Analyzing the Configured Child User of the Nintendo DS

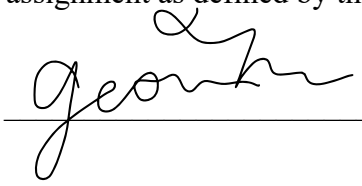
STS Research Paper
Presented to the Faculty of the
School of Engineering and Applied Science
University of Virginia

By

Georgie Lafer

April 13, 2019

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: 

Approved: _____ Date _____
Benjamin J. Laugelli, Assistant Professor, Department of Engineering and Society

Introduction

The Nintendo DS is among the most popular video game consoles for children. Within a decade of its release, the DS sold 154 million consoles, making it the most popular handheld console of all time (Plant, 2018). Researchers point to the DS's dual-screen design, which included a touchscreen along with the standard display, as the primary cause of its success. This technical feature allowed game developers to design unique and creative gameplay. For example, the game "Nintendogs" lets players "pet" their virtual dogs by moving their finger over the dog's image on the touchscreen. But as technology evolves, the once unique features and capabilities of the DS have become common or outdated. If we continue attributing the DS's success to certain technological specifications, then we will overlook the role that designers' ideas about their users played in the outstanding design. Instead, we should examine *how* designers came to understand their end users, the children who would buy the DS, and how this understanding guided design choices.

I argue that the Nintendo DS is designed specifically for a child user. Defining aspects of the DS's design, such as its dual screen design and wireless network capabilities, are implemented in a way that corresponds to the needs and values of children. Specifically, the interactions between the user and the DS: its touchscreen, "Pictochat," and "DS Download Play" satisfy what children want from design according to scholarly literature on human computer interactions. The close match between the designers' envisioned user and actual children not only accounts for the device's success across this age group, it also demonstrates that designers embedded values such as storytelling, creativity, and control into their product that matched the priorities of actual children.

Literature Review

The majority of the scholarly material on the DS's success focuses on the technical specifications of the device. Research often highlights the touchscreen as the primary cause of the DS's success. Occasionally scholars also point to the DS's wireless network feature as an accessory to the device's success; the wireless network makes it easier for Nintendo owners to co-opt gaming experiences and the limited range of the network helps to protect child users. Though the technical features and social quality of Nintendo devices have been thoroughly studied, not much work has been done to explicitly link these features to the needs and requirements of child users.

The technical specifications and physical design of the Nintendo DS are well documented by researchers. In "The Evolution of Game Controllers and Control Schemes and Their Effect on Their Games," Alastair Cummings describes how consoles and game design mutually shape each other. Cummings provides a brief description of the individual components in the DS, explaining their history and contribution to the console. The touchscreen is highlighted as a distinguishing feature of the DS that sets it apart from its competition. According to Cummings, the touchscreen's ability to act as an additional controller allows developers to create games with faster and more intuitive controls. To underscore the added efficiency and range enabled by the touchscreen, Cummings lists how specific games take advantage of this feature. By explicitly framing the touchscreen as a controller, Cummings is able to explain *how* the touchscreen allowed developers to create unique gaming experiences.

Overall, Cummings attributes the DS's success to the technical efficiency of the touchscreen, and adds to the research by characterizing the interactions made possible by the

touchscreen, but does not explore *why* the interactions facilitated touchscreen appealed to users. While this technical superiority was undoubtedly key in the DS's success, technology has since moved forward, and it is important to understand how this feature functioned on a conceptual level.

Researchers also recognize the value added by the DS's built-in collaboration features (Rusetski, 2012). The Nintendo DS is equipped with ad-hoc wireless connectivity, which essentially functions like Bluetooth. This allows the console to have built-in software such as Pictochat, an open chat room space; and "DS Download Play," an easy way to share multiplayer games with other DS owners. Christine Szentgyorgyi in "Renegade Gaming: Practices Surrounding Social Use of the Nintendo DS Handheld Gaming System " argues that this ad-hoc connectivity changes the social environment of gaming and analyzes the different types of gaming that emerged from this connectivity.

The DS attracts a different crowd of gamers than its competitors which are mainly stationary consoles. As a handheld console, the DS has the ability to bring gaming out from the home and into the greater world; however, playing video games alone in a public space is still an antisocial activity. But by including location features to combat the antisocial nature of gaming, the DS solidified its identity as a social and casual gaming console (Szentgyorgyi, Terry, & Lank, 2008). While this study identified new social practices around gaming among adults, it does not explore how the increased sociality of the DS attracted child users.

