

LOOK FOR THIS SEAL



It's your assurance that a product or service has demonstrated alignment with ISTE's National Educational Technology Standards (NETS). You'll find this Seal of Alignment on products, services, and resources ISTE has rigorously reviewed and determined meet specific NETS standards for Students (NETS•S), Teachers (NETS•T), and/or Administrators (NETS•A).

To date, more than 90% of states already use NETS in their technology, assessment, and/or curriculum plans.

Visit www.iste.org/standards/ to learn more.

Look for the ISTE NETS Review and Seal of Alignment when evaluating your Ed Tech purchases.

Why Whyville?

Whyville (<http://www.whyville.net>)

is an inquiry-based, learner-centered, online science community that appeals widely to adolescents between the ages of 9 and 14. Whyville was created in 1999 by science educators at Caltech who were interested in creating an online space for kids. The goal of Whyville is to create an engaging science environment to support exploration, communication, interaction, and science learning. The community has a political system, an economy, a newspaper, and interactive science games. Whyvillians (Whyville users) create their own unique identity, navigate through the community, chat with other users, and engage in science activities to increase their salary. Simulation and hands-on activities are key elements of the interactive science activities that link chemistry, biology, physics, and the history of science. Users can create elaborate avatars and visit the Spin Lab, the Whyology Center, WASA (Whyville Aeronautics and Space Administration), and many other science activities. Whyville has more than 900,000 registered users and 25,000 daily visitors. In addition, 67% of the users are girls, an unusual feature for a science education site.

Working with the owners of Whyville, Numedon Inc., my colleague at the University of California, Los Angeles, Graduate School of Education and Information Studies (GSEIS), Dr. Yasmin Kafai, and I were able to schedule an outbreak of an online virus called whypox as part of an NSF study on immersive, collab-



By Cathleen Galas

orative simulation environments. We conducted a pilot study in the fall of 2003 in my sixth grade science classes at the Corrine A. Seeds University Elementary School, the laboratory school for the GSEIS at UCLA. The research team included me; Kafai; Jen Sun, Numedon Inc.; and graduate students Linda Kao, Nina Neulight, and David Feldon.

Whypox

As users entered the site, they flew into Whyville Square, a busy place with many avatars representing users and word balloons over their heads as they chat. They learned to navigate around to Dr. Leila's, Smart Cars, the beach, get information, and communicate and interact with other Whyvillians. After they had time to navigate freely through Whyville and considered themselves part of the community, chatting, whispering, y-mailing, trying out science activities, and buying face parts, a few were suddenly confronted with an uncomfortable situation.

"Ms. Galas, there are red spots on my great new face!"

“My face, the new one that I just bought from Akbar’s Face Mall, is turning gray, a really dull gray!”

The first reactions to the whypox were focused on appearance and social behavior. Students became annoyed that they couldn’t chat—they would generate “ah-choos” above their head when they tried unsuccessfully to chat with others on the site. Spots began appearing on the faces of the users, and their faces became gray and unappealing. The spots and sneezing would increase for a few days and then fade. Then, they became concerned with how to behave around infected people, both to prevent themselves from becoming infected, and to help those who are already infected. In class, we discussed “What is happening in Whyville? What can we do about helping our community?” The whypox infection spread through our class and the rest of the online community, affecting some and not others.

As whypox spread through their class and other members of the online community, UES students began to discuss what was happening, what might happen, and how to control the spread of the disease. We charted the infections, and all data relating to infections, on a wall-sized data collection chart. The chart remained in the front of the room during the infection phase. Students became epidemiology detectives as they gathered data from classmates and others on Whyville to discover information about whypox. Students used sticky notes to add information as they or others became infected when at school or at home. We charted new infections daily, including the date of onset, symptoms, which class was infected, and with whom they came into contact. We consistently added new information and conducted ongoing analysis about the epidemic. Students asked each other “Where were you when you first noticed the spots? Where were you just before that? Who did you talk to

Engage Students with Special Needs with Graphing Software

During a two-week period, students in a K–2 special education class engaged in an authentic problem-based activity in which they used The Graph Club to collect and graph information about the daily success of their school’s food drive. Pairs of students worked collaboratively to count the number of cans collected that day in each teacher’s food bin and then, using the classroom’s computer, they entered the data into a table, generating a bar graph that was then hung in the classroom. For each graph generated, students discussed the data, making observations, and noticing trends. At the completion of the activity, the inservice and preservice teachers featured this real-life data collection activity on their class’ home page (<http://edweb.tusd.k12.az.us/gharty/cannedfood.htm>).

