Real Arguments about a Virtual Epidemic: Conversations and Contestations in a Tween Gaming Club

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Abstract: Recent studies have examined how argumentation around science is positioned and used in everyday interactions. Our research extends these investigations into a virtual world called Whyville.net and its annual outbreak of Whypox, a virtual epidemic. We observed and recorded players' conversations and contestations about Whypox in an after school gaming club. We found that club members' argumentation involved the use of warrants, rebuttals, and data as found in other studies of everyday argumentation. Players also developed different theories, some unwarranted, about the causes and spread of Whypox, and used the epidemic to position themselves as insiders. In our discussion, we address ways in which virtual epidemics connect to on-going research on everyday argumentation and provide starting points for students' learning about infectious diseases.

Introduction

The last decade has seen an increased interest in studying informal settings recognizing that outside school activities play a crucial role in students' engagement with and understanding of science. Most prominent has been research in science museums and after school clubs (Falk & Dierking, 2002), some of which has focused on identifying "learning talk" in museum visitors' casual conversations during interactions with exhibits (Allen, 2002; Callanan & Braswell, 2006). Other research has traced how museum activities connect to learning from family or school environments through the content of visitors' conversations (Crowley & Jacobs, 2002; Palmquist & Crowley, 2007). Recent work has taken a closer look at conversations of family visitor groups as dialogic inquiry, focusing on how learning is mediated by members of the group as well as materials such as exhibit texts and interactive elements (Ash, 2003). For the most part, this research has focused on activities and talk within the physical confines of a museum location or home.

Our research extends the line of inquiry to events in virtual worlds in which youth participate in large numbers. Virtual worlds can be defined as online spaces visited by thousands, if not millions, of players where they can engage in shared activities (Bartle, 2003). Unlike science museum exhibits only accessible for limited hours each day, virtual worlds offer access from anywhere and at anytime. These aspects of virtual worlds provide opportunities to participate in extended activities that require large number of participants (Bainbridge, 2007). A popular proposal is to use virtual worlds for simulating epidemic outbreaks to study people's behaviors and interactions; such outbreaks are difficult to replicate in real-world settings for ethical reasons alone (Lofgren & Fefferman, 2007). We focused on the educational prospects of the annual outbreak of a virtual epidemic called Whypox in Whyville.net, a virtual world with 1.5 million registered players ages 8-16, to study players' engagement and learning about infectious diseases. We were interested in ways that the participation in a virtual epidemic could provide a context for the type of argumentations previously observed in homes and museums.

To do so, we focused on the conversations and contestations about Whypox in an after school gaming club where we observed and video recorded groups of participants as they were visiting Whyville several times a week. During an outbreak of Whypox, infected Whyvillians show two symptoms: red pimples appear on their avatars and the ability to chat is interrupted by "sneezing" (i.e., typed words are replaced by "achoo"). Our research goal was to examine the content and structure of argumentation of our participants: Do club members engage in argumentation practices such as making claims and providing warrants when discussing different aspects of Whypox? What kind of theories do players develop about the cause and spread of Whypox? What role does Whypox play to position participants within the gaming club? In our discussion, we address how the observed argumentation practices of children can be leveraged to support further science inquiry in the contexts of virtual worlds.

Background

Science education sees argumentation as a key inquiry practice (Duschl & Osborne, 2002; Kuhn 1993; Newton, Driver, & Osborne, 1999) because it is central to the practice of science (Latour, 1987). Numerous studies have focused on the particular challenges faced by students and teachers to bring argumentation into the classroom. For instance, students' problems in distinguishing between theory and evidence have been documented (e.g., Kuhn, 1993) and teachers' issues with orchestrating classroom discourse have been critically examined (Lemke, 1990). While part of this research focuses on written arguments (Bell & Linn, 2000; Sandoval & Millwood, 2005), much attention is also given toward argumentation as part of classroom discourse

(Kelly, Druker, & Chen, 1998; Driver, Newton, & Osborne, 2000). Whether they are written or spoken, students' arguments are generally analyzed in terms of the structures proposed by Toulmin (1958).

