

CLICKABLES: TOYS AND INFORMATION SHADOWS

Smart Toys combine the best of two worlds; [they] allow children to play naturally, as they have for generations with traditional toys, only now their play is extended with highly engaging worlds inside of the PC.

Shwe (1999)

It is now technically possible to digitally identify almost every object in an environment and to accumulate enormous quantities of metadata about many objects online. Increasingly, developers are stitching those technologies together into services that provide knowledge about objects, places, and people when they are encountered in the world¹ — creating what I call a digital information shadow (Chapter 6). However, creating engaging user experiences with digital information shadows remains a significant challenge.

As with many ubicomp technologies, some of the most direct physical-virtual bridging has happened in children's toys.² Children need professional or personal productivity features less than adults, but they want social interaction and compelling stories just as much, if not more. The children's toy market is both profitable and highly competitive, which makes children's technology an excellent place to look for innovative ubicomp experience design.

This chapter examines Clickables, a line of toys targeted at preteen girls that leverage the power of information shadows. These toys merge the tangibility of physical interaction and an online social narrative with the visual power of a virtual world. As girls interact in person, or acquire special Clickables jewelry, their online avatars do the same, making friends and acquiring virtual copies of the jewelry. The experience of having a physical connection between two friendship bracelets on a school playground automatically connects avatars in a virtual playground. This is intended to involve children more deeply in a fantasy world that crosses the boundaries between online and offline engagement.

¹These include Internet-based augmented reality services, location-based services, etc.

²For example, LEGO Mindstorms, launched commercially in 1996, bridged digital and physical play to go from "physical construction kits to behavioral construction kits" (David Rose, private communication).

7.1 BACKGROUND: BRACELETS, COLLECTIBLES, AND STORYTELLING

The Clickables user experience combines several threads woven through consumer electronics and toy design. These include:

- The design of *wearable computing for social interaction*, specifically the design of smart jewelry for tween girl socializing
- The rise of *collectible toys with information shadows* that bridge physical toys with online social networks
- The growing prominence of *transmedia storytelling* that creates broad narratives that span many user experiences simultaneously

7.1.1 SMART BRACELETS

Jewelry, particularly worn on or near the hands, has long been used to signal information about the wearer and keep useful tools handy. As far back as ancient Egypt, jewelry was worn both as a symbol of beauty and wealth and for its magical properties (Pinch, 1994). In the 1950s, bracelets dangling iconic “charms” bought in tourist destinations were a popular way for American women to show off international travel (Steele, 2005). The wristwatch, once a high-tech novelty in the early twentieth century, actually inspired comic strip detective Dick Tracy’s two-way wrist radio, which is a pop culture precursor to the mobile phone.³ The preoccupation with carrying communication and information on the wrist has continued from the classic Casio watch-calculator to Microsoft’s SPOT network-connected wristwatch (Microsoft, 2003).

Over the past thirty years, charm bracelets and friendship bracelets (Figure 7-1) have moved in and out of fashion among American teenagers and tweens.⁴ Inexpensive and easily customized, these accessories come in a wide variety of styles and are often shared as handmade or hand-assembled gifts. The trading of bracelets and charms acts as a ritual bond between friends and publicly displays social relationships.

The combination of bracelets (and to a lesser extent, necklaces) as a familiar form factor with a strong existing social role has led researchers and designers to explore smart social jewelry, primarily for tween girls. Several experiments in such narrowly targeted wearable computing set the stage for the arrival of Clickables, the first commercial implementation of these ideas to be widely used.

³Although, ironically, wristwatch-shaped mobile phones have never been successful.

⁴Tweens are kids who are not yet teenagers, but are no longer small children. The term describes behavior more than a specific age range, although most tweens are likely between the ages of 10 and 14. They are highly social and (at least in Western cultures) technologically proficient. For example, Lenhart (2009) stated that 59% of American children age 12 to 14 had their own mobile phones in 2008.