The inservice teacher noted that although this same activity could have been done manually, the software “saved us much time in the creation of graphs” and enticed her autistic students to “stick to” completing the activity and “kept them from getting frustrated at their less-than-perfect graphs.” Instead, they could “look at their perfectly created graphs and compare them” allowing them to “demonstrate the concept of more than and less than.” Furthermore, “The students worked on objectives in the areas of communication, motor skills, math and language arts as they gathered, sorted, and graphed the cans.” The preservice teacher who assisted in the implementation of this activity commented how the software provided the students the opportunity to “collect, compare, and quickly analyze the data mathematically, something they wouldn’t have done as fast on their own.” She further commented how the “software caught the kids’ attention and the visual stimulation assisted them in getting involved and staying involved in the learning process. ... I would have thought that the students would have had most difficulty understanding the mathematics, but I think they got it. I think the software helped.”

Standards: NETS•S 3 (<http://www.iste.org/nets/>)

Special Needs

—Robin A. Ward, Assistant Professor, Department of Teaching and Teacher Education, University of Arizona, Tucson

that day? Do you know where they were? Oh, I saw that person you were talking to before you got infected, and they now have whypox!” The post-infection interviews resulted in flow chart formations of sticky notes and drawn lines all over the butcher paper as kids tried to make sense of how the infection was spreading. Discussion online centered on the question of why everyone was sick and what we could do about it. Classroom online

and offline discussion and activities dealt with such questions as:

- Who is sick?
- What are the symptoms?
- When did they get sick?
- Where could they have been exposed?
- Why do some get sick and others stay healthy?
- What causes the sickness?
- What should individuals or the

community do when we find ways to prevent the sickness from spreading?

- Does the prevention method work? Why or why not?

Students investigated and searched for answers to try to determine how the whypox was introduced into the community and what could be done to prevent the spread of the disease.

Additional classroom offline and online curriculum in epidemiology supplemented the whypox online simulation. Students built individual “What is disease?” concept maps during the unit. Students regularly updated their maps as they gained new insights into the spread of disease. The maps became more sophisticated and detailed over time, becoming an assessment tool and artifact to observe the evolution of student understanding about epidemiology. Students researched topics about infectious disease and wrote articles for the

Whyville Times. As students needed to know more about certain topics, articles, experiments, and activities from several sources were used to reinforce and expand their understandings.

Technology tools at the Whyville CDC authenticated our learning environment. At the CDC, students gathered information on the past whypox epidemic, interacted and shared insights via the bulletin board postings, and used graphing and visualization tools to analyze data and simulate infections and epidemics. Within the CDC, at Outbreak Headquarters, students read past and present case files submitted by users. At Whypox History, they read about the first whypox outbreak in 2002. Using the Infection Simulator, they could observe how infectious disease spreads in a population. In the second level of the simulator, they could control who got sick first and how many people each sick person infected daily. Using the

Epidemic Simulator, students began to notice factors indicating whether an infectious disease could lead to an epidemic. They used the simulation tools to try to predict how long the epidemic would last, how infectious it was, and how many people it would affect. Cooperative groups ran many different simulations, changing one variable at a time to see the effects, and discussing and charting the results. As a class, we looked at the large area and fast spread of infection and studied the concepts of epidemic and exponential growth.

Our wall-sized data collection chart was the focal point of discussions of trends, adding information about when each person contracting whypox logged on, where they went, and with whom they came into contact. Students discussed trends and came up with hypotheses about ways to prevent one from catching whypox. Most often, they said to stay away from the beach. They noticed high rates of infection there, and many were sure that others at the beach had coughed on them, thus spreading the whypox virus.

Students all wrote group articles that were published in the Whyville Times on bacteria, viruses, spread of contagious disease, and documented the spread of whypox in Whyville. Each student also individually contributed to the postings of observations and data analysis from the infection and epidemic simulators. They added information and notes to the online bulletin boards to share information with the entire community. The CDC bulletin board had questions to help focus student discussion and thinking about the epidemic. Questions helped to focus the discussion on science and scaffold the students’ thinking and problem solving about the outbreak of whypox. Some of the users were heavily engaged in trying to understand the dynamics of the disease.