Research tends to frame the touchscreen and reputation as a social device as the key to the DS's resounding success with children; however, this perspective provides little insight into designers who wish to learn from Nintendo's success. By studying the experiences created by the

DS, we can determine why the design was successful among child users, independent of the technical specifications.

Conceptual Framework

User Configuration:

I will deploy the user configuration framework developed by Steve Woolgar to understand how Nintendo's configuration of its child users translated to effective product design. This framework uses the metaphor of scripts to outline the relationship between designers, a product, and users. In this metaphor, the designer is the author, inscribing (embedding) meaning into the technology like a script, which is then interpreted by an audience or the users. According to this theory, to configure a user, a designer must predict the identity of the user and make design choices accordingly. As a result of this process, the designer's ideas about the user become embedded in the product's architecture. User configuration can be used to separate the "configured user," or the idealized user designers had in mind, from the artifact which contains design choices on behalf of the configured users embedded in its architecture (Lindsay, 2003).

Following Woolgar's theory that ideas about the configured user are embedded into a product's design, I will study the design of my own DS. Specifically, I will look at three specifications of the product: the touchscreen, Pictochat, and DS Download Play, to analyze what ideas have been implicitly embedded in the product.

Profiling The Child User:

To demonstrate that the configured user matches the profile of a child, I will map the design choices onto values held by children. These values can be found in "Designing Online Interactions: What Kids Want and What Designers Know," by Allison Druin. Druin outlines the types of experiences that children are looking for from a digital product, including the five primary "wants," or values, of child users: stories, relationships with characters in many forms, to create, to control, and to collect. I will elaborate on the values most relevant to the DS analysis: stories, relationships, creators, and control.

Children like to interact with stories. This interaction can manifest as reading, listening, participating in the storyline, or creating stories of their own. Children want relationships with characters that feel real. The relationship can exist across different platforms and experiences. For example, Webkinz stuffed animals embody the value of interaction because they are experienced both as a physical stuffed animal and also as a virtual pet.

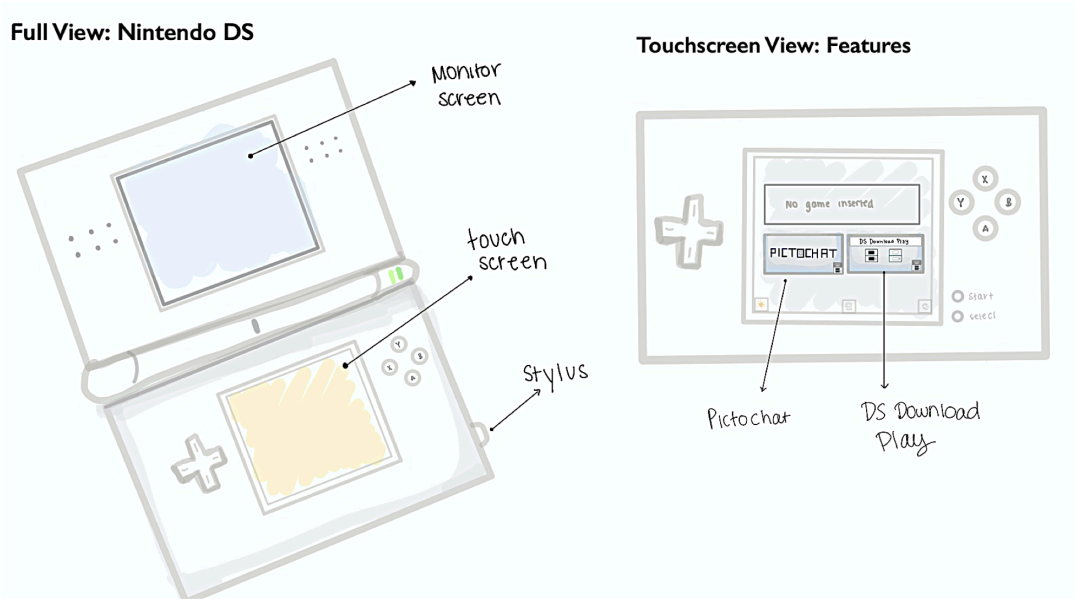
Children also want to create their own experiences. Druin's research found that children learn by "constructing or creating their own paths of knowledge." Druin continues to suggest that computer tools can support such construction by allowing children to be creators. Another value that is essential to a child creating her own experience is control. Children generally have little agency in their own lives. At home, rules are dictated by parents; at school, rules are dictated by teachers. Accordingly, children like to have control when they engage in play.

