Making the Virtual a Reality

Playful Work and Playbour in the Diffusion of Innovations

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Abstract

After raising US$2.5 million in a Kickstarter campaign for an inexpensive Virtual Reality (VR) display, the technology company Oculus revitalized the medium through collabourative production and a reliance on the avid participation of fans to make content. This paper investigates the impact of playful labour on the diffusion of innovations (Rogers 2003). Through a platform analysis (van Dijck 2013) of the Oculus Rift and semi-structured interviews with 90 VR adopters, it reveals how a production system based on "playbour" (Kücklich 2005) both shaped perceptions of the Rift as the de facto VR device and provided access to game developers at the expense of other professions. Ultimately, these findings are emblematic of an increasingly common practice: capitalizing on the playful experimentation and expenditure of enthusiasts/consumers in the adoption of innovations within the "tech" industry.

Keywords

Virtual Reality, Oculus, playful labour, collaborative production, platform analysis, diffusion of innovation

Introduction

When Oculus raised US$2.5 million in a 2012 Kickstarter campaign for an inexpensive Virtual Reality (VR) display, it revitalized the medium through collabourative production. The fundraiser surpassed its target goal in 24 hours—a major vote of confidence in the commercial viability of the long-struggling immersive media industry. However, the first headsets sent to funders were decidedly non-commercial: they were development kits (DKs) with which early enthusiasts were expected to create novel content. Therefore, playing with the "Rift" required skills in coding and a suite of complementary software such as the Unity game engine. As a result, those with expertise in gaming and programming gravitated to these head-mounted displays (HMDs) and most of all wanted to make games—immediately porting the fantasy adventure *Skyrim* and first-person shooter *Team Fortress 2*

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(Mitchell 2014) onto headsets. Such content solidified the public's impression that VR was for gameplay, a position the company reinforced (Kedmey 2015).

This in part explains the vitriolic reaction when Oculus was purchased for US$2 billion by social media giant Facebook in 2014. Instead of being celebrated as another boon to the budding industry, it pitted ardent gamers against the social and advertising platform: "Hope the swimming pools of money are worth selling out the VR dreams of every gamer in the world" (Harris 2019: 352) one fan decried online.

It is this strained relationship that motivates the paper. I will use the Oculus "Rift" headset, which has primarily represented the latest wave of VR, as a case study to investigate how a system built on the playful labour of early adopters impacts the diffusion of innovations (Rogers 2003). By design, Oculus' product enticed devotees to play with the technology as it evolved. At the same time, it bound them to specific ideologies embedded in the company and affiliated platforms.

Initially, I will review key literature on the Rift that focuses on the influence of gamer communities in its reception and inception. At the same time, Oculus' ethos and business model fit into the "platformisation of cultural production" (Nieborg and Poell 2018) where the ideologies, economics, and infrastructure of platform behemoths like Facebook make new innovations and users alike contingent on them.

A platform analysis (van Dijck 2013) clarifies the political economy and technical actors that shape the Rift; it finds that Oculus' prosperity was built upon the passionate labour and "playbour" (Kücklich 2005) of users who act as producers, testers and, ultimately, consumers for the device while it remains a niche product. To understand the effect of such a system on these "playbourers," interviews with 90 early adopters of commercial VR reveal the disparity between the device's potential creative and professional opportunities and the practical restraints surrounding it. However, those enthusiasts who willingly worked within these limitations happily engaged with the HMD.

Ultimately, the Oculus Rift is emblematic of an increasingly prevalent practice: incorporating and capitalising on the playful experimentation and expenditure of early consumers in the adoption of innovations within the "tech" industry.

Enter the Rift

VR has been the subject of research in communications and media studies for over three decades (cf. Biocca and Levy 1995). A majority of studies explore the efficacy of HMDs and virtual environments as tools for meaningful interaction and community formation through their ability to elicit empathy, presence, and immersion (cf. Herrera et al. 2018).

However, the technology is also inextricably linked to industry. In fact, Jaron Lanier coined the term "virtual reality" in part to describe products made by his company VPL Research. Corporate decision-making has driven the innovation's diffusion: for instance, Nintendo played an infamous role in the technology's commercial failure during the 1990s. Boyer pinpoints the business' missteps with the Virtual Boy headset—high price, headache warnings on the package, use of 2D rather than 3D games and lack of any embodied or immersive qualities—but argues that the console cemented Nintendo's status as a company with "innovative gaming concepts" (2009: 25). Such an example underscores how the intimate and intertwined relationship between business and consumer has determined the value and future of immersive media as much as any particular feature or affordance.

