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MINECRAFT

Transitional Objects and Transformational Experiences in an Imaginary World

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There's a lot of excited shouting upstairs. My 10-year-old twin boys are playing *Minecraft* (2009) with some of their friends on a shared world over our wireless network (a LAN party!). For several years, *Minecraft* has been their favorite indoor activity. They've changed how they play, becoming more interested in building their own worlds or playing virtually with their friends on servers than downloading the mods that fascinated them a few years ago, and often select the challenge of Survival mode instead of merely Creative mode. My son Jason likes building more and Sammy prefers combat and blowing stuff up, so sometimes this makes for a good partnership, and at other times there can be considerable conflict. But at all times, they and their friends are engaged in play in which they have a higher degree of agency for actualizing their imagination than in other activities.

When they ask to play *Minecraft*, though, I've learned to ask them back what they intend to play *in Minecraft*, because "playing *Minecraft*" doesn't tell me much more than playing "in my room". Perhaps they want to play the official version of the game purchased from Mojang (now owned by Microsoft), known to players as vanilla *Minecraft*, but even that doesn't convey what they might be doing, whether they will have unlimited resources or have to find or trade for materials, or whether when night falls in the game world, hostile creatures will attack their avatars. Perhaps they want to play individually, or together on a world they have made unique with their collaborative constructions, or online on a friend's private server, or on one of the hundreds of thousands of servers around the world they can access with a variety of games, mods, and social interactions. Perhaps they will also want to look up information like recipes for how to craft items, read reviews of mods, listen to the music from *Minecraft* composed by Daniel Rosenfeld (aka C418) or parodies of popular songs changed to be about *Minecraft*, or watch their favorite YouTube media stars play and opine in videos. In addition, at other times,

they may want to read *Minecraft*-themed comic books and novels and play with *Minecraft* LEGO. It is not possible to keep track of all the possibilities that “playing *Minecraft*” could encompass. This is because *Minecraft* is for them, and the over 100 million registered users, an imaginary world they have made into a bridge between their selves and the world in which to have transformational experiences.

Minecraft is a video game played on a computer, mobile device (Pocket Edition), or gaming console (Xbox, PlayStation, Wii U) in which a player, represented by an avatar, smashes and places blocks of different materials in a randomly generated three-dimensional environment that spawns non-player character creatures, some of which are hostile. Players can choose different modes of gameplay, including Creative mode (in which they have unlimited resources, can fly, and cannot die) or Survival mode (in which they have to gather materials (by mining) and craft materials into shelter and other resources achieve goals, and maintain levels of health and hunger or they will die). *Minecraft* was created by Swedish software engineer Markus Persson in 2009. It was produced by Mojang and after a lengthy public beta, released in 2011. It became the best-selling PC game of all time in 2014. In addition to Persson and the team of designers, programmers, and artists organized in the company Mojang who produce the official game, there is an enormous international community of players and content creators who make and use mods and servers that offer variations to vanilla *Minecraft*, provide information and instructions (there are no user manual or in-game instructions), and produce videos, stories, artwork, and poetry in and about *Minecraft*.

No other game is characterized to the same degree by what scholar Dennis Redmond (2014) terms an “audience-led production”, in which a digitally networked community of Internet users in a technologically and transnationally diverse digital ecosystem engaged in co-creating *Minecraft*. “*Minecraft* is a commercial franchise wrapped around a core non-commercial fan community. While the fan community does not legally own the franchise, this lack of formal ownership is also irrelevant. The reason is that fans co-produce, co-regulate, and co-distribute the videogame in close concert with the commercial franchise.”¹ The process of creating content is what grew *Minecraft* from a game into not only an imaginary world, but also a virtual world.

Unlike other imaginary worlds that originate from a narrative, like a novel, or a game with more emphasis on narrative elements, like *Halo*, *Minecraft* is an example of an imaginary world in which storytelling takes a secondary role to world-building. It is an imaginary place in which players have experiences, some of which are related as narratives in a range of forms in the transmedial imaginary world that includes vanilla *Minecraft* and everything *Minecraft* beyond and around it. Whether they take the form of carefully planned-out and edited videos made by teams of specialized individuals or recordings of gameplay by one person, whether artfully illustrated comic books with character development, themes, and plot arcs or unpunctuated, misspelled retellings about purported encounters with the mythic character Herobrine, the stories people create set in and about

Minecraft provide a rich narrative framework that over time has spawned a set of characters and themes within the imaginary environment generated in the game that amplifies and fills in gaps in the infrastructures that Mark J. P. Wolf categorizes that help creators and audiences organize an imaginary world: narrative, maps, timelines, genealogies, nature, culture, language, mythology, and philosophy.² It is as if an environment as stimulating and open as *Minecraft* was waiting for it to be peopled with heroes and mythic figures, and for them to dramatize conflict.

Since Microsoft purchased Mojang and *Minecraft* for an astounding \$2.5 billion in 2014, *Minecraft* not only has an unprecedented community of player co-creators, but also the international corporate might of the software, hardware, and gaming giant. Microsoft executive Jeff Teper explains the value of *Minecraft* to Microsoft: “Minecraft is a development tool. People build worlds out of it.”³ Mojang’s chief operating officer Vu Bui asserted, “We don’t want any story that we make, whether it’s a movie or a book, to create some sort of ‘this is the official Minecraft, this is how you play the game’ thing. That would discourage all the players who don’t play in that way.” “When coming up with a story, we want to make sure it is just a story within Minecraft, as opposed to *the* story within Minecraft.”⁴ Phil Spencer, head of Microsoft’s Xbox division, also articulated an understanding that what Microsoft purchased was not only a game, but also an entity: “You don’t own Minecraft. You curate it.”⁵

Although some in the *Minecraft* community had skeptical reactions about what kind of curator Microsoft would prove to be,⁶ since the acquisition, vanilla *Minecraft* has not changed fundamentally. However, there have been significant expansions in some of the ancillary aspects of *Minecraft*, such as the server hosting service Minecraft Realms, increased attention to Minecraft.edu, the dramatic demos of *Minecraft* augmented reality applications for the HoloLens, the launch of the narrative game *Minecraft Story Mode* (Telltale Games, 2015), the continued development of the *Minecraft* movie by Warner Bros., and expanded licensing agreements for toys, books, and other merchandise. It will be interesting to see what directions Microsoft takes, or tries to take, with the *Minecraft* imaginary world. Mark J. P. Wolf has suggested that *Minecraft* could be integrated into the Windows operating system.⁷ I like to imagine it the other way, with Windows integrated into *Minecraft*, or a Minecraft-like HoloLens-mediated interface, with a real-time animated avatar using webcam-enabled facial and body animation. The so-called Minecraft Generation might easily perceive Windows as another mod, another mode.