Figure 7-1
(A) A charm bracelet design project, friendship



Figure 7-2
Story Bead Technology

- Storytelling: the image communicates the narrative. The bead is new.
- Pet-friendly: social animals

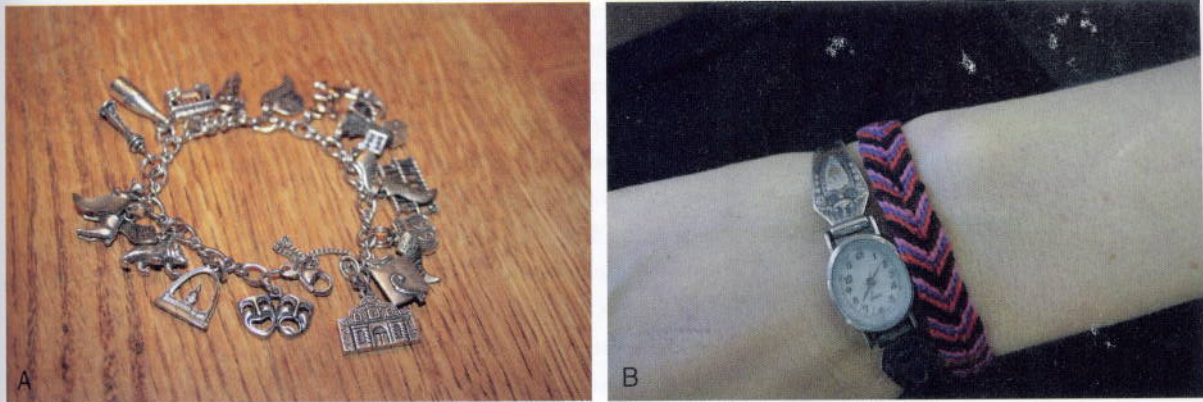


Figure 7-1

(A) A charm bracelet and (B) a friendship bracelet, two bracelet types that have served as inspiration for a number of ubicomp design projects (Charm bracelet photo © Amy the Nurse, licensed under Creative Commons Attribution — No Derivative Works 2.0; friendship bracelet © Lauren (Flickr name: cuttlefish), licensed under Creative Commons Attribution 2.0, both found on Flickr)

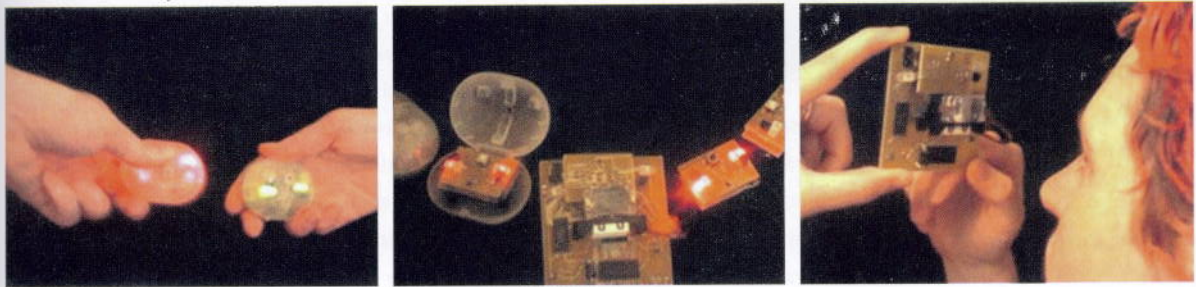


Figure 7-2

Story Beads. (Images from Barry, B.A., "Story Beads and Mobile Storytelling." Master's Thesis, Massachusetts Institute of Technology, 2000. With permission.)

