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Untitled. Illustration by Mika Edström

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Cultural Production of Video Games: Conditions of Control and Resistance

Sian Tomkinson and Tael Harper

Abstract: In this article we consider how much control gamers have over game culture and production, arguing that the monopolistic power of corporations has been challenged in many cases by resistant cultures. In the view of the Frankfurt School’s culture industry, ownership and control of the means of production translates into control over culture. Indeed, the high costs of production and platformisation has extended trends of consolidation and control in the video game industry. However, there is also evidence that this consolidation and control can be resisted by digitally native, active, and organised sub-cultures. Such moments occur, we suggest, in part due to the contingent and digital nature of video games, which allows digitally literate players to utilise tools and communities to resist the cultural control of platform owners. In the face of a general tendency to emphasise the winner-takes-all effects of platform technology, our research suggests that technological literacy and enthusiast communities can play a crucial role in governing game production. Examining the games industry, we show that, generally, cultural production is shaped by concerns around profitability, but under some quite particular conditions, the affordances of versatile digital technology can contribute to more idiosyncratic cultural production. We discuss examples such as the *Universal Windows Platform* (2019), *Minecraft* (2011) and *Star Wars: Battlefront II* (2017) to provide insight into ways that gamers have influence over video game production.

Keywords: Video Games, Cultural Production, Platformisation, Resistance, Capitalism, gameenvironments

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In this article we revisit and critique a technological determinist approach to

explaining cultural production in the digital age. As Google, Amazon, Facebook, Apple and Microsoft (GAFAM) each approach and pass US\$1 trillion in value, the argument that the current technological assemblage is leading to a winner-takes-all effect in cultural production is certainly compelling (Taplin 2017, Nieborg and Poell 2018). However, our research into the digital game industry indicates that this concentration of power is as much a product of cultural, social, political and legal norms as it is an outcome of technological affordances. Indeed, while others have identified the contingency afforded by digital technology as contributing to the consolidation of power (Nieborg and Poell 2018), such contingency actually makes digital production innately resistant to totalising control. Technology determines profound changes in ways of being and ways of seeing over time. However, the contingency of contemporary cultural production also suggests we have more control than ever over the production of culture. Such an argument has certainly been made by other scholars in the past, and is one that media and cultural studies readers will be familiar with. Our goal in this article is to provide specific insight into the production of videogames.

A contingent cultural commodity is one that is malleable, transportable, modular and “open to constant revision and recirculation” (Nieborg and Poell 2018, 4276). Digital games are contingent because their code can – at least in principle – be altered, patched, updated and modded. The contingency of digital games makes them a suitable case study for understanding the mode of production in the digital age; with the qualification that digital game players are also unusually *digitally native*. Unlike journalism and film, let alone storytelling and song, producers and consumers of digital games are, by and large, extremely familiar with digital forms of production, distribution, critique, and regulation. In our research on digital game production, we have uncovered examples where the indigeneity of digital games to digital culture

for conducting marketing campaigns” (Sun, interviewed in Ruggill et al. 2017, 55). Although budgets are rarely made public, Koster (2018) suggests that marketing costs are around 75 to 100 percent of triple-A development costs. While it is often difficult to find marketing costs for games, many of the numbers available are on the upper end of the scale. For instance, Eidos Montreal’s 2018 *Shadow of the Tomb Raider* (2018) cost around 75 to 100 million USD to develop, and 35 million USD to market (Dring 2018); and CD Projekt RED’s 2020 game *Cyberpunk 2077* (2020) cost nearly 148 million USD to develop and nearly 121 million USD to market and distribute (CD Projekt Group 2021). Indie games also need marketing (Whitson, Simon and Parker 2018), which can cost around 50,000 USD (Carroll 2017). Marketing can add a significant financial cost to game production and also a clear incentive to ensure alignment with an already popular platform. This provides both network and structural advantages to large enterprises and existing platforms.

Finally, economic considerations influence what kinds of games developers publish. While the top genre tags on Steam have remained relatively stable over time, yearly changes can significantly impact chances of success. For example, Johnson (2017) points out that the rapid increase of rogue-like, survival, and crafting games in 2014 meant that puzzle-platformers were unlikely to sell well. Genre is also a factor in the need for games to be streamer-friendly, as Twitch streams and reviews are increasingly important sources of information for players and advertising for companies (Johnson and Woodcock 2019, 676 and 684). To be successful, then, games must fit the market and, to improve chances of success be able to be appropriately displayed on streaming services. As a result, the need to be economically successful often constrains the kinds of games that developers produce.

