Using video games to model real life outbreaks

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The “Corrupted Blood” spell being spread between players

Those of you who know me know that I'm a video game nerd. And comic book nerd. And just nerdy nerd in general. So when I read an article that used World of Warcraft to model disease outbreaks, I jumped on it.

World of Warcraft is a MMORPG (Massively Multiplayer Online Role Playing Game) and forms the butt of many jokes in shows like Community, The Simpsons and others. I've never played it myself, but I

lived with a guy who did so picked up a few things. Basically, you pick a player class (barbarian, wizard etc) and then join a "guild" and do quests together. These vary from the mundane to the epic ("kill this dragon"). It is, allegedly, a lot of fun. And a lot of that fun comes from being in a group of 50-60 like minded people, all playing out their fantasies as an elf, warlock, goblin etc.

World of Warcraft (WoW) has a very intricate world that has grown up around it. Gold provides an in-game economy, and treasures you gain from slaying foes give people items to trade. And since it is based around the actions of people, each quest can be very different from the last. Sometimes this can result in inadvertently hilarious consequences; the video below shows a guild meticulously planning their attack. However, when a player decides that he's had enough, he runs in screaming his name ("LEEEEROOOOYYYYY JENNNKINNNSSSSS"). This results in his team panicking, and all their planning going to waste. To quote Robert Burns: "The best-laid schemes o' mice an' men / Gang aft agley." I'm pretty sure he was talking about WoW when he wrote that.

So you have this society with thousands of players all logging on regularly, heavily invested in their characters, spending anywhere upwards of 40-60 hours a week in the game. What happens when a "virus" is introduced into the game?

Video games have a long and storied history of teaching people and modelling how they react to external stimuli. For example, the game Pandemic (link here) taught people that the safest place in the case of a zombie outbreak is Madagascar, because they close their port IMMEDIATELY. You might be able to infect every other country in the world, but if you don't get to Madagascar early, you lose. (Ed note: I've never successfully infected Madagascar. It's infuriating).

In World of Warcraft, the developers occasionally introduce updates to add functionality, balance characters and add quests. An update issued in September of 2005 added a new boss character called "Hakkar the Soulflayer" who would cast a spell named "Corrupted Blood" that caused you to lose health points every second. After you were infected, you could then pass the disease onto your teammates and other players who were around you. It was limited to one area though, and only the one boss character could cast the spell. But then players found out that if you teleported to a nearby town, the spell would continue to infect others who had nothing to do with your quest, and weren't fighting that boss, but just relaxing in "Ye Olde Tavern."

This resulted in two main effects on the in-game world, and paralleled how people respond to outbreaks in the real world.

First, the good. Some players (generally higher level "healing" characters) would provide their services to try and either remove the plague or heal those afflicted. Lower level characters would stand further away, and direct people away from the infected areas, trying to stop the spread of the disease. Blizzard (the company that makes WoW) also introduced a voluntary quarantine of those infected.

On the other hand, there were those who wanted to spread the disease. These people worked to bypass safety measures that Blizzard Entertainment implemented to try and control the spread of the disease, and infected non-player characters, as well as summoned animals. Every time Blizzard introduced a new security measure, they tried to bypass it, as well as spread the disease in ways that the developers could not have predicted.

What does this mean for researchers?

Well, we have a thriving online community that is infinitely better than a

mathematical model or simulation. While we can predict how we *think* people will respond to a disease outbreak and model that using software and code, we can't be sure. The "Corrupted Blood Incident" adds in the human factor and an element of randomness that improves our model. In addition, we can also use it to model experiments that would be otherwise unethical. Introducing a disease that "kills" players in a game is a minor annoyance (you have to wait to come back to life, you lose some gold, no big deal). Introducing this in the real world would be impossible. In addition, you can see how "Public Health" announcements are viewed – do players take them seriously? How do they respond when you tell them to avoid an area? Finally, for those interested in bioterrorism, you could model the spread of the disease between terrorist cells, and observe how these cells interact and spread the disease.

That being said, the use of video games isn't necessarily the way forward for research as there are too many unknown factors. Death is nothing more than a minor annoyance in the WoW universe, and so people are much less cautious as a result. As a result, the stakes (and consequences) for both parties are considerably lowered. In addition, for those interested in biosecurity, these individuals are not committed to sowing anarchy or ruining the world, they're just having fun. And so their actions may not mimic those of bioterrorists.

In closing, I think video games have a huge potential for both educating those who are not familiar with epidemiology, and could be very useful as a starting point for researchers. They can't replace our existing methods and techniques – nor are they meant to. They can, however, open a whole other door though, and increase the awareness of Epidemiology in the community and provide us with opportunities, insights, and a rich testing environment.

More information: "The untapped potential of virtual game worlds to shed light on real world epidemics." *The Lancet Infectious Diseases*, 7

(9), 625-629 DOI: 10.1016/S1473-3099(07)70212-8

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