- Story Beads (Barry, 2000; Figure 7-2) were designed to allow adolescent girls to tell "stories about themselves and the culture they live in." Arranged in a necklace, the beads allowed groups of girls to "sequence and trade story pieces combining images and text" (Barry et al., 2000). Each one contained bidirectional infrared communication, memory for two images, and a button that activated the bead. On activation, each bead transmitted its image(s) to a special bead with an LCD display. The LCD displayed the images and associated keywords. A sequence of beads created a narrative, which could be interpreted differently based on the arrangement of beads. If many girls had Story Bead necklaces, the beads could be traded to create new collectively created narratives.
- Pet Pals (Pering, 2002) were created to increase inclusion in social groups by encouraging preteens to exchange digital beads with children outside their existing social groups. Each child's smart keychain had a series of beads, each shaped like an animal (so the keychain acted as a menagerie). An LED on each bead represented



Figure 7-3
BuddyBeads. (From Kikin-Gil, R., "BuddyBeads techno-jewelry for nonverbal communication within groups of teenage girls." Proceedings of the 7th Int. Conf. on Human Computer Interaction with Mobile Devices and Services, pp. 375–376, 2005. With permission.) (Photo by Ivan Gasparini, courtesy Ruth Kikin-Gil)

each animal's internal state. The animals could be happy, angry, or sad. If angry, an animal needed to be given to some other child. If lonely, it needed a friend, which could only be acquired through trading another bead to someone else. A central service controlled all animals' emotional states, and it deliberately induced situations that would maximize social mixing.

- BuddyBeads (Kikin-Gil, 2005; Figure 7-3) are "techno-jewelry items [to] facilitate nonverbal and emotional communication" among groups of teenage girls. Each girl in a social network wears a bracelet with a number of digital beads that are also pressable buttons. Beads are either "friend" beads or "message" beads. Owners press a "message" bead and then a "friend" bead to send a specially coded text message to that friend's mobile phone. To signal the reception of a message, the corresponding bead on the recipient's bracelet would glow and vibrate. The system is designed to be open-ended, with the precise meaning of each bead negotiated by the group.
- Telebeads (Labrune and Mackay, 2006) explored designs for "electronic beads with a mobile phone-based interface" that

created "mobile mnemonic artifacts" for 10- to 14-year-old girls to keep track of social contacts: "a digital address collection that could be literally woven into the everyday objects a girl wore or carried." Their goal was to let teens create associations "between a physical object, the telebead, and individuals or groups in the group." When a girl activated a bead by touching it, that person or group's identity would appear in a PDA or mobile phone, providing a digital shortcut.⁵

7.1.2 COLLECTIBLES WITH INFORMATION SHADOWS

Offering a series of collectible items is a familiar marketing strategy. Baseball cards, for example, have existed almost as long as the sport of baseball. More recently, Beanie Babies stuffed toys and Magic the Gathering collectible cards reinvigorated the collectible market in the 1980s and 1990s. The defining feature of collectible items is that they do not stand alone. Each plaything is a small part of a larger narrative that connects the series. In a sense, each plaything from one of these lines has always had a longer information shadow than stand-alone toys. This extending shadow grew longer in the 1980s when successful toys launched cartoon television shows and vice versa. Since the 1980s, the

⁵Kalanithi (2007) coined the term *magical social objects* for "physical object(s) that both symbolize a relationship between two people, and provide an active channel between them." He also coined the term *tangible social networks* to describe collections of such objects "that, in aggregate, map out the social network of all of the people with whom they are associated." In Kalanithi's terminology, Telebeads would be a tangible social network.

sophisticati
has only gr
Pokemón fi
and a wide

More re
directly and
experience
toy sold is
entered in
digital vers
can interac
using curre
ucts, from
furnishing:
their own
world.

One im
(Kalanithi
online soc
mation sh
(typing nu
inexpensiv
with mach



sophistication of these narratives, and the technologies used to deliver them, has only grown from the GI Joe toys and cartoons to the massively popular Pokémon franchise, which combined cartoons, video games, collectible cards, and a wide range of toys.