Platforms

While the cost of developing digital games stifles creative production, this effect is further augmented by the often-explicit control of a small collection of powerful digital platforms that act as intermediaries for digital products and their audiences. GAFAM are particularly powerful in terms of providing both marketing and access to digital games (Nieborg and Poell 2018, 4276). This pattern of global oligopoly is replicated in the downloadable PC game market, where Valve (Steam) controlled somewhere around 50 to 70 percent of PC game sales in 2011 (later data unavailable) (Chiang 2011), and reports having 132 million monthly active players, 69 million daily active players, and 31.2 million new purchasers in 2021 (Steamworks Development 2022). Valve has come under fire for “written and unwritten rules” that enable it to exploit “its market dominance to threaten and retaliate against developers that sell games for less through other retailers or platforms” (Leonard 2022). The global oligopoly is also evident in the console market where Sony, Microsoft, and Nintendo effectively comprise the entire global industry. These console companies are “also heavily involved in both in-house and third party game development”, and exhibit control over publishing and retail sales (Kerr and Flynn 2003, 99). While the barriers to entry are lower in the mobile games market, these markets are still dominated by massive global technology companies such as Tencent, Sony, Apple, Microsoft, Google, NetEase, Activision Blizzard, EA, Nintendo, and Bandai Namco (Newzoo 2019).

As mentioned above, the consolidation of the industry is largely due to the financial expense of developing games, but as Nieborg and Poell (2018) have explained, these companies also exercise control by providing (and sometimes mandating) particular development tools and by using their network power to determine pricing structures and encourage particular content. As the key platform for PC games, Steam has a reputation for being quite unfriendly and opaque for indie developers, and for

consoles indie developers must submit their proposal to the brand before they can be licensed to develop for the platform. What we see here is something similar to the problems of monopsony on digital platforms, as described by Jonathan Taplin (2017), where there is just one middleman between the consumer and producer. This is more usefully described as an oligopsony in game production, where game developers have only a handful of very powerful companies to buy their games and subsequently support their development, promotion, and distribution.

As Kerr explains, game consoles function as a two-sided market comprised of consumers (players) and game publishers (2017, cited in Nieborg and Poell 2018, 4284). This means that game publishers control the means of production *and* distribution, leading to a winner-takes-all situation where a small number of franchises dominate (ibid.). In the same way that vertical integration makes it difficult for new companies to enter the market due to the high costs of licensing, marketing, production, and distribution, the two-sided market allows for certain platforms (and therefore companies) to become dominant, providing a wide range of games and services that cannot be matched by new entrants.

Historically, game companies have benefitted from ensuring that they have control over access to their platforms. When Nintendo released the Nintendo Entertainment System in North America in 1986, they controlled the quantity and quality of games developed for the system and promoted their own intellectual property. Since an influx of low-quality titles to the market was blamed for an industry downturn in 1983 (Wolf 2008, 29), Nintendo introduced its Seal of Quality. To obtain this seal, game designers had to “submit games, packaging, artwork, and commercials” for Nintendo’s authorisation; were limited to producing a certain number of titles per year; and were unable to produce games for other consoles for two subsequent years

(Kline, Dyer-Witheford and De Peuter 2003, 114). As Kline et al. note, such practices provided Nintendo with significant control over its platform, and a sizeable profit. There are many more recent examples of such industry giants enacting significant changes that impact how developers and publishers create and distribute games and, while many of these activities were ultimately abandoned due to backlash, they left their mark on the industry.

A recent example of platforms extending their control over cultural production is evident in the 2015 adoption of the Universal Windows Platform (UWP), an API developed by Microsoft that allows the same piece of software (such as a game) to run on all Windows 10 devices (Walton 2016a). However, software that runs on this platform must be sold through the Windows Store, where Microsoft takes a 30 percent cut of the price (Walton 2016a). Tim Sweeney, the co-founder of Epic Games, described the move as Microsoft “working to turn today’s open PC ecosystem into a closed, Microsoft-controlled distribution and commerce monopoly” (Sweeney 2016). Apple is equally capricious. In September 2019 Apple released Apple Arcade, a monthly subscription service that provides access to exclusive, curated games for Apple devices without advertisements or in-app purchases. But three days before the launch game developers were still unsure how they would be paid; whether “exclusive” meant that games would not be portable to Android (which meant a significant reduction in the potential market for any game); or how decisions would be made regarding keeping games in Apple Arcade (Swanner 2019). While it is still not clear how much of a cut Apple takes from game developers, they take 30 percent from sales in the App Store (Apple 2020). Five months after Apple Arcade’s release, *Vice* reported that most developers were reasonably happy with the service (Klepek 2020), although the lack of detailed information available on payment and management structures remains concerning, and some developers have had their

contracts cancelled by Apple as they have changed the Arcade’s strategy (Gurman and Schreier 2020).