To assess whether design choices reflect a configured child, I will compare the ideas embedded in the DS to the values described above. A feature is successful if it matches something that a child "wants" as described above (Druin, 2008).

Analysis

The DS was released before Druin's list, so it would be impossible for the designers to have read this paper on what kids want. Even so, many DS features satisfy values on this list. This match between needs and features demonstrates that the designers had a good understanding of child users and that their understanding resulted in a product that was successful among children.

Exhibit 1: The Nintendo DS



To explain the DS's success with child users, I will focus on the values of stories, creation, and control. The designers of the DS helped create a greater range of interactive stories by allowing the dual screen to be used strategically. Designers also included a built-in messaging system, Pictochat, that makes it easy for children to be creators. "DS Download Play" returns a sense of control to children's technology by enabling children to decide how they want to share individual games. Exhibit 1 shows how each of these features fits together within the console.

The Child Wants to Be Immersed in Story

The current scholarly consensus is that the inclusion of a touchscreen on the DS resulted in more advanced and unique gameplay. This idea is correct, but the reasoning goes beyond the novelty of these games. In the sections below, I will explain how the DS's second screen allowed games to tell more engaging stories.

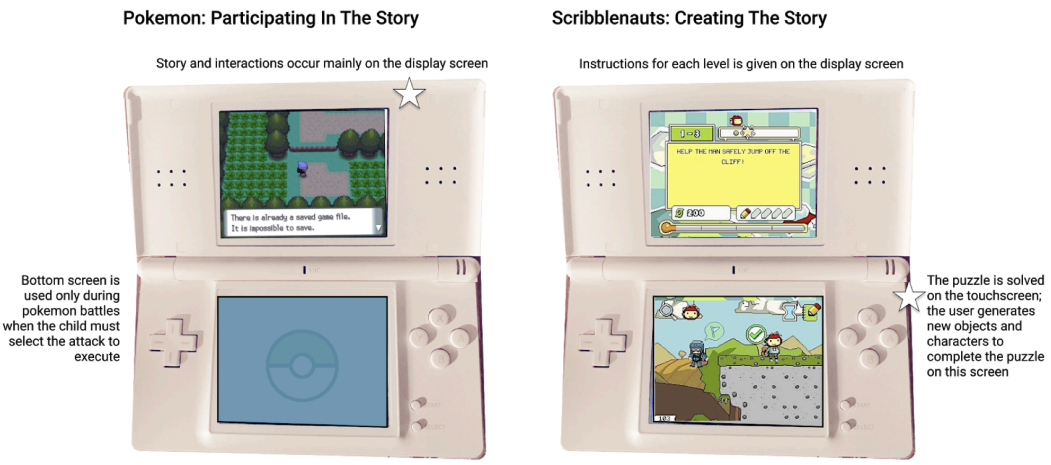
Depending on the context or nature of a game, a developer could choose to utilize one or both of the screens. For example, in Pokémon Diamond, the original Nintendo series, the majority of the game is played exclusively on the top screen. The Pokémon games all have a standard plot for the child to simply follow. When choices are presented to users, they are given limited options. For this reason, the game's decision to use the display screen and traditional controller over the touchscreen controller makes sense.

In contrast, the game Super ScribbleNauts focuses more on the touchscreen. ScribbleNauts consists of logical challenges that the child solves by maneuvering her character and generating new objects or people on the screen using the notebook feature (Go, Ballagas, & Spasojevic, 2012). Children can simply search for an object and it appears in the virtual world and acts autonomously but can still be moved or combined with other things. This game focuses on creation and manipulation, so it is logical that the touchscreen is used more intensely than the display screen.

The dual screen design enables developers to tell different types of stories on the DS. When a game uses the top screen to display important content, like in Pokémon Diamond, the game signals that the child will observe and participate in the storyline. Meanwhile, a game that primarily uses the bottom screen like Scribblenauts signals that the child will be creating stories

of their own. By selecting a dual-screen design, Nintendo's designers made the DS a device that could be used to experience stories.

