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## The Great Dragon Swooping Cough

Stories about Learning Designs in Promoting Participation and Engagement with a Virtual Epidemic

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### Abstract

In Winter and Spring 2016 the great Dragon Swooping Cough entered the virtual world of Whyville, wreaking chaos with scales, swooping, and great annoyance. In this panel we shared first findings from this engaging and educational epidemic: industry designers, educational researchers, and professional epidemiologists joined together to work to release a virus in a virtual world for kids, promoting experience and engagement with infectious disease. How was the virus designed to create the greatest possible engagement from citizens? What forms of participation and prevention could citizens engage in? What worked educationally? What failed? In the end we invited audience members to reflect on how the virus performed and what could be improved in future iterations. We engaged audience members in a conference-wide epidemic game (the GLS Swooping Spots), simulating experiences of epidemic outbreaks in the virtual world.

### Introduction

Plague, influenza, and polio were considered to be epidemics of the past, yet a spate of recent outbreaks of measles in Disneyland, Ebola in Africa and Zika in Latin America suggests that epidemics continue to everyday life. Reading about historical outbreaks or running small-scale simulations in classrooms are good starting points for learning but cannot provide the visceral experience of an epidemic outbreak for ethical reasons. The *Corrupted Blood* outbreak in World of Warcraft illustrated both from a game design and an epidemiological perspective the potential of virtual epidemics for massive engagement (Lofgren & Fefferman, 2007). A virtual world for millions of tweens, Whyville holds potential to engage youth in learning with infectious disease if the virus, economics, and prevention can be designed well.

Enter the *Dragon Swooping Cough*, a designed virus unleashed on the virtual world of Whyville in December 2015. This virtual epidemic offers a novel approach to learn about infectious disease by using prominent features of virtual worlds—persistence, real time, personal representation, and massive numbers of players (and data)—to allow youth to experience and investigate an epidemic outbreak (Kafai & Fefferman, 2013). Using an innovative combination of observational methods and field experiments, this research provides insights into how to design large-scale online activities to promote individual and community inquiry. Public health prevention and protection measures were connected to

behavioral changes, conceptual understanding of infection, immunity, and associated social issues. By including an epidemiologist in the design of the virtual epidemics, we assured that the features of the epidemic outbreak and the tools that youth were using related to those of scientists studying epidemics.

In this symposium we bring together different members of the research and design team of the *Dragon Swooping Cough* to share about the experiential design and research of the virus and community response. How did the team negotiate tensions between design constraints, epidemiological requirements, and pedagogical considerations? In what ways did Whyvillians engage with the virus? What worked and what did not? The audience engaged in reflecting on a pre-approved virtual outbreak of the *GLS Swooping Spots*, with parallel (but adapted) features to the *Dragon Swooping Cough*. Drawing on both of these experiences, we invited reflections on the design of future virtual epidemics.

## Panel Organization

We organized the panel in three acts: (10 min) First we provided an overview of virtual worlds and virtual epidemics, before illustrating what considerations went into designing different disease vectors both from epidemiological and educational perspectives. (30 min) Second we shared findings on participation and engagement from the virtual epidemic outbreak of *Dragon Swooping Cough*, including feedback from outside panelist, Ben Devane. (20 min) Finally, Whyville resident epidemiologist “Dr. Nina” Fefferman hosted the audience in a virtual Q&A live on Whyville’s Greek Theater, inviting reflections on experiences with the *GLS Swooping Spots*) and opening up to questions from the Whyville community at large.

## Panelists

**Deborah Fields**, Whyvillian extraordinaire and learning scientist at Utah State University, examines kids’ learning, creative work, and identity in virtual spaces. **Yasmin Kafai**, a learning scientist at the University of Pennsylvania, studies children’s participation and learning of science and computation in massive virtual communities. **Jen Sun** is president and co-founder of Numedeon, which develops and runs Whyville, one of the first virtual worlds. **Nina Fefferman** studies epidemiology and biosecurity at Rutgers University and consults for the CDC. **Estee Ellis**, an undergraduate research assistant from the University of Pennsylvania, engages in on-the-ground ethnographic observations in Whyville. **Ben Devane** studies sociocultural design, identity, and learning in games at the University of Iowa.

## Overview and Design of Virtual Epidemic for Learning

The design of *Dragon Swooping Cough* draws on 15+ years of experience with virtual epidemics, beginning in 2001 when Whyville first introduced a virtual epidemic: *WhyPox* (Kafai & Fields, 2013). Building on insights gained from *WhyPox* outbreaks, we designed the *Dragon Swooping Cough* virus to reflect real-life features of particularly dangerous infectious viruses in the real world, like Ebola. We carefully considered incubation period (time between infection and symptoms) and infectious period (time between infection and being infectious) as well as the rate and mode of infection. We targeted key aspects of engagement on Whyville to trigger emotional responses and interest: avatar appearance (dragon scales), chat (roaring), movement (swooping around the screen), and finances (stopping salary deposits during infection). Building on the economics of earlier viruses, we created various preventative

measures that worked to varying degrees, introduced tests for infection with false positives and false negatives, and provided graphs of current infection rates in the population.

## Findings and Discussion of *Dragon Swooping Cough* Outbreak

The massive outbreak of *Dragon Swooping Cough* impacted the breadth of users in Whyville, demonstrated by the high purchase and use of preventative measures (e.g., biohazard umbrellas, scale block lotion, hand-washing). While some users were enchanted with the disease, seeking to catch it and spread it, others maintained vigorous protocols to prevent infection, including misapplied preventative measures previously designed for the flu (i.e., covering coughs) that were not helpful with this skin-based virus. A large number of experienced users refused to log in during the first week of symptoms—leaving the scene! How can future iterations build on citizen reactions for disease prevention?

## Public Debriefing with Dr. Nina [In Whyville’s Greek Theater]

In the final part of the panel, we will open up for a broad discussion with the audience by connecting to an online public forum with “Dr. Nina” in the Greek Theater in Whyville. Here audience members can compare Whyville viruses and the *GLS Sneeze* to real-life counterparts alongside Whyvillians.

## References

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- Lofgren, E., & Fefferman, N.H. (2007). The Untapped Potential of Virtual Game Worlds to Shed Light on Real World Epidemics. *The Lancet Infectious Diseases*, 7, 625–629.