Games and Culture

''Stealing From Grandma'' or Generating Cultural Knowledge?: Contestations and Effects of Cheating in a Tween Virtual World

Deborah A. Fields and Yasmin B. Kafai

The online version of this article can be found at:

Published by:

$SAGE

Additional services and information for *Games and Culture* can be found at:

Email Alerts: http://gac.sagepub.com/cgi/alerts

Subscriptions: http://gac.sagepub.com/subscriptions

Reprints: http://www.sagepub.com/journalsReprints.nav

Permissions: http://www.sagepub.com/journalsPermissions.nav

Citations http://gac.sagepub.com/cgi/content/refs/5/1/64

"Stealing From Grandma" or Generating Cultural Knowledge?

Contestations and Effects of Cheating in a Tween Virtual World

Deborah A. Fields[1] and Yasmin B. Kafai[2]

Abstract

Much research has described the various practices needed of gaining access and participation in multi-user game communities. Cheat sites are a continuation of game communities where players engage in knowledge building about game related challenges. In this paper we analyze the cheat sites created by players for a tween virtual world called Whyville.net, which encourages youth to participate in a range of social activities and play casual science games. Through analysis we created typologies for both the cheats and sites related to science content. Further, a case study of an exemplary cheat site elaborates on how some player-generated sites work to build knowledge of Whyville. Finally, investigation of over a hundred player-written articles illuminates how Whyvillians contest different practices of cheating and how cheating affects the virtual world. Implications of these findings as cultural artifacts of the game community and as guides for designing informal online learning activities are discussed.

Keywords

ethics, virtual worlds, tweens, cheating, science, knowledge building, learning, cheats

[1] University of California, Los Angeles, California
[2] University of Pennsylvania, Philadelphia, Pennsylvania

Corresponding Author:
Yasmin B. Kafai, 3700 Walnut Street, Philadelphia, PA 19104.
Email: kafai@upenn.edu

Introduction

To cheat or not to cheat—is that really the question in gaming? Based on her research, Consalvo (2007) would say no, the question is more likely when and how one should cheat—at least in playing computer and video games. According to her, being a member of a game culture is more than just playing games and playing them well; it also means building knowledge about games and their secrets and sharing them. In other words, being a member of gaming culture means knowing how to cheat and sharing that with others. She calls this gaming capital, a reworking of Bourdieu's (1984) concept of cultural capital. Consalvo argues that gaming capital coevolves with the competing forces of top-down shaping by various parts of the gaming industry and bottom-up shaping by players. Cheating, thus, gains relevance beyond individual player's individual "transgressions" and places cheating within the larger gaming culture in which players creatively push back on the designs and rules of games. From this point of view, an analysis of cheating in a particular gaming space provides a perspective into both players' and designers' cultures and worldviews at multiple levels: an individual's choices, a small group's knowledge building, player culture at large, and the mindset and influences of designer decisions.

Based on this perspective, we wondered what we could learn about the virtual world of Whyville.net by studying cheating at various analytical levels. Whyville is a virtual world aimed at younger players (or as we call them, tweens) with educational goals. In educational virtual worlds, players not only learn how to play the game but also (presumably) something about the subject matter integrated in the game. This adds yet another dimension to studying cheating—what effect cheating has on the educational intent or learning in games. Whyville encourages players aged 8-16 years (the average age is 12) to play casual science games to earn a virtual salary (in "clams"), which players can then spend on buying and designing parts for their avatars (virtual characters), projectiles to throw at other users, and other goods. The general consensus among Whyvillians (the citizens of the virtual community of Whyville) is that earning a good salary and, thus, procuring a large number of clams to spend on face parts or other goods is essential for fully participating in the social world of Whyville (Kafai & Giang, 2008). Thus, the science games are a means to an end: the more games one plays and the higher levels one reaches, the higher one's salary and the more options one then has to participate in the financial, facial, and social life of the world.

Although Whyville is a virtual world and not particularly a "game," from one perspective becoming an insider in Whyville could be considered something of a "game." Making a good look, learning to make friends, and making the best of the annual pox epidemic mean learning the tacit "rules" of the Whyville culture, and discovering how to do these kinds of things is much like figuring out the rules in a formal game. During our multiyear research on Whyville, we became aware of quite a number of cheat sites that promised solutions not only to the science mini-

games within Whyville but occasionally also offered help in becoming an insider in the culture of Whyville itself, sharing the secrets of having a social life in the virtual world. In this article, we study cheating in Whyville from multiple angles: kinds of cheats and cheat sites, implications of learning for science games, the construction and culture of a particularly promising cheat sites, and the effects of cheating on the culture of Whyville at large. In this way, we gain a unique perspective on the learning and culture of Whyville from different kinds of players and designers alike.

Background

Large-scale multiplayer online games and more broadly virtual worlds with gaming elements in them have gained increased attention in the past few years in regard to learning that takes place in them. Thousands to millions of players can participate in these worlds and Gee (2003) has argued that the collaborative problem solving, networking, cultural learning, and complexity of these worlds give them the potential to be strong learning environments. A number of researchers have investigated learning and scientific thinking in commercially based online spaces such as the online forums associated with *Civilization* (Squire, 2008) and *World of Warcraft* (Steinkuehler & Duncan, 2009) or the broader learning practices of becoming an insider in games such as Lineage (Steinkuehler, 2006). Other researchers have designed virtual worlds that promote explicit educational goals such as science inquiry skills in River City (Dede, Nelson, Ketelhut, Clarke, & Bowman, 2004) or social responsibility in Quest Atlantis (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005).

One aspect of play in games or virtual worlds that has received little attention so far is cheat sites, player-generated Web sites where players post solutions to problems in a game. Steinkuehler and Duncan (2009) found that *World of Warcraft* forums were rich sites of collective knowledge construction where players engaged in scientific reasoning about challenges in the game. The sites we study in this article differ from commercially supported sites such as those studied by Steinkuehler and Duncan because players are the creators and moderators of the sites rather than game employees, though in both kinds of sites, players are the source of forums and conversations about the game. Furthermore, the creators of Whyville cheat sites are tweens, a generally understudied population regarding virtual worlds. Because cheats for popular games are often published in magazines and/or planned for by designers (Easter eggs and cheat codes are built into games), there is some legitimacy to using cheats in gaming culture; though among players there is great variety on what counts as cheating, what the repercussions are, and how and when one should use cheats (Consalvo, 2007; Stevens, Satwicz, & McCarthy, 2008). Salen and Zimmerman (2004) developed a typology of the kinds of cheats found in computer and video games, which include Easter eggs, cheat codes, game guides and walkthroughs, walkarounds, true cheating, hacks, and spoil-sport cheating (see Table 1). From this description alone, it is clear that there is dramatic variation in the kinds of

