Innovations in Games: Better Health and Healthcare

SUMMARY | April 2012

Convened by the Office of the National Coordinator for Health IT and the White House Office of Science and Technology Policy

Prepared by Institute for the Future

Introduction: Why Games and Health

> "Games, in the twenty-first century, will be the primary platform for enabling the future."
>
> —Jane McGonigal, *Reality is Broken*

As the Federal government has taken an increased role in supporting the adoption of health information technology new opportunities have been created to use information to support consumer engagement, education, disease management, and care delivery. Games offer a uniquely valuable tool for taking complex health data and making it meaningful and actionable to patients across a variety of demographics and health states. By making it easier for people to engage with difficult health challenges and information, gaming has already shown promise in treating conditions from Parkinson's Disease to Post-Traumatic Stress Disorder At the same time, studies have also found limits to the effectiveness of games for improving health, suggesting that games have particular potential to improve health in certain contexts and under specific conditions. This suggests a need to systematically explore the power and potential of games to understand how to identify opportunities where they can effectively engage patients, improve care delivery, and lower costs.

On February 1, 2012, the White House Office of the National Coordinator for Health Information Technology and the White House Office of Science and Technology Policy hosted a group of leading game designers, researchers and government officials to explore the potential for games to improve health and health care. Specifically, discussion focused on three areas: 1) Understanding the current landscape of games and health; 2) Identifying areas where game dynamics and health needs could intersect to improve health outcomes in the future; 3) Identifying areas where the federal government could play a role in promoting innovations in health games. This report summarizes the key discussion points from the day.

PARTICIPANTS

Richard Buday | Archimage/Playnormous

Drew Davidson | Carnegie Mellon University

Ben Sawyer | Digital Mill, Inc.

Doug Goldstein | Gaming4Health

Ellen LaPointe | Hope Lab

Bradley Kreit | Institute for the Future

Mike Liebhold | Institute for the Future

Bill Sabram | Me You Health

Daniel Greenberg | Media Rez

Radu Burducea | Microsoft Kinect

Philip Tan | Massachusetts Institute of Technology

Kurt Squire | Morgridge Institute for Research

Dave Warhol | Realtime Associates, Inc.

Bob Hone | Red Hill Studios

Sabrina Haskell | Schell Games

Marientina Gotsis | University of Southern California

Skip Rizzo | University of Southern California

Lynn Fiellin | Yale University School of Medicine

Wil Yu | Health and Human Services, Office of the National Coordinator for Health IT

Constance Squire | White House Office of Science and Technology Policy

Lygeia Ricciardi | Health and Human Services, Office of the National Coordinator for Health IT

Robert Mittman Moderator

Anthony Weeks Graphic Recorder

Mapping the Landscape: Where Games Can Impact Health

The field of health games is going through a combinatorial explosion—where declining technology costs, growing clinical and professional interest in games, and an increasingly refined understanding of what makes health games work are shaping a variety of trends that are shaping the landscape for health games. The following is a summary of some of the key trends identified by participants.

Declining technology costs amplify design possibilities

With the emergence of technologies such as cheap sensors, ubiquitous mobile phones, and Microsoft's Kinect technology, games that once would have required specialized, expensive equipment can now be developed using low-cost, off-the-shelf technology. These technological advances are not only enabling designers to experiment with games at much lower cost, they are also enabling games to move from clinical and experimental settings and into people's lives, making it possible for people to engage regularly with games in order to improve health.

Games are becoming a key tool to promote behavior change

Well-designed games make facing difficult challenges fun—and this dynamic is making games an increasingly valuable tool for promoting healthy behaviors. Smart phones, as well as lightweight tools that track activity, are making it possible for designers to build simple game mechanics into daily life, allowing for efforts that encourage people to make healthier choices in context. In other instances, games that stretch over longer periods of time have helped people to quit addictive habits such as smoking and gambling.

Games offer enhanced diagnostic capabilities

Clinical diagnoses are beginning to be augmented by games that can measure physical states. For example, physically immersive games, such as those that require dancing, jumping or other physical activity, can be used to create more robust portraits of physical capabilities—particularly of patients with ongoing chronic conditions such as Parkinson's disease, as well as patients undergoing physical rehabilitation. These kinds of games can also be used to track patient conditions over time to identify improvements or declines in physical states.

Simulation games facilitate patient and clinician learning

Virtual reality games that simulate health scenarios are showing promise to help everyone from clinicians to patients. Like flight simulators for pilots, medical simulation games are becoming effective tools to help medical students and practitioners develop and refine skills. Immersive simulations are being put to even broader use to enhance patient health: for instance, helping patients understand and visualize the consequences of health behaviors, and offering a means to help treat PTSD and other mental health conditions.

Social games create collective efforts for health improvement

By harnessing the power of friendly competition, social games—played in mobile spaces, online networks and even workplaces and communities—are turning health problems into collective efforts to improve health. By harnessing social dynamics and social support, collaborative health games are keeping people motivated to stick with health goals and make healthier decisions.

Crowdsourced games advance health research and development

Social games are also showing promise for helping people collectively confront challenges such as weight loss and exercise, but they are also offering opportunities for individuals to collaborate on research and development challenges. From turning complex biological research into solvable puzzles to using gaming dynamics to tap into the wisdom of crowds, games offer medical researchers a tool to augment their understanding and advance their work in order to improve health.

Mapping Opportunities: Where Games Dynamics and Health Needs Can Intersect to Improve Outcomes

Effective health games leverage critical aspects of game design to fill critical health needs. As part of the discussion, participants were asked to identify which aspects of games have particularly strong potential for improving individual health. Below are several of these critical intersections, which represent key opportunities to use game design to further efforts to improve health outcomes.