But back to the present, and why *Minecraft* is so popular. There are many reasons, but the four most important are the kind of interactivity, the audiovisual and kinetic aesthetics, openness, and how *Minecraft* is shared. First, the core mechanics of destroying and placing blocks are easy yet yield many possibilities for gameplay. It is not hard to punch things, pick up materials, or, once you know how, to craft items. In creative mode, all the materials are available, and the interface for the inventory is more visual than textual. Placing blocks can be done rapidly, resulting

in a high degree of instant gratification for the effort (in contrast, for example, to physically choosing and building with physical LEGO bricks, which are likely to be a limited resource, can fall over, take time to line up, etc.). The randomly generated environment is interesting, responds to and can be changed by what the player does, invites exploration and discovery through digging and traveling, and the world seems infinite. The non-player characters provide culture, company, and adversaries. Tameable animals are a particularly interesting feature, beyond the scope of this essay.

Second, audiovisually, the blocky aesthetic, saturated colors, limited animations, humorous sound effects and ambient music (both by C418) all contribute to an experience that is stimulating but also dials down the complexities and details of the actual world and the more photorealistic aesthetics many video games try to achieve. *Minecraft* hits a sweet spot between the figurative, the icon, and the abstract that is realistic enough to have reference to the actual world without too much pesky detail. The avatars and non-player characters have the simplified features of iconic representation that, according to Scott McCloud, allow people to identify more with a character than one with greater realistic detail, so that “We don’t just observe the cartoon, we become it.”⁸ Further, kinetically, the game is iconic, with all avatars and characters limited to a few gestures and movements, and no one can leap higher than another player because of their accrued skill. Even with custom skins and the addition of a second, slimmer-armed avatar model Alex (who some perceive to be female, or more potentially female than Steve), there is a limit to the customization of the avatar. Cause and effect, time, physics, and relationships between materials and living beings are all abstracted.

Third, *Minecraft* offers the player choices of agency, from the *ludus* of more structured, goal-oriented survival to the open-ended *paidia* of creative mode, and many possibilities in between as players choose mods, servers, and maps, and create their own games within *Minecraft* that afford them experiences to interpret, explore, combine, remix, transform, and invent. Multiple modes offer a variety of ways to play, and as players develop, they can shift to activities that challenge them in different ways, staying in the relationship between challenge and skill that Mihaly Csikszentmihalyi termed the “flow” state⁹.

Fourth, *Minecraft* is social, whether played alone in the wider context of the community experienced asynchronously through wikis, YouTube, and other media, in multiplayer with actual-world friends or online teammates, or in terms of the global and local communities in which so many people participate. As studies have shown, children use *Minecraft* for social recognition.¹⁰

There is a fifth reason *Minecraft* is so popular: it puts the player in a situation in which they learn by doing. *Minecraft* shares Jean Piaget’s view that children are not, in Seymour Papert’s words, “empty vessels to be filled with knowledge ... but active builders of knowledge”.¹¹ Philosophically, *Minecraft* interpellates the people on the other side of the avatar arm as people who have a framework that they can reinvent to adapt to their changing situation. By transforming their environment

creatively, they will make their environment adapt to their needs. I think this is at the root of why so many educators are excited about *Minecraft*'s potential for learning; children and adolescents have already endorsed the game because, as we suspected/hoped, kids want to learn, and they respond to what they can do in with the constructionist object-to-think-with. The exploration of abstract concepts of characterization and plot that Schifter and Cipollone studied in high school students' machinima videos made in the *Minecraft* game environment¹² can also be seen in the plethora of *Minecraft* videos on YouTube created outside of classroom assignments, such as *If Notch Was Evil and Herobrine Was Good*, many of which have had millions of views.¹³

For children and adolescents, *Minecraft* is a transitional object-to-think-with and a "potential space" for transformational experience in which learning of all kinds occur. Examples of the efficacy that researchers find in their case studies of *Minecraft* in classrooms are found in abundance in the informal, voluntary constructions people make, document, and discuss across the pages, screens, interfaces, and physical manifestations of the transmedial imaginary world experience.¹⁴ *Minecraft* is a "transitional object" both in constructionist learning theorist Seymour Papert's sense as an example of "objects-to-think-with" and in psychologist D. W. Winnicott's interest in the transitional objects and phenomena found in "the *potential space* between the individual and the environment" that people use in transformational experiences (children's differentiation of self and world, and adults' experiences of creativity and play). The first-person *Minecraft* avatar is an object that is between the player and the virtual environment, existing in the imaginary realm the player creates that bridges the actual and virtual bodies in the physical world and on the screen.¹⁵

Because of *Minecraft*'s appeal to players in the seven-to-seventeen-year-old age range,¹⁶ it is being played by children and adolescents in who are in what Piaget termed the "concrete operational stage" (seven to eleven) and "formal operational stage" (eleven to sixteen).¹⁷ My hunch is that the development from concrete to more abstract thought is recursive throughout our lives, and so we re-enact that leap again and again, in ways that are trivial and significant. We need transitional objects as we oscillate between the concrete and the abstract in Papert's sense of objects-to-think-with to learn our way every time we have to make that leap, and also in Winnicott's sense of what is popularly understood as a comfort object but is more broad than that, and includes everything we put in the space between the me and not-me as we seek to refine our understanding of our relationships of being in the world. The processes of commodification in mass consumer culture push objects upon us to fill the gap, but, as the unprecedented popularity of *Minecraft* shows us, kids are more interested in making their own. In our time, we are all challenged with the changing demarcation between the virtual and the actual; I see *Minecraft* in particular and virtual worlds and video games in general as transitional phenomena for thinking through this cultural transformation.¹⁸

Origins and Transformations

Although *Minecraft* is now part of one of the largest corporations in the world, it began as an indie game, coded by Markus Persson, known as Notch, in 2009. Persson had worked at successful Swedish game companies, but bristled against the commercial constraints to creative freedom he experienced in them. He gravitated towards the indie game scene, participating in the TIGSource forum.

In one way, we can say *Minecraft* is Persson's imaginary world; he is the one who coded it and posted it in 2009. Like other imaginary worlds, however, it draws on other fictional constructs, in this case recombining the best elements of the games Persson liked into a new game, with a first-person perspective. Persson was influenced by the complex open-ended gameplay with simple graphics of *Dwarf Fortress* (2006), the ease of creative building in *RollerCoaster Tycoon* (1999), the atmosphere of *Dungeon Keeper* (1997), and the freedom of the game he had co-designed, *Wurm Online* (2006).¹⁹ Persson described an early version of *Minecraft*, before he had named it, as an "*Infiniminer* clone" after *Infiniminer* (2009), an indie game that got away from its creator Zachary Barth when the source code was disclosed on the Internet, resulting in too many versions for people to play the multiplayer community game Barth had imagined. Persson took the open-source code Barth released in response to the leak, and recoded it into *Minecraft*.