Exhibit 2: Screen Allocation of Plot Driven and Player Driven Games



Note: images drawn from *Cannot Save Image in Pokemon Diamond,* Stackexchange. (2017)

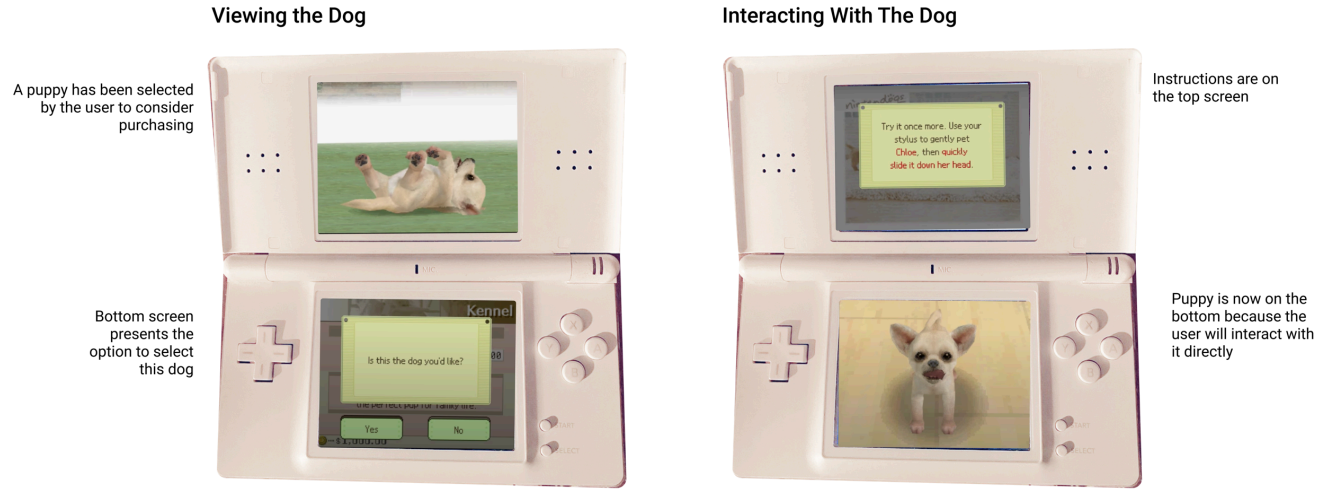
The Child Wants Relationships with Characters in Many Forms

Not only did the touchscreen give developers more flexibility to tell unique stories, but it also allowed developers to create activities and characters that could be experienced in different ways. The transition of a character or object from one screen to another changed how the child could interact with it and created multidimensional relationships between the child and the characters in the game.

One game, Nintendogs, focused on this affordance of the dual screen design as the central mechanism of the game. At the start of the game, the child observes different puppies running around the top screen. When the child sees a puppy she likes, she presses a button to summon it over. The puppy then runs from the top screen down to the touchscreen where the child can "pet"

the dog with the stylus or finger. The game makes this relationship feel real because the dog responds to the user's actions. Each screen creates a relationship differently: the top screen allows the user to influence and move their dog around (the dog reacts to the user on the top screen by moving or barking), while interactions on the bottom screen result in the puppy rolling over or inducing haptic feedback (if a user pets the dog, it looks happy and makes the DS rumble so it feels real). The flexibility of interaction allowed the games developed for the DS to create elements that could be experienced in many ways. This accords with Druin's contention that "kids want relationships across many forms."

Exhibit 3: Nintendogs



Note: images drawn from *Let's Try [DS 0089] - Nintendogs: Chihuahua & Friends* , Pimanrules - Youtube Channel. (2017)

The Child Wants to Be A Creator

Druin contends that children want the opportunity to become creators; the DS's Pictochat satisfies this desire by providing children a bare yet expressive platform to create shared messages (Druin, 2008). The metaphor of an "empty room" is important to keep in mind when

designing for children. An empty room is a digital space that children can occupy which contains few built-in activities. Sarah Grimes, an expert in children's digital media, views empty rooms as an important tool in play. Empty rooms provide children with a space to socialize and engage in shared make-believe play (Grimes, 2015). Nintendo also saw a need for a shared space for children to socialize and developed Pictochat, a virtual chatroom that comes standard with the DS. Pictochat is a very flexible platform. At first glance Pictochat is designed to be used in a social context. It is a shared messaging system that allows up to 16 users to join the virtual chatroom (Lusch, Fleury, & Chandra, 2007). But Pictochat could also be used as a personal digital space for a child to draw, write, and create.