Other examples of executive control include platforms banning games that are politically challenging, of which there are numerous examples from the past decade or so. In 2011, for instance, Molleindustria’s *Phone Story* (2011) was banned from Apple’s App Store. The app contains four minigames that critique exploitative mining practices in eastern Congo; suicides committed by factory workers in China; planned obsolescence; and eWaste. As Nieborg and Poell state, “[t]hese kinds of platform provisions have a clear chilling effect on developers who want to make artistic or political statements about gender (in)equality, labor exploitation, organized violence, or repressive governments” (2018, 4286). More recently, Google removed *The Revolution of Our Times* (2019) from its app store, a game where players role-played as a Hong Kong democracy protester, because it referred to “sensitive events” (Mickle, Horwitz and Kubota 2019). These examples illustrate how a propaganda effect limits where games are made available, which exerts a chilling effect upon what games are subsequently produced.

Finally, the largest digital games distribution platform, Valve, dominates the PC game market despite a record of exploitative practices. Games journalist Tim Colwill describes how Valve takes a 30 percent cut from developers, retains player data, and for years refused to give refunds on faulty products. Valve has a record of exploiting free labour, where promised payments to developers were not received (Colwill 2017). Colwill (2018) has also interviewed numerous developers who describe extreme punishments for any negative reviews; a lack of action taken on trolling or off-topic reviews; an expectation that developers will provide technical support in the forums; and little communication on price points in different countries. Changes that

Valve has made to its search algorithms and policies have also negatively impacted indie developers (Grayson 2019, Kerr 2021). Despite such complaints, since Steam controls so much of the PC market, developers often feel that they have no choice but to use the platform.

Re-examining the Claim of Exclusionary Platformisation

All of this evidence suggests that by being the only place where artists can effectively sell their material online, large game companies and digital platforms can issue demands about pricing and distribution that are essentially non-competitive and unfair to the artists. In addition, the increased costs of production and precarious nature of employment mean that unless one is at the very peak of the industry, it is becoming increasingly difficult to make a living through creating digital content (Bulut 2020, IGDA 2021, 45-46). It is difficult to articulate to what extent indie creators or hobbyists are engaging in self-exploitation or self-emancipation (Keogh 2021). While we argue that most game producers struggle to compete against large corporations because of an uneven playing field, that is because their experience is commensurate with the economic, social, and cultural conditions of late capitalism, not something unique to the games industry (Piketty 2014). On the contrary, there is significant evidence that game cultures can and do resist the control and consolidation of platforms.

In thinking about the affordances of platforms, it is worth reflecting on the optimism that greeted the emergence of the Internet as a means of cultural production. In 1997, Poster described that the "magic of the Internet" is the way it "radically decentralizes...the apparatuses of cultural production" (Poster 1997, 222). Much academic work has rightly criticised idealistic attitudes towards digital tools and

and Grabarczyk 2016). Indeed, many indie games are produced with little to no funding, and it is often safer to experiment as an indie developer (VanEseltine, interviewed in Ruggill et al. 2017, 219, Harvey 2020). While Unity is the paradigmatic example of a tool marketed at democratising game production, even clearly proprietary game design systems use tiered pricing systems to encourage use and engagement from all levels of games creators. For example, in 2020 Epic Games made its development software Unreal royalty-free for the first one million dollars in revenue (Epic Games 2022). The process of obtaining development kits from Microsoft, Nintendo and Sony significantly varies in terms of cost and ease of access (Limpach 2020, 56), although, as of July 2021, Microsoft’s Game Developer Toolkit is free (Gammill 2021). While these gestures arise from the platforms’ desire to encourage developers to create products for their platforms, it can also be understood to be encouraging a participatory culture.