Table 1. Typology of Whyville Cheats

Cheats	Description	Whyville cheat sites
Easter eggs	Special secrets hidden in the game by designers	Unlisted spaces within the game, for example, Jupiter, Disco Room, the Newspaper
Cheat codes	Actual codes written up by the designers (providing immortality and other benefits)	Indirect parallels in Whyville: "teleport Jupiter" to get to Jupiter "earmuffs now on" to listen to people whispering online
Game guides and walkthroughs	Step-by-step instruction for finishing a game	Most common on cheat sites: How to play through a game Answers to games Illustrations for games
Workarounds	"Legal" ways of working around game structures	For example, House of Illusions: walking through all rooms without looking at anything Setting up another account to get more clams Selling or buying others' extra accounts
True cheating	Really and truly breaking the official site rules (e.g., multisessioning)	Stealing others' accounts through scams that ask for usernames and passwords
Hacks	Intervention on the level of a computer code	Codes that deposit many clams in account (now expired—we were unable to test these)
Spoil-sport hacking	Intervening in a way that brings down the game and is not for the purpose of being involved in the games	Stealing others' accounts by hacking into the system (rumors of this happening but unstudied by the authors)

cheats used by players and that on cheat sites, players can display cultural knowledge about the game environment.

If the know-how and sharing of cheating in games is a type of gaming capital (Consalvo, 2007), then the creation of Web sites to share them might be considered a type of capital that moves beyond the game itself with potential social, technological, or even material (through income from advertisements) gain (see Malaby, 2006 for a discussion of material, social, and cultural capital that moves beyond the game world). With this in mind, we approached the investigation of cheat sites for Whyville with the following questions: How do Whyville players design cheat sites? What do sites consist of, how do they change over time, who creates them, and what are their motivations? Is there any science displayed in the cheat sites stemming from Whyville? If so, what kind of science concepts and skills are targeted on these sites? Moreover, what does this reveal both about the designers of the sites and the nature of the science games themselves? Finally, how is cheating discussed in

the larger Whyville community? In our analyses, we will focus primarily on the science-learning potential of the designers who create and contribute to these sites. However, our analysis will also consider the cultural dimensions of cheat sites that offer tips and suggestions about participating in the game community and, thus, could be considered an insider's guide to Whyville.

Methods

There were three stages to our exploratory analyses of cheat sites: studying the range of cheats and cheat sites for Whyville, conducting a case study of a particularly thorough cheat site, and examining how the Whyville community discusses cheats in the public forum of their weekly newspaper.

To study the range of cheat sites about Whyville, we first did an Internet search—entering the search terms, ''Whyville cheat or cheats,'' in Google in July 2006, which resulted in a listing of 257 sites. We looked up the sites listed in the first four pages of the search—38 sites in all (or approximately 15% of the total sites returned in our search)—presuming that the first Web sites turned up in the search were the ones Whyvillians would also be more likely to visit. Because 23 of the sites were scams, we focused our analysis on the 13 legitimate cheat sites. First, we looked for the range of cheats across the sites, drawing on typology developed by Salen and Zimmerman (2004). Then, using grounded theory (Glaser & Strauss, 1967), we thematically coded the different kinds of sites and the range of cheats for the games that resulted in salary raises (the most predominant form of cheats). For the latter, we built on Aschbacher's (2003) analysis of the cognitive skills and scientific problem solving in most of the salary-raising science games. As a validation of our classification of cheat sites, we found one Web site that provided an evaluation (one to five stars) of cheat sites that matched our own.

Through this process, we discovered that two of the cheat sites were much more nuanced and provided many more cheats and insider tips about socially participating in Whyville than the other sites. We conducted a case study of one of these sites, the most popular and most in-depth cheat site, GameSite.net (a pseudonym). From July to December 2006, we visited the site weekly and took screen shots of the changing forum discussions and welcome page of the site. In particular, we closely followed discussions and the development of a new cheat that coincided with the appearance of a new salary-raising science game on Whyville. In this way, we were able to study some of the active work of designing and participating in cheat sites.

Finally, to answer our final question about views of cheating within the larger community of Whyville, we searched in the archive of Whyville's weekly, player-written newspaper, *The Whyville Times*. By using the Times' search tool with the words ''cheat,'' ''cheats,'' and ''cheating,'' we identified more than 100 articles from 2000 to 2005 (roughly 1 article every 3 weeks) that discussed cheating in Whyville. Each article was roughly 1 page long, or 3-4 paragraphs, written by Whyvillians. We conducted a content analysis of the articles to capture the range of

opinions expressed on Whyville about different types of cheating and discussions about how this affected the community. Searching the newspaper had inevitable limits for understanding community discussion on Whyville as a whole because one of the employees of the company who hosts Whyville.net performs the role of editor, and obviously, not every article written by the players made it into the weekly newspaper. In addition, not every Whyvillian submits articles to the Times, so we cannot assume that the articles selected for publication are perfectly representative of Whyvillians' views because we do not know all the selection criteria and motivations of individual authors that influence what is published in *The Whyville Times*. However, as the discussion below will demonstrate, published articles do represent a wide variety of opinions on cheating and certainly alerted us to different ways of thinking about cheating in Whyville than we had previously considered.

Findings

In the first section of our findings, we will report on the range of Whyville cheat sites and cheats; in the second section, we discuss the case study of one cheat site; and in the third section, we focus on the discussions about cheating within Whyville community.

Kinds of Cheats and Cheat Sites

The large number, 257, of cheat sites about Whyville found on the Internet in July 2006 is a clear indication both of Whyville's popularity and of the popularity of using cheats in Whyville. As a first attempt at understanding the range of cheats available for Whyville, we applied typology of cheats of Salen and Zimmerman (2004) and found all the types they identified in the cheats for Whyville. We have outlined their definitions in the table and listed parallel types of cheats found on Whyville sites (see Table 1). To illustrate, an Easter egg is something hidden into the design of the game itself, for instance a secret room in the game space. Whyville has its own set of unlisted spaces in the game, consisting of a set of solar system objects (Earth, Jupiter, Moon, Saturn, Mars). Similar to Easter eggs, designers also develop cheat codes with the intention that they will be discovered (or read about in a gaming magazine) and shared with others. These codes might allow a player to have unlimited magic power or special jumping abilities. In Whyville, the parallel is found in a few simple computer commands typed into one's chat bubble such as "teleport moon," a code that transports one to the Moon on Whyville, or "earmuffs now on," a code that is used to allow players to eavesdrop on private whispered conversations. Walkthroughs and walkarounds are strategies developed or discovered by players to accomplish difficult tasks in a game. In Whyville, a walkthrough might consist of step-by-step instructions on how to play through a level of a science game, while a walkaround consists of a trick that allows one to get around some work intended by the game designers. For instance, in the House of Illusions on Whyville, players are supposed to walk through a set

of rooms and spend time looking at optical illusions in each room. Finishing each room results in one increase of salary increments. However, it is possible to walk through all the rooms without actually bothering to look at anything and still get a whopping eight-clam salary raise. Similarly, one might create a second account on Whyville to earn money and send it to one's main account. This allows the player to accumulate virtual wealth more quickly.

