Researchers release systems biology educational game

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Screen capture from ‘Virulent.’

Researchers at the new Morgridge Institute for Research at the University of Wisconsin-Madison have released the biomedical research organization's first digital learning game created through collaborations among scientists and education researchers.

Virulent is an action and strategy game designed to teach key concepts in systems biology, an interdisciplinary research field that focuses on complex interactions in biological systems. Morgridge Institute researcher and game designer Nathan Patterson says the game, intended for people age 13 and older, allows players to experience what it takes to infect a cell, replicate and escape to infect other cells.

The game is available for free download from iTunes as an iPad app and from the Morgridge Institute website. By the end of summer, all 15 planned levels of the game are expected to be available on iPads, Android tablets, web browsers and as a standalone program for Windows and the Mac operating system as well.

More than 100 individuals from area schools and youth groups helped test the game. Additional feedback has been sought from participants at the Games+Learning+Society Conference taking place this week at UW-Madison, as well as from the general public.

Patterson says early indications from student testers show the game is achieving its key objectives: It's fun to play and initial results suggest students understand the scientific concepts. The public can learn more about Virulent at the Saturday Science at Discovery learning series taking place Saturday, July 2, in the Town Center of the Wisconsin Institutes for Discovery. Patterson and his colleagues will talk about their work and invite learners of all ages to participate in hands-on gaming demos.

In Virulent, players control "Raven virus" particles, or virions, modeled after the vesicular stomatitis virus. By defending their Raven virions from the cell and the immune system, players learn about the strengths and weaknesses of the body's own biological defenses as well as concepts that underpin the work of scientists in virology at the private Morgridge Institute for Research and systems biology at its public twin, the Wisconsin Institute for Discovery.

Virulent was developed by a team from the education research challenge area at the Morgridge Institute for Research as part of its mission to make scientific discovery accessible to the public. The team designs digital games for learning science that provide authentic windows into the scientific process.

John Yin, systems biology theme leader at the Wisconsin Institute for Discovery and professor in the chemical and biological engineering department at UW-Madison, along with Collin Timm, a UW-Madison graduate student in Yin's research group, worked closely with the Virulent design team to establish learning goals for the players and optimize player interactions with the vesicular stomatitis virus.

Jenny Gumperz, an associate professor in the UW-Madison Department of Medical Microbiology and Immunology, also worked to identify key learning goals and focused on the interactions between the Raven virus and cellular and immune system responses. Yin and Timm's expertise on the vesicular stomatitis virus, which they are researching as a tool to destroy some types of cancer, and Gumperz's expertise in immunology allowed the team to create a unique learning experience that engages players with content that fascinates researchers.

"We focused on integrating educational content into the game mechanics instead of adding a layer of content to an already defined game genre. We then improved these mechanics using feedback from testers," Patterson says. "The result is a high-quality gaming experience that enables players to learn concepts provided by cutting-edge scientists. As a cross-disciplinary team, we've learned many things during Virulent development that we're excited to apply as we develop additional games in other scientific areas."

In addition to Patterson, Yin, Timm and Gumperz, other researchers who worked on Virulent include Richard Halverson, an associate professor in education leadership and policy analysis at UW-Madison; Kevin Harris, a UW-Madison graduate student; and Morgridge Institute for Research artists and programmers Mike Beall, Ted Lauterbach and David Mann.

More information:

-- Education research challenge area: discovery.wisc.edu/home/morgri … earch/erca/erca.cmsx
-- Virulent demo: discovery.wisc.edu/home/morgri … s/projects-home.cmsx
-- iPad app: itunes.apple.com/us/app/virulent/id438485177?mt=8

Special thanks to Nathan Patterson.

Source: University of Wisconsin - Madison