Participatory Culture

Given the wealth of available support for game development, it is even possible to frame game development as occurring within a “participatory culture” that Henry Jenkins posited in opposition to the “mass/industrial culture” described by the Frankfurt School (Jenkins 2006a). To recap Jenkins’ (2009, xi) argument, a participatory culture is one:

- with relatively low barriers to artistic expression and civic engagement;
- with strong support for creating and sharing one’s creations with others;
- with some type of informal mentorship;
- where members believe that their contributions matter; and
- where members feel some degree of social connection with one another.

community that could see that this spoke to a shared creative essence. As well as being a product of a participatory culture, the game quickly developed a participatory culture of its own, with members able to create and share their creations and help each other gain expertise.

We do not mean to suggest that modding is utopian, without complications. Many scholars have discussed issues surrounding ownership of such content, as well as unpaid labour. Ekbia and Nardi (2017), for instance, note that although video game companies encourage modding, they can disable any mods that do not fit with how they want the game to be played. Prax (2019, 11) investigates *World of Warcraft* mods as an example of this, noting that it is very difficult for modders to “maintain control over their contributions” and receive recognition for their participation. Indeed, enabling mods is also a way for game developers/publishers to capitalise on modders’ free labour while retaining intellectual property rights (Kücklich 2005, Sotamaa 2010, Thorhauge 2022). In this sense, the modding community is somewhat indentured, as decision-making by the company typically does not extend to collaboration with players (Ekbia and Nardi 2017). This is not to say that modders are unaware of the system they are working within – indeed, modders tend to be aware of “the tension between the power of participation and the power of empire” (Postigo 2010), and are able to keep this in mind while taking pride in their creations and contributions to their game communities (Postigo 2007). The ability to engage with a broader community (beyond the platform/production team) is crucial to resisting platform power. In Prax’s (2019) *World of Warcraft* (2004) case study, for example, the modders had signed away their rights to discuss their work through a non-disclosure agreement. Such measures prevent discussions about unfair dealing in broader game culture. Conversely, the ability to engage and motivate a community is a central feature of our examples of the successful resistance to platform power.

The contingency of digital cultural products, however, means there are always ways of working around restrictions if you have enough cultural clout. While Valve controls 50 to 70 percent of the downloadable game market, its network effects were not strong enough to coerce Epic Games to release *Fortnite* (2017) on the Steam platform. Epic Games instead used its own platform to launch and support the game. It is the versatility of digital technology that enabled Epic Games to speak to and create its own separate community of players. Like *Minecraft*, despite being launched independently of any of the major game platforms or franchises, *Fortnite* is now one of the most valuable game properties in the industry, making 9.1 billion USD between 2018 and 2019 (Epic Games 2020). Similarly, both *Minecraft* and *Fortnite* have avoided being signed to an exclusive console or platform. Exclusivity is often demanded by platforms, as this can have a significant impact on hardware sales (Song, Jung and Cho 2017, 109), and so is typically used to promote certain game consoles. However cross-platform development tools have become increasingly available and as a result, it is harder for individual platforms to mandate and then protect the development of a platform-exclusive product, particularly when that product was developed by a third party (Srinivasan and Venkatraman 2018, 4 and 15). The contingency of the cultural product is the very thing that protects it from being monopolised.

The presence of crowd funding sites such as Kickstarter and GoFundMe has also limited the control that platforms and large developers have over which games are released and developed. Anthony Smith’s study showed that such arrangements not only allow potential players and communities to exercise some control over the style and content of the gameplay, but at least in some cases, their input can influence which platform the game would be released upon (Smith 2015, 205). Game developers can not only engage their playing communities to produce a better game, they can also use such engagement as a form of marketing; securing buy-in for a

Platforms such as Itch.io mean that small organisations can still produce and distribute games, even when they offer up content that might offend or be too small-scale for large producers. Indeed, Werning (2019) notes the prevalence of cheap, autobiographical, and highly idiosyncratic, and self-reflexive and media-reflexive games. For instance, *A Bewitching Revolution* (2019) is a short pay-what-you-want game “about a communist witch living in a cyberpunk city” (*A Bewitching Revolution* 2019), available on Itch.io and Steam. The player conducts Tarot readings that explain Communism, turns propaganda into solar panels, and starts a revolt. MolleIndustria’s satirical, critical serious games are generally freely available on their website. The availability of culturally minor, marginal and dissident material on platforms such as Itch.io is an indicator of the high level of artistic freedom and civic engagement in digital game culture.

