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SMALL STEPS: IMPROVING HEALTHCARE WITH LOCAL INNOVATION

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Abstract

Integrating technological innovations into healthcare systems has proven to be challenging. It is possible, however, to make small but significant improvements to healthcare through technologies that are not connected to the massive electronic health records systems. This paper describes one such system, Walk the Ward, which was developed for a medical ward in a large regional hospital. Walk the Ward is a quiz-type game played by hospitalized patients to provide entertainment, social interaction and, most importantly, exercise, which promotes healing. Educational information is also provided in the game. Evaluations of the game have shown that patients found it enjoyable and useful, and it facilitated social interactions. Hospital staff also found the game beneficial because it both helped patients and did not increase staff workloads. While the game is currently used in only one location, the basic structure can easily be expanded to multiple settings at a relatively low cost.

Keywords: serious games, healthcare, innovation, elderly

1.0 Introduction

Healthcare systems across Europe, the UK and the US have all been described as facing a looming crisis due to a growing elderly population and a fixed or declining percentage of resources allocated to healthcare. Technological innovation is viewed as a means of addressing at least part of this challenge. However, promising innovations are often bogged down by regulations or slow-moving decision-making processes. In many cases, regulatory bodies find it more prudent to disallow innovations rather than risk approving an innovation that ultimately has negative consequences (Herzlinger, 2006). The extremely sensitive nature of healthcare data further increases the likelihood that

decision-making bodies will prohibit innovative healthcare technologies from being integrated with electronic health record (EHR) and related systems.

It is possible, however, to develop technological solutions that are patient-focused and effective in improving health and reducing healthcare costs, without engaging directly with prohibitive regulations. Some of these bottom-up solutions are driven by patients such as the 'health hackers' creating their own artificial pancreas systems (e.g. Omer, 2016), others by technology firms and researchers, and others by the healthcare providers themselves. Whereas the ideal situation might be one in which these systems are integrated with the EHR system from the start to facilitate maximal sharing of information between healthcare providers and patients, there are nonetheless potential benefits that can be achieved without such integration. It is possible that controlled evaluations of these independent medical systems may provide empirical results that eventually lead to approval for them to be integrated with the full healthcare system.

This paper reports on the first iteration of an on-going action research project that seeks to address a local healthcare issue. The purpose of the project is to investigate how modern technology can be used to activate patients in a way that has a positive impact on both mental and physical states, thus facilitating recovery, while at the same time not putting greater burden on the hospital staff. The remaining material is presented in the AR cycle of diagnosing, action planning, action taking, evaluation, and reflection (Susman & Evered, 1978; Davison et al., 2004).

2.0 Diagnosis: Immobile, Isolated Hospital Patients

In the medical ward involved in this study, patients are typically hospitalized for several days for issues related to chronic conditions (e.g., diabetes). Hospitalized patients experience an avalanche of emotions and feelings during their stay, such as boredom, loneliness, fatigue, pain or fear. In addition, the trend towards single rooms results in patients rarely leaving their rooms, which leads to isolation, a reduction of social contact, and a decrease of physical exercise. Inactivity, both physical and mental, can have a negative impact on recovery and general health, and is of particular concern with elderly populations, who are more likely to be hospitalized.

3.0 Action Planning: Game to Increase Mobility and Interaction

Preventative activities have been shown to be effective in combating isolation and lack of mobility (Clegg et al., 2013; Windle et al., 2010). In this regard, the research team focused on games for rehabilitation, both physical and mental. Such games are often aimed at addressing a specific condition or improving motor skills in the home environment, using different tools such as Nintendo Wii or Xbox Kinect motion-detecting consoles (Borghese et al., 2013; Griffiths, 2005; Jung et al., 2009), dance pads with games, or force platforms to assess posture and balance (Molina et al., 2014).

Among the mental benefits of games are better mood, increased self-esteem, reduced sense of loneliness, and improved memory. It has also been asserted that games can contribute to a reduction of pain; the distraction they generate helps one part of the brain's ability to shift from perceived pain to focus on the game (Griffiths, 2005). Additionally, when the games are fun, connected with reality, and involve other people, they help with mental well-being and social contacts (Borghese et al., 2013).