Salen and Zimmerman (2004) differentiate between the types of cheating described above and what they call "true cheating," hacks, and spoil-sport cheating. These forms of cheating go beyond finding secret places and accidents in the design of the game. Players who engage in these practices usually are not interested in the goals of the game (finishing a game or, in Whyville, gaining a good salary to hang out with others) but in negatively affecting the experiences of others. For instance, it is a frequent practice in Whyville to lie to Whyvillians to obtain their password so that one can log into another's account and send the money to oneself. This type of cheating and hacks or computer codes developed by users to intervene in the game programming itself affect the gaming environment for others, at least in multiplayer games.

Kinds of Science Cheats

Because Whyville is touted as a virtual world with opportunities to learn science, we wanted to know more specifically what kinds of cheats were available for the science games and how they might affect the potential science learning in the games. Because an in-depth analysis of the cognitive skills and scientific problem solving for most of the salary-raising games on Whyville was already provided by Aschbacher (2003), we do not so much analyze the science learning in the individual games as the range of cheats for the games. After compiling a table of the salary-raising science games, the kinds of cheats for each game, and which sites listed the cheats, we found that different games lent themselves to certain kinds of cheats (see Table 2).

The most common type of cheat for the science games is a list of answers or screenshots (pictures) that show a "correct" way to finish a game level. The basic skill for using these kind of cheats is similar to having a list of answers for a multiple-choice test; one only has to type in or choose the correct answer from a list provided to finish the game. This generally leaves very little potential for learning in a game. For instance, the Alien Rescue Game involves complex three-dimensional thinking about the Earth rotating on its axis and revolving around the sun in addition to hints about the people in a certain part of the world to identify a place at a certain time of year. To illustrate, the third level of the game gives this clue to the player:

> It's quite beautiful here; there's a snow-covered volcano not too far away. I have no idea what the date is, but the Sun rises and sets pretty much exactly in the East and West these days. Take your time—I'm really liking the raw seafood that they serve here!

Table 2. Kinds of Cheats for Science Games

Game	Sites listed	Type of cheat	Better version
Skater Game	6	Answer	Picture (2)
Alien Rescue	6	List of answers	
House of Illusions	5	Workaround	
Treasure Hunt	4	List of answers	
Sun Spot Puzzle	4	List of answers	
WASA Rocket	4	List of answers	
Spin Game	4	Set of pictures	Theory (2)
Great Balloon Race	3	Walkthrough	Pictures + final levels (1)
Getty Treasure Hunt	2	List of answers	
Getty Artset	2	Workaround	Answers + pictures (1)
Solstice Safari	2	Guide	Pictures (1)
Whyeat Challenge	1	List of answers	
Spitzer Spectrum	1	List of answers	
Dance Creation	1	Walkthrough + pictures	
Smart Cars	1	Guide + pictures	
Zero Gravity	1	Guide + reference picture	
WASA Ion Engine	1	List of pictures	
Geodig Safari	1	List of answers	
Spitzer Spectrometer	1	Guide + reference picture	

However, the cheat to such a clue is "Date: September 28th, Location: Tokyo, Japan." Cheating the game for all 12 levels involves putting in the right answers—potentially without even reading the clues (we tested this).

Similar to a list of answers is a set of screenshots illustrating a correct "answer" to a problem in a science game, such as those found in the Spin Game or the Ion Engine. For example, playing the Spin Game involves orienting a series of objects (from a cereal box to a tuna can to the letter "I") one by one on a "spinner" in ways that make the objects spin fast (see Figure 1). One must reach a certain speed to earn a salary point for each of the eight objects.

Cheats for this game most often included screenshots of a player's successful orientation of each object such as that in Figure 1. However, on two of the cheat sites we found that the site designers offered a short explanation instead of or in addition to a set of pictures, telling players to line the objects as straight up and down as possible. This is actually a decent theory about how to make objects spin fast—lining them up vertically. The Spin Game is the only game on Whyville that seemed to encourage such an explanation, which appeared only on two sites, but there were other games that also required more than simple lists to create a cheat.

Certain games do not lend themselves to a list of answers, such as the Hot Air Balloon game (discussed earlier) and the Zero Gravity game. Instead, the cheats for such games consist of guides or walkthroughs, perhaps with helpful reference guides or pictures on more comprehensive cheat sites. For instance, the object of the Zero
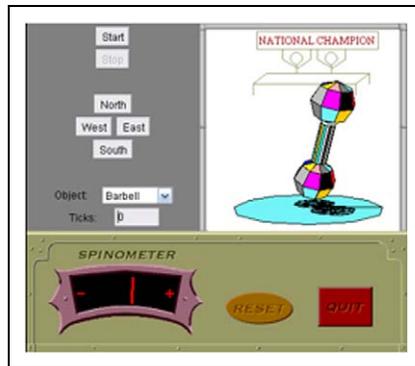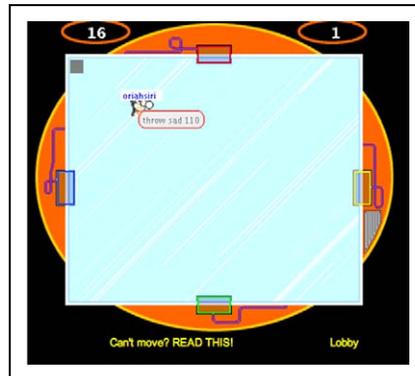
Figure 1. Spin Game © Numedeon, Inc.

Figure 2. Zero Gravity Game © Numedeon, Inc.

Gravity game is similar to the 1970s children's toy Simon, where one must remember and punch four lights in a particular order based on the order in which they blinked. The only difference is that in the Zero Gravity game one must throw objects to propel oneself to hit each light (see Figure 2).