More recently, the Webkinz line of toys, launched in 2005 (Ganz, 2006), directly and concretely linked an off-line experience with plush toys to an online experience with digital versions of the same toys (Figure 7-4). Every Webkinz toy sold is tagged with a unique identification number. When this number is entered into the Webkinz Web site, the pet is “adopted” by the owner and a digital version of the toy appears in the owner’s online world. There the owner can interact with it as a kind of “real” pet and purchase virtual accessories for it using currency earned through playing games in the virtual world. Other products, from game cards to branded products, have additional codes that unlock furnishings for the online play space. Finally, the owners (mostly children) have their own social network and online chat environment in the Webkinz virtual world.

One implication in Webkinz is that collections are social network maps (Kalanithi, 2007), and that the exchange of physical objects can affect an online social network provided that the objects have easily modified information shadows. The Webkinz method of modifying the information shadow (typing numbers into an online social network) was primitive and slow, but inexpensive for the time. Clickables would take these ideas to the next level with machine-readable identification.



Figure 7-4

Part of an advertisement for Webkinz, showing the association between a unique code and a plush toy dog. (From Ganz, “Webkinz Provides Safe Online ‘Chatting’ in A World Where Kids Are Still Kids!” official press release, http://www.ganz.com/corporate/media/press_release/WebkinzInternetSafety.pdf, 2006. With permission.)

7.1.3 TRANSMEDIA STORYTELLING

For a child, now it's a continuous play experience. They don't have to emotionally disconnect.

Ginny McCormick, Clickables interaction designer (2008)

Unlike a traditional consumer-electronic or computer product, Clickables are part of Disney's character-based entertainment strategy. In this sort of transmedia storytelling strategy (Jenkins, 2003), related, intertwined stories leap across media formats, engaging audiences with a single cast of characters while using each medium's specific strengths.

The on- and off-line experiences of Clickables are part of the larger transmedia property called Disney Fairies. Unveiled in 2005, the property drew on the recognizability of Tinkerbell, originally invented by J.M. Barrie for his *Peter Pan* books and plays (Barrie, 1911). New Disney *Peter Pan* books and cartoons expanded Tinkerbell's character and introduced new friends for her.⁶ The October 2008 release of Clickables coincided with an ambitious transmedia product release that also included the *Pixie Hollow* virtual world, an animated feature-length film, a Nintendo DS game, and a new area in Disney's theme parks. The same characters and stories appeared in all of the different experiences simultaneously.

Digital technology is one of the keys to connecting stories across media. For example, Perryman (2008) described a BBC transmedia initiative that included "mini-episodes on mobile phones, podcast commentaries, interactive [...] adventures, video blogs, companion programming, and 'fake' metatextual websites." Nearly all were delivered digitally.

7.2 CLICKABLES

Note: This chapter is based on an analysis of public information published by Disney and Techno Source and on firsthand experience with the products.

Techno Source, a Hong Kong-based toy developer, announced Clickables at the spring 2008 New York Toy Fair. Branded with Disney's Fairy characters, this set of toys represented the most mass-market comprehensive attempt to bridge a physical and virtual toy experience. Earlier attempts, such as Microsoft's *Actimates Barney* (Strommen, 1998), focused on a single, usually tethered, toy or were presented as video games that could be played both on a handheld device and game console. Clickables was the first set of toys to work independently as physical toys and as a part of a virtual world.

⁶Unlike Tinkerbell, these new characters are Disney-owned. The basic description of Tinkerbell's character is in the public domain, along with Barrie's books.

Sideba
With pro
Clickable
Pixie Ho
experien
Game
toy as:

- A gam
The ru
the ga
- A toy i
if you
come v

By thes
structure
games wi
flowing i

7.2.1 DEVI

The initial :
October 20

The first
box, charm
styled in the
generated pla
styling is ke
other toys c
brand ident

For Click
retail envirc
[of a toy sto
ables sensor
let in the st
Hollow" (M
the Clickab
the toys to n
ties together
experiences.

The colo
classes of the
ior and a di
tions.