Oculus and the Rebirth of VR

Oculus ushered in the second wave of commercial VR diffusion. In the 2010s, autodidact Palmer Luckey, long obsessed with VR in science fiction, started posting his prototypes for HMDs to the "MTBS3D" forum, which focused on modifying and hacking existing headsets to improve their graphic fidelity and overall quality. From these early correspondences, Luckey connected with key figures in tech and gaming, including developer John Carmack and co-founders Brendan Iribe and Nate Mitchell. After forming Oculus, the three launched the Kickstarter campaign along with a series of demonstrations at gaming expositions like QuakeCon. The company then manufactured DK versions of the "Rift," starting with just the HMD and building in features (such as motion tracking) in subsequent versions. After its 2014 acquisition by Facebook, the commercial headset was released in 2016 with upgraded and mobile versions introduced each year after through 2019. The "Rift" itself was discontinued in 2019 when it was replaced by the "Rift S." For content, Oculus not only opened its own online market, but also is compatible with the popular Valve "Steam" store. Thus, the Oculus "Rift" is hardly a single device, but a constantly evolving agglomeration of hard- and software. Despite this, the company consistently maintained its reliance on the labour of users and ties to gaming culture. According to Ewalt, Luckey explicitly hoped that campaign funders "would start making software for the Oculus platform, building an ecosystem of games and applications that would eventually run on a mass-market consumer version of the device" (2018: 100).

Gaming

In the original Kickstarter, the Rift was advertised as "the first truly immersive virtual reality headset for video games" ("Oculus Rift: Step Into the Game" 2012). Golding (2017) examined how such depictions of the Rift, along with Luckey's predisposition, contributed to expectations of VR as a decidedly male experi-

ence. Harley (2019) further suggested that Luckey helped normalize "VR as yet another domain for white, middle-class men" (11) despite rhetoric to attract broader audiences. He contends that the "dominant games and cultures that its supporters venerated are ostensibly those that VR was meant to solidify" (ibid: 6). Simply, in order to flourish, Oculus tapped into the passion and even ideologies of existing "gamer" culture without addressing associated issues surrounding gender and misogyny.

Crowdfunding

The Kickstarter campaign also underscores the importance of early users' enthusiasm. Gleasure and Feller attribute its success to "anchor values" initiated on MTBS3D and embraced by fundraisers and funders: namely, "passionate amateurism rather than business ambition" (2016: 714), and collective understanding of the Rift as a communal object (ibid: 715), as well as a "shared source of validation" (ibid: 713).

Similarly, Ramakers (2015) proposes that innovation diffusion stemmed from a rich media landscape that promoted and trialed the HMD, including online social communities, technology blogs and other news outlets. Oculus' development relied in part on users and their input, be it monetary, in the case of the Kickstarter campaign, or cultural in their preoccupation on making a device for and by gamers. These groups formed common ideas around the medium even before a prototype was released, and championed the devices in a rich media environment, which included "enthusiast and mainstream journalistic articles, promotional media, individual blogs and publications [...] YouTube and online tutorials, conferences and festivals" (Foxman 2018: 71). Such a media ecosystem reinforced not only the economic value of the technology, but also companies like Oculus as major "players" (ibid: 71) in VR's future. Both studies emphasize the substantial communal effort and investment required for public acceptance. This type of unpaid digital labour has been acknowledged as an often-exploitative part of the crowdfunding process because it merely produces "the illusion of modified relations of production and of an inversion of the production cycle" (Karatzogianni and Matthews 2018: 96).

Such user-born labour and content is also a hallmark of digital platforms and/or multisided marketplaces. In his popular history of Oculus, Harris states the entire reason for Facebook's investment was a "platform strategy" (2019: 411) to corner the immersive market. As such, the capitalisation on gamer culture and user labour can be viewed in the broader context of the platformisation of cultural production.

Platforms and Platformisation

Oculus, even before its sale to Facebook, was rooted in an environment dominated by platforms that, unlike open-source software, controlled the creative processes of digital technologies. Nieborg and Poell (2018) categorize this as the "platformisation of cultural production," in which the underlying logic of platforms extends into "*economic*, *governmental* and *infrastructural* [original emphasis]" (4276) prerogatives by shaping multisided markets of content exchange, software limitations and ultimately user habits and activities. Subsequently, platformisation consolidates power into a handful of global "platform behemoths," including Google, Apple, Facebook, Amazon, and Microsoft.