Minecraft's visual aesthetic and gameplay reflect its origins as an indie game, with emphasis on creative use of minimal assets. It's not about flash and polish, but about making more out of simple blocks, colors, and mechanics than what's originally there through mining, crafting, building, and modding. Moreover, the blocks that comprise everything in *Minecraft* tap into several broad trends in the culture of play and creativity. The blocks are almost universally described as LEGO in a computer, and in order to survive in Survival mode, or do much of anything in Creative mode, a player has to create, place, transform, and destroy blocks. In 2016, *Minecraft* is a popular, accessible tool in the more digitized wing of the Maker movement, a tech-savvy DIY grassroots community working with tools like Arduino controllers, 3D printers, and Raspberry Pi to make objects and products. *Minecraft* can be used as a simulated virtual world in which to make, and redstone is a simulation of circuits which can be used to trigger complex mechanics. *Minecraft* may not have been created as an educational tool, but like LEGO, its constructionist possibilities are quickly evident.²⁰

One of constructionist Seymour Papert's insights about applying Piaget's constructivist ideas of child development to pedagogy is that the educator's role is to provide an environment in which children, positioned as scientists, can explore their assumptions and, through experimentation, develop ways of thinking and knowing. *Minecraft* players are positioned in this way, without instructions, having to learn from experience and each other, and have to create their own way of playing and learning *Minecraft*.²¹ *Minecraft* is a "transitional object" and "the game environment is a valuable place for learners to relate to the environment, and intellectual structures of knowing".²² If *Minecraft* is used to convey information

and stops functioning as an “object-to-think-with” and instead becomes a vehicle for disseminating information (i.e., an avatar walks around a *Minecraft* world and reads information on signs or in books), then it loses the affordances that make it an “object-to-think-with”.²³ For people to learn best, according to constructionism, they need to be able to construct and transform something, whether material or digital, and share what they make. *Minecraft* would rate highly, by those criteria. Papert used the example of gears from his own childhood. The gear is not only useful because it illustrates mathematical concepts, he explains, but also because “it also it also connects with the ‘body knowledge’, the sensorimotor schemata of a child. You can be the gear, you can understand how it turns by projecting yourself into its place and turning with it. It is this double relationship—both abstract and sensory—that gives the gear the power to carry powerful mathematics into the mind.”²⁴ However, there is also an emotional aspect as to why gears are powerful objects-to-think-with; Papert explains, “*I fell in love with the gears*” (emphasis in original).²⁵ It is not an exaggeration to say that millions of children have fallen in love with *Minecraft*, that it connects with their body knowledge as both digital natives and LEGO brick builders, and their experiences in the world as both creators of amazing structures and smashers of what they encounter.

In the following discussion of three examples from the multitudes that constitute the *Minecraft* imaginary world—Herobrine, the ending of the game, and the concretization of actual objects from virtual ones—we can see how *Minecraft* provides a potential space for the creation of transitional objects that transform the elements of the game into an imaginary world in which people can have transformational experiences.

Herobrine: Transformations of a Character

The imaginary worlds of *Minecraft* have not only expanded through modding and merchandising, but also transmedially, both through community-created and officially sanctioned professionally produced artifacts. Using my Transmedial Imaginary Worlds Experience Model (TIWEM) to explore the trajectory of one subcreated aspect that has no official expression, the character of Herobrine, we can see how the imaginary world of *Minecraft* begins on the interface platform as the “vanilla” version and spreads across the interface platform in the maps, mods, and servers that proliferate from it.

The Herobrine myth started on the interface platform of the online forums but then emerged as part of the wider *Minecraft* phenomenon, created by the community, appearing transmedially in stories, comics, forum discussions, YouTube gameplay videos, animations, mods, artwork, and in physical form, plush dolls on Etsy. Herobrine began as a hoax, and the tales about him are the ghost stories told within a community. Herobrine is not, and has never been, a character in the official release of *Minecraft*. (There is an avatar skin available for the Xbox 360 version, but any instances of Herobrine are players’ modifications to their own avatars.)

In *Minecraft* mythology, though, he is the ghost in the machine, the spirit that can move your objects and call out to you from within the game to WAKE UP even when you are playing in single-player mode. In some versions, he can come out of the computer, a kind of imagined concretization. In general, he is a scary character, often said to be the ghost of creator Notch's dead brother (except Markus Persson does not have a dead brother).

Herobrine is the trickster figure of the imaginary world of *Minecraft*, playing multiple roles in different circumstances. He is a thief and a boundary-crosser, embodying a lack of control in a game about control. He is the shadow self of our avatar-hero, Steve, with the same skin except for glowing white eyes. Through Herobrine, the community created elements of two of the infrastructures of the imaginary world that the official version had not provided: genealogy and mythology. By connecting Herobrine to Notch, who is still a powerful icon in the community despite no longer being at Mojang (and often visualized in the game in mods and sometimes described as a god in stories), the character becomes part of the founding family of the imaginary world.

Persson has repeatedly stated on social media that there is no Herobrine, writing "*Getting loads of tweets and emails about Herobrine again. I don't have a dead brother, and he never was in the game. Not real. Never was,*" on May 26, 2012, but at other times he fueled the myth by putting "Removed Herobrine" in lists of feature updates, or on reddit, when he posted as xNotch on March 10, 2012:

The Herobrine stuff is awesome and kind of scary at the same time. It really shows how little control a content producer has over the content.

I've publicly told people there's never been any such thing as Herobrine, and that I don't have any dead brothers, and that letting too many animals die in lava is a fool proof way to summon him but that you don't need to be afraid of him. He only means well, he's looking out for you, trying to warn you of the dangers you can't see.