4.0 Intervention (Action Taking): Walk the Ward

The first version of the game, Walk the Ward, was developed in 2015. It is a tablet-based, quiz-type game that tracks points earned by answering questions correctly and steps taken by walking from one station (a poster with QR code) to another. At each of eight stations positioned throughout the ward, patients scan the QR code with the tablet, select a theme (such as 'the garden' or 'diet') and answer the multiple-choice question presented on the tablet. To reinforce the concept of movement, after the patient has scanned five stations, another screen opens which provides a 'guess where you are' question about a European city. The points and steps are recorded on the tablet until the patient decides to stop playing or is discharged from the hospital. At that time the patient's game is ended and the tablet cleaned and reset so it can be given to the next patient who wants to play the game.

5.0 Evaluation

An assessment of Walk the Ward v1 was performed at the end of 2015 through early 2016. Eight patients, four men and four women, were recruited by ward staff to serve as testers. Because there was particular concern that the game could be difficult to use for elderly patients, all of the testers were older than 70. None of these patients suffered

Improving Healthcare with Local Innovations

from cognitive impairments such as dementia. To protect patients' privacy, no names or other identifying information was recorded. Instead, only the patient's age and gender were recorded, and if they were in a single or double room. The testers were given tablets with the game preloaded, brief instructions on how to use them and how to play the game, and then were allowed to keep the tablets for as long as they wanted during their stay. When the patient was discharged from the hospital or decided to stop playing the game, they were briefly interviewed about their experiences with the game. In addition, the staff in the ward were interviewed to gather their impressions of the game and its impact.

5.1 Patient testers

The patient testers were uniformly positive about Walk the Ward. They found it enjoyable and not too difficult to use. However, some of the testers were surprised that this was a game because it wasn't clear who won. They believed that the game could contribute to increased social contact because if more people were playing they could encounter each other in the corridor and the game could serve as a social 'ice breaker'. The only slightly negative feedback related to the themes (topics of the questions), the number of questions available and the noise the game made when an incorrect answer was chosen. One tester finished all of the questions available, and another wanted to be able to add new questions. Some testers wanted to continue playing when they went home. Observation of the testers identified another issue: holding the tablet and scanning the posters requires two hands, which could be a problem if the player has poor balance and needs support of a device when walking. The testers using rollators solved this problem by putting the tablet in the basket or on the seat when traveling from station to station and by sitting down to answer the questions.

5.2 Hospital staff

The staff reported that although they had been initially sceptical, they were quite happy with the game. They noted that patients playing the game were more ambulatory and appeared proud that they could participate. In addition, staff noted that after being provided with initial instructions, the patients could manage the game on their own. Patients who were not part of the study also got involved by walking along with the testers and giving input to select the correct answers. Some staff members said they would like to be able to play the game too!

6. Reflection and Next Steps

Overall the general concept of a game to improve physical activity and reduce isolation, without increasing staff workload, was deemed a feasible solution. However, the game could be improved to address some of the issues that came up during the assessment. A second version of Walk the Ward (WtWv2) is currently being developed and will be evaluated in the ward in early 2018. The issues addressed in WtWv2 include increasing availability by making the game web-based, allowing it to be played on devices other than those provided by the hospital. To make it more obvious that this is a game, stars are awarded for getting a question correct – and to make it more positive the player can keep selecting answers until correct (with three stars awarded if the correct answer is selected on the first try, two stars on the second try, and one star on the third attempt.) There is no noise played for a wrong answer. An ‘exercise of the day’ video was added to the home screen to encourage even more movement.

This prototype will be tested with a larger group of patients covering a broader age range. The length of the patient’s hospital stay will be recorded so that it can be compared with system averages for this type of patient. If it can be shown that increased physical activity and reduced social isolation through the use of such a game significantly reduces the length of hospital stays, this will provide motivation for decision makers to formally incorporate new technologies such as this into the broader healthcare environment.

Currently several other local hospitals have asked to get the game. The next step will be to create a content-management platform for the game which will enable hospital wards or other healthcare facilities, such as care homes or nursing homes, to add questions and to customize their own games using the appropriate language and themes. With a very low commitment of resources, many patients could be provided with a tool to improve – and potentially shorten – their stay in the hospital. Eventually it may be possible for physicians to access data from the game to assess their patients’ activity levels or even to provide particular exercises or themes that are relevant for particular patients.

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