Exhibit 4: Pictochat Screens

Pictochat has a minimalistic design. It contains a set of keyboards and a limited pen tool that can be used with a finger or with the stylus. Though the keyboard design appears straightforward, there are several different ways it can be used. To type, a child could use the control pad to navigate through the letters and press the button "A" to produce the desired letter.

A second way to type is by tapping the desired letter with the stylus or a finger. There is also a more creative way for children to interact with the keyboard; rather than typing, children can drag the letters from the keyboard onto their message like a sticker. This allows for more interesting and intuitive combinations of text and the pen tool because they can easily be used together in the same message. By combining these tools together so seamlessly, the Nintendo designers made it easy for a child user to express herself in different ways.

The design of Pictochat is simple: keyboard and a pencil tool. But by allowing children to freely combine these tools, the designers of Pictochat produced a very creative space. The purpose of an empty room is its bareness, yet it is essential that designers include the right props, or tools, to facilitate play. (Grimes, 2015). Pictochat does just that. Despite only providing two tools, Pictochat is able to facilitate play without sacrificing its advantages as an empty space.

By affording this level of creativity and collaboration, Pictochat enables children to be creators. Providing a chat room instead of a built-in game with every DS shows that the designers understood children needed an expressive space that could be collaborative and social or simply used to draw and write (Reich & Black, 2012).

The Idea That the Child User Wants Control

For children, who do not have much control over their own lives, the opportunity to control the DS's world through features like Pictochat made the device very attractive. Children must follow the rules at home and in school because they are financially and socially dependent on adults (Druin, 2008). As we become more invested in digital products, the toys and activities with which children engage also shift to the digital world (Johnson & Christie, 2009).

Advancements in technology make it possible for games and products to enforce their definition of proper play by literally encoding these rules into the artifact. Nintendo accounts for children's desire to control their experience in two ways: by allowing shared experiences with games and by providing different methods of interacting with the interface. "DS Download Play" allows children to share their games between multiple DS consoles. The touchscreen creates more freedom of expression, allowing the child to control and customize her experience.

How can specific experiences from a game be shared without actually giving the game to someone else? While physical artifacts and toys can be used however the user sees fit, digital products are more tightly controlled. There are many examples of this phenomenon: smartphones can only connect to one pair of headphones, so users cannot listen to music together in public spaces. While CD's can be distributed, resold, and borrowed without the label's consent, streamed albums cannot be shared unless strict criteria are met (such as, both people must have a subscription to the same service and plan). It is more difficult for users to exert control and agency over digital products because rules are literally encoded into the products.

When the DS was released in 2004, its main competitors were stationary gaming consoles such as the PlayStation or XBOX. These consoles had implicit but very clear guidelines of use as a consequence of their design. These consoles are heavy, large, and must be connected to a monitor or television set. These design choices rigidly dictate the context in which the child can interact with the game (Rusetski, 2012). The DS created a mechanism that allowed users to control the context in which games could be played collaboratively: "DS Download Play." By making it easier for children to share their games, this built-in feature lets children dictate where, when, and with whom they share their games. Instead of enforcing rules on what can or cannot

be shared, the DS makes it possible for games to be shared with others via the wireless connection.

As mentioned earlier, the DS's touchscreen enables games to tell better stories and to create multidimensional relationships with the child, but the touchscreen also makes it easier for a child to simply use the DS. The touchscreen can act as a secondary controller that is used differently from the physical controller. The child can interact with the touchscreen with her finger, the built-in stylus, or the traditional control pad, depending on the level of accuracy required for a given task (Cummings, 2007). By offering three ways to perform a single action, the DS affords the user a degree of control over her experience and makes it more likely that she will be able to complete the desired task. Because the touchscreen functions as a display and a secondary controller, children have more opportunity to successfully control the DS.

Not understanding the correct way to complete a task can be frustrating and might prevent the child user from expressing what she wants to do. The touchscreen makes it possible for the user to draw, select options, gesture with their finger or stylus depending on what the specific game allows. In other words, the DS provides different modes for the child to communicate what he or she wants from the system. Beyond Druin's list of what children want, other experts have emphasized the importance of allowing a child to express herself, and in some cases, recommend that designs include multimodal elements to accomplish this (Reich & Black, 2012). The touchscreen makes it possible for the child to successfully express what she wants to do on the DS and to control the game itself.

