

Engaging Adolescents in a Computer Based Weight Management Program: Avatars Could Help

Cynthia LeRouge, Ph.D.¹, Christine Lisetti, Ph.D.², Toree Malasanos, M.D.³, Kate Dickhut, MPH¹,

Saint Louis University¹ Florida International University² Heath-e³

Abstract

Pediatric obesity has become a growing public health issue with increasing impact as these children become adults. Unfortunately, overweight and obese children are not receiving complete lifestyle management in the current health care disease management model. This study aims to address how and in what context avatars can help overweight adolescents. Results show great interest and promise for the use of avatars in weight-management for adolescents.

Introduction and Background

Obesity in children has reached unprecedented levels; 43 million children under the age of five were overweight (1), creating far-reaching health and economic implications. In 2008, US obesity-related medical care costs totaled \$147 billion (2). These costs will increase as today's children reach adulthood afflicted with longstanding diabetes, hypertension, polycystic ovaries and sleep apnea. The burden of obesity related illness could be reduced by lifestyle changes such as improved nutrition and physical exercise. The recommendation of intensive lifestyle management for all overweight and obese children is a task that is not being met in our current health care disease management model and are not widely available due to lack of human resources. The programs that are in place and effective are often temporary or involve only periodic interactions; they need to be reinforced to have a greater change to produce long-term, positive effects.

Evidence has accumulated about the efficacy and user acceptance of computer-based interventions (CBI) to modify behaviors (3). CBIs can increase accessibility (available 24/7, any location) and cost-effectiveness (easily scaled). CBIs can tailor information to the specific needs of their users (via personalized assessment and feedback sessions), and demonstrate infinite patience (providing and explaining relevant health literacy material without time limits). Success of CBIs, relies on engagement and retention of users so that they remain motivated to use and continue to use them over the long term. Whereas current CBI interventions have been found effective, high dropout rates due to their users' low level of engagement during the interaction, limit their long-term adoption and potential impact (3, 4). The use of virtual agents may increase users' engagement (a.k.a avatar characters representing the user in virtual environments or artificial health assistant characters). Given the interest that youths have in avatars from their experience with avatars in computer games, consumer health applications designed with avatars may be a cost-effective way to engage them in behavioral lifestyle support tools. In response to this potential, this study explores two research questions: "How can avatars in a CBI facilitate superior self-care in the context of a chronic care model focused on adolescent overweight and obesity?" and "What are the opportune contexts for the use of avatars to facilitate healthy behaviors for overweight adolescents?"

Methodology

Using a User-Centered Design (UCD) method, in three phases using focus groups and in depth interviews of teens (ages 12 to 17) participating in an intensive lifestyle modification summer camp program: Phase 1 - analysis of overweight adolescent, needs, barriers, technical infrastructure, and human-computer interaction preferences, and social in social context; Phase 2 - design, prototyping, usability and Phase 3 - final development and proof-of-concept field evaluation. An iterative and user interactive approach was used to enhance validity and reliability in keeping with a UCD approach. This paper reports on phases 1 and 2 in relation to avatars. Phase 1 activities consisted of 10 user-driven design focus groups with adolescents in existing self-management programs. Phase 2 activities consisted of 77 one-on-one usability assessments of technology requirements including avatar prototypes and contextual determinants of use. Four members of the team conducted all the usability assessments, which were audio taped and then transcribed. Two members of the research team performed open coding (using Dedoose©) of transcripts to identify and define themes related to each question (5). A third researcher reviewed all codes. The team of three researchers collaborated to reach consensus on identified themes.

Results

Overall, the teens had great interest in including avatars to assist their self-management efforts and make self-management more “fun”, and “entertaining”. The adolescents felt the avatars could reinforce the guidance and support provided from lifestyle modification programs and that interacting with the avatar would fit within their lifestyle. The participants viewed the avatars as a way to set future goals with respect to how they look. They indicated avatars could serve as a coach, buddy, teacher, and motivator; and avatars should be designed to provide empathic support and guidance. Many participants indicated the need for two avatars, one being a representation of themselves and another an authoritative figure (a coach or teacher). The teens expressed that goal setting and adapting avatar size and shape to predicted or actual patterns of behavior, measurements, or weights provided by users could facilitate achievement. This included internal (e.g. change in realistic visual of a heart), and external changes. The teens also described the role of the avatar in specific self-management applications: 1) demonstrate the various cooking activities, such as chopping, sautéing showing utensil use 2) provide feedback on food choices or direct a game picking healthy food choices 3) demonstrate exercise activities.

The desired appearance of the avatar varied across and within gender and age groups. Preferred choices included fantasy characters, and a range of cartoon to realistic self-images (a few younger participants showed a preference for animal characters). A common theme was the desire for the avatar to have appearance customizations to represent various races and cultures.

Furthermore, teens saw the avatar as a source of fun or a friend to spend time with. The teens envisioned the avatars as being useful even when the teen was not physically active as a means to stay mentally active towards achieving their self-management goals. Participants also indicated the avatars could serve as surrogates to receive rewards such as new clothes, exercise equipment or accessories in response to the teen’s healthy behaviors.

When asked about the context of use of avatars as part of weight-management software, adolescents were primarily focused on using the avatar at home. Teens believed they would use the avatar in a variety of locations: home, school if allowed, while traveling, and out or staying with a friend. The use of the avatar changed based on the location. Many stated that the length of use of the avatar was completely dependent upon the activity. Teens thought they would only want to spend a few minutes using the avatar for recording food intake or physical activity, as opposed to longer when learning healthy habits or hanging out. However, teens also stated that in a busy lifestyle with school and other activities, finding time to connect with the avatar could be a major challenge. But, once results can start to be seen, most teens say the avatar will sufficiently motivate them to stay engaged and continue reaching for healthy lifestyle goals and proper management of self-care. In terms of the preferable type of platform for avatar use, both mobile and stationary were desired. However, they did express concern with technical issues they have experienced with other mobile phone applications, such as a constant need to update and poor or no Internet connection.

Conclusion

The results of this study support that the use of virtual agents may be a means to increase engagement of overweight and obese adolescents’ participating in a weight management program, in their use of behavioral lifestyle support tools. Further research and proof of concept in-field evaluation is required to assess the impact of avatars embedded in self-management software on patient outcomes, as well as interest in routine use.

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