There certainly are NO physical manifestations of Herobrine that will sneak out of your computer if you leave Minecraft running at night, looming over you as you sleep with his pale eyes inches away from your face, as he tries to shout at you to wake up. Sometimes you wake up with a jolt, and he's gone, and all that lingers is the memory and faint echo of his wordless screaming. Of course it was just a dream. There's no way a morally dubious ghost with a god complex could at any point decide to haunt the children who play my game "for their own good", as there is NO SUCH THING. etc etc

The Herobrine meme began in August 2010 with a "creepypasta" (slang for horror stories or images copied and pasted on the Internet) post on a message board on/v/4chan with a screenshot of a figure in the fog who the poster said had built strange things in their world, even though it was single-player mode. In late

August 2010, the Herobrine character was used in a faked live video stream by two different “Brocraft” players²⁶ and became a popular meme, which included a message revealed in jumbled characters that implied the reader is living in a fantasy world and they have to “WAKE UP” (dramatized by Dan TDM, aka TheDiamondMinecart, in the animation “Herobrine in the Library”).²⁷ As Jandy Gu summarizes, Herobrine “exists on the pages of online forums and fan fictions, an existence difficult to undo”.²⁸ Herobrine also features prominently in the community-created comics and fiction available as e-books and also as print books, mostly as a villain, but sometimes he is portrayed as a sympathetic, misunderstood character, like Frankenstein’s monster. KindleUnlimited, Amazon.com’s e-book subscription service, has 627 results for a search for Herobrine, including titles such as *Diary of a Misunderstood Herobrine: It Ain’t Easy Being Mean* (Herobrine Books Book 1) and *Herobrine Saves Christmas*. These are examples of unofficial texts, some written by kids or teenagers.

Herobrine was integrated into mods by the end of 2010; in the Herobrine Mod, Notch also appears as a character who fights Herobrine. On YouTube, there are videos of encounters with Herobrine, gameplay of Herobrine mods, and stories featuring Herobrine. One video, “If Notch Was Evil and Herobrine Was Good – Minecraft”, reverses the usual moral compass ascribed to each figure. In Dan TDM’s videos that review and demonstrate mods, Dan populates his videos with characters he creates through his narration, machinima camera work, and mise-en-scène. Part of the joke, of course, is that Dr. Trayaurus is no more of an individual character than any of the other non-player villagers, but Dan cleverly uses him as a puppet with whom to interact. In the Herobrine Mod video, while the Dan character sleeps, Dr. Trayaurus spawns Herobrine. Dan TDM exclaims, “I can’t believe Trayaurus has done this! This is probably one of the worst things he’s ever done.” He imbues Dr. Trayaurus with a history that the viewers know, the setup for the gameplay. The Herobrine mod is only one of many representations that adds Notch as a non-player character, and indeed the character of Herobrine is often portrayed in opposition to Notch. Here, Notch appears and fights Herobrine.

Herobrine is the villain in the series of music videos by Captain Sparklez. Like TheDiamondMinecart, Captain Sparklez is a popular YouTuber who makes videos about mods, maps, and servers, as well as teaming with others for elaborate animations made outside the game engine. “Take Back the Night” is an original music video that depicts a hero’s journey, which ends with him fighting and vanquishing Herobrine in an epic battle. Eschewing the *Minecraft* environment for the modeling and animation prowess of software like Maya and After Effects gives the animators a much larger range of the facial expressions and physical gestures with which to work. Instead of the YouTuber’s clever voice-over driving the narrative, all the elements of animation can be exploited. The overall blocky aesthetic is preserved, but the characters and sets can be controlled in a more cinematic way.

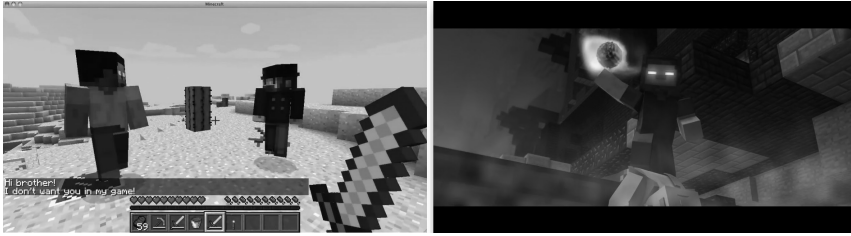


FIGURE 8.1 Herobrine in the Herobrine Mod (left) and Captain Sparklez’s video “Take Back the Night” (right).

Belief in Herobrine’s existence, insisting Herobrine is real in message forum arguments, writing, making, reading, or watching Herobrine stories, comics, or videos—all of these activities contribute to the infrastructures and are ways of participating in the imaginary world that do not include playing the game, or necessarily being in the game environment at all. The desire to connect Herobrine as a member of Notch’s family, and indeed the elevation of Notch and then Jeb into an icon and character fulfills an impulse to fill out not only the genealogy and mythology of the imaginary world of *Minecraft*, but also to imbue the virtual world with existence beyond code. In this way, *Minecraft* is an example of how “imaginary worlds invite audience participation in the form of speculation and fantasies, which depend more on the fullness and richness of the world itself than on any particular storyline or character within it”.²⁹

Redstone: Transforming

In *Minecraft*, redstone is a material embodiment of a force; it is an element with the properties of electricity. Players build mechanical and electrical devices with redstone, from simple constructions such as toggles and switches to turn on lights or set off TNT to building working clocks, elevators, self-building constructions, and even graphing calculators. Redstone dust can be laid out like wires in circuits; redstone circuits can power pistons that push blocks to open doors or create game mechanics like traps; clocks and other signal controllers regulate complex contraptions or devices. Redstone is one of the ways the high degree of agency in *Minecraft* reveals itself; as a simulation of the principles of circuitry, it works very well, and it is in the fun, accessible *Minecraft* virtual environment in which kids have already become comfortable and empowered. *Minecraft* makes electricity and circuitry concrete, albeit in a virtual simulation, by making redstone into components people can use to make transitional objects. Redstone can be like Papert’s gear, in an experience that is both abstract and sensory.

Concretization brings concepts from secondary worlds into the Primary World, blurring the boundaries between the two to make the Primary World more like the imaginary one. If, as Jane McGonigal contends, reality is broken, and the solution to the problem of people preferring games because they are empowered to do more

and be more than in the Primary World is to make the real world more like a game, then concretization has the potential to make the real world more fun.

The Transmedial Imaginary Worlds Experience Model focuses attention on several factors: experience (as opposed to storytelling), the dynamism of participating in a transmedial imaginary world, and what people can do with different mediated forms. The vertical (or y) axis is the media platform. Vanilla *Minecraft* originates on the interface platform as the game that is played. People might have their first experience on a different platform, however, such as on the screen (YouTube videos, or the forthcoming *Minecraft* movie) page (books), or in the physical realm (*Minecraft* toys or clothing). The platforms are arranged on the vertical axis, moving upward in increasing representation and decreasing simulation (to use Gonzalo Frasca's terms).³⁰ Within each platform, there are a range of locations along the other two axes: along one, a continuum of affordances (interpreting, exploring, combining, remixing, transforming, and inventing) and along the other, the degree of structure, anchored at each end with Roger Caillois's foundational terms of *paidia* and *ludus* for respectively, turbulence and rules, "a primary power of improvisation and joy" and "the taste for gratuitous difficulty"³¹ but informed by an understanding of how structure and agency can "mutually constitute each other".³²