More recently, researchers have focused on the study of argumentation in everyday contexts asserting that this is the space in which youth learn and practice argumentation. While the structures of claims, data, warrants, and backings offer a powerful analytical tool for looking at arguments, many everyday arguments seem to lack these explicit structures. However, research has shown that many of these same structures emerge when elements that are left implicit by the speakers, such as assumption of shared knowledge, are taken into account (Bricker and Bell, 2007; Simosi, 2003). For instance, in Simosi's study of argumentation in a workplace, warrants and backings that seemed missing at first were apparent when considering the company's official rules and assumed norms. Bricker and Bell traced argumentation among parent-child or peer-to-peer conversations across multiple contexts including science classes, home and play. These cross-contextual analyses provided evidence that speakers often make references to past events — and not just rules and norms — which are often missed in research that focuses on one single context.

We expanded this study of everyday argumentation into the contexts of virtual worlds increasingly popular with children. Previous studies about the virtual epidemic Whypox focused on 6th grade classroom discussions directed by teachers (Neulight, Kafai, Kao, Foley & Galas, 2007) or online chat content (Kafai, Feldon, Fields, Giang & Quintero, 2007). We documented that students often likened Whypox to naturally occurring infectious diseases they had learned about in their science curriculum. The chickenpox-like qualities of Whypox – its red pimples – might have led students to draw these conclusions (see Figure 1). In the analysis of online chat content we found a significant increase and drop in Whypox-related words concurrent with the outbreak and fading of the virtual epidemic. The examination of players' face-to-face conversations about Whypox in the gaming club while simultaneously online in Whyville.net allowed us to continue the investigation of multiple contexts seen by Bricker and Bell (2007) as instrumental in understanding peer-to-peer everyday argumentation.

Figure 1. Whyville.net: Whyvillian with Whypox (left), Beach with infected Whyvillians (right).

In addition, we were interested in the kind of explanations or theories that players developed about the causes and spread of Whypox. Related research about tweens – a common term for youth around the age of 10 to 12 – and their understanding of the computer virus (Kafai, in press-b) indicated that most of them focused on behavioral aspects of the virus, i.e., what it does, but were not able to provide biological explanations, i.e., how it functions. Our focus in this analysis was less on students' conceptual understanding of a computer virus but more on the explanations that players offered in the context of their interactions about the causes or the length of the virtual epidemic. We were interested in how the ideas or legends about Whypox spread through the community (Windschitl, 2001) as an indicator of the kind of ideas that contribute to the theory building of what a computer virus like Whypox might be like.

Finally, we place the study of argumentation about virtual epidemics within the larger context of research about the value of games for children's development. Most relevant here is prior research on children's conversational practices in games; these studies have shown how arguments serve to position players and communicate understanding (Goodwin, 1985; 2006). The Whypox virtual epidemic immerses players of the whole community because participation in it is not a matter of choice. Thus even those players who do not catch Whypox participate in the game as they make decisions whether or not to avoid the disease that might impact their online social contacts and interactions. We have proposed elsewhere (Kafai et al., 2007) to consider Whypox as a community or affinity event (Gee, 2003) because it creates a shared experience and history among its players. As such, participation in Whypox offers multiple points of connection into understanding the causes, symptoms and duration of infectious diseases (Au, Romo, & deWitt, 1999; Kalish, 1999; Parmelee, 1992) and thus have possible instructional applications.

Methods

Research Settings

Whyville.net is a multi-user virtual environment (MUVE), with over 1.5 million registered players at the time of the study, that encourages youth ages 8-16 to play casual science games in order to earn a virtual salary which youth can then spend on buying and designing parts for their avatars (virtual characters), projectiles to throw at other users, and other goods (Kafai, in press-a). Social interactions with others are the highlight for most Whyvillians and consist primarily of chatting on the site where users are visible to each other on the screen (see the picture of the Beach in Figure 1).