The primary means by which platformisation prevails is through "contingency;" users, software and markets become dependent on the platform for their own production, development and distribution of services and products. Such contingency operates at multiple levels, but is perhaps most obvious in technical infrastructure, where developers are provided packages like application programming interfaces (APIs) and software development kits (SDKs) that simultaneously facilitate production for the platform while limiting access to its capabilities (as well as user information). Bechmann (2013) labels this as "intraoperability" to describe the power imbalance that occurs between providers and users who, ironically, drive the platform's success by providing it data and content. Thus, platformisation requires the labour of users to operate.

Playbour with Platforms

A comparable form of contingency exists between gaming communities and publishers, where players modify or "mod" existing games with novel content. Kücklich (2005) argued that such "playbour" capitalised on fan loyalty, added life and value to games, was a testing ground for ideas from both the publisher and community and even served as a recruitment tool. His concept grew from "free labour" (Terranova 2000) where the voluntary efforts of individuals specifically benefit digital service companies because they create "a data commodity that is sold to advertising clients as a commodity" (Fuchs and Sevignani 2013: 237). Intraoperability exacerbates these endeavors. It turns not only user-generated content (e.g., social media posts) and personal activity, but also professional development into free labour.

"Data labour" that is performed on platforms, ranging from fan activity to the performance of the self through social media applications, falls under the purview of playbour (Scholz 2017). Typical examples are Amazon and Yelp reviews where customers "are called upon to do what they love" (ibid: 88). Playbour is particularly evident in gamification where the use of "game elements" in "non-game context" (Deterding et al. 2011) allows for the playful exploitation of labour. Ferrer-Conill asserts that playbour not only muddies the distinction between "the coercive

nature of labour and the agency of play" (2018: 196), but it is precisely the "immaterial, emotional and affective connections" (ibid: 199) of players that power platforms and keep them relevant. Playbour through platforms simultaneously provides "new spaces of empowerment, as well as spaces of exploitation" (ibid: 197) for users. In other words, playbour inherently requires the passion of consumers to produce content outside traditional work.

Playbour also propels innovation. Van der Graaf notes that precarious playbour by modding communities satisfies both corporate needs for innovation, as described by Kücklich, and user desires for "problem solving, hacking, self-expression and portfolio building" (2017: 33). This may explain why playbour is integral to Oculus Rift's funding strategy and development. Varying degrees of playbour have been identified in the design of crowdfunding platforms (Fieseler et al. 2019), as well as identity formation of playtesters who, like early Oculus enthusiasts, play key roles in video game development (Bulut 2015). Pesch explicitly discusses the relevance of play in the adoption of the Oculus Rift, which enables developers to test VR headsets with a sense of familiarity because they associate it with traditional video games (2016: 2).

Since the Rift's development mirrors platforms, it provides an important case for understanding how play and playbour impact emerging digital innovations and compels several questions: What are the Rift's key platform features? How do they instill playbour into the practice of individuals? How does the relationship between play, labour and platforms affect individuals as they incorporate the Rift into everyday use?

Methods

Platform Analysis

To answer these questions a multimethod approach was undertaken: first with a platform analysis to gain a holistic view of the Oculus Rift. Van Dijck's analytic framework defies traditional media studies' tendency to "separate user-technology interaction from the organizational and socioeconomic structure" (2013: 25), which she regards as too interconnected to dissociate. Her goal is to at once "disassemble microsystems" (ibid) in order to "reassemble" (ibid) them within larger interconnected ecosystems. To do this, she draws on actor-network theory and political economy to regard "individual platform's microsystems as both *techno-cultural constructs* and *socioeconomic* structures [original emphasis]" (ibid: 27). Van Dijck suggests six interconnected areas of platforms on which to focus: *technology* or "computational architectures" (ibid: 29) including data, protocols and interfaces; *users and usage*, or the agency of the user, which she garners primarily through online responses (ibid: 33); *content* which she argues "draws out opinions

on what people like or dislike" (ibid: 35); the *ownership* structure of the platform company (ibid: 36) including partnerships with other businesses (ibid: 37); *governance* in the form of "license agreements (EULAs) or terms of service (ToS)" (ibid: 38) which show how "communication and data traffic are managed" (ibid); and finally *business models* by which the platform makes money.

Such an examination displays interconnections between these constitutive elements, especially technical and economic prerogatives, and simultaneously provokes "questions pertinent to the ideology and politics underpinning this ecosystem" (ibid: 44). This is particularly valuable when considering platforms in states of "interpretive flexibility" (Pinch and Bijker 2012) or the period in which new discoveries and technologies are negotiated before reaching a period of "stabilization" (ibid: 428). During such a generative phase, this kind of study discloses the agreed upon value of the platform to users, institutions, and corporations. Consequently, a platform analysis inherently involves a level of historicising, constructing a narrative by which to illustrate a platform in transition and development.