Motivate people to overcome challenges and obstacles

Games are particularly useful at taking frustrating challenges and making them into fun opportunities to engage with and overcome obstacles. This kind of engagement is critical to helping patients stay motivated, particularly those patients who struggle to stay motivated to maintain and improve their health.

Enable people to visualize change and progress

While the health effects of everyday decisions such as food choices and exercise habits accumulate over time, it is hard for individuals to accurately track progress and to visualize and experience the benefits of good decisions. Game design elements—for example, keeping track of points, or more involved visualizations such as avatars—can provide feedback loops that enable people to understand the cumulative effects of everyday decisions and experience their health progress more tangibly.

Improve self-efficacy through knowledge and goal-setting

Games work, in part, because they are designed around clear challenges and goals, and a clear understanding of how to progress toward each goal. Because of this, games have the potential to help people establish specific, personal goals for their own health and well-being. This ability to set goals can serve a broader purpose of improving patient self-efficacy and understanding not only of their personal health conditions, but of the states they hope to achieve.

Facilitate patient-provider communications and interactions

Games, through their ability to measure and track regular progress, can serve as a key tool for ongoing data collection. Not only can these games become a key source of data, but they can help facilitate positive communication between patient and provider in addition to serving as a means to help patients internalize advice from caregivers.

Enhancing Success: Potential Opportunities
for the Federal Government to Support Health Games

The workshop concluded with a discussion of the various roles that the federal government could play in supporting the development and adoption of games to improve health outcomes. Participants identified several strategic areas where the federal government could play a key role.

Facilitate connections between gaming and health research communities
Despite increasing interest among health researchers in using games, and among game designers in targeting health outcomes, the two communities remain largely separate from each other. Finding ways to facilitate connections between these two networks will not only help spur health game development, but will help ensure that games are developed to meet more rigorous, clinical specifications.

Set Standards for Health Data Interoperability
Effective game design, particularly games aimed at rehabilitation and treatment, may require integration of a variety of technologies and data sources, such as allowing performance on a home video game to interact with a clinical medical record. Ensuring the development of clear technical standards that facilitate data exchange will ensure that game and technology developers can partner effectively with clinical practitioners. This will also ensure that users transfer data between different games.

Create developer challenges focused on key outcomes
Game developers interested in health may not have a clear sense of which health issues and outcomes to target. Game developer challenges, focused on using games to improve specific health outcomes, could drive game developer attention to some of the most pressing health needs—and also engage a much broader community of developers who may be harder to find and engage with other forms of funding.

Develop agency expertise to evaluate health games
Developing governmental expertise in the clinical application, as well as cost-effectiveness, of health games could bring clarity to evaluating which games have been proven effective in improving health. As part of this process, RFPs should be modified to include games as possible solutions, even when the funding opportunity is not exclusively focused on games. Likewise, the federal government could integrate health games into its own culture as a means to enhance health. Not only could this broad expertise ensure the clinical quality of games, but clear guidance from the federal government could help improve adoption among practitioners and patients.

Explore opportunities to increase funding for health games
Finding ways to improve funding of health games could help bring additional expertise and effort to the use of games in health. From increasing funding opportunities for basic research and clinical validation, to exploring possibilities for turning games into a reimbursable intervention, enhanced federal funding for games could help encourage game research communities to develop more clinically effective games.

Release data sets to game developers to facilitate enhanced design
The federal government already has a variety of key data sources, such as clinical guidelines and recommendations that may be of interest to game developers, as well as data sets on local and regional health variations. Releasing these data sets in formats that are easy for game developers to use and integrate into game design could facilitate innovations aimed at using games to promote health. As part of this effort, the federal government could explore engaging the game developer community to create a resource of best practices for health game design.
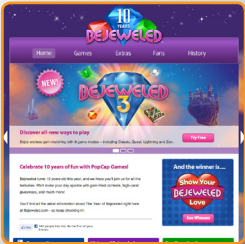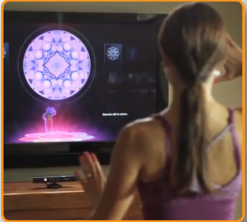
Coordinate gaming activities across government agencies to enhance learning
The federal government has already begun exploring how games can be used to address a variety of critical challenges beyond those related to health, such as improving education outcomes. As efforts to use gaming dynamics become increasingly common, it will be critical to coordinate efforts and best practices gleaned from across agencies in order to enhance the effectiveness of games.

Appendix A

Innovations in Games: Better Health and Healthcare

The White House Conference Center, Washington D.C. | February 1, 2012

As part of the day's discussion, participants were asked to identify innovative games that have successfully improved health outcomes, which are highlighted in this matrix.

	Health Assessment and Diagnostics	Health Promotion and Disease Prevention	Disease Management and Rehabilitation	Research and Development	Community Health	Skills Building and Learning
Casual Games	Didjet	Playnormous Happy Neuron	Lit 2 Quit Bejeweled Peggle	Breakthroughs to Cures	Feel Electric! Nike Fuel Band Rock Band	Elude
Social Net Games		Super Better Trainer Zamzee Biggest Loser	Health Seeker		Keas Shape Up	#GameDevDiet
Collaborative Games		Cryptozoo		Fold-it Phylo		
Immersive Simulations		Zombie Run Expresso Fitness Wild Divine	Virtual Iraq Re-Mission Parkinson's Balance Games		Sim Coach Johann Sebastian Joust Just Dance	Dr. Hero Immune Attack
Physical Games	Leela Fitness Pal	Striiv Monumental Geocaching			Come Out and Play Green Goose Girls on the Run Special Olympics	Dance, Dance Revolution Mother Nature

Source: Arto Teräs [a](t)@iki.fi]