Sidebar: Toys versus Games

With products that look like video games, it may be easy to view the toy Clickables as unusual controls for a *Pixie Hollow* video game. Although *Pixie Hollow* has some video game elements, the overall Clickables experience design is actually more toy-like.

Game designers Rollings and Adams (2003) defined a game and a toy as:

- A game takes place in an artificial universe that is governed by rules. The rules define the actions or moves that the players may make in the game, and also the actions that they may not make.
- A toy is a play object without rules. You can play a game with a toy if you make up some rules to play by, but ordinarily a toy does not come with rules.

By these definitions, Clickables are much more like toys than games. The structure of the play is only partially determined by rules. One can play games with Clickables, but their creators imagined them used in more free-flowing interactions such as collecting, barter, gifting, and decoration.

7.2.1 DEVICE DESIGN

The initial set of Clickables products, aimed at tween girls, went on sale in late October 2008.

The first four products (Figure 7-5) were a friendship bracelet, a jewelry box, charms for the bracelet, and a handheld video game. Clickables are styled in the familiar purple and pink of other tween products, and their exaggerated plant and flower shapes follow the Disney Fairy brand. This physical styling is key to their marketing, since Clickables have to compete with many other toys on the toy store shelf while still remaining true to the Disney Fairy brand identity.

For Clickables, Disney extended the Clickables experience all the way to the retail environment: “If you’re in the girls aisle [of a toy store], you’ll see a display with a Clickables sensor on it. Girls can touch their bracelet in the store and unlock something in *Pixie Hollow*” (McCormick, 2008). In other words, the Clickables information shadows allowed the toys to maintain the transmedia thread that ties together the large number of Disney Fairies experiences.

The colorful shells house three different classes of the device. Each has a different behavior and a different role in Clickables interactions.

Figure 7-5

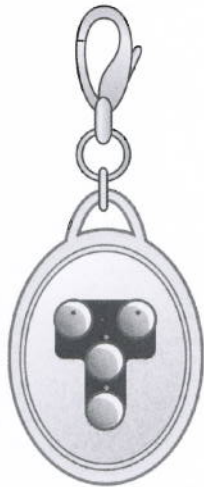
Disney and Techno Source’s Clickables. (Courtesy Disney)



⁷The exact technology for data transfer is not described by Disney or Techno Source.

Figure 7-6

A Clickables charm diagram, showing electrical contacts. (Source: Clickables instruction manual)



⁸Saffer (2006) defined *affordance* (coined by cognitive psychologist James Gibson and popularized by design theorist Don Norman) as "a property, or multiple properties, of an object that provides some indication of how to interact with that object or with a feature on that object. A chair has an affordance of sitting because of its shape. A button has an affordance of pushing because of its shape and the way it moves (or seemingly moves). The empty space in a cup is an affordance that tells us we could fill the cup with liquid."

- Charms are unpowered. When touched to an appropriate reader,⁷ they transfer a unique digital identifier.
- The friendship bracelet and jewelry box read digital identifiers. Plugged into the USB port of an Internet-connected PC, they upload data from physical toys to Pixie Hollow. The bracelets also create one of the key Clickables experiences. When two bracelets touch each other, they exchange data and the children wearing them are automatically added to each other's Pixie Hollow social network.
- Points earned playing the handheld video game can be uploaded to the virtual world of Pixie Hollow either by a USB link to an Internet-connected PC or through one of the other two readers.

7.2.1.1 Data Contacts

The devices exchange information when one cluster of four contacts (Figure 7-6) touches another. The contacts are arranged to make it physically difficult to align the contacts incorrectly. When they are touched correctly and a good data connection is made, one or both devices glow as feedback.

7.2.1.2 Operation

Given that the target audience of Clickables is children and the products are marketed as toys, it is not unreasonable to assume that most users would not read the instruction manuals. This assumption is reflected in the actual instruction manuals. The longest is two pages long and consists mostly of legally required disclaimers and warnings. Successful use of the Clickables devices therefore depends on how their physical affordances⁸ communicate proper use, which means that those signals need to be simple.

