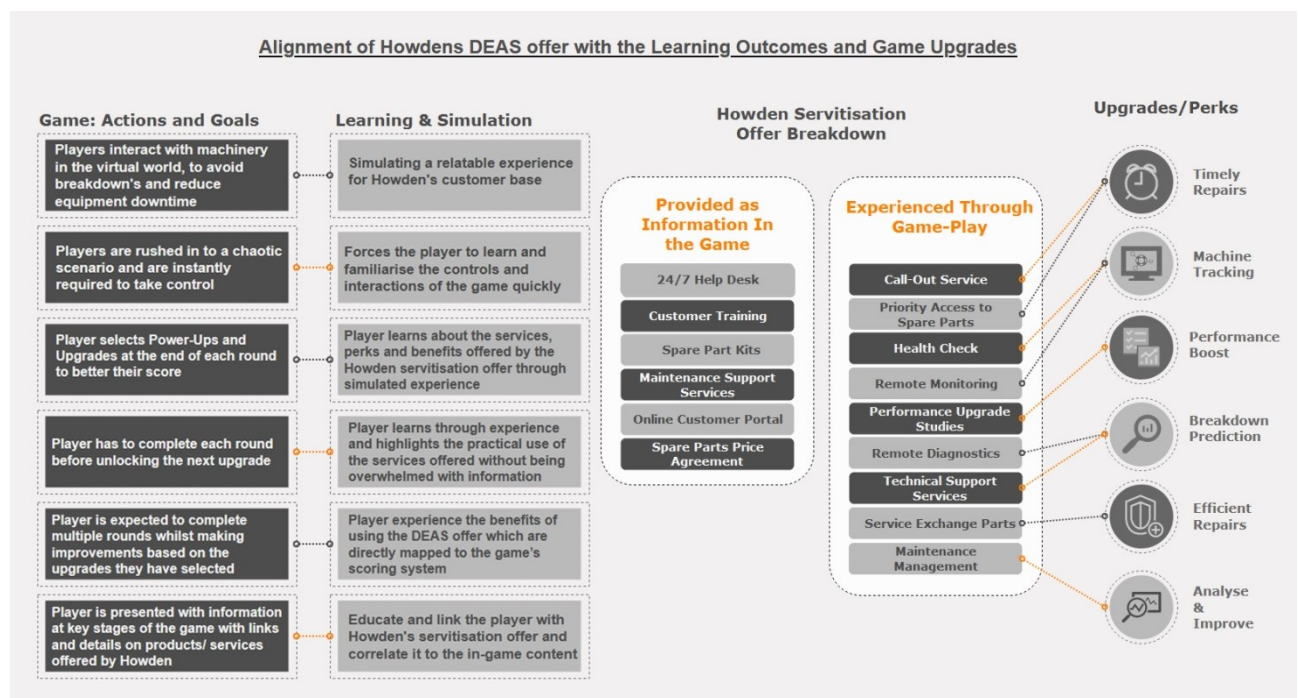

Figure 1: Alignment of Howdens DEAS offer with the Learning Outcome and Game Upgrades

KEY DISCUSSION POINTS

- How can Serious Games be used in order to communicate, engage and educate customers about DEAS offers?
- What are the considerations to take in to account whilst designing a game to promote/ educate DEAS offers?
- Can serious game be effective in communicating a DEAS offer?
- How applicable is the design/development of the Howden DEAS game to other companies/ organisations and other sectors?

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References:

Andrews, D. et al. (2017) 'Gamification to Engage Manufacturers with Servitization', in James Gao, Mohammed El Souri, S. K. (ed.) *Advances in Manufacturing Technolog*y XXXI. Netherlands, pp. 195–200.

Andrews, D. and Baines, T. (2017) *Unlock Your Insight: Employing a Gamified App to Engage Manufacturers with Servitization.*

Baptista, G. and Oliveira, T. (2019) Gamification and serious games : A literature meta-analysis and integrative model', in *Computers in Human Behavior*. Elsevier, 92(May 2018), pp. 306–315. doi: 10.1016/j.chb.2018.11.030.

DEAS NetworkPlus (2019) *Digitally Enhanced Advanced Services EPSRC NetworkPlus Manufacturing Theme Research Agenda*. Available at: www.deas.ac.uk. ISBN number: 978 185449 478 8

DEAS NetworkPlus (2020) What are Digitally Enhanced Advanced Services? Available at: https://www.deas.ac.uk/deas-project (Accessed: 21 January 2021).

García-magro, C. et al. (2019) 'Design of services in servitized firms: gamification as an adequate tool', Journal of *Business & Industrial Marketing*, 3(July 2019), pp. 575–585. doi: 10.1108/JBIM-12-2018-0413.

Guang, V. et al. (2017) 'Using gamification to transform the adoption of servitization', *Industrial Marketing Management*, 63, pp. 82–91. doi: 10.1016/j.indmarman.2016.12.005.

Howden Group (2021) About Howden. Available at: https://www.howden.com/en-gb/about (Accessed: 21 January 2021).

Petridis, P. et al. (2014) 'iServe: A serious game for servitization', in 2014 *International Conference on Interactive Mobile Communication Technologies and Learning (IMCL2014)*, pp. 237–241. doi: 10.1109/IMCTL.2014.7011139.

Petridis, P., Baines, T. and Shi, V. G. (2014) '*iServe : A Serious Game for Servitization*'. IEEE, (Imcl), pp. 237–241.

Uren, V. and Petridis, P. (2015) '" this beer is off! " - building a dialogue game for servitization', *Spring Servitization Conference SSC2015*. Birmingham, pp. 91–98. doi: 978-1-85449-492-4.