Material for this analysis was gathered inductively, following van Dijck's parameters, and included popular media and coverage of Oculus, its products and affiliated software, user responses as well as critical review of the terms of service and other legal documents. Collectively, it validates the Rift as a platform and identifies the specific technical, social, and economic features of the company in the context of cultural production.

Interviews

To evaluate how these features influenced actual users, semi-structured interviews were conducted with content creators, enthusiasts, and developers of VR hardware as part of a larger project studying the adoption of immersive media more generally (Foxman 2018). For this research, user perception of both Oculus and the Oculus Rift was scrutinized. From 2016 through 2017, interviewees were garnered from enthusiast meetups in the United States and a private VR lab which gave instruction in and supported content production. A total of 90 interviews were conducted. Interviewees were given the opportunity to remain anonymous and thus are not identified throughout the work. Slightly more than 75 percent of the participants were male which followed the general make-up of meetups. Seventy-six percent focused explicitly on development and content creation and were interested in using the Rift and other immersive technology to expand this work. Approximately a third of interviewees wanted to start or led their own businesses. Most simply wished to apply the technology to their own professions. Ultimately, these interviews impart a deeply personal reflection of the Rift as a platform and how play shaped participant's use and understanding of VR during the early stages of its commercial diffusion.

The Oculus Rift Platform

Using van Dijck's six components, the following disassembles the technical, cultural, and economic features of the Rift.

Technology

At its foundation, the Rift is not very different from previous versions of HMDs. "Immersive" media aims for the user to lose themself in a virtual world through what Bailenson considers the technology's most important affordance: "presence," or the sense of "being there" (2018: 3). The hardware facilitates this through not only "occlusion" which cuts off (primarily) visual perception from the real world, but also tracking, rendering and display (ibid: 21) which accommodate the natural movements of the head, eyes and even the rest of the body so the virtual world appears real. Oculus' ability to harness these key features at a relatively low cost is a primary reason for the company's ascendency. Furthermore, they continue to be upgraded: tracking for the original "DK1" development kit was limited to the head display, whereas the "DK2" included an external camera, which allowed for more freedom of movement. Despite this, the Rift (and Rift S) require significant power to produce their (relatively) high quality virtual experiences and thus can only run on expensive "gaming" computers, packaged with independent graphics cards, voluminous memory, and speedy processors. The HMD is tethered to this type of computer, as are all tracking components, with only hand controls being fully wireless.

The Rift technology was developed within a distinctly hacker culture. Harris (2019) describes Luckey's early involvement on modding forums as building "purpose-driven relationships" that were "imbued with a playful spirit of one-upsmanship" (11) where modders tried to outdo each other by producing cheaper and faster devices. Core myths surrounding the headset tout Luckey's "hacker's aesthetic" (Ewalt 2018: 95) since he cobbled the Rift together from disassembled smartphone components. Using the single screen from the "mobile phone boom" (ibid: 114) and glass lenses that reconfigured two distorted images into one for the viewer, his device was lighter with a wider field of view and a deeper sense of presence than other options at the time. While the commercial versions of the headset are more refined, they still retain this initial innovation. Most important, the Rift was enhanced through practices commonly found in Kücklich's original playbour model: the avid and competitive labour from VR fans whose hacking and modding laid the groundwork for the device.

Users and Usage

The hacker culture, assisted by media coverage, forged a distinct ethos around the Rift which fixated primarily on game development. This can be traced back to the MTBS3D and RetroMod forums (Harris 2019) that Luckey frequented, along with the earliest users and Kickstarter backers who championed his early concepts. Additionally, game companies and developers were some of the first to construct demonstrations for the Rift. Among them was Justin Moravetz who built a brick-breaking game *Proton Pulse* (ibid: 274) and Owlchemy Labs that wanted to port its indie game over to the device (ibid: 276).

However, after the Facebook acquisition, Oculus targeted not *just* gamers or gaming. Since presence can allow for various kinds of telecommuting, the company has particularly endorsed social uses for the Rift, what Egliston and Carter (2020) dub the "Oculus Imaginary." Noteworthy are two projects spearheaded by Facebook: "Spaces" allows for virtual rooms where users communicate through animated avatars; the bolder "Horizons" promotes an entire interactive virtual world. These efforts reflect Zuckerberg's vision of Facebook "[...] building the kind of social infrastructure that we believe will be important in the future" (Rodriguez 2019), a "Metaverse, the collective virtual reality [...] where user-controlled avatars could hang out, do business, and socialize" (Ewalt 2018: 113).