Every Clickables device needs to exchange data with the Pixie Hollow world. But each device takes a slightly different technical approach to data transmission.

- Being unpowered, the charms need to be physically connected to a source of power to work. The charms have only one set of such contacts, which are located in the only obvious area that could make physical contact with another device.
- The jewelry box's data contacts function as a button. Pushing a charm, bracelet, or game against the contacts activates lights, indicating data transfer. This creates a sensation of "magical" recognition, since no other objects pressed against the box will make it glow.
- The bracelets' contacts are flat, presumably to minimize damage while worn by active kids. Pushing a button activates the bracelets and if the bracelets are in appropriate contact, they both glow in confirmation.
- The handheld game transfers data in three ways: through its own USB cable and by touching its control pad to a bracelet or jewel box.

7.2.2 EX

The idea levels (q

1. As jew jewelry
2. As an i game a and th
3. As a bi offline play a think

In ad world a experie online.

7.2.2.1

Existing ables in stickers success well-kn and sha

Simi already Pengui person The in crea

7.2.2.2 Decor

The gi Clicka (Figur to mo collect At the

7.2.2 EXPERIENCE DESIGN

The ideas of transmedia storytelling permeate the design of Clickables on three levels (quotations from McCormick, 2008):

1. As jewelry: "[...] if you never touched the jewelry to your computer, you'd still have great jewelry to show off your Fairy style."
2. As an interface to *Pixie Hollow*: "You can earn points for your fairy through the LCD game and unlock items. [Girls] expect online play. If your first plush was a Webkinz — and those kids are starting to grow up — you expect some connection."
3. As a bridge between media experiences: "I can share things with you and we can connect offline, and then online our fairies have exchanged gifts and become friends. Or I can play a game and then touch my bracelet to yours and exchange points. I really can't think of anything in our toy history that's been done like that."

In addition to the challenges of independently creating a successful virtual world and a successful toy line, Clickables designers had the additional user experience design challenges of encouraging use of the products off- and online.

7.2.2.1 Use Existing Experiences

Existing tween acquiring, sharing, and trading behaviors form the basis of Clickables interactions. Kids trade rocks, shells, stamps, coins, bottle caps, marbles, stickers, toy cars, collectible cards, etc. This behavior has been the basis of many successful toy franchises (*Yu-Gi-Oh*, for example). Clickables builds on these well-known trading and collecting activities to make a new kind of acquirable and sharable item.

Similarly, many of the American tweens in the Clickables target audience already have experience with virtual worlds such as *NeoPets* and *Club Penguin*, which have internal economies of points and concepts of ownership, personalization, and sharing.

The plan for Clickables was to merge these two known formulas for success in creating a new hybrid experience.

7.2.2.2 Motivate Through an Interlocking Cycle of Collecting, Decorating, and Gifting

The girls in the target audience are encouraged to decorate themselves with Clickables jewelry while similarly decorating their *Pixie Hollow* fairy avatars (Figure 7-7). Clickables toys and the *Fairy Hollow* virtual world work together to motivate continuous engagement by shifting focus between three modes: collecting, decorating, and gifting. Each one encourages and enables the others. At the core is the process of acquiring certain small items, some common and



Figure 7-7
Decorating in Pixie Hollow.
(Courtesy Disney)

others rare or unique. Physical world charms must be bought or bartered. Pixie Hollow items and virtual currency are gained by completing quests, visiting certain areas, or receiving gifts. Points earned in the handheld game translate to Pixie Hollow currency.

7.2.2.3 Explain That Digital Products Are Related to, but Different than, Their Physical Counterparts

Communicating the unfamiliar concept that digital objects could be given away multiple times without loss required special effort. “The challenge of offline trading [...] is almost bittersweet. You’re giving away something you love, but you’re getting something new. [...] Online there was an infinite option, though. You could just give things away; you didn’t have to lose anything” (McCormick, 2008).