In early 2005 we set up an after-school club at a school where 20 tweens ages 10-12 came to play on Whyville for an hour most days after school for three months. Most tweens were new to Whyville, though one had played for the year before the club started. Some of the youth were also students in one of the classes where Whyville was used as part of their infectious disease curriculum (see also Neulight et al., 2007). The players distributed themselves among 10 computers, often sharing a computer or wandering around the room talking to others. While the club began as a quiet place, it quickly became loud and lively as participants learned about the site and began to shout advice to each other, arrange parties on Whyville, chat, throw virtual projectiles at one another virtually, and critique each other's avatars . Often clusters of tweens would form around one computer when something interesting happened on Whyville.

Data Analysis

In order to study the youth's conversations at the after school club, two video cameras were set up to focus on small groups of youth clustered at tables with two to three computers. The Whypox epidemic lasted three weeks, 11 days of which were videotaped at the club. After an initial logging of the video data, we identified all conversations that were directly related to Whypox. As the novelty of Whypox subsided, the amount of Whypox talk decreased in later conversations. For that reason, we focused on the first two days when Whypox-related talk was most concentrated and analyzed the transcripts. We analyzed club members' inquiries about the nature of Whypox, such as identifying symptoms or making inferences and predictions about the duration or source of the sickness. We also highlighted social positioning and play where Whypox was incorporated into the group dynamics and activities of the tweens.

Findings

Whypox as a Context for Discussing Claims and Evidence about a Virtual Epidemic

We found extensive conversations and discussions about Whypox in the gaming club where the tweens were both online and in a shared physical space. The virtual epidemic quickly became the subject of conversations since it impacted the two most popular aspects of Whyville: appearances of avatars and socialization. As such, the immediate concerns of the youth were to find out each other's infection status and to avoid getting sick. The following is an example of how one group reacted to and argued about the status of a boy's infection status.

Blake: Hey Dude, don't get me sick.
Scott: You're already sick man.
Blake: No, I'm not.
Scott: Yes you are, look, where are you.
Blake: I'm right here.
Scott: That's you?
Blake: Yeah I changed me.
Leslie: Where are you?
Blake: Right here.
Leslie: Oh you're not saying ah choo.
Blake: I know, I don't have the Whypox...

Scott claimed that Blake was already infected with Whypox. Based on their understanding that an avatar with Whypox would sneeze and have pimples, Scott and Blake both referred to Blake's avatar as evidence for their claim and rebuttal respectively. Eventually, the argument was settled when Scott and Leslie realized that they had mistaken another avatar for Blake's and confirmed that Blake's was "not saying ah choo." While this argument seemed incomplete at first, structural components such as warrant and backing emerged when we considered the tweens' shared knowledge (see Figure 2). Based on their experiences together in class, on Whyville, and at the club, certain basic information about Whypox was assumed to be common knowledge among group members and was left implicit.

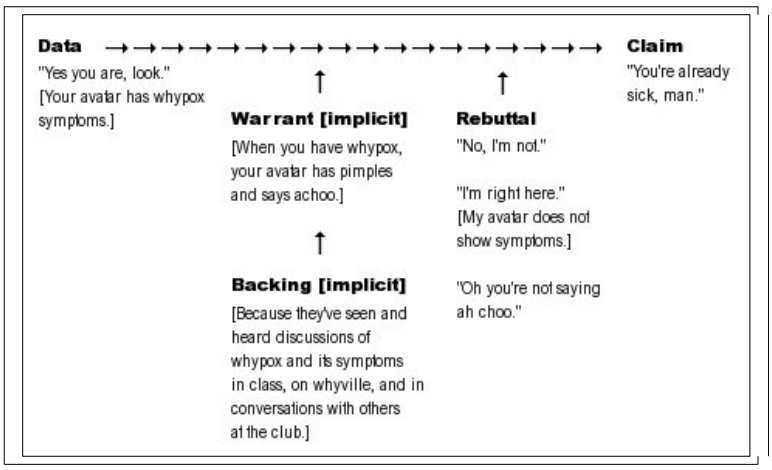

Figure 2. Tweens' argument about Whypox with implicit warrant and backing.