Active Audiences

It is also apparent that game players and communities operate as a very active audience. Jenkins points out that media companies must allow their audiences some power in order to maintain their loyalty (Jenkins and Carpentier 2013, 273). Mihoyo, for instance, regularly conducts surveys in order to gain player feedback on games such as *Genshin Impact* (2020). The goal is to keep players engaged and invest in microtransactions; an extension of indentured culture. However, such forums, and the creation of active audiences on other communication platforms, have allowed players to have input on the future of the game. There have been a number of similar cases where the demands of the playing community have forced platforms and game companies to change their behaviour or their policies. For instance, Švelch describes how *Borderlands 2* (2012), *Counter-Strike: Global Offensive* (2012), and *Marvel Strike Force* (2018) players fought against patches by publicly criticising patch changes, organising gameplay offline, gaining the support of eSport organisers and boycotting

streamed game content. As a result of these community actions, the developers rolled back changes (Švelch 2019, 1603-1609). The digitally native aspect of the community means that they were relatively easily able to employ the decentralised communication platforms that the Internet provides such as Twitter, Reddit, Discord and Twitch to organise collective resistance and force game companies to make changes.

Even the largest companies and franchises are still subject to such community power, and the controversy surrounding EA's *Star Wars: Battlefront II* is an example of this (Jackson 2017). Players became angry at the prevalence of micropayments for loot boxes, which provided cosmetic bonuses *and* game advantages. Credits, gained through loot boxes and at a much lower number through regular play, could be used to unlock key characters such as Luke Skywalker at very high prices. When a Reddit user complained that after paying \$80 for the game Darth Vader was still locked, an EA representative responded with a message including "[t]he intent is to provide players with a sense of pride and accomplishment for unlocking different heroes" (EACommunityTeam 2017). As a result, *pride and accomplishment* became a satirical meme, and the comment became the most downvoted in Reddit history (EACommunityTeam 2017). Subsequently, among other changes, EA lowered the cost of some heroes, and eventually removed the ability to purchase crystals, which were used to purchase loot boxes (Jackson 2017). Ultimately, sales were one million lower than expected, and 5 million lower than its predecessor (Jorgensen 2018), in no small part due to such poor reception.

Another example comes from Microsoft's 2013 Xbox One launch, which was hampered by controversy when it was announced that the console would be *always online*. This meant that the console would need to connect to the Internet daily to

check licenses, hourly if accessing one’s game library from another console (343 Industries 2013). The Kinect, an always-on motion-sensing input device, would also be required. When the then-Microsoft creative director, Adam Orth, tweeted that players upset by this revelation should *deal with it*, he was met with a slew of criticism (McWhertor 2013). Ultimately Microsoft changed the system so that an internet connection was no longer required for offline games; removed the limitations to sharing and reselling games (343 Industries 2013); and unbundled the Kinect, but sales significantly lagged behind their competitor Sony’s PlayStation 4 (D’Angelo 2019). It is evident from these examples that players have some power to sway platform owners, and game producers generally pay careful attention to community sentiment.

A Circuit of Culture?

We argue, then, that while issues around cost and platforms play a huge role in shaping the digital game industry, aspects of culture are also intrinsically determining. This idea of an active audience and responsive industry suggests that we might better look to the notion of circuit of culture where cultures of production, consumption, regulation, representation, and identity all relate to and determine each other (du Gay et al. 1997). Examining how each of these aspects shapes cultural production in turn illustrates how culture itself influences every aspect of production.

One of the clear examples of how ideological issues of representation and identity can influence consumption and production is the peculiarly masculinised culture of digital game development. As Fron et al. (2007) have pointed out, the games industry generally is one where women and minorities are marginalised, not just by products that present caricatured stereotypes, but as also part of the hiring processes of work

teams, and practices of production. For instance, tech companies generally normalise a workplace environment that operates on a notion of crunch time that is irreconcilable with (feminised) care-giving roles. This amplifies a masculine workplace culture that also tends to be hostile to people and technologies that are foreign to “traditional (male) gamers” (Fron et al. 2007, 1). This “complex layering” of technological, economic and cultural power, Fron et al. point out, “has dominated the development of the digital game industry over the past 35 years” (ibid.). Despite improvement, the masculine working environment is still a significant issue in the industry (D’Anastasio 2019, Conditt 2021, IGDA 2021, Totilo 2022).