Clickables needed to reinforce the relationship between the physical object and its information shadow while communicating their differences. Similarly, a Webkinz off-line plush animal and its corresponding online interactive animal

are clearly c
kids, but the
Clickables c
the notion
designers g
just decorat
a special bu

7.2.3 STOR

As can be s
involves acc
physical and
digital worl
online. Much
opportuniti
and share t
chat system

This eco
New activiti
or contribu

Disney Fa
simultaneous
Clickables t
ponent of th
ible (the Ni
and chat sp
we may con
ows and ubi
play and co

Sideba

Neither D
toy’s laun
toys are s
failure as
The toy i
with the
as an imp
objects w
rative. Th
likely only
2009 saw
a digital f

are clearly distinct, yet related. The online virtual world may feel real to the kids, but the plush toy feels real in a different way (it is huggable, for example).⁹ Clickables charms resemble jewelry rather than a recognizable character, and the notion of a simple online bracelet is not particularly compelling, so the designers gave the online versions magical behaviors. Online, charms are not just decorative. They also enable magical behaviors in the virtual world, such as a special butterfly that follows the charm owner's fairy avatar.

7.2.3 STORIES, ECONOMIES, AND TECHNOLOGIES

As can be seen in the previous description, much of the Fairies experience involves acquiring and spending various kinds of currencies that bridge the physical and virtual worlds. Charms exist simultaneously in the physical and the digital world; currency points exist simultaneously in the handheld game and online. Much of the impetus for action within the world occurs either through opportunities to acquire currencies or to spend them. Girls can even acquire and share unique phrases in SpeedChat, the proprietary language-restricted chat system used in *Pixie Hollow* and other Disney Web sites.

This economic scaffolding supports a rich transmedia narrative structure. New activities are continuously announced in *Pixie Hollow* and they often echo or contribute to Fairies storylines in other media.

Disney Fairies is one of the first narratives to consciously bridge so many media simultaneously. Ubiquitous computing technology, whether in the form of the Clickables toys, the Nintendo DS, or the *Pixie Hollow* virtual world, is a key component of this ambitious project. The seams between the media are still quite visible (the Nintendo DS game and chat space do not interact with the similar game and chat space of *Pixie Hollow*), but the project's ambition is impressive. In time, we may come to see *Pixie Hollow* as an early example of how information shadows and ubicomp can blur the line between the physical and the virtual, between play and commerce, and between entertainment and socializing.

Sidebar: One Christmas Later

Neither Disney nor Techno Source has mentioned Clickables since the toy's launch in late 2008. No new toys have been added to the line. The toys are still on sale, but heavily discounted. All of this points to the toys' failure as a commercial product. This is unfortunate, but not unexpected. The toy industry is highly volatile, and the Clickables launch coincided with the economic collapse of late 2008. Nevertheless, the toys stand as an important example of how to couple the information shadows of objects with online experiences as part of a transmedia storytelling narrative. This is a combination of elements that will not go away, and will likely only grow as a key application of ubiquitous computing. Christmas 2009 saw the launch of *Nanovar*, a collectible card game that comes with a digital handheld viewer and a multiplayer online game.

⁹An example of how children understand the difference between the on- and off-line existence of objects can be found in the "Webkinz Killer" urban legend that spread through the preteen world (Snopes, 2008). In this legend (which, as all urban legends, has multiple variants) a disgruntled hacker from rival virtual world *NeoPets* has turned the kindly *Webkinz* physician Dr. Quack into a cold-blooded killer. The doctor appears randomly when the child is logged into the system and chops off the head of a beloved digital *Webkinz* pet (sometimes with a knife, sometimes with a chainsaw). Though amusing in its own right, it is also instructive in that the children did not seem to fear for their actual plush toys, just the toys' digital avatars.