To reiterate, this direction unsettled initial users of the Rift who feared the loss of the platform's gaming aspects as well as their input in the product. Further, their antipathy was directed towards the "platformised" practices of Facebook, particularly surveillance and the collection of their data for profit. Ewalt quoted one forum poster: "I don't want a social platform [...] I want something I can attach to my face to help me forget there are other people" (2018: 116). He wrote others "worried that Facebook would ruin the Rift with embedded ads and intrusive data collection" (ibid: 116).

Content

Tension also manifests at the content level, where expectations about gaming clashed with more novel formats and experimentation. Most content fulfills fans' desires for games, a position reflected in the earliest coverage of the Rift and its version of the popular video game *Doom 3*. The game press wrote: "It's no exaggeration to say that [the HMD] transforms the experience of playing a first-person video game. It's beyond thrilling" (Welsh 2012). The notion that Oculus is prime for gaming continued even after its acquisition. The Rift's online store advertises top paid experiences as games, and even highlighted the best games of 2019 by type (e.g., RPG, Adventure and Action). Only two popular experiences are not explicitly for entertainment: a virtual desktop and a sculpting application as of this writing ("Top Selling" n.d.).

The emphasis on gaming also stems in part from software development kits (SDKs) which were a major objective of founder Brendan Iribe, who formerly worked at game company Gaikai: "Sure, the [Oculus] hardware is cool, but you've got no software [...] And what's the best way to accomplish that? An SDK" (Harris 2019: 67). Simply, SDKs provide code and demonstrations by which developers can "build comprehensive applications for a specific platform" (ibid: 67). They solved a formidable problem facing attempts to commercialise VR in the 1990s. Rather than making and coding proprietary content from scratch, developers could use existing software and distribute work beyond Oculus to other platforms. Rift SDKs were designed and made available first for the Unity and Unreal game engines. These packages were also instrumental in establishing an "intraoperable" relationship between Oculus, other platforms and ultimately creators. Since Oculus can regulate what second-parties get to test their software on its latest hardware, users must possess knowledge of such tools in order to construct virtual experiences; in this way, content must be adapted to Oculus' requirements rather than the other way around.

At the same time, the relatively easier point of entry afforded by SDKs permitted early experimentation within Oculus' technical parameters that diverged from gaming norms. One example is *The Machine to be Another*, in which two people wearing developer headsets swapped bodies, seeing the body of the other person as if it was their own. Developed by BeAnotherLab, this art installation was publicised for being a "radical take on the Oculus Rift's promise to let you simulate being anywhere or anyone" (Robertson 2014). However, commercial content for the Rift distributed through the Oculus store still is oriented mostly toward games.

Ownership

Facebook owns Oculus, purchasing the company just two years after it was founded by Luckey, Mitchell and Iribe. At the time, it was the third largest acquisition by Facebook, which has subsequently invested in other immersive companies like Beat Games, producer of the Rift's most popular title in 2019, the music/rhythm game *Beat Saber* (Carlton 2019). At first, Oculus was given relative autonomy. However, in 2018, after all three founders left the company, it became a division of "Facebook Technologies LLC," which houses the social media giant's hardware products. Users and media have speculated that the primary benefit of the Oculus acquisition has been a diversification of assets: rather than relying on advertising revenue exclusively, Facebook Technologies represents potential new profit centers in hardware and gaming (Gupta 2019).

While Oculus historically adhered to many of the norms of platformisation, as part of Facebook's ownership structure, it is fully enmeshed within them.

Governance

Forms of control within this environment become apparent through governance. Oculus equips developers with tools for production while simultaneously tightly regulating distribution. Their SDK documentation includes technical specifications and criteria—as well as sample code—on audio, sensors, controllers, and motion tracking. Further, they provide instruction on how to achieve benchmarks, and troubleshoot issues such as low frame rate, which can cause choppiness in the image and nausea in the viewer ("Guidelines for VR Performance Optimization" n.d.). Their distribution service, the Oculus store, is the impetus for such guidelines. Each submitted app must meet requirements in terms of image quality, audio, compatibility, security, etc. ("Rift Virtual Reality Check (VRC) Guidelines" n.d.). Regulations also prohibit any violence, nudity and sex, drug usage or "hateful imagery (such as swastikas, Pepe the Frog, or similar images whether they were offensive at the time of submission or become offensive later)" ("Content Guidelines" n.d.) in their store's art. Upon delivery, the content is reviewed for meeting specifications and can be published, rejected, or approved for use on the Rift without being featured on the store ("App Upload and Store Submission" n.d.). In this way, the platform firmly controls output to consumers.[1] While content creators can still develop material for pre-production, or use Valve's Steam store, Oculus' distribution channel is the default option.