The model is best imagined, though, as a model of a space of performance possibilities through which any transmedial experience connects different platforms and affordances. Wolf delineates how mediated experiences are comprised of the basic elements of words, images, sounds, interactions, and objects, with expansion and adaptation from one medium to another occurring through "processes of transformation": description, visualization, auralization, interactivation, and deinteractivation. *Minecraft* Story Mode is an example of deinteractivation, because it substitutes fixed narrative events for the more open choices a player could make in the game world; animations made with programs like Maya that add detailed movement and facial expressions to the characters use visualization to transform stories that take place in a reimagined *Minecraft* world.³³

I would add *concretization* to the list of transformational processes to describe the production of a new physical object that makes a virtual concept or object concrete as a distinct process of transformation that is different from visualization because it emphasizes how, in transmedial imaginary worlds, the boundary between physical and digital manifestations can be permeated in both directions. To be sure, staging a movie based on a book requires props, and merchandising from any book, movie, or game makes physical objects out of imaginary ones. There are many examples of *Minecraft* objects like diamond swords and pickaxes, printed cardboard heads, plush and plastic toys, as well as the seemingly inevitable LEGO sets (first micro and now regular-sized), but what I'm interested in particularly are how video-game mechanics or imaginary worlds use objects, especially magical ones, as a kind of synecdoche in which the part stands in for the whole. For example, in the LEGO original intellectual property theme *The Legends of Chima*, the energy force CHI is concretized into specialized crystal and orb pieces. In Chinese culture, qi is invisible, more like air or

a gas than a palpable liquid or hard material if it had to be described as such. In the LEGO sets, it is made into a plastic object. In the animated series, comics, and books, based on the LEGO sets, CHI is visualized as a flowing liquid and glowing, pulsing energy. Because of its aesthetics, *Minecraft* seems like an easy fit for LEGO, but the abstract aspects of the world are concretized nevertheless.

There is of course an economic reason for making actual objects out of virtual objects; although the commodification of virtual goods and services is increasing, the virtual marketplace is not equivalent to the actual one. People buy the *Minecraft* game from Microsoft once, maybe more if they also want to play on a mobile device and game console. But official merchandise extends the profit margin that can be gained from each player.³⁴

The most interesting example of concretization in the *Minecraft* imaginary world experience is the mixed reality Bitcraft mod and littleBits electronic building blocks. Color-coded littleBits snap together magnetically like concretized scratch blocks, making it easy for kids or anyone to make inventions. The cloud-Bit receives input signal from littleBits circuits and sends it to the Internet; it also sends output from the Internet as a signal to the littleBits circuit. The Bitcraft mod connects the physical cloudBit circuits to what is happening virtually in *Minecraft*, so a person can trigger a redstone contraption with the physical contraption they have built (which can simply be the littleBit blocks or be more elaborate, housed in something like cardboard or, of course, attached to LEGO or other objects). Or, even more fun, an event in *Minecraft* can make something happen in the actual world, like setting off an alarm. One of the things that does happen, though, with the transformative process of concretization is that everything slows down; it takes longer to make the loop between the actual and the virtual than to only activate the redstone in *Minecraft*. In making the actual circuit with littleBits, the redstone vanishes, and we are back to invisible, intangible electricity.

My kids were unsure about whether combining littleBits and *Minecraft* would be fun, until the video demonstrating how to use the circuits and the mod made by one of their favorite YouTubers, Dan TDM, piqued their interest. They could



FIGURE 8.2 Transmedial Imaginary Worlds Experience Model (model and photo by Lori Landay) (right), and YouTube Superstar Dan TheDiamondMinecart demonstrates littleBits and the Bitcraft mod at <https://www.youtube.com/watch?v=6iCOPWTbudY&feature=youtu.be> (left).

not have connected the littleBits to the Internet without adult support, but Dan TDM's endorsement convinced them it was worth the effort and temporary loss of independence to experiment with bridging the virtual and the actual, and playing with connections between the concrete and the abstract. As an early example of how concretization may bring elements of the beloved virtual world into the physical realm, it paves the way for more experimentation with augmented reality.

The End

One of the biggest differences between the beta and 1.0 versions of *Minecraft* is the addition of an ending. A player doesn't have to get to this ending, and it doesn't end the game in the sense that it doesn't delete the world in which the player has been playing, but there is a narrative closure of some sorts (end "credits" roll).

In a reddit Ask me anything thread on July 31, 2012, Notch clarified that he perceived the ending to be necessary:

Before it had the end, I always felt like it was an incomplete game. I know a lot of devs don't agree with me, but a game without a game is just a toy. Without a climax, it becomes Sim City where you play until you get bored instead of playing until you beat it.

Sure, I don't really believe anyone STOPS playing after killing the ender dragon, but it still feels more like a complete package to me now.

Persson approached the ending of *Minecraft* consistently with how he approached other aspects of the game: differently. Persson tweeted that he was looking for a writer: "Are YOU a talented writer (famous is a plus ;D) who wants to write a silly over-the-top out-of-nowhere text for when you win Minecraft?" (@notch, October 16, 2011). Many followers replied recommending Julian Gough, an Irish writer who lives in Berlin. Persson later tweeted that Gough's story "The iHole"³⁵ (which is one of the most brilliant things I've ever read) was "the story that convinced me @juliangough was the right guy to write the end game text for Minecraft" (Twitter, @notch, July 9, 2012).

Gough recalled:

I didn't have to explain where the dragons came from. [Persson] just wanted me to do something interesting and original, because it's a very interesting and original game, and he wanted something that people weren't expecting at the end. Like an ending, in fact. I mean, a lot of people didn't want the game to have an ending at all, and I totally understand that.³⁶

At this point, I am going to discuss what happens at the "end" of *Minecraft*, and if you don't want to know, you should stop reading at the end of this sentence and rejoin after Figure 3.

The ending is in many ways not an ending to the events in the game. Even after killing the Ender Dragon, reading or skipping the nine-minute scroll of text Gough's story and the credits, and respawning in the Overworld, the player can return to the End. Players get The End Achievement by entering the exit portal that appears when the Ender Dragon is defeated, and then the End text begins. For eight minutes, a dialogue between two unnamed speakers in green and blue text scrolls across a background of the iconic *Minecraft* dirt texture. "I see the player you mean," the blue text says. The green text answers with the player's avatar name. Blue replies, "Yes. Take care. It has reached a higher level now. It can read our thoughts." This is a mind-blowing, reality-shaking moment, worthy of a Philip K. Dick novel. No matter what your experience of *Minecraft* has been, nothing has prepared you for this. The speakers are from outside of the imaginary world we have encountered, acknowledging the player in an unprecedented way.