Infection status was a frequent topic of conversations. Club members often engaged in a claim-contestation structure that involved the infection level of the community. As more and more Whyvillians appeared to have Whypox, one club member would state "Everybody has Whypox", which would be immediately rebutted by others offering themselves as counterexample to the claim. In one example, not only did Trevor offer himself as a counterexample to Leslie's claim, he was supporting his rebuttal further with evidence from Whyville's city records and showing his confidence with a bet:

Leslie: Almost everyone has Whypox.
Trevor: I don't!
Leslie: I doubt it.
Trevor: You doubt it? Go to city records. I'll bet you $5.
Leslie: You mean 5 clams or $5.
Trevor: 5 clams.
Leslie: Ok, I won't bet you, but I'll go anyway.

Besides arguing about infection status, the youth also talked about Whypox in the context of infection causes, strategies for dealing with symptoms, and symptom durations. Quite a range of opinions concerning infection cause were given, ranging from whispering with an infected Whyvillian, sending y-mail, throwing projectiles or even getting infected face parts, etc. The leading claim among these was proximity to an infected Whyvillian. The following is a typical exchange between youth when uninfected club members on Whyville saw avatars with Whypox moving close to theirs:

Paul: Ahh too many sick people. Get away. Aidan, you're ah chooing.
There's a girl with Whypox following me! Ahh...!
Scott: There's a lot of people saying Ah choo.
Aidan: Woo hoo I gave you Whypox!
Paul: What?! Nuh uh.
Aidan: Yeah huh.
Paul: You don't see freckles on me.
Aidan: Yeah but guess what, tomorrow you are.

Once again, a casual banter between the youth becomes a more substantial argument when implicit elements are taken into consideration. It is clear from the excerpt that both Paul and Aidan shared the generally accepted notion that one can get infected by proximity. They also shared the understanding that pimples (referred to as "freckles" in this case) were a symptom of Whypox. While both of them used this shared knowledge as evidence for their claims, Aidan furthered his argument with an implicit warrant that pimples do not appear immediately after infection. This particular sequence of symptoms had been discussed among the youth at the club that day when everyone was gathered together at the beginning of the club session. Leslie summarized for the convened club members that "you first... well... the thing [avatar] says achoo a lot, and then you start getting these pink bumps all over your face." Aidan was also a student in one of the classes that used Whypox as part of their infectious disease curriculum. In class he had read an article on Whyville's virtual newspaper in which one Whyvillian described her symptoms from the 2002 Whypox epidemic, including the fact that her pimples first appeared on the second day of infection (see Figure 3).

