

Gamifying health: Using video games for obesity and diabetes interventions

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Video games are a common recreational activity for Canadians of all ages: 59% of Canadians play computer or video games¹ and the average Canadian gamer is 33 years old.¹ Rather than being considered an antagonist in the fight against obesity and diabetes, video games can be used to support healthy behaviour such as improving nutrition and encouraging exercise; two of the most important modifiable risk factors for some forms of diabetes and obesity.² Video games designed for health education have increased player knowledge, changed health attitudes, and changed health behaviours.³ For example, children with Type 1 diabetes who played the interactive diabetes educational game *Packy & Marlon*[®] had higher diabetes-related self-efficacy, self-care behaviours and fewer unscheduled urgent doctor visits.⁴ Active games (such as Wii[™] Sports, and Just Dance[™]) have demonstrated positive effects on gamer health: players experience increased metabolic activity compared to sedentary game play.⁵ Although exciting, we have yet to demonstrate that educational and active video games can compete with conventional games for player's attention outside experimental conditions.

Video games have been used for educational interventions, but another aspect to obesity and diabetes interventions is motivating people to begin and continue healthy behaviours. Gamification is the application of the motivational elements that make video games "fun" to non-video game applications,⁶ like obesity and diabetes interventions. Some of the gaming elements that can be used are: the competitive and supportive social experience within and around the game,⁷ the challenge presented⁷ and the fulfilment of fantasy.⁷ Another element is clearly defined feedback rewards that signal, perhaps more obviously and tangibly than other aspects of a gamer's life, that the player's achievements are acknowledged and worthwhile.⁷ Not all of these elements are used in every gamification strategy and other video games elements are used as

well. Gamification interventions could be implemented on common mobile devices such as cell phones and smart phones. Gamification principles have been applied to consumer reward programs and on social media sites to encourage users to engage with their services. But what would gamified obesity and diabetes interventions look like?

The Humana American Horsepower Challenge used some of these elements in their intervention in secondary schools to increase walking among students. Children at participating schools walked more, but commitment to the program declined after a few months. Pedometers automatically uploaded step counts to a website.⁸ Students unlocked ribbons and customizations by walking more⁸ (feedback). On the website, schools' avatars raced against each other⁹ (challenge). Critical errors, however, limited the intervention's success. The "game" did not allow students to interact with each other⁹ (social interaction). The students' goal (to collectively walk more than other schools thereby winning a grant for their school) was predefined and the students did not feel invested in winning⁸ (challenge). Furthermore, slow school computers and pedometer malfunctions contributed to declines in students' engagement.⁸ Despite the shortcomings of the Horsepower challenge, more interventions like it are needed to determine how to successfully gamify health interventions.

Another intervention for Type 1 diabetes is Bayer's Didget[®]. This system integrates accurate self-monitoring of blood glucose with the handheld Nintendo DS[®] console.⁹ Didget[®] users have access to an online community (social interaction). Players who perform blood glucose tests throughout the day gain access to new levels and receive bonuses for consistent testing habits (feedback).⁹ Didget[®] users can set personalized target range goals⁹ (challenge). Users thought Didget[®] was useful for the management of

their diabetes, but studies need to be done comparing the effectiveness of the Didget® system to other monitoring systems.⁹ Using various video game elements, the Didget® system gamifies blood glucose self-monitoring, which may not be intrinsically motivating for many people with diabetes.

Despite these applications, gamification is not foolproof or easy. Research into quantifiable long-term outcomes of gamification interventions is needed to determine if gamification is feasible and cost-effective. Technical malfunctions, long-term maintenance and upgrade commitments are serious challenges to gamified interventions. A related concern that must be addressed is if the use of external gamification motivators will inhibit internal motivation to engage in healthy behaviour when the gamified intervention is discontinued.¹⁰ Further research into video game elements and the particular strengths and pitfalls of specific elements in health intervention strategies must be done. Despite these challenges, gamification is worth exploring for new ways to engage with children and adults to encourage healthy behaviours.

Health researchers can learn about motivating people from video game developers. Challenge, fantasy, curiosity, competitive and supportive social networks, and feedback rewards are only some of the elements of video games that could be used to invigorate health interventions. Bold, creative collaboration between researchers, health care providers, video game developers and companies like Bayer to gamify health behaviours should be encouraged to find the limits of the application to gamification of health interventions for all ages.

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