Although Persson and Gough refer to the text as a "story", it is more frequently termed a poem, perhaps because the language is more allusive than what is usually associated with prose, because it engages in mystical, philosophical, or mythological issues, or because it is so ambiguous. Whatever the reason, the meaning of the text has become a topic for interpretation and debate at all levels of *Minecraft* discourse. In a review of *Minecraft*, Simon Parkin succinctly articulates how the end text relates to the *Minecraft* phenomenon:

Minecraft's mainstream appeal may not lie in the poetry tucked away in an endgame few will see, but it is to be found in this poetry's sentiment. Here is a game that enables humans to experience an accelerated form of existence—of dominion but also of stewardship. It makes clear the ancient ties between creativity and survival, and the wonder of collaboration, cooperation, and community, both in its world and in the reality on the other side of the screen. This is a recipe that demonstrates how video-game design, in the right hands, can be elevated to an art form every bit as strange and wonderful as any other, revealing deep truths about the human condition.³⁷

The End text is the most explicitly narrative element in the official *Minecraft* game world, and yet it shies away from specificity or narrative closure, choosing ambiguity, meta-commentary on gaming, and unity. I read it as a reward of the achievement of making it to the End, and the surprise of how weird it is, how it gives an ending yet doesn't, and how it is unlike anything else (except maybe the very end of the rebooted television series *Battlestar Galactica*, 2006–9), is part of that reward. As the text scrolls, I am filled with wonder at this amazing game that seems capable of expanding infinitely, marvel at the resonance I feel at ideas that echo my own analogies of dreams and video games.

The End text concludes with a call to wake from the dream. Look below and you can see why people think of the text as a poem, because on a page or screen, it looks like a poem. The repetitive language provides a rhythm one might find

in a spoken spiritual piece like a meditation or a prayer. In the quotation from it below, the green voice is in italics, and the blue in regular font.

and sometimes the player believed the universe had spoken to it through the zeros and ones, through the electricity of the world, through the scrolling words on a screen at the end of a dream

and the universe said I love you

and the universe said you have played the game well

and the universe said everything you need is within you

and the universe said you are stronger than you know

and the universe said you are the daylight

and the universe said you are the night

and the universe said the darkness you fight is within you

and the universe said the light you seek is within you

and the universe said you are not alone

and the universe said you are not separate from every other thing

and the universe said you are the universe tasting itself, talking to itself, reading its own code

and the universe said I love you because you are love.

And the game was over and the player woke up from the dream. And the player began a new dream. And the player dreamed again, dreamed better. And the player was the universe. And the player was love.

You are the player.

Wake up.

The End text is a powerful expression of subcreation in and of itself. The moving and profound experience so many players relate comes from how Gough's text takes the make-believe world of *Minecraft* very seriously, more specifically and articulately than anything in the gameworld of *Minecraft*. Compare the language, tone, and content of the text with the other articulations in *Minecraft*: the hissing of the creepers before they explode, or the humming sound of the villagers; the text is indeed at a higher level in terms of linguistic expression than anything else in the gameworld, and uses that sophistication to endow the secondary world of *Minecraft* with, to borrow Tolkien's phrase, "the power of giving ideal creations the inner consistency of reality".³⁸

The End text speaks of transformation in a loving universe, in a game that loves you, that has always treated the player as a world-maker. The expansive quality of the End text that connects the player to the universe, and their game experience to dreams and more, funnels to a sharp point with the final line, "Wake up." Some interpret this as a call to go out into the world and do things beyond



FIGURE 8.3 A LEGO set concretizes The End.

playing a game. Some connect this behest to the Herobrine myth, and collapse the End text into a dialogue between Notch and Herobrine, bringing it into the mythology and genealogy developed in the community. On one hand, even if Gough, admittedly not a big *Minecraft* player before Notch contacted him, was unfamiliar with the Herobrine story, Notch certainly was. On the other, the End text so powerfully exceeds the Herobrine story that the resonance seems just one more thread it encompasses in its meta-narrative. In an interview, Gough said he wanted to capture the moment of transition between the game and the real world:

I love the strangeness that comes when people get so lost in a game that the game becomes the world. Because you do get lost like that. Especially in something like *Minecraft*, that's so endless. You're actually startled to come back into your life at the end of it. So I wanted to play with that moment, where you're between two worlds, and for a short little period you're not sure which one is more real.³⁹

When people interpret the End text in this vein, as some do, it functions to call attention to how the game is potential space, how playing *Minecraft* brings you into something new where you have transformative experiences.

Transforming a Game into a Virtual World

Mods make *Minecraft* into more than a gameworld; *Minecraft* becomes a way to encounter every kids' culture supersystem I can think of, and quite a few adult imaginary worlds like those of the *Game of Thrones* and *Battlestar Galactica* franchises. It can even be a portal to *Portal* (2007). When I asked my sons, both eight

years old at the time, if they wanted to play a game with Batman in it (meaning the Wii game I was ready to produce dramatically from my bag), they said, yes, there's a mod for that. To them, *Minecraft* is the go-to portal through which they can, mostly on their own, access and acquire elements of the imaginary worlds that interest them, and do with them what *they* want. *Minecraft* is like the "Map of the Empire whose size was that of the Empire" in Jorge Luis Borges's one-paragraph story, "On Exactitude in Science" (1946), except that it is not a simulation trying to become simulacra, but a blocky abstraction sliding up and down Scott McCloud's picture plane. It does not overlay a physical geography, but a *virtual* one, shaped as much by cultural imagination as geographical reality. Perhaps the *Minecraft* generation is creating a perception of the world through the virtual, but an imaginative one, not a photorealistic version. Because the imaginary world of *Minecraft* is accessible technically and aesthetically, it can be a metaverse, a virtual universe in which virtual worlds exist and are connected.

A new generation is accustomed to playing, creating, communicating, watching, listening, and reading via *Minecraft*. That children and teens are having formative encounters with games, online social experiences, and user-generated content across media platforms through *Minecraft* suggests that the future for virtual worlds is robust. As youth grow accustomed to participatory imaginary worlds in which they can communicate with friends, customize avatars, create, play, share information, have fan experiences, follow characters and stories, compete in games, and strengthen media and computer skills in order to show off to and compete with their peers, they bring the elements of virtual world participation into everyday life. Since *Minecraft* emerged organically from single-player games into user-generated multiplayer synthetic worlds and a community-created virtual world, the experience of *Minecraft* is an experience of agency and empowerment.

Seen in this light, *Minecraft* redefines what an imaginary world can and will be, retaining the crucial properties of a virtual world: persistence, a network of participants represented by avatars, a shared sense of place, synchronous experience and communication made possible by networked computers, but also expanding to encompass participatory and transmedial affordances of an imaginary world. As potential space for transitional phenomena and transformational experience, *Minecraft* is not only a transitional object-to-think-with, a way for people to oscillate between concrete and abstract thought as they make meaning with their constructions, but also a way for people to cope with changes in the demarcation between the actual and the virtual.