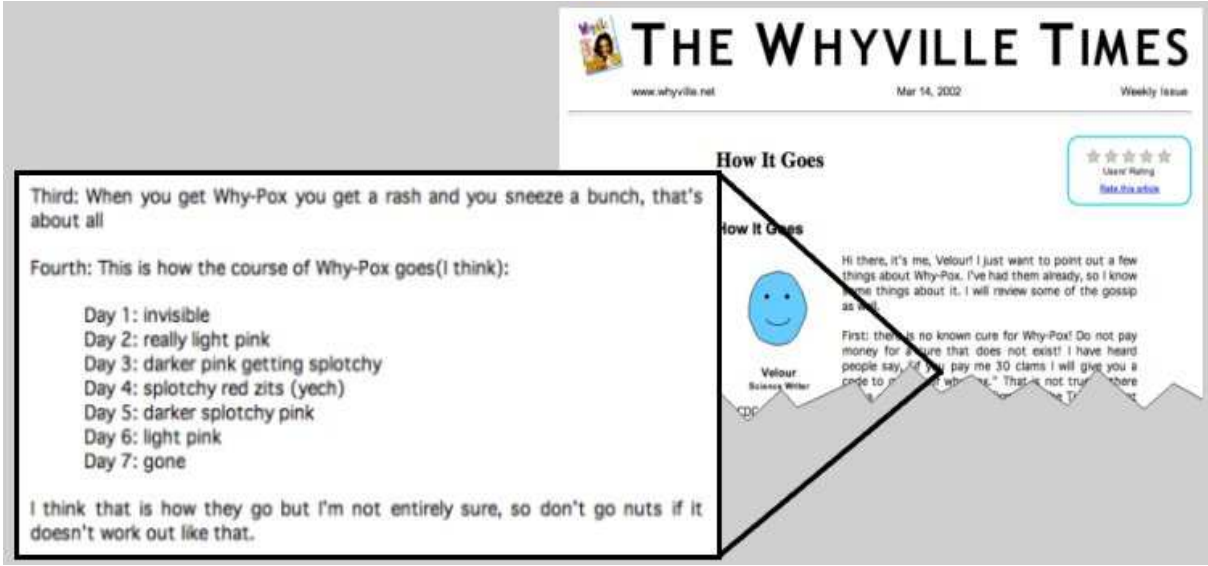

Figure 3. Excerpt from a Whyville Times article addressing Whypox and its duration.

A more specific crossover of classroom Whyville knowledge into conversations and arguments at the club concerns the duration of Whypox. One popular claim at the club was that it took seven days to recover from Whypox. Aidan seemed to be the main source of this idea at the club. The same article that he read also put forward the idea that Whypox only lasted for seven days in 2002 (see Figure 3). This idea propagated within the club and was subsequently repeated and accepted by other members. While Aidan and others who read the article based their claim of the seven-day duration on information from the article, it is interesting that the reference was not necessary once this information was accepted as a fact and commonly known among the club members. In many instances, the seven-day rule was invoked readily by club members in their conversations:

Blake: Aidan, it takes you *a week* to heal?
Aidan: Yeah.

And later:

Lela: What is whypox?
Paolo: You only get sick if you're around sick people.
Lela: Well, I'm not around sick people.
Paolo: Good, then you're healthy.
Leslie: It's only *a week*, no big deal.
Blake: I know it does only last like *a week*.

Tracing the idea of a seven-day rule from a classroom Whyville task to the casual conversations at the after school club illustrates how a common knowledge base can form around the youth's shared activity (Windschitl, 2001). This shared knowledge was present in the youth's conversations as they bantered with each others and tried to convince each others of their claims about Whypox. These arguments and demonstrations of Whyville knowledge took place in the broader social context of the youth's interactions at the club. As such, conversations about Whypox were also ways for the youth to position themselves within the club's Whyville community. The next section will revisit one of the excerpts above concerning Blake's infection status within its context of participating in the community science event of Whypox.

Whypox as an Affinity Event: Insider/Outsider Positions

Our last finding pertains directly to players' positioning as participants in Whypox. Unlike many traditional games that have established activity structures the organization of which can be negotiated in play (Goodwin, 1985), it was not clear to some club members whether or not they wanted to be infected with Whypox at the beginning. On the one hand, Whypox disrupted the important social aspects of online chat and avatar appearance. At the same time, Whypox was becoming a topic of conversation and source of attention, with youth sharing complaints and strategies about the disease. Blake's reactions to Whypox provide a good example. As discussed above, Blake didn't want to get Whypox and warned Scott not to get him sick. Later in the same conversation, he changed from his initial negative response to wishing that he had Whypox:

Blake: ...I don't have the Whypox, I wish I did.
Leslie: Why? (In a bitter voice).
Blake: A coo. Ah choo.

Soon following this comment, Blake expressed sympathy toward an infected player on Whyville, a sentiment shared by his club friend:

Blake: Ah choo, poor guy.
Scott: Ah choo poor guy, that girls really sneezing. I don't sneeze that much.
Blake: You don't have the Whypox?
Scott: No. I just sneeze.
Blake: I don't want Whypox.
Leslie: Then get away fro, those people!
Blake: No, but everyone here has Whypox.
Leslie: Get away from those people.
Blake: This is my friend.
Scott: But he has Whypox, unless you want to catch it.
Blake: Yeah I want to catch it. No, just kidding.
Leslie: I read in this article, someone said that Whypox is sexy.

As demonstrated by this exchange, sympathy for those infected with Whypox was mixed with fear of contracting the disease. Blake noted that everyone at one Whyville location were sick, including his online friend. In order to stay away from Whypox, he was not able to socialize with sick Whyvillians. When Blake repeated again that he wanted to catch the disease, Whypox became the context of the club members' jokes. Blake noted that he was "just kidding" about getting Whypox. Leslie responded by commenting that "someone said that Whypox is sexy", which prompted the group to laugh.