Improving Students’ Language Learning

Our Spanish textbook, like yours we’re sure, has supplemental listening exercises on CD. These disks are excellent, except that the native speakers are speaking at a normal conversational rate, which leaves most students unable to keep up with the discussion. So we converted the audio tracks into MP3s and used PowerPoint’s “Custom Animation” feature to insert the files into a presentation in which we placed the text being spoken. As the speakers converse, the script appears, similar to a karaoke machine, allowing the students to follow the conversation visually as they listen to the tracks.

The visual representation combined with the audio improved students’ grades dramatically. Before using this technique, grades were generally in the lower 80s even after students listened to the track three or four times. Afterwards, students consistently received grades of 90 or better after the first viewing/listening. The higher grades continued to be present on quizzes and exams when they did not have the benefit of the visual props. Those students who participated in both forms, with visual cues and without, insisted that this format is much easier to understand and to retain.

Standards: NETS•T III (<http://www.iste.org/nets/>). FL 1.2 (<http://www.actfl.org/>).

—Lyn C. Howell, Assistant Professor of Education, Milligan College, Johnson City, Tennessee, and Robert Rose, Spanish Teacher, Andrew Jackson Elementary School, Kingsport, Tennessee

Foreign Language

Sixth graders became activists. They took to heart attempting to solve the real world questions about whytox and its spread through the Whyville community. UES students organized online groups dedicated to research, education, and philanthropy. They actively spread the word about ways to prevent infection, education, organizing a hospital and university as future educational and research centers. They took on different tasks to combat the spread of the disease within their online community. An outline of classroom science activities is available at <http://www.ues.gseis.ucla.edu/teaching/curriculum/science/epidemiology/epidemiologyindex.html>.

What Do Students Learn?

The simulation of whytox infection throughout the online community was a meaningful problem to solve, and an active, engaging way for students to build their own understanding about the spread of infectious disease. Whyville provided a collaborative environment by allowing students access to a larger community in which they could share data, communicate with knowledgeable individuals, and share resources. UES students, teachers, and online users as a community collaborated to think critically about

the spread of whytox, gathering data about the online virus spread, making hypotheses regarding the spread and prevention tactics, and analyzing ongoing data to check the validity of their hypotheses. Whyville allowed students to participate in virtual science activities and study the whytox infection, both at home and at school. Many invested many hours outside of school at night and on weekends on Whyville. Students collaborated to help each other solve the real problem of the whytox epidemic. Students asked deep questions, researched answers, and took responsibility for their own open-ended learning. They were productive citizens of the community, and were given support to research, experiment, and contact experts to discover answers to their questions.

In Whyville, the community and science features blur the line between home and school, as students choose to participate actively in Whyville outside of school. Several students asked me to “assign” time on Whyville so that parents would allow them more time at home to be online. Frequently, students would call online class meetings at 6:30 or 7:00 pm in one of the checkers rooms. Anyone who was available would make the meeting and chat about whytox, epidemiology,

or science homework. Girls and boys were equal participants in the science activities. Students were engaged, and many became passionate advocates to build a university and health science research center. Some became philanthropists, donating large amounts of clams, Whyville currency, to build a center for research and education. The collaborative online environment and the class cross-gender collaborative groups empowered students to investigate, question, gather data, hypothesize, and analyze data. This non-traditional science-learning environment provided a meaningful context for studying about epidemiology and problem solving. Students worked collaboratively beyond the borders of their classroom to investigate and solve the whytox dilemma in Whyville.

Standards: NETS•S 3, 4, 5; NETS•T II, III (<http://www.iste.org/nets/>). NSES Grades 5–8 A, C, F (<http://www.nap.edu/reading-room/books/nses/html/>).

Cathleen Galas was for many years a demonstration teacher/researcher at the University Elementary School in the Graduate School of Education and Information Studies at the University of California, Los Angeles. She is now consulting in the San Francisco Bay Area.



Call for Curriculum Submissions



Have you or a colleague taught a lesson or unit integrating technology that went particularly well?

Do you have:

- Tips, tricks, or tidbits?
- Stories or quotes that demonstrate student learning?
- A great tech tool or resource?
- Quick ideas easily adapted to other settings or content areas?

If you answered **yes** to any one of these, please call or write the editor with your ideas:

Kate Conley • kconley@iste.org • 1.541.434.8926