

Team infuses science into 'Minecraft' modification

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The 3-D world of the popular "Minecraft" video game just became more entertaining, perilous and educational, thanks to a comprehensive code modification kit, "Polycraft World," created by University of Texas at Dallas professors, students and alumni.

With "Polycraft World," the millions of "Minecraft" players worldwide will now be able to incorporate the properties of many materials—chemical elements and compounds—into game action. For example, said Dr. Walter Voit, players could harvest natural rubber from trees, thwart enemies using flamethrowers and jetpacks, explore underwater biomes by scuba diving, or rapidly travel through virtual worlds on pogo sticks wearing custom-molded running shoes.

Voit, a faculty member in the Erik Jonsson School of Engineering and Computer Science, is co-creator of the modification, or mod as video gamers refer to the kit.

"The accessibility and popularity of 'Minecraft' makes it a great tool as an educational platform," said Voit, an assistant professor of materials science and engineering, mechanical engineering and bioengineering.

"Using our 'Polycraft World' mod, people of all ages will have an opportunity to navigate materials science, including metallurgy and polymer chemistry, in a fun, creative self-paced environment."

"Minecraft" allows players to build their own worlds from scratch using 3-D cubes. The open-ended game allows the users to construct castles

and tend to animals, or compete on large, online multiplayer servers where players can even destroy each other's creations and fight battles.

"'Minecraft' is pretty addictive," said Voit, who researches polymers that can be responsive to different environments, and is a 2013 Defense Advanced Research Projects Agency young faculty awardee. Voit has been an avid "Minecraft" player since the alpha launch of the game and has introduced many others to it, including "Polycraft World" co-creators Dr. Ron Smaldone, an assistant professor of chemistry, and Dr. Christina Thompson, a lecturer in chemistry.

Millions agree with Voit's assessment. An alpha version of "Minecraft" was released in 2009, and a full version in 2011. It quickly gained a following mostly through word-of-mouth, and now has more than 100 million registered users of the PC version, with billions of views of instructional videos on YouTube. In 2012, "Minecraft" was one of 20 video games featured in the "Art of Video Games" exhibition at the Smithsonian American Art Museum. "Minecraft" now has its own annual convention, MineCon, Lego characters and a Hollywood film in the works.

Players can already mine materials such as redstone to craft diodes, switches and triggers to build circuitry in their virtual world. Voit, who graduated from UT Dallas with a bachelor's degree in computer science and master's degree in intelligent systems, used Java code for his mod to add sophisticated plastics and metals processing to extend "Minecraft" possibilities and help users learn about polymer chemistry.

"Polycraft World" was the brainchild of Voit and two fellow programmers, close friends and UT Dallas alumni Chris Wahlen BS'05, MS'06, and James McAndrew BS'05, MS'06. Wahlen, McAndrew and Voit studied artificial intelligence together at UT Dallas nearly 10 years ago, and have taken very different tracks in their professional lives.

Wahlen worked at Amazon for several years and recently moved to the Google Maps team in Seattle. He has spent his nights and weekends contributing coding for the mod. Upon graduating from UT Dallas, McAndrew took the freelancing route, writing code for hedge funds, real estate groups, defense contractors and other tech firms in addition to supporting "Polycraft World."

Voit, McAndrew and Wahlen also brought on a team of talented help, including Smaldone and Thompson, local entrepreneur Jim Amato, and UT Dallas undergraduate students Shelbi Parker and John Will, and Jake Sporrer, an undergrad from Iowa State who spent the summer at UT Dallas working on "Polycraft World." The team has created comprehensive Wikimedia-style help pages found at polycraft.utdallas.edu. This site explains how to perform complex tasks in "Polycraft World."

For example, to create a flamethrower, the user would have to learn much about plastics processing in order to refine and fabricate the necessary components to build the device.

"You learn how to refine different kind of chemicals, starting with crude oil," said Smaldone, who has also made instructional YouTube videos outlining these steps. "These processes teach interesting relationships in chemistry and allow users, for example, to build injection molders to make polymer grips and gaskets, which are necessary for making tools better and for building regulators, which are components of flamethrowers."

One of the features added for fun was scuba capabilities. Currently, it is difficult for players to go underwater. The "Polycraft World" team's kit allows players to create scuba gear such as masks and flippers needed to explore the deep seas, or get away from enemies.

"Polycraft World" launches at 6:02 p.m. Thursday to coincide with Mole Day, an unofficial holiday in recognition of the number of atoms found in one mole of a substance.

"Fun and learning do not have to be diametrically opposed," said Voit, who was part of the inaugural class of the Eugene McDermott Scholars Program. "We hope our 'Polycraft World' mod is one example of learning in a fun, engaging way."

Provided by University of Texas at Dallas

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