A Virtual Reality Training Tool to Improve Weight-Related Communication Across Healthcare Settings

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ABSTRACT

Overweight and obesity is a global health problem and the related challenges are complex and difficult to address. Healthcare professionals working across different settings have opportunities to engage in weight-related discussions, but often there are perceived barriers to communication. Training in this area provides healthcare professionals with little opportunity for skills-based communication practice because the training is mostly limited to the medical impacts of overweight and obesity. A virtual reality (VR) training tool could offer the opportunity to learn and practice sensitive communication skills in a safe and practical way. This paper describes the research methodology that will be used to develop and test the feasibility of a VR training tool to improve weight-related communication with patients who are overweight and obese in healthcare settings.

The study design will use a mixed method approach over 4 phases; (1) Systematic literature review (2) Design and development of the VR training tool (3) Usability testing and (4) A Feasibility study of the VR training tool. A Twitter chat will be used to gather feedback from the public and semi-structured interviews with healthcare professionals will inform the design of the VR tool. The anticipated outcome of this PhD is the development and feasibility testing of a VR training tool to improve weight-related communication with patients who are overweight and obese in healthcare settings.

CCS CONCEPTS

• Human-centered computing • Human computer interaction (HCI) • HCI design and evaluation methods • User studies • Usability testing

• Interaction paradigms • Virtual reality

• Interaction design process and methods • Scenario-based design

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**KEYWORDS**

Virtual reality, Digital learning, eLearning, Connected health, Health communication, Healthcare professionals, Weight management, Obesity management

1 Background

The World Health Organisation (WHO) defined overweight and obesity as ‘abnormal or excessive fat accumulation that presents a risk to health’. Globally, 39% of adults aged 18 and over are overweight, and 13% are obese [1]. According to the most recent Organisation for Economic Co-operation and Development indicators, UK obesity prevalence is 27%, and 36% are overweight [2]. The 2017/18 Health Survey Northern Ireland (NI) shows the rise in overweight and obesity rates since 2010 - and are currently at 64% [3]. Initiatives such as the ‘Fitter Future for all (NI)’ framework, launched in 2012 to address and prevent obesity, have so far made little impact.

Effective health communication is known to positively impact patient outcomes, if it is sensitive, accurate and honest [4]. Communicating about weight and obesity is especially challenging, as it can negatively impact the relationship between the healthcare professional and the patient [5]. Many patients show ambivalence to weight management interventions and report that there is too much focus on their weight to the detriment of other health goals [6,7]. Healthcare professionals can also hold ambivalence in raising the topic of weight [8, 5].

2 Better Training for Healthcare Professionals

Healthcare professionals in the UK have a range of online training options for weight and obesity management, but the training addresses medical impacts of obesity, rather than communication skills. In 2018, The All-Party Parliamentary Group on Obesity reported that 42% of people were unconformable talking to their GP about obesity, and only 26% felt respected when seeking treatment [9]. While the online training content for healthcare professionals in this area is written by experts, the presentation is text-heavy and linear. The overall learning experience provides little opportunity for practice, reflection and feedback, which are essential to skills-based learning [10, 11]. Communication for healthcare professionals is a skill that needs deliberate practice.

VR can be defined as “The experience in which the user is effectively immersed in a responsive virtual world” [12]. VR training approaches have not yet been used to teach weight-related communication but have been for other topics of sensitive communication. These topics include child safeguarding, vaccination education [13] and reactions to unreasonable requests for antibiotics [14]. VR as a training tool offers many benefits including supporting hands-on practice in a safe way [15], increased engagement because of a high-fidelity experience [16], increased learning retention [17] and the ability to model and teach empathy [18].

3 Research Gap

There is a gap in the literature for evidenced-based research on weight-related communication for healthcare professionals, which positively impacts patients [19, 20]. Common communication challenges have emerged, including how to raise the topic sensitively, preferred language [21], whether to use opportunistic or structured strategies [22] and taking a life-course approach to weight and obesity management. The interest in weight bias has increased, with a clear link to patient motivation [23, 24]. However, research on interventions to reduce weight bias are still at early stages [25, 26]. Empathy can be important for effective health communication but the link between empathy and weight stigma is not clear [27].