Throwing objects at a certain angle (e.g., "throw smile 0") results in moving a short distance in the opposite direction according to Newton's third law of equal and opposite reaction (in this case, one would throw to the right and move to the left). The cheat for this game gave explicit directions about how to use projectiles to make oneself move in the opposite direction of a throw (rephrasing Whyville's more formal directions in the players' own words), suggested that one buy 200-300 projectiles to complete all 10 levels (something one author wished she had known when she first played the game), and even included a picture of every 5° angle in a circle (see Figure 3).
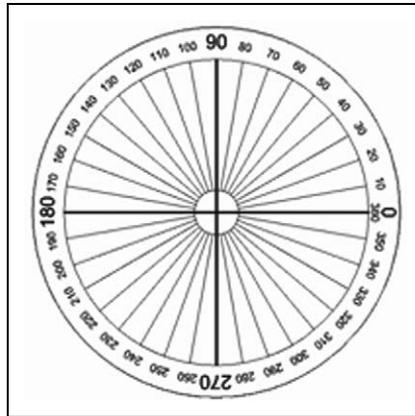
Figure 3. Zero Gravity Cheat Reference

The picture of angles was a very helpful reference that might aid players in their speed of recalling which angle would cause them to move in which direction. Notably, relatively few cheat sites gave walkthroughs or guides for the more difficult games to cheat. In fact, only one site provided cheats for all the salary-raising science games on Whyville, including a number of cheats not available on other sites.

Kinds of Cheat Sites

Beyond studying the range and kinds of cheats for Whyville, we also wanted to study the kinds of cheat sites there were for Whyville, who made them, and how they were made. As part of this, we created a typology of cheat sites based on the quality of the help or answers provided (see Table 3); we did not include scam sites in this typology, which did form the majority of the Web sites listed as Whyville cheat sites (25 sites). Although the cheat sites varied in terms of the number of games for which they posted, differentiating them by the sheer number of games was not as relevant as by the quality of directions or solutions for completing games.

Of the 13 sites, we studied in more depth, only 2 ("comprehensive" in our typology) contained almost complete listings of all the games (20) on Whyville and provided solutions and/or directions for how to complete these games. These sites also supplied insider tips for participating on the site, including which shops offered the best face parts, how to teleport to secret locations unlisted on the normal Whyville map, and even a computer code to throw projectiles more quickly and, thus, get the best of your opponents. They also included contributions from multiple players rather than being Web pages made solely by individuals. All other sites paled in comparison, but a small number of sites (partial) provided solutions for 4-10 games and included in their solutions some directions or illustrations (such as the diagram of the angles in a circle in Figure 3) that facilitated completing games. At the lower

Table 3. Typology of Whyville Cheat Sites

Types of sites	Description
Complete: 15%	Almost complete listing of help for games (15–20), includes solutions for the harder levels of certain games, researches some answers outside of Whyville, insider instructions for how to play games, explicit and full directions for games, provides other hints and help for being on Whyville
Partial: 23%	Includes solutions for the harder levels of certain games or researches some answers outside Whyville, basic directions for playing games, provides 1+ illustrations
Minimal: 31%	Unexplained answers to games, no solutions to the harder levels of certain games
Ultimate cheat: 31%	Completely copies other sites without referencing the source

level of quality (minimal) were sites that only gave unexplained or incomplete answers to games, such as an ordered list of answers to the Great Balloon Race with no accompanying explanation, in this case, altitudes between which to fly to reach a target for the lower levels of the game. Unfortunately, without more explicit directions, such as how to navigate between altitude levels where the wind switches directions, this lower quality cheat is not very helpful. Finally, included in what we call the "Ultimate Cheat" are sites that are obvious copies of other Whyville cheat sites, noted by the identical misspellings and punctuation in their solutions; these actually appeared to be cut and pasted, plagiarized Web sites!

One commonality between all the less comprehensive cheat sites was that they were also personal Web pages. In other words, these were the personal Web sites of individuals who played on Whyville and wanted to display their knowledge about Whyville as part of their personal Web site. Many of these Web sites were either unfinished (visible in the notes of the Web template to "write about your hobbies here") or were part of a larger personal Web site for which the cheats on Whyville were just a section of the site. This may provide clues as to the motivations for the Web designers in featuring the cheats—displaying knowledge and affiliation about Whyville, identifying as an insider, as part of their personal identifies on their Web sites.

Interestingly enough, during our investigation, we found an independent evaluation of cheat sites compiled by a Whyville player. As part of his own cheat site, this player had assembled a page listing 38 other cheat sites and rated them with one to five stars, sometimes with comments about which sites were scams. In general, our typology agreed with his; we agreed on which sites were scams, his one- to two-star ratings roughly correlated with our "minimal" ranking, his three-star ratings with our "partial" rankings, and of course we thoroughly agreed on his only four- and five-star ratings that matched with our two "complete" sites. Our only area of disagreement was in our category of "ultimate cheat," probably explained in that he did not appear to be looking for cheat sites that copied other cheat sites. His only five-star rated cheat site also happened to be the site we chose for continued study.

Case Study of a Cheat Site

We examined in detail Gamesite.net (a pseudonym for the site), the most comprehensive cheat site (see Table 2) that contained Easter eggs, cheat codes, game guides and walkthroughs, and workarounds as described above. The site itself noted that it had on average 200 visitors a day, in addition to 34 registered users (as of October 8, 2006). It began in mid-2004 and, according to the history posted on the site, went through several versions until in mid-2006 it started regaining popularity. The site owner and designer, a 14-year-old young man, and his three administrators posted new messages on the home page of the site roughly four times a month, not including numerous responses to messages on the forums. On the home page, the site designer wrote regular updates about ''our'' progress in developing/researching cheats for new games or versions of games in addition to cheats or hints about things that were not game related (in other words not related to a game that would be rewarded with clams). Other Whyville players posted comments about cheats they had figured out in a game, pleas for more or better cheats, and praises for the help offered on the site. Although the site designer and his site administrators officially managed and posted the cheats, the activity of gathering and synthesizing the cheats was a collaborative effort, and the leaders gave credit to those who had assisted with various parts of researching and developing the cheats.

The appearance of a new salary-raising game on Whyville during the time we tracked the site provided an opportunity to study the collaborative development of a new cheat. When the new game, called the Spitzer Spectrometer (see Figure 4), appeared on Whyville, players encountered a great deal of difficulty in winning the game. In the first level of the game, players had 120 s to match five elements to their individual spectra by dragging an element to either the Bunsen burner (for a solid element) or what appears to be a gas discharge lamp (for a gaseous element) at which time the element's spectrum appears below the picture of the spectrum that one needs to match. At the second level, a spectrum of two elements was pictured with the added task of finding the two elements that matched. Figure 4 displays the successful matching of the spectra of two elements to the picture.

Although the Spitzer Spectrometer is a basic matching game, the time limit of 120 s for five matches with 30 possible elements was overwhelming not only for one of the authors who was previously familiar with spectroscopy but apparently also for many other players who posted urgent requests for the cheat site to finish the cheat. One of the main problems was that spectra are not easy to visually memorize, so the main tactic of playing the game—methodically trying out each element one by one for each new spectra to be matched—was not efficient enough to meet the time limit.