The SDK, however, also supplies vital tools for developers, such as usage statistics including active users, number of installs, average device frame rate, unique users over the last seven days and even percentages of people that use gamepads or headphones with the devices (Flautt 2018). This data is allowed to be collected through extensive terms of service. Oculus' privacy policy sanctions the compilation of information from the platform, including "interactions with [their] Services, like information about the people, games, content, apps features, or other experiences you interact with including information collected through [...] third-party partners" ("Oculus Privacy Policy" 2019). Facebook also states that it will share "de-identified or aggregate data with others." Essentially, Oculus' policies and terms fall in line with other Facebook services. While intimate details of HMD use (such as recording individual movement or the rooms in which the Rift is played) do not seem to be shared or collected for potential advertising (Horwitz 2019), Facebook will amass other particulars to facilitate ads across their products (Vaas 2019).

Free labour is still part of the Facebook operating-plan. Both developers' content and consumers' gameplay are important modes of capitalization for the service, enabling sophisticated, targeted advertising.

1 The only way to get unapproved work to users is through the experimental "App Lab" which requires special URLs and keys for users to access (Heaney 2021).

Business Model

Oculus' business model therefore relies in part on the ability of its platform to engender information for ad sales on Facebook. Beyond this, the Rift diversifies Facebook's commerce by opening new hardware markets for the company. Hardware typically is a loss leader, but the Oculus store generated US$100 million by 2019, including both hardware and software (Matney 2019). Like similar platforms, Oculus retains 30 percent of all title sales, which are priced like other high-production (AAA) video games, with the rest going to the developer ("Set up Your Banking and Tax Information" n.d.). Content remains the (current) driver for the Rift, and thus continues to satisfy the gaming consumer base. This has prompted no shortage of articles questioning whether Facebook has recouped its investment (cf. Hoium 2018) particularly as it claims wider potential uses. However, it also affirms that the business model currently fits with gaming, playbour, and the platform economy.

Reassembling the Platform

The analysis identified that the Oculus Rift is deeply indebted to the intense and free labour of users. In many ways, its development mirrors the activities of modding and gaming communities, where there is an expectation for users to feed growth. Even the business model is, as of this writing, based on AAA platforms like the X-Box or PlayStation. In essence, the Rift is a comparable platform.

At the same time, the Rift's affiliation with Facebook embeds it even further within the platformisation of cultural production, where governance, ownership and future revenue streams are built around the acquisition of user data and tight "intraoperable" controls. Occasionally these positions can be at odds, particularly in regard to the divergent expectations of the gaming community and Facebook. However, platformisation ultimately capitalises on the playful work of individuals by giving them access to development through SDKs and aggregating user data. The device's platform molds not only the innovation as it comes to market, but also the activities of users as they play and create content for it.

Seeing is Believing: Interviews with Early Adopters

Adopters' perceptions corroborated the platform analysis and previous research on Oculus as a brand, especially regarding the authenticity of games, the importance of crowdfunding and the value of play. Overall, interviewees were optimistic about VR and their ability to make content for it despite barriers to access which precluded how the Rift could be used and mixed opinions about the company's direction. Pleasurable play occurred as part of the development and adoption

process but required being amenable to the technical and social parameters engendered by the device.

Although interviews were conducted before much of the aforementioned scholarship, they coincided with perceptions about the technology. Mention was made of the Kickstarter campaign, as well as early access through the DK1. One interviewee stated that it was when he read about the Kickstarter that he "realized very quickly this [VR] is going to happen [soon]." Enthusiasm was counterbalanced by disenchantment with Facebook's acquisition. Interviewees were skeptical about "what Facebook will do" with the platform after the first few years of its release.

The passion and efforts of the Oculus community was also credited for the development of the HMD. "It's still very much a grassroots community," stated one interviewee. Another described how after his first experience, he searched an Oculus forum and found the closest person to him with a device and drove hours to his house to borrow it. One adopter chronicled how he had started with "Android games," which led him to "3D game development" and ended with him finding the DK1 Kickstarter. However, the same emotions emanated from those with both gaming and more general backgrounds.