3.1 Research Question

How can a VR training tool improve weight-related communication in healthcare settings?

Aim

To develop and evaluate a VR training tool to improve weight-related communication with patients who are overweight and obese in healthcare settings.

**Objectives**

The objectives are:

1. To review the current literature on digital training tools that support weight-related communication in healthcare settings.
2. To design and develop a VR training tool to improve weight-related communication in healthcare settings.
3. To test the usability of the VR training tool to improve weight-related communication in healthcare settings.
4. To conduct a feasibility study of the VR training tool to improve weight-related communication in healthcare settings.

4 Methodology

This research project will use a mixed method feasibility study to design, develop and determine the impact of a VR training approach to weight-related communication in healthcare settings. The project will comprise four phases and will progress in accordance with guidelines laid out in the Medical Research Council (MRC) Framework for Developing and Evaluating Complex Interventions, as updated 2008.

4.1 Phase 1: Systematic Literature Review

The systematic literature review will identify best practice and barriers and gaps in current communications approaches to addressing the topic of weight and obesity in healthcare settings. The focus of the literature review will be exploring how to apply effective communication theory to design and develop the VR training tool and the role of empathy in weight-related communication.

The systematic literature review will be conducted based on the following question:

“Do digital training tools assist with weight and obesity communication in healthcare settings?”

4.2 Phase 2: Design and Development of the VR Training Tool

In this phase, the content and features of the VR tool will be scoped and prototyped. Content scoping includes (1) Review of healthcare practice-based guidelines, (2) Semi-structured interviews with healthcare professionals and (3) A Twitter chat to elicit feedback from the public on discussing the topic of weight. Thematic analysis will be used to analyse the semi-structured interviews and sentiment analysis will be used to analyse the Twitter chat. The result will be a set of patient personas, typical communication challenges and communication techniques that will inform conversation scripts. The scripts will be modelled in the Unity 3D platform as communication scenarios for healthcare professionals to engage with. This phase of the project corresponds to the “Design” and “Development” phase of the MRC framework.

4.3 Phase 3: Usability Testing

This phase will test the usability of prototype. Convenience sampling will be used to select between 15 to 50 healthcare professionals from at least two Health and Social Care Trusts in Northern Ireland. The usability testing will take place as individual sessions. The Eye Tribe integrated with the Oculus Rift head mounted display will be used to track and analyse eye movements. Three usability measures will be used (1) Systematic Usability Scale (SUS) (2) A short form User Engagement Scale (UES) and (3) A retrospective think aloud protocol. The retrospective think aloud protocol will better maintain the user’s immersion in the VR training tool, which is important for engagement.

This phase of the project corresponds to the “Feasibility/Piloting” phase of the 2008 MRC framework.

**4.4 Phase 4: Feasibility Study**

To assess if the VR training tool has impacted weight-bias and confidence in raising the topic, a series of questionnaires will be administered before and after using the training tool. A custom questionnaire for healthcare professional’s confidence will assess the confidence outcome. The outcome measures for weight bias will be assessed using two validated questionnaires (1) Attitudes Towards Obese Persons Scale (ATOP) and (2) Anti-Fat attitudes Scale (AFAS).

An additional empathy scale questionnaire, the validated Jefferson Scale of Physician Empathy, Health Professions version, is currently being explored to assess the potential link between empathy, weight bias and communication confidence.

The results of the questionnaires will be analysed and used to report on future areas of research and improvements to the tool.

5 Summary of Work and Challenges to Date

Phase 1, the systematic literature review is underway and options for developing the prototype scenarios in Unity are being explored. Intelligent voice recognition options for Unity are still limited, so exploring a method of encouraging a natural conversation between the user (healthcare professional) and the patient avatar is a priority. A wizard-of-oz modelling approach is being considered, allowing the researcher to select the conversation snippets in response to the user.

Specific techniques for VR usability testing are also being explored. There are few validated VR-focused usability instruments, so it may be necessary to adapt an existing tool to reflect the immersive nature of the VR-based learning experience.

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