Encountering these difficulties, the site owner did some of his own research on the game with his administrators and then made a more general plea for help on the site's main forum:
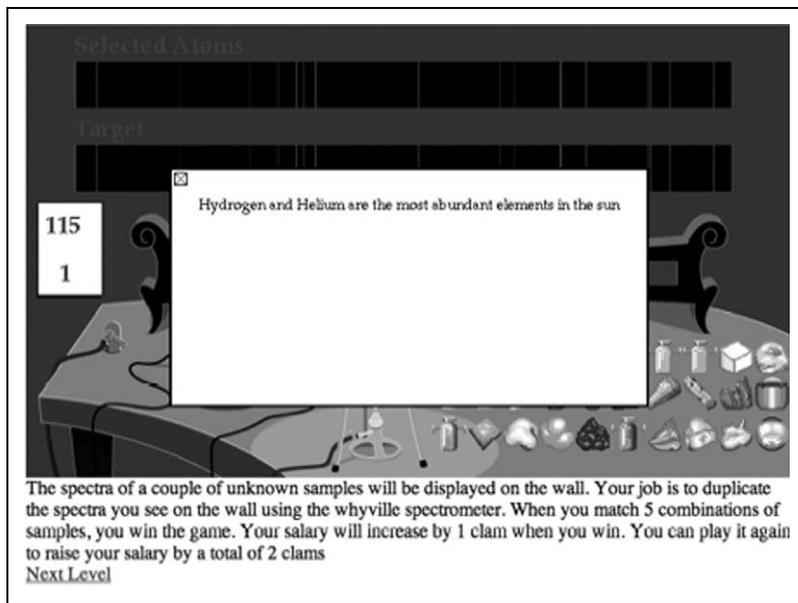
Figure 4. Spitzer Spectrometer Level 2 © Numedeon, Inc.

August 13, 2006

This new game (Spitzer Spectrometer) is to hard for us to figure out. We have read up on Spectroscpoy on the Internet and found nothing on it! Now since we can't figure the game out we need your help to give us the answers so we can give them to every one else. We will give the first person who responds to us with the correct answers 2000 clams! If you give it to use in the next 48 hours (2 days) it will be 3000 clams, but after that it will be 2000.

–Site Owner

Because 130 clams was the upper limit of a daily salary on Whyville, the offer of 2000–3000 clams represented over 2 week's accumulated salary and was a generous reward. It seems even greater when one considers that the site owner would gain few clams by increasing his salary with the game (maximally eight clams a day if he completed all the four levels). Thus, the motivation seems to be serving the community with knowledge and figuring out the game.

A few days later, with still no success, the site owner went on vacation (he posted this news to the site) and a grass-roots effort to figure out the game began in earnest. There were many frustrated postings on the site by Whyvillians discouraged in their efforts to play the game. Finally, 1 week after the original plea, a girl came up with a clever solution, posted her solution online, and told the forum about her cheat:

August 20, 2006

I made somewhat of a cheat .... Well its just all the elements names with the colors they make on the spectrum .... [lists website] It looks better before I upload it ....
haha.

–Site Participant

The cheat consisted of individual screenshots taken of each element's spectra and listed as a table (see Figure 5), what one might consider a scientific reference guide similar to what professional scientists might use to discern what element's spectra they are observing.

Within a day, a different cheat site designer who also participated on GameSite.net posted this girl's cheat on his own site and directed GameSite.net participants to it so they could find it more easily (giving full credit to the username of the girl who created the cheat). One day after that, he made his own plea on GameSite.net's forum for more people to join in figuring out a cheat for the higher levels of the game:

August 22, 2006

We gotta get some answers quick! I am going to form a group of people to work different solutions out for spitzer spectrometer. All we are doing is in our spare time, we will experiment with the game and see what we can do with it. Especially level 2. Level 2 is nothing but trouble for everyone. So I hope to get answers as soon as possible. Remember everyone reading, if you have answers SUBMITT them. It will benefit us all ....

–Site Participant/Outside Cheat Site Designer

Finally, when the site designer returned from vacation, he put the girl's cheat on the main cheat page with full credit and told the community about this on the home page. The cheat itself would be classified as a ''guide'' on our typology (see Table 1). It changed the game strategy from trial and error to a more systematic and less time-consuming search by providing a reference table of the spectra of all the elements.

Beyond just providing cheats for salary-raising games, GameSite.net provided cultural hints for participating on Whyville (where to hang out, how to make friends, where to shop for the best face parts), additional cheats not intrinsic to monetary success on Whyville (how to ride in a virtual car without a seatbelt, a computer code for throwing projectiles faster), and a space to discuss appropriate behavior on the forum. For instance, although answers to the chat license test were posted, there was a warning that one should understand the reasons for the answers and not just use the cheats without considering their meaning. Similarly, the site never posted answers to the ''ymail helper'' test, presumably because it is a sought-after leadership position on Whyville and the owner thought it should not be cheated. Furthermore, the owner closely watched forum postings for inappropriate material and advertising of other sites: ''every one who swears a lot, spams, or cusses ... will be banned.'' Looking through the forum, we found many times when messages or parts of them had been
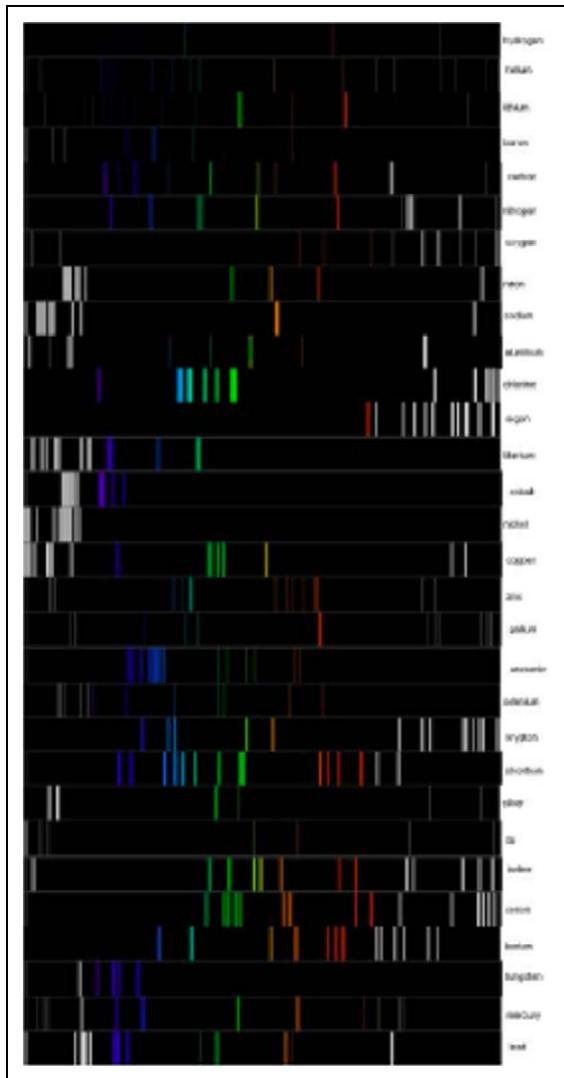
Figure 5. Cheat for the Spitzer Spectrometer: A Compilation of Spectra

locked or erased by the owner. In addition, other forum participants pointed out things that they thought rude about some comments left on the site. For instance, when one user complained that there were not enough cheats or that the site did not help him enough, another user replied that the site owner did a lot of work on others' behalf and we should be grateful for the help he provided. Finally, although the site recognized that scams occurred, it did not support them and purposefully tried to

