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PEDIATRICS PERSPECTIVES

Videogames, Here for Good

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There is a long-standing debate about the potential contribution of videogames to negative outcomes in youth; however, definitive conclusions have not been reached. As the debate continues, the use of videogames for good, as vehicles for delivering health promotion and risk prevention interventions, is growing. With the evolution of the field of “serious games” (ie, games for a primary purpose other than pure entertainment¹), the interest and opportunities for designing and using videogames for positive health impact are emerging. Key components of videogames include that they have rules, are goal oriented, and some have points or levels. Furthermore, serious games can serve as educational tools that allow interactive and simulated role playing and provide a platform for realistic and engaging environments for skill building. These critical components of videogames can be harnessed to promote positive health outcomes. Goals of the serious games field include using scientifically rigorous tools (eg, theory-based content, randomized clinical trials) to develop and evaluate games for efficacy and capitalize on their potential to produce rich in-game data in simulated game environments reflecting real-life behaviors.

The use of technology in health care is increasingly ubiquitous, and there is mounting evidence that videogames can serve as interventions to increase knowledge and effect behavior change in youth.² Our purpose is to highlight that videogames can be used for good. We draw on emerging evidence showing that specially designed videogames can have a positive influence on cognitions and actions related to health and have the potential to be used as measures of actual behaviors outside gameplay. In addition, we underscore the increasing interest in this field by a number of stakeholders but also emphasize the need for more funding, given the cost of developing high-quality serious games for the field to reach its potential.

Ninety-seven percent of youth play computer, Internet, mobile, or console games, and 50% report playing videogames daily.³ In addition, 58% of youth report having downloaded applications (“apps”) to their cell phones or tablet computers, suggesting that mobile platforms may be ideal for videogame interventions targeting this population. The particular assets and advantages of videogames, and specifically those developed on mobile devices, are that they can travel with the player and probably offer greater capacity for dissemination. Notably, not only do children and teens play games, but they also have a significant presence on social networking sites such as Facebook. Most youth use the Internet, and 80% of these users also use social media sites.

Additionally, 50% to 70% of youth play videogames on social networking sites. Therefore, the opportunities to use games for good are evolving, and their presence on mobile platforms and social networking sites is expanding.

Although serious videogames have been developed to address a range of medical conditions in children and teens, including HIV/AIDS, asthma, diabetes, and cancer, a major challenge to the field is the need for more evidence-based development and evaluation of their impact on health outcomes. For example, despite its inherent appeal, the impact of exergaming (videogames that involve exercise) on levels of physical activity in children is still not clear.⁴ Re-Mission, a game developed to increase adherence to cancer chemotherapy in children and young adults,⁵ is one of the most well-designed and tested serious games. Researchers demonstrated improvements in knowledge, self-efficacy, and adherence to chemotherapy among those who played Re-Mission in comparison with a control group. Similarly, SPARX, a serious game designed to improve depressive symptoms in adolescents, has demonstrated efficacy.⁶ Although these 2 examples represent well-designed and efficacious interventions, a recent systematic review evaluating the use of electronic media targeting behavior change in youth found that the studies were generally of poor quality when evaluated using standard metrics designed to evaluate levels of evidence.² Therefore, an evolving focus in producing games for health is establishing scientific and evidence-based approaches to game development alongside methods for testing these games with objective indicators of efficacy. If the appropriate amount of time and funding is not devoted to the development and evaluation of these games, their promise will be limited. Although not all serious videogames will require

the budgets typical of large commercial videogames, the National Institutes of Health, the National Science Foundation, and other funders should demand, as part of their funding plans, the comprehensive assessment of videogames as interventions.

Videogames may be used not only as interventions but potentially as a means to collect valid assessments of change in knowledge and real-life behaviors. There is compelling evidence that people who acquire new information, motivation, and behavioral skills in a virtual environment and subsequently practice these behaviors in a virtual reality game are more likely to act in accordance with the new skills in real life.⁷ Could videogame play documenting specific behaviors and actions by the player actually be a viable proxy for real-life behaviors? If so, then videogames could have the additional benefit of providing evidence of what youth would actually choose or how they would behave in a given circumstance. Self-reported data are considered the standard in certain areas of patient-oriented research, although they can be subject to a number of biases. Data collected during gameplay, if generated in a reliable and valid way, could expand the utility of videogames as a way to document behavior, potentially eliminating or reducing self-report biases. For instance, preliminary data from an ongoing randomized controlled trial of an iPad-based risk reduction videogame for youth demonstrate high levels of correlation between "success" in the game and improvements in knowledge collected outside the game using standardized assessments.⁸ Systems for gameplay metrics must be developed and refined to fully capture all dimensions of in-game learning.

Foundation, commercial, and government stakeholders are showing interest in serious games that is parallel to the growth of this field. In 2004, the Robert

Wood Johnson Foundation established the Games for Health conference and created the Health Games Research program (healthgamesresearch.org). In 2009, the Foundation for the National Institutes of Health launched the mHealth Summit, convening scientists, innovators, and policymakers to advance the use of wireless technologies (including mobile games) to improve global health outcomes (mhealthsummit.org/). More recently, GlassLab, supported by the Bill & Melinda Gates Foundation, the John D. and Catherine T. MacArthur Foundation, Electronic Arts, and the Entertainment Software Association, was established and directs its efforts on assessments collected through videogames to track students' gains in learning. In addition, the White House Office of Science and Technology Policy established the Academic Consortium on Games for Impact, bringing together leaders of serious game programs at 15 academic institutions to forge collaborations across member institutions to catalyze progress in the field.

There is a growing interest in and need for effective and well-tested videogame interventions for increasing knowledge and changing behavior. Emerging evidence shows that games have the potential to assess and document that change. Although the association between videogame play with negative behaviors and outcomes should continue to be monitored, the role videogames may play for good as they increasingly pervade the landscape of youth demonstrates the need to examine them fully for their potential for wider-scale and higher-impact promotion of health and well-being.

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