Notes

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- 2 Mark J. P. Wolf, *Building Imaginary Worlds: The Theory and History of Subcreation*, New York: Routledge, 2012, Kindle Edition, pages 153–54.
- 3 Mary Foley, “Microsoft Strategy Vice President Teper: ‘Minecraft is a Development Tool,’” *Zdnet*, November 24, 2014, available at www.zdnet.com/article/microsoft-strategy-vice-president-teper-minecraft-is-a-development-tool/, accessed January 4, 2016.
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- 7 Mark J. P. Wolf, “Crafting and Mining True Interactivity: Building a World of World-Building,” Response to the Panel *Minecraft: More than a Game*, Society for Cinema and Media Studies Conference, March 2015, Montreal, Canada. I organized this panel as part of my research on *Minecraft*, and the present essay draws heavily on my paper for it and is indebted to the discussion of all the papers.
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- 9 Mihaly Csikszentmihalyi, *Flow: The Psychology of Optimal Experience*, New York: Harper and Row, 1990.
- 10 Michael Dezuanni, Joanne O’Mara, and Catherine Beavis, “‘Redstone Is Like Electricity’: Children’s Performative Representations in and Around Minecraft,” *E-Learning And Digital Media* 12(2), 2015, page 149; Jeffrey E. Brand and Penny de Byl, “Mining Constructivism in the University” in Nate Garrelts, editor, *Understanding Minecraft: Essays on Play, Community and Possibilities*, 2014, Kindle Locations 1049–1371; Iris Bull, “Foreclosing Possibility in Virtual Worlds: An Exploration of Language, Space, and Bodies in the Simulation of Gender and Minecraft” in Nate Garrelts, editor, *Understanding Minecraft: Essays on Play, Community and Possibilities*, 2014, Kindle Locations; Anne Burke, “Children’s Construction of Identity in Virtual Play Worlds—A Classroom Perspective,” *Language and Literacy* 15(1), 2013, pages 58–73.
- 11 Seymour Papert, “Papert on Piaget,” *Time Magazine’s Special Issue on the Century’s Greatest Minds*, March 29, 1999, page 105.
- 12 Catherine C. Schifter and Maria Cipollone, “Constructivism vs Constructionism: Implications for Minecraft and Classroom Implementation” in P. Isaias, J. M. Spector, D. Ifenthaler, and D. G. Sampson, editors, *E-Learning Systems, Environments and Approaches*, Berlin, Germany: Springer, 2015, pages 213–27.
- 13 Orepros, “If Notch Was Evil and Herobrine Was Good - Minecraft,” video, 2013, available at www.youtube.com/watch?v=7Fot5bQ8nmI, accessed Sept 16, 2016.
- 14 For example, see Brand and de Byl, “Mining Constructivism in the University”; Daniel Short, “Teaching Scientific Concepts Using a Virtual World—Minecraft,” *Teaching Science—The Journal of the Australian Science Teachers Association* 58(3), 2012, page 55; Michael Dezuanni, Joanne O’Mara, and Catherine Beavis, “‘Redstone Is Like Electricity’: Children’s Performative Representations in and around Minecraft,” *E-Learning and Digital Media* 12(2), pages 147–63. See also the websites *MinecraftEdu* available at <https://minecrafterdu.com> and *Massively Productive Minecraft*

- Network available at <http://socialmediaclassroom.com/host/MassivelyMinecraft/page/welcome-massively-productive-minecraft-community-educators>.
- 15 The role of the imaginary body is a major part of my larger animation and essay project, *The Animated Self*. See “Sound, Embodiment, and the Experience of Interactivity in Video Games and Virtual Environments,” Society for Cinema and Media Studies Conference, Chicago, Illinois, March 6–10, 2013, available at <http://lorilanday.com/sound/>. On phenomenology and the avatar body, see Denise Doyle, “Embodied Presence: The Imaginary in Virtual Worlds,” *Embodiment and Performativity, Digital Arts and Culture* 2009, Arts Computation Engineering, University of California—Irvine, December 12, 2009, available at www.escholarship.org/uc/item/2p326961 accessed December 15, 2015; Frank Biocca, “The Cyborg’s Dilemma: Progressive Embodiment in Virtual Environments,” *Journal of Computer-Mediated Communication* 3(2), September 1997, available at <http://jcmc.indiana.edu/vol3/issue2/biocca2.html> accessed December 15, 2015; Robert J. Moore, E. Cabell Hankinson Gathman, and Nicolas Ducheneaut, “From 3D Space to Third Place: The Social Life of Small Virtual Spaces,” *Human Organization* 68(2), 2009, pages 230–40; Donald Ihde, *Bodies in Technology*, Minneapolis, Minnesota: University of Minnesota Press, 2002.
 - 16 Mojang doesn’t publish demographics, but a 2011 poll on one popular *Minecraft* server, Hypixel, indicated the majority of players were in the thirteen-to-seventeen-year-old age bracket (Paul R. Messinger and Xin Ge, “Advertising in Virtual Worlds” in Matthew S. Eastin, Terry Daugherty, and Neal M. Burns, editors, *Handbook of Research on Digital Media and Advertising: User Generated Content Consumption*, Hershey, Pennsylvania: Information Science Reference, 2011, page 90). A 2014 *Huffington Post* article said, “reports suggest the biggest group are kids under the age of 15” (Ondi Timoner, “*Minecraft*: The Game that Captured a Generation through the Eyes of Serial Entrepreneur Jay Adelson”, *HuffPost Tech*, October 7, 2014, available at www.huffingtonpost.com/ondi-timoner/the-minecraft-generation_b_5900518.html, accessed 15 December 15, 2015).
 - 17 I’m playing with and remixing core concepts from Piaget, Papert, and Winnicott not because I don’t recognize the significant differences in their ideas, but because I glimpse, when put together, an insight about how children and adolescents are using *Minecraft* as both the object that is between me and not-me (Winnicott) and the object-to-think-with (Papert) as they toggle between concrete and abstract thinking (Piaget’s categories, reinterpreted based on twenty years of assigning constructionist projects in my college courses and my own learning practices). On the concrete in constructionism, see Sherry Turkle and Seymour Papert, “Epistemological Pluralism and the Reevaluation of the Concrete” in Idit Harel and Seymour Papert, editors, *Constructionism, Research Reports and Essays, 1985–1990*, Norwood, New Jersey: Ablex Publishing Company, 1991, pages 161–91. On Piaget and Papert, and relationship between abstract and concrete, see Edith Ackerman, “Piaget’s Constructivism, Papert’s Constructionism: What’s the Difference?” *Future of Learning Group* 5(3), 2001, page 438. On Papert and Winnicott, see Robin A. Hodgkin, “Cognitive Objects,” *Oxford Review of Education* 14(3), 1988, pages 353–62. On Winnicott and virtual worlds, see Victor Burgin, “The Location of Virtual Experience” in Annette Kuhn, editor, *Little Madnesses: Winnicott, Transitional Phenomena and Cultural Experience*, London–New York: I. B. Tauris, 2013, pages 56–74.
 - 18 On the avatar as Winnicottian transitional object, see Annick Janson, “Can Avatars Perform as Electronic Transitional Objects?” *International Journal of Learning And Media* 1(4), 2009, <http://ijlm.net/knowningdoing/can-avatars-perform-electronic-transitional-objects>,