Figure 6. Excerpt of Whyville Times Article on Cheating © Numedeon, Inc.

distance itself from that practice. So, while GameSite.net wholeheartedly embraced many types of cheating, including Easter eggs, cheat codes, walkthroughs, and workarounds, it did not embrace "true cheating" or spoil-sport hacking that infringed on others' virtual property or identities (e.g., scamming to obtain clams and/or avatars).

Public Discussions About Cheating

Cheat sites about Whyville, such as the one we presented above, are not a hidden phenomenon; in fact, they are openly discussed in *The Whyville Times* newspaper that constitutes a community forum (see Figures 6 and 7). Just as in the commercial gaming world (Gee, 2003), cheating is a hotly debated topic in Whyville and the newspaper articles criticize the practice of using cheat sites to increase salaries illegitimately: "when just one person uses cheats it could affect our whole town" (Ickamcoy, 2003). Yet, the conversation goes beyond simple condemnation of using cheats, though many of the writers espouse that view.

   Our search of the archive identified more than 100 articles that mentioned cheats in *The Whyville Times* from 2000 to 2005. Roughly 10% of them were

Figure 7. Exceprt of Whyville Times Article on Cheating (II) © Numedeon, Inc.

explicit warnings against scams, reporting on the many imaginative ways Whyvillians have tried to procure others' passwords with the promise of raising their salaries, giving them makeovers, and even claming to be site designers. Another 30% more generally condemned cheating in salary-raising games, that is, using cheats found on cheat sites. Others (20%) discussed cheating in the Smart Cars races where instead of going around the track in a traditional race, some players would immediately turn their cars around and cross the finish line, thus, triggering a win. These particular articles constituted a long, multiyear discussion about whether this was a valid way to win at Smart Cars. Some utterly denounced the practice while others, including the *Times* editor, considered it a rather clever method. Still further, another 10% of the articles concerned cheating in dating relationships, some of them asking whether it was cheating if one had one boyfriend in the "real" world and a different one in Whyville. Another 20% concerned issues with ballot stuffing, creating multiple accounts to have more votes for oneself in elections for Whyville senator or prom king/queen. In addition, a final 10% described and rebuked other forms of cheating on Whyville, including the provocative "stealing from grandma" referenced in the title of this article.

Stealing From Grandma: Condemnations of Cheating

By far, the predominant view of cheating in the articles is that cheating is bad, lazy, dishonest, and unfair. In addition, they claim that it hurts Whyville and goes against the "Whyville Way," a philosophy that values learning, mutual support, and

positively contributing to the community. Many of the arguments are based on the idea that such practices are wrong in real life and, therefore, are also wrong in virtual life, as in the following quotes from two articles:

> On Whyville you have to earn your things and earn a living, just like in real life (Twigsy, 2002)
>
> In real life would you take things from your grandma and sell them to people at the mall? (oSTEPHo, 2002)

Both these articles espouse the view that morals in "real" life should apply to virtual life. The second article refers to grandmas, the local charity in Whyville where new players can go to receive donated face parts. According to oSTEPHo (2002), experienced players were going to grandmas, accepting rather than donating parts, and selling them at the trading post for a profit. Therefore, they benefited from others' well-meaning donations and "stole" from grandmas and newbies.

In addition to "stealing from grandma," we discovered seemingly innumerable other types of cheating on Whyville that we could not have imagined on our own. Some of the more interesting cheats included obtaining passwords by offering "makeovers," copying face parts (a designer/copyright issue), and creatively coordinating cussing. For this latter cheat, GrriesYEA (2003) vividly described three citizens standing next to each other, saying:

> Person 1: Bu
> Person 2: tt
> Person 3: head

He goes on to denounce this and other forms of cussing, consisting of creative spellings of bad words, that try to get around the censorship word filter on Whyville. However, not all Whyvillians consider cheating as completely negative.

Nuanced Views of Cheating: Confessions of a Site Designer

Although not the majority, many writers saw intellectual and creative elements in cheating practices on Whyville. For instance, the Times editor wrote comments on several of the Smart Cars articles questioning whether turning around the car to go backwards across the finish line rather than around the entire race track was really cheating. Instead, the editor posed the view, held by a few Times writers, that this could be considered a clever solution. Other writers pointed out that multiple accounts used by the same individual should be allowed one vote each if the accounts represent active citizens on Whyville. Finally, regarding more traditional salary-raising cheats, some writers pointed out how those cheats could be useful in getting people to the next step of their participation in Whyville:

And how many of you got help earning your salary, whether from a friend or by using a cheat site? (Kemario, 2005)

  Some of us are unable to complete the games, and it is tough finding help (there is a cheat site but its name will not be released; LukeG, 2002).

Indeed, we witnessed a site designer publicly confessing to having used a cheat during a community discussion at the Greek Theater, the live public forum in Whyville. So, even the game designers use cheats once in a while!

Effects of Cheating on the Whyville Community

The large number of articles devoted to discussing cheating, roughly one every 3 weeks, demonstrate that citizens are aware of cheating in Whyville. What are some of the effects of cheating on this virtual community? Beyond just the existence of the debate of cheats on Whyville, one of the most evident effects is disillusionment about elections and leaders on Whyville. The issue of ballot stuffing and bribing voters comes up almost every senate election, to the point that some Whyvillians formed a committee to try to dissolve elections. In fact, one senate campaigner purposely cheated in an election just to bring the issue to the forefront:

  I wanted to prove that everyone who gets lots of votes is a cheater. And that even though the accounts behind it might not be obvious, a majority of the accounts are from the same select few people (PixiBritt, 2005).