As I have argued, the design of the DS affords children more control over how they use and interact with games. But it has been argued that the decision to make the DS a handheld

console also takes away from users' ability to control the social context in which games are experienced. Users have expressed frustration with the DS, noting its "lack of ability to observe gameplay" (Szentgyorgyi et al., 2008). Because the participants in shared gaming experiences each use an individual DS, it is difficult for others to observe the game and to be part of the experience. However, this criticism of the DS misconstrues the identity of the target users. The choice to design the DS as a handheld device actually makes it more well suited for children because it allows them greater freedom than a stationary device. While a stationary console that connects to a television or monitor supports different dynamics between active participants and observers in a gaming experience, these consoles are typically not in the domain of children, and rather belong to the household. In her book *Kids Carrying Culture Wherever They Go,* Allison Druin speaks to the difference between access and ownership in children's possessions. While siblings might share a DS, in general, the DS's status as a handheld console makes it easier for children to claim full ownership of it, something that Druin notes as essential for the child's development of identity and self-esteem.

Conclusion

I have argued that the DS's success was a product of how its technical features aligned with what children want and need. Mainly, the screen enabled more complex and diverse storytelling in games, Pictochat provided children a space to play and to be creators, and the ad-hoc connectivity allowed children to control how they experienced and used their games. It is important to understand how these once-novel features enriched the child user's experiences. If we simply believe that children were attracted to the device for technology's sake instead of its

technical features and capabilities, then we miss the role its designers played in successfully imagining and configuring its child users. By reframing the DS's success from "touchscreen" to "it enables games to be more interactive and compelling" we can see how its designers were able to understand successful technological artifacts in terms of what they do for users.

References:

Cummings, A. H. (2007). The Evolution of Game Controllers and Control Schemes and their Effect on their games. *The 17th Annual University of Southhampton Multimedia Systems Conference*, 6. Retrieved from http://mms.ecs.soton.ac.uk/2007/papers/6.pdf

Druin, A. (2008). Designing online interactions: What kids want and what designers know. *Interactions*, *15*(3), 42–44. https://doi.org/10.1145/1353782.1353792

Go, J., Ballagas, R., & Spasojevic, M. (2012). Brothers and sisters at play: Exploring game play with siblings. *Proceedings of the ACM Conference on Computer Supported Cooperative Work, CSCW*, 739–748. https://doi.org/10.1145/2145204.2145316

Johnson, J. E., & Christie, J. F. (2009). Play and digital media. *Computers in the Schools*, *26*(4), 284–289. https://doi.org/10.1080/07380560903360202

Lusch, A. C., Fleury, A. V., & Chandra, S. (2007). Do nintendo handhelds play nice? An analysis of its wireless behavior. *Proceedings of the 6th ACM SIGCOMM Workshop on Network and System Support for Games, NetGames '07*, *1*, 87–92. https://doi.org/10.1145/1326257.1326273

McCrea, C. (2011). We play in public: The nature and context of portable gaming systems. *Convergence*, *17*(4), 389–403. https://doi.org/10.1177/1354856511414987

Plant, M. (2018). No Title. Retrieved from https://guinnessworldrecords.com/news/2018/12/top-10-best-selling-videogame-consoles-551938/

Reich, S. M., & Black, R. W. (2012). Missed opportunities on Webkinz when developmental abilities are not considered. *Journal of Applied Developmental Psychology*, *33*(3), 136–145. https://doi.org/10.1016/j.appdev.2012.02.001

Rusetski, A. (2012). The Whole New World: Nintendos Targeting Choice. *Journal of Business*

Case Studies (JBCS), *8*(2), 197–212. https://doi.org/10.19030/jbcs.v8i2.6808

Szentgyorgyi, C., Terry, M., & Lank, E. (2008). Renegade gaming: Practices surrounding social use of the Nintendo DS handheld gaming system. *Conference on Human Factors in Computing Systems - Proceedings*, 1463–1472. https://doi.org/10.1145/1357054.1357283

Verhoeff, N. (2009). Theoretical consoles: Concepts for gadget analysis. *Journal of Visual Culture*, *8*(3), 279–298. https://doi.org/10.1177/1470412909105693