Aspirational Oculus

Not only did interviewees express optimism about the Rift and DK1, but also emphasized how the device represented something meaningful, real, and exciting for the future of VR. A long-standing fan said "I just tried the dev [kit]. [It was] the first thing I tried that really got me excited [...] that made me feel [it was] really accessible and tangible." Another anonymously donated to the original Kickstarter because bringing the HMD down to US$350 was a "big deal."

However, their optimism was tinged with aspiration. Interviewees referenced the Rift when imagining the future of commercial VR and their careers within it. The viability of the medium was made real by the Rift. In these cases, Facebook was viewed as an asset, able to sustain production, especially as hype around the devices began to fade: "It's going to be a big, big, big deal," stated one interviewee, adding "I mean it's Facebook. Facebook, they're pushing Oculus [...]" The investment guaranteed future jobs in the industry as it grew. One filmmaker went as far to say: "I had read about the Oculus sale. I had seen that happening and that's money in the bank." He told his wife they were moving to San Jose the next week.

For interviewees, the Rift was a ground-floor opportunity. They only needed to put in the hours and have the passion (as well as excess time to learn how to make content for it) to gain employment. As one interviewee put it, "If you have any object-oriented programming background, you can just [go] straight into Unity. If you don't then you [...] just have to learn Java or C# [...] And from there, there's tons of people who have published their findings on VR." Such skill attainment might seem daunting, but most enthusiasts did not view it as an insurmountable hurdle.

Playful Restraints

While aspirational desires were commonly voiced, interviewees were constricted by practical considerations. These included knowledge of interoperable tools to make content and the prohibitive cost of the Rift itself. One interviewee complained about the US$1000 computer and headset package. Another said the equipment was "so specialized that [...] it's not clear who's doing [VR]." Additionally, some respondents did not possess the technical background to develop for the Oculus. One detailed the excessive labour to port projects from the Rift to other devices. Some felt that the company concentrated too much on games, with an interviewee advocating for a more theatrical approach to design, which she felt it did not encourage.

The upshot was a homogenisation of both content and development. A respondent stated we were in a "console era" between the Oculus Rift and the HTC Vive, saying that it had "taken some of the fun out of it." By contrast, another successfully developed a suite of new apps because of his background working with the Microsoft Kinect. Therefore, content was limited, but so was access to the VR industry, which was more open to programmers and developers at the expense of other related professionals like filmmakers.

The implications of such homogenisation are notable. Caucasian males mostly dominate digital game making in the USA, which implicitly bars other demographics. A female interviewee commented about a gender gap within the gaming and VR communities which she actively resisted. Another decried how Oculus was dogged by issues surrounding misogyny and gender.

Such restraints shaded perceptions of the company itself: again, those from gaming and programming felt more positive about the Rift than those who did not hail from this selective group. A coder, for instance, characterized the industry as "extremely developer friendly" and how important it was for Oculus to get developers "up and running very quickly and creating a lot of content." This also suggests that the feedback about and reception of the DK and Rift was much narrower in scope despite the broader potential that adherents of VR envisioned. Because game developers were the pioneers, other voices went unheard.

Playing with the Rift

The sort of free and passionate labour that underlies theories of playful work suffused adopters' experiences, where they expected to and eagerly took on extracurricular activities to successfully become involved with the Rift and VR. A frequent refrain was how there were "all these packages created by Oculus... that you just throw into Unity and it's all fun and play." The challenge of working with the Rift's SDK, grasping technical specifications, and designing something rewarding drove enthusiasts. There was a distinct pleasure that they expressed

about the process. And, if they did not enjoy it, they abandoned the emerging medium.

One amateur developer's trajectory was paradigmatic of these practices. Like many, he became interested in the Rift via the Kickstarter, and started to make content after his first experience on a DK1 at Comic-Con. Among the experiences he designed was a prototype fighting game. When gifted with new Oculus "Touch" controllers, he was inclined to convert his project over as a "thank you" and to "impress" Oculus though the company might never see his final product. He immediately went into action compiling the few packages from Oculus to get the controllers working and making sure they were compatible with existing avatars. Just a few days before a public demonstration, he went into crunch mode, researching YouTube videos and documentation to help him flawlessly run the game with the controllers. Still working a day job, he spent "two or three nights" happily slogging through tutorials. The result was a project which not only made him proud, but also required inordinate labour to bring to fruition. In the end, though, his remarks suggest that meeting the challenge was worth the sacrifices.

There is a delicate balance between the fun of developing, the demands of mastering new technology and the substantial amount of labour necessary to make content. Rather than being merely a hobbyist activity, the playbour described here called for the retooling of skills to meet platform requirements during the little time a person has outside their workday. Lastly, aside from conforming to Oculus' technical standards, the motivation to make an impression drove excessive playful expenditure.