Her ''secret experiment'' certainly worked to publicize the view that ballot stuffing is a frequent enterprise on Whyville (though notably she was ''caught'' so perhaps it is not as easy to do as she thought). In addition, with the availability of cheats to raise one's salary, one of the qualifications for being a citizen leader on Whyville, namely a ''ymail helper,'' was called into question. Several writers doubted whether ymail helpers were truly qualified to help newbies because they may not have actually played the games to earn a salary. Although these issues may or may not be as prevalent as some citizens think, the cynicism in the public forum of Whyville is apparent in the majority of the articles we read.

Discussion

Our examination of cheat sites in Whyville, an informal virtual world for tweens, demonstrated that there are a wide variety of cheats and cheat sites, gave insight into the collaborative processes of one promising cheat site, and showed considerable controversy about cheats in Whyville. Apparently, players are dedicated enough to the ''game'' of participating in Whyville for many members to create their own cheat sites. In this discussion, we want to use our analyses to tackle two questions about cheating in Whyville. First, what are the benefits for players who use and/

or develop cheats for Whyville? Second, how can we use cheats to promote learning in virtual worlds?

What do players "get" out of creating cheat sites? At the simplest level, youth at least learn some technical skills in developing Web sites. Even the copies of other cheat sites required some learning about how to create a Web site. On another level, hosting a site as a designer or just knowing about good cheat sites as a player constitutes some sort of "gaming capital" (Consalvo, 2007). As in many other games, knowing shortcuts represents some form of insider knowledge. Indeed, some knowledge on Whyville, specifically teleporting (the only rite of passage to chat rooms such as Jupiter, Mars, or Saturn), is solely passed on through word of mouth or on cheat sites (Fields & Kafai, 2009). Accessing the hints page on GameSite.net would avail a new player of cultural knowledge on how to navigate Whyville. Rich cheat sites are akin to travel guides for going to a different part of the world—they give you hints about where to go and what to do that save players from floundering in a new culture. In addition, the presence of what might be considered frivolous cheats, cheats who do not help players with more obvious goals of playing a game (such as earning clams), point to what Kuecklich (2004) speaks of as the aesthetic value of cheats. As Kuecklich notes, some cheats can constitute "a playfulness on the part of the players that goes beyond the game itself and transforms the object of consumption into a creative medium." The constant efforts of participants of GameSite.net to find sneaky ways to work around putting on seat belts in scions or some Whyvillians' impressively coordinated efforts to get around the security system to cuss indicates a social and creative value in cheats that goes beyond purely logistic motives.

Creating or posting the cheats also positions players as knowledgeable participants of the Whyville community, the kind of recognized competency or cultural capital discussed by Malaby (2006). Well-visited sites such as GameSite.net may also earn money from Web advertising and the sale of the site in real money, translating gaming knowledge into material capital. Of course, given that Whyville has science education components, creating cheats would presumably result in some science understanding from completing the games or going beyond the games to draw together references and resources for others to complete games more quickly (as in the case of the Spitzer Spectrometer). Thus, there are several valuable things that players can get from using and creating cheat sites, including cultural, material, and educational benefits.

How can we use cheats to promote learning? This is a provocative question as schools tend to look down on cheating, but we are not alone in considering it. Engeström (2008) discusses how making cheating slips for a test is an important form of student agency and learning. In creating cheating slips, the students make tools that help them master a test. The challenging part is selecting the most relevant aspects of a topic and organizing the slip well (p. 8). In fact, Engeström sometimes encourages students to cheat on his tests and collects their cheating slips at the end to gain insight into their thought processes. This points to the design of games (or tests)

such that developing or using cheats can promote learning. In another article, we discuss ''transgressive design'' (Kafai & Fields, 2009) as a way to consider designing games with cheats in mind, such that players learn by developing cheats. For instance, Whyville's Spin Game promotes theory development about how to make objects spin faster and the impossibility of completing the Spitzer Spectrometer forced players to develop a reference guide for spectra. Unfortunately, most games on Whyville did not seem to support learning by cheating, so there is plenty of room for growth in this and other virtual worlds.

There are also opportunities to promote learning by encouraging players to create and/or collaborate in creating cheat sites. Besides learning the technical skills to create a Web site, there are other new literacies important to today's ''participatory cultures'' (Jenkins, Clinton, Purushotma, Weigel, Robison, & Weigel, 2006), building cheat sites might support. One of these new literacies identified by Jenkins et al. is collective intelligence, ''the ability to pool knowledge and compare notes with others towards a common goal'' (p. 39, see also McGonigal, 2008). The participants on GameSite.net used collective intelligence in developing the cheat for the Spitzer Spectrometer and in their forum as a whole, they pooled the knowledge of site participants to create cheats and hints about Whyville. Although one person owned and operated the site, anyone could participate in the forums to build knowledge about Whyville. However, GameSite.net was the only cheat site we studied that had this collaborative element. Thus, creating sites of collaboration is something we ought to encourage youth to do in developing cheat sites. Other new literacies that cheat site development might advance include researching sources outside the games or virtual worlds, disseminating relevant information, and judging sources for their relevance (Jenkins et al. suggest the terms transmedia navigation, networking, and judgment for these literacies).

Finally, the controversy and many articles about cheating in Whyville suggest that cheats may be a hot topic for promoting critical engagement with media and ethics. Cheating in Whyville brought up many contemporary ethical issues facing people in today's society: identity theft, intellectual property, sharing information, relationships, honesty, leadership, and even an implied critical look at the goals of the virtual world (is it for science learning or for relationships?). These topics came up without much adult intervention. Unfortunately, the discussions of them were limited mostly to a standalone article with an occasional editor's comment. There are opportunities both inside and outside virtual worlds to build on these issues and promote deeper critical engagement. Collaborative cheat sites would be one excellent place to discuss these issues, but classrooms, homes, and after-school clubs would also be good places to help socialize kids into the ''emerging ethical standards'' of creating and shaping media (Jenkins et al., 2006, p. 18).

In a recent analysis of children's virtual worlds, Grimes (2008) points out that most children's virtual worlds are relatively impoverished compared to their teenage or adult counterparts in opportunities for player creativity and collaboration. Cheats and cheat sites, particularly those that promote collaboration as in our case study of

GameSite.net, are one way that children can push back on the virtual worlds made for them and are potential sites of creativity, knowledge building, and critical engagement. Although the value of cheating in games is debatable, player participation in the design and use of cheat sites can be considered a valuable activity, its implications reaching far beyond the original site.

References

Aschbacher, P. R. (2003). *Gender differences in the perception and use of an informal science learning web site.* Final Project Report to the National Science Foundation. Pasadena, CA: California Institute of Technology.

Barab, S. A., Thomas, M., Dodge, T., Carteaux, R., & Tuzun, H. (2005). Making learning fun: Quest Atlantis, a game without guns. *Educational Technology Research and Development*, *53*, 86-107.