Later on the same day, Blake was infected with Whypox as well. Despite expressing his earlier wish for Whypox, he complained that he was sick and joined others in expressing frustrations about the symptoms. On the next day, when it became apparent that Ben didn't know about Whypox, Blake led the others in expressing disbelief and ridicule:

Blake: You don't know what the Whypox is?
Ben: No.
Blake: He doesn't know what the Whypox are.
Leslie: Oh my god.
Blake: That's just sad. You should already know.

While the conversations mentioned here around Blake were particularly rich with Whypox references, the sentiments expressed were common. One frequent response to seeing avatars with Whypox pimples, including one's own, was verbal disgust (e.g., "Ewww...") accompanied by drawing nearby club members to witness "how ugly my person looks". One's Whypox status could invoke both positive and negative reactions, with club members expressing pleasure (e.g., "Yes!") when they remained uninfected or displeasure (e.g., "I hate the Whypox.") when dealing with symptoms. Since many assumed that the disease could spread by proximity, Whypox also induced social ostracism, with frequent exclamations of "Get away from those people!" At the same time, other club members had shared Blake and Scott's sympathy towards those who were infected (e.g. "poor guy"). The conversations described here serve as examples of how Whypox became a part of the club's Whyville community and created affinity between those who were in the know and those who weren't. The argumentation about Whypox's infection status, causes, and duration took place within this social context and was one way through which the youth participated in the club's Whyville community and demonstrated their insider status.

Discussion

These findings extend previous research on children's conversational pragmatics associated with everyday argumentation, in particular how these strategies connect across different contexts such as the Whyville virtual environment, the classroom, and the club. While researchers have begun to examine how these competencies can be leveraged in the context of classroom science activities (Bricker & Bell, 2007), our efforts are more directed towards supporting argumentation in the context of virtual world activities. We see the

development of emotional and social aspects, and the design of conversational contexts as promising starting points.

We know from prior research that the emotional impact associated with Whypox is one of the main reasons for Whyvillians to choose to engage in further investigations in Whyville's virtual center for disease control to examine the bulletin board postings or to use the disease simulators (Kafai, Feldon & Quintero, in press). Our most interesting finding here concerns the conversations among club members about the desirability of having Whypox. Prior analyses of the online chat records indicated that some Whyvillians deemed Whypox important enough to fake one of its symptoms by typing 'acho' into their chat bubbles. The perceived need to participate (or not) in Whypox could be one of the reasons of what lead club members to argue about various aspects of the virtual epidemic. Within this context, we suggest that positions of insider/outsider or sick/healthy can help situate players' argumentation about virtual epidemics. Virtual worlds offer the possibility to adopt more than one identity or role that could provide space for experimentation. Goodwin (2006) and others have argued that these forms of everyday play helps children to develop argumentative practices that can provide the foundation for science inquiry in schools.

An equally important aspect is the difference in breadth and depth of the arguments we observed in the face-to-face club setting when compared to the rather sparsely worded exchanges in online chat or players' limited participation in the bulletin board postings. In our analysis of face-to-face club conversations, we recorded that claims in regard to several aspects of the virtual epidemic (e.g. causation, spread, and symptoms) were stated and club members either sought to confirm or rebut those statements using different data sources as evidence (e.g. observation, data check in records, and exceptions to rules). It is possible that the current bubble format of online chat is not very conducive for these forms of expanded claims and rebuttals. The use of online discussion forums such as blogs, wikis, or cheat sites could be used to further argumentation about virtual epidemics. Players then could debate in more detail claims such as the "seven-day rule" of Whypox or causes for the spread of infection. The physical proximity of members in the club might have facilitated the exchanges and thus would suggest that online discussion spaces need to be integrated in a similar way within Whyville play. Our findings suggest that these spatial, emotional and social aspects provide important scaffolds in how players become engaged in real arguments about virtual epidemics.

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