Discussion

The dual analyses disclose how a contemporary system of production fosters playbour. More so, the passion and free labour of producers/consumers, or their playbour, fuels this system and acts as the primary means by which it functions.

The platform analysis helped dissect the Rift's technical makeup and economic logic. The DK1 release (and subsequent versions, prototypes, and SDKs) situated the Rift as an innovation with which to be experimented and realised through individual effort. It also resided in an "intraoperable" software environment which allowed both Oculus and its partners to retain tight control over development, something still built into the governance of the device. However, those who had access, time, and ability to playfully develop for the Rift were offered exclusive admission to a burgeoning industry. As a consequence, a uniquely privileged group flocked to early versions of the Rift to make content. The enthusiasm of these adopters was something that then spread and was reinforced by a larger hacker/modder/playbour community. Developers shared information via forums, websites, and tutorial videos, increasing the value of their playful output. This free educational material assisted others who wanted to start experimenting with

content and promoted visions of the Rift's future. Finally, it provided feedback to Oculus. For instance, interviewees, particularly around the commercial release of the Rift, were circumspect about its inclusion of a traditional gamepad instead of new controls. It is unsurprising that now Oculus "Touch" controllers have become standard for all later versions of the device.

However, platformisation of this system established rules by which early adopters playboured with the technology. In essence, it set a tightly knit technical and social agenda: one where specific modes of development for the Rift were more interoperable than others and those with experience working within a game and app ecosystem could navigate and even find pleasure in their labour. It was not remarkable for interviewees to describe "messing with" the Rift as "fun." In fact, when I asked what they found "playful" in VR technology, experimentation in the development process was a common answer.

Yet, content was shaped in the image of that system rather than breaking from it. Enthusiasts almost invariably used existing SDKs for creating new material or modeled their designs after already manufactured products for the device. In other words, the Rift as a platform had distinct parameters (rules) that made it fun to plot, learn and construct content. This entailed adopting Oculus' perspective and revamping projects to fit it. However, to achieve results was hardly onerous, but, exciting and worthwhile for those who pursued it.

Adopters who did not conform to or defied these modes of production struggled to find success with the Rift and fulfill aspirations about VR through it. One interviewee gave up on the Rift all together when it stopped releasing compatible packages for his older Oculus DK, stating he did not want to be involved with a company that "keeps a kill switch in software."

While game developers and programmers might be delighted by the HMD, those without that level of expertise were stymied. This locks-in and entrenches the platform ideologies already stemming from Oculus and Facebook; it also establishes and narrows the future scope of an innovation to gaming while in an inchoate stage of interpretive flexibility.

Conclusion

This paper used the Oculus Rift as a case study to investigate how platforms and playbour affect the diffusion of commercial VR. An entire system of production, built around playbour, facilitated the adoption process, and formed not only key features of the platform, but framed who and how it was supported.

The study is limited historically and geographically, capturing the perceptions of primarily US-based enthusiasts shortly after the commercial release of the devices. Further research should venture beyond not only national borders, given that the VR community is so globally connected via tutorials and forums, but also capture the actual experience of early adoption.

What is clear is that the system within which adopters playboured was not wholly negative. Rather it tapped into the passion of a specific type of user and empowered them: for those with the background, energy, and time to devote to VR production, the Rift provided the opportunity to realize their dreams about a long-awaited technology and gain a foothold in the industry. Their playbour within the platformised and semi-closed environment developed by Oculus drove diffusion. For others without the acumen or desire to act in accordance with the rules of the road, a much rockier journey to adoption was ahead. At the same time, the byproduct of this arrangement was a perpetuation of the platform itself: Oculus (and Facebook) were able to maintain "intraoperable" control and cultivate a loyal fanbase inclined to learn and create content for their device, not to mention comply to the restrictions and cultural norms upon which the platform was built.

However, it is worth reflecting if the Rift simultaneously created a playful environment whose rules and strictures were ripe for subversion. Playful labour and platforms dictate the innovation's boundaries and policies. Most play within and by these, which results in the company's prerogatives (making games) being met by a distinct cohort of developers, programmers, and ardent enthusiasts. However, the very regulations that both sustain this system and exclude marginalised groups may also foster the means to circumvent it. After all, when a platform's practices are mastered and rules followed, adopters may not only delight in them, but also attain the capacity and knowledge to break them, which could lead to realising an innovation's potential beyond even the dreams of its inventors.

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