Bourdieu, P. (1984). *Distinction. A social critique of the judgment of taste.* Cambridge, MA: Harvard University Press.

Consalvo, M. (2007). *Cheating: Gaining advantage in video games.* Cambridge, MA: The MIT Press.

Dede, C., Nelson, B., Ketelhut, D. J., Clarke, J., & Bowman, C. (2004). Design-based research strategies for studying situated learning in a multi-user virtual environment. In Y. B. Kafai, W. A. Sandoval, N. Enyedy, A. S. Nixon, & F. Herrera (Eds.), *Proceedings of the sixth international conference of the learning sciences.* Mahwah, NJ: Lawrence Erlbaum Associates.

Engeström, Y. (2008). From design experiments to formative interventions. In V. Jonker, A. Lazonder, & C. Hoadley (Eds.), *Proceedings of the eighth international conference of the learning sciences* (Vol I, pp. 3-26). Netherlands: University of Utrecht.

Fields, D. A., & Kafai, Y. B. (2009). A connective ethnography of peer knowledge sharing and diffusion in a tween virtual world. *International Journal of Computer Supported Collaborative Learning*, *4*, 47-68.

Fields, D. A., & Kafai, Y. B. (2010). Knowing and throwing mudballs, hearts, pies, and flowers: A connective ethnography of gaming practices. *Games and Culture*.

Gee, J. P. (2003). *What video games have to teach us about learning and literacy.* New York: Palgrave Macmillan.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory.* Chicago: Aldine Publishing Company.

Grimes, S. (2008). Saturday morning cartoons go MMOG. *Media International Australia*, *126*, 120-131.

GrriesYEA. (2003). Cheating the System? *The Whyville Times*. Retrieved February 27, 2007, from http://h.whyville.net/smmk/whytimes/article?id=2494

Ickamcoy. (2003). Cheat Sites!, *The Whyville Times*. Retrieved February 27, 2007, from http://d.whyville.net/smmk/whytimes/article?id=3247.

Jenkins, H., Clinton, K., Purushotma, R., Robison, A., & Weigel, M. (2006). *Confronting the challenges of participation culture: Media education for the 21st century.* White Paper. Chicago, IL: The John D. and Catherine T. MacArthur Foundation.

Kafai, Y. B., Cook, M. S., & Fields, D. A. (2010). "Blacks deserve bodies too!" Discussion and design about diversity and race in a tween virtual world. *Games and Culture, 5(1),* 43-63.

Kafai, Y. B., & Fields, D. A. (2009). Cheating in virtual worlds: Transgressive designs for learning. *On Horizon*, *17*, 12-20.

Kafai, Y. B., Fields, D. A., & Cook, M. S. (2010). Your second selves: Player-Designed Avatars. *Games and Culture, 5(1),* 23-42.

Kafai, Y. B., & Giang, M. (2008). Virtual playgrounds. In T. Willoughby & E. Wood (Eds.), *Children's learning in a digital world.* Oxford: Blackwell Publishing.

Kafai, Y. B., Quintero, M., & Feldon, D. (2010). Investigating the "why" in Whypox: Explorations of a virtual epidemic. *Games and Culture, 5(1),* 116-135.

Kemario. (2005). Labelling in Whyville. *The Whyville Times*. Retrieved February 27, 2007, from http://h.whyville.net/smmk/whytimes/article?id=5283

Kuecklich, J. (2004). Other playings—Cheating in computer games. *Online proceedings of the other players conference.* Denmark: IT University Copenhagen.

LukeG (2002). A Kinder Heart. *The Whyville Times*. Retrieved February 27, 2007, from http://h.whyville.net/smmk/whytimes/article?id=1643

Malaby, T. (2006). Parlaying value: Capital in and beyond virtual worlds. *Games and Culture, 1*, 141-162.

McGonigal, J. (2008). Why I love bees: A case study in collective intelligence gaming. In K. Salen (Ed.), *The ecology of games: Connecting youth, games and learning* (pp. 199-228). Cambridge, MA: The MIT Press.

oSTEPHo. (2002). Scamming Grandma Scums! *The Whyville Times*. Retrieved February 27, 2007, from http://h.whyville.net/smmk/whytimes/article?id=2069

PixiBritt. (2005). Biddigurl's Kelcie Army. *The Whyville Times*. Retrieved February 27, 2007, from http://h.whyville.net/smmk/whytimes/article?id=5281

Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals.* Cambridge, MA: The MIT Press.

Squire, K. (2008). Open-ended video games: A model for developing learning for the interactive age. In K. Salen (Ed.), *The John D. and Catherine T. MacArthur Foundation series on digital media and learning* (pp. 167-198). Cambridge, MA: The MIT Press.

Steinkuehler, C. A. (2006). Massively multiplayer online video gaming as participation in a discourse. *Mind, Culture, and Activity*, *13*, 38-52.

Steinkuehler, C. A., & Duncan, S. (2009). Scientific habits of mind in virtual worlds. *Journal of Science Education & Technology*, *17*, 530-543.

Stevens, R., Satwicz, T., & McCarthy, L. (2008). In-game, in-room, in-world: Reconnecting video game play to the rest of kids' lives. In K. Salen (Ed.), *Ecology of games: MacArthur foundation series on digital media and learning.* Cambridge, MA: The MIT Press.

Twigsy. (2002) Scam Busters. *The Whyville Times*. Retrieved February 27, 2007, from http://h.whyville.net/smmk/whytimes/article?id=1359

Bios

Deborah A. Fields has an MS from the University of Wisconsin-Madison's School of Education and is a doctoral candidate at the Graduate School of Education & Information Sciences at the University of California, Los Angeles. With extensive experience working in areas of informal education, her research focuses on learning across spaces, peer-to-peer learning & teaching, and play. These interests have guided her studies in virtual worlds, science, and math in both formal and informal contexts. Currently, she is studying two sixth graders' intersecting identities from different social spaces in their lives. Her recent work has been published in the *International Journal of Computer Supported Collaborative Learning, the International Journal of Science Education, and On Horizon*.

Yasmin B. Kafai is professor of learning sciences at the Graduate School of Education at the University of Pennsylvania and Coexecutive Editor of the *Journal of the Learning Sciences*. Her research focuses on the design and study of new learning and gaming technologies in schools, community programs, and virtual worlds. Recent collaborations with MIT researchers have resulted in the development of Scratch, a media-rich programming environment for designers of all ages, to create and share games, art, and stories. Current projects examine creativity and IT in the design of computational textiles with urban youth. In partnership with industry, she has designed and studied learning opportunities in virtual epidemic outbreaks in Whyville.net. Kafai earned a doctorate from the Harvard University, while working at the MIT Media Lab.