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## Engaging healthcare users through gamification in knowledge sharing of continuous improvement in healthcare

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### Abstract

Knowledge management systems are key for capturing, retaining, and communicating results from projects and presenting information to staff. The purpose of a knowledge management system is to tap into the vast wisdom from projects and experts across an organization. This research focuses on the knowledge management system within the Veterans Health Administration that was developed as a repository of information on continuous improvement tools such as flowcharts, value stream mapping, 5S, and the application of these in healthcare projects. The use of social network analysis and gamification improves website organization, user participation, and dissemination of shared knowledge related to continuous improvement of operations. The purpose of gamification is to engage, teach, entertain, measure, and improve the ease of use of information systems. The goal of this research is to utilize gamification theory within the knowledge management system to drive behaviors in a targeted audience and engage users in aspects such as writing, contributing, getting the feedback, which will create a more robust, cohesive system. A thorough review of the current knowledge management system was conducted, and a gap analysis was performed comparing the goals and objectives for the system to the current results. Next, gamification techniques with the potential to improve performance were identified and strategies to implement these were developed.

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## 1. Introduction

Knowledge management systems are key for capturing, retaining, and communicating results from projects and presenting information to staff. This research focuses on the use of social network analysis and gamification to improve a Knowledge Management System (KMS) with respect to website organization, user participation, and dissemination of shared knowledge related to continuous improvement of Veterans Health Administration (VHA) operations. The goal of this research is to utilize Gamification Theory within the KMS to drive behaviors in a targeted audience and engage users.

The purpose of gamification is to engage, teach, entertain, measure, and improve the ease of use of information systems. Gamification has been widely used in industrial applications to increase customer retention; such as Starbucks creating custom badges in Foursquare which provides customers that check in at store locations with real world benefits such as discounts and virtual rewards such as becoming mayor at a Starbuck's location. This application of gamification motivates users to voluntarily participate in required tasks, encourages brand loyalty, and provides customer feedback and vast amounts of data about user behavior.

The purpose of the Veterans Health Administration Knowledge Management System for Systems Improvement is to tap into the vast wisdom from projects and experts across the VHA. The first phase of developing the KMS was the creation a repository of information on the basic continuous improvement tools such as flowcharts, value stream mapping, and various other tools, which is known within the system as the KMS Wisdom. The second phase, Improvement in Action (I-ACT), was to focus on the application of that knowledge through projects. The purpose of this research project is to focus on the application of gamification theory in the KMS Wisdom and I-ACT with the goal of engaging users, motivation, and increase content submission. The volume of information and examples on the KMS is very beneficial to the user; unfortunately, it can seem daunting to the user at the same time.

The purpose of the research is to explore using gamification techniques to engage VHA KMS users to improve the users' experiences and to encourage continuous improvement at the VHA. As part of the research, gamification strategies were developed for the KMS Wisdom and KMS I-ACT portions based on the user behaviors, best practices in the literature, and goals of the KMS workgroup.

## 2. Literature review

The science of gamification, though a recently coined term, was developed in 1973. The modern term was coined by Nick Pelling[1]. However, the basic concept of gamification was first established by Charles Coonradt in his book "The Game of Work" in 1973. Gamification is defined as the use of game design elements in non-game contexts [2]. Contrary to popular belief, gamification does not involve constructing games out of tasks or events. Gamification aims to apply specific aspects of games/gaming to tasks and events to produce desired effects. Gamification is a method of Incentive-Centered Design (ICD), which is the process of designing a system that aligns players/users goals with the goals of the system. Gamification does this through the use of rewards and competitions such as digital badges and leaderboards. Various definitions have been proposed including "the adoption of game technology and game design methods outside of the games industry" [3], "The process of using game thinking and game mechanics to solve problems and engage users" [4], "Integrating game dynamics into your site, service, community, content or campaign, in order to drive participation" [5], and an informal umbrella term for the use of video game elements in non-gaming systems to improve user experience (UX) and user engagement [6]. Gamification has become a large, rapidly growing industry that totalled \$421 million in 2013 with projected growth of \$5.5 billion by 2018, a growth rate of 67% [7].

Gamification is composed of two subcategories, structural gamification and content gamification. Structural gamification (such as digital badges and leader boards) is the use of game elements to encourage a player/user to obtain a goal. Structural gamification does not change the content of a process but instead it changes the structure and progress chain of the process. Content gamification alters content to make it more game-like. Gamification is often confused with learning games. These are self-contained games designed for a specific purpose such as teaching reading or mathematics. Simulations, such as flight or driving simulators, allow users to practice a process without real world consequences are also different than gamification.

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