- accessed December 15, 2015.. Also see Sherry Turkle on the computer as a transitional object.
- 19 “This is a very early test of an *Infiniminer* clone I’m working on. It will have more resource management and materials, if I ever get around to finishing it,” Daniel Goldberg and Linus Larsson, *Minecraft: The Unlikely Tale of Markus “Notch” Persson and the Game that Changed Everything*, New York: Seven Stories Press, 2013, page 94.
 - 20 Seymour Papert’s theory of constructionism emphasizes how learning happens through the construction of a shareable object. See Seymour Papert, “Situating Constructionism” in Seymour Papert and Idit Harel, *Constructionism: Research Reports and Essays, 1985–1990*, New York: Ablex Publishing Corporation, 1991, pages 193–206, available at www.papert.org/articles/SituatingConstructionism.html, accessed December 15, 2015. Papert’s ideas have been applied to *Minecraft*; for example, Schifter and Cipollone use Piaget’s constructivism and Papert’s constructionism as frames for evaluating *Minecraft* in education: Catherine C. Schifter and Maria Cipollone, “Constructivism vs Constructionism: Implications for Minecraft and Classroom Implementation” in P. Isaias, J. M. Spector, D. Ifenthaler, and D. G. Sampson, editors, *E-Learning Systems, Environments and Approaches*, New York: Springer, 2015, pages 213–27, page 215.
 - 21 Schifter and Cipollone, “Constructivism vs Constructionism”, page 219.
 - 22 *Ibid.*, page 217.
 - 23 Papert, “Situating Constructionism”, page 11.
 - 24 Seymour Papert, “Preface: Gears of My Childhood,” *Mindstorms: Children, Computers, and Powerful Ideas*, New York: Basic Books, 1980, page xx.
 - 25 *Ibid.*, page xx.
 - 26 The first was Copeland, who recalls putting Herobrine into a stream to “get a rise” out of people. Another streamer, Patimuss, also faked a Herobrine sighting, but then could be heard telling his wife it was a hoax. “After that people started doing their own Herobrine stuff and it exploded pretty fast. I kept pretending Herobrine was real for the better part of a year after the stream, and it was a meme in chat that my stream was real and Patimuss just faked a sighting to try to be popular” (*Minecraft Wiki*, “Herobrine/StreamStory,” June 8, 2013, available at <http://minecraft.gamepedia.com/Herobrine/StreamStory>, accessed 12 January 2016).
 - 27 The Diamond Minecart//DanTDM, “Minecraft | HEROBRINE IN THE LIBRARY!! | Animated Funny Moment,” video, 2015, available at www.youtube.com/watch?v=fEEYvyhylQw, accessed September 16, 2016.
 - 28 Jandy Gu, “A Craft to Call Mine Creative Appropriation of Minecraft in YouTube Animations” in Nate Garrelts, editor, *Understanding Minecraft: Essays on Play, Community and Possibilities*, Jefferson, North Carolina: McFarland, Kindle Edition, September 24, 2014, Kindle Locations 2665–9.
 - 29 Wolf, *Building Imaginary Worlds*, page 13.
 - 30 Gonzalo Frasca, “Simulation versus narrative” in Mark J. P. Wolf and Bernard Perron, editors, *The Video Game Theory Reader*, New York-London: Routledge, 2003, pages 221–35.
 - 31 Roger Caillois, *Man, Play, and Games*, 1958; English translation, New York: Free Press of Glencoe, 1961, page 27.
 - 32 Karen Ann Brennan, *Best of Both Worlds: Issues of Structure and Agency in Computational Creation, in and out of School*, Ph.D. dissertation, Cambridge, Massachusetts, Massachusetts Institute of Technology, 2013, page 25.

- 33 Wolf explains, “Deinteractivation usually involves the addition of narrative material, since the removal of interactivity often requires substituting a fixed series of events for the series of events that would otherwise occur as a result of the choices made by the user.” Wolf, *Building Imaginary Worlds*, 2012, page 263.
- 34 Rovio is a good example here, with 45 percent of their annual earnings in 2012 coming from IP licensing, not games. But in 2014, Rovio posted a 73 percent drop in earnings before income and taxes because of drops in merchandising. Consumer products dropped from 73 million euros to 41 million euros. Ingrid Lunden, “Angry Birds Maker Rovio Says 2012 Sales Up 101 percent to \$195M with Merchandising, IP 45% of That; Net Profit \$71M,” *Techrunch*, April 3, 2013, available at <http://techcrunch.com/2013/04/03/rovi0s-revenues-up-101-to-195m-non-games-45-of-that-net-profit-71m/>, accessed September 16, 2016. Dan Pearson, “Annual Rovio EBIT Down 73% as Merchandising Falters,” *Gamesindustry.Biz*, March 19, 2015, available at www.gamesindustry.biz/articles/2015-03-19-annual-rovio-revenues-drop-by-9-percent-as-merchandising-falters, accessed September 16, 2016.
- 35 “The iHole” is hard to find online. It was shortlisted for the BBC International Short Story Award, but legal issues caused Gough to make changes for the BBC broadcast. It was published in *An Apple a Day* (Jeremy Fernando and Julian Gough, *An Apple a Day*, Singapore: Delere Press, 2015, available at www.amazon.com/Apple-Day-Julian-Gough/dp/9810947674/ref=la_B0039STDGM_1_9?s=books&ie=UTF8&qid=1474753270&sr=1-9, accessed September 21, 2016.
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- 37 Simon Parkin, “The Secret to a Video-Game Phenomenon,” *MIT Technology Review* 116(4), June 2013, available at <http://www.technologyreview.com/review/516051/the-secret-to-a-video-game-phenomenon/>, accessed December 20, 2015.
- 38 J. R. R. Tolkien, “On Fairy-Stories” in Christopher Tolkien, editor, *The Monsters and the Critics and Other Essays*, New York: HarperCollins, 1997, page 138.
- 39 Chatfield, “Ending an Endless Game.”

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