As exemplified by Gamergate, the culture that dominates digital games is not necessarily healthy or sanctified, but the contingent nature of cultural commodities does mean that this culture matters. During and after Gamergate there were many instances of game-related companies conceding to the demands of the gamer community. Gamergaters used social media to boycott companies in *Operation Disrespectful Nod*, where they sent massive amounts of emails to Intel because they had placed advertisements on games journalism website *Gamasutra*, which had published an article critical of Gamergaters. Intel removed the advertisements from *Gamasutra’s* website, a move criticised by Busch, Chee and Harvey (2016) as an abdication of corporate responsibility. Meanwhile, the contingency of digital media made it difficult to control the movement. When a 4chan administrator banned discussions of Gamergate and Quinn, they moved to 8chan. While Gamergaters were banned from Wikipedia, Github and numerous forums for organising harassment campaigns and spreading rumours, numerous other platforms willingly hosted pro-Gamergate content. The power of the audience encouraged these platforms to concede to morally unjustifiable behaviour.

While the circuit of culture model accounts for the important role that pre-existing culture plays in determining production, it also seems to suggest that culture pre-exists the means of production. Digital game culture is, however, inextricably bound up with the digital technological assemblage. We argue, therefore, that the circuit of culture model elides the central role that technology and software have played in determining how digital game culture is formed. This issue has been addressed by Benjamin Nicoll and Brendan Keogh, who have adapted the *circuit of culture* to *circuits of cultural software*, in an attempt to highlight the central role that software and technological assemblages play in computer game culture. Focusing on the free-to-use development software package Unity as an example of democratising cultural software, Nicoll and Keogh argue that such software tools encourage users to “adopt particular design methodologies”; cultivate “specific *literacies*”; and “govern the activities of their users” through the development of a homogenising software assemblage (2019, 4-5, emphasis original).

Nicoll and Keogh identify how the governance function of software determines the standard workflow, literacy, and “grain” (Nicoll and Keogh 2019, 63) (or look and feel) of cultural production. While this governance needs to appear responsive enough to ensure continued enrolment and allow for “transgressive and countercultural purposes”, the software invariably determines production in various ways, acting as a homogenising force at the same time. The “democratisation dispositif” (Nicoll and Keogh 2019, 101) works to enrol people in the use of the software, and ensure its spread, however:

“Unity has not democratised employment opportunities, nor has it addressed tendencies within studio environments to turn a blind eye toward issues of precariousness, toxicity, burnout and exploitation...[but] displaces the task of labour reform onto self-governing Unity users.” (Nicoll and Keogh 2019, 113)

While the “democratisation dispositif” (ibid.) thereby internalises neo-liberal values, many game developers still view the openness and accessibility of Unity as “a significant step forward from the proprietary engines that once stifled the field of production” (Nicoll and Keogh 2019, 113). As a result, they argue, “different constituents understand Unity’s mediations as empowering, diversifying, homogenizing, or threatening to the videogame field” (Nicoll and Keogh 2019, 8).

Like any other attempt to disseminate culture, the promotion of certain particular SDKs, APIs, and game development engines can be understood either as a form of imperialism, or as a moment of engagement and empowerment. Certainly, while the domination of a particular platform (or development software) is problematic, the opening up of that language for use, negotiation, and interrogation may, in itself, be a positive move for cultural production. While enrolment through the provision of SDKs, APIs, and proprietary software directly strengthens the network effects of the platform or company involved, there is also plenty of evidence that platforms and companies need to be sensitive to the actual needs of their producers and users. When the UWP failed to provide game features that Steam versions did (Walton 2016b), players and developers opposed its control over the market. Ultimately, the plan to force game developers to recreate their games using UWP was cancelled following poor reception and technological challenges (Warren 2019, Machkovech 2018). UWP has now been functionally superseded by a more open and flexible SDK, although developers can still use the platform if they have already become proficient in its use (Thurrott 2021). The needs of the audience, and the *contingency* of alternative options for developers, overrode the ability of the platform holder to mandate the use of their software to strengthen their own brand. This example illustrates how technology is both limited in its ability to facilitate true participatory culture, but also able to facilitate negotiations and alterations according to

community expectations.

The importance of community expectations here is crucial. As with the examples of participatory culture and the active audience in-game communities, the ability for game developers to communicate and organise collectively and in a relatively egalitarian manner is the genuinely democratising aspect of the new tools of cultural production. The same contingent digital technology that allows for the easy distribution of SDKs and development software also allows for the easy formation of development communities through relatively transparent and open means of communication. The availability of a diversity of communication and management tools here is crucial, allowing communities to exist without an exclusive reliance on any particular platform. Organising through Github or Reddit once again reprises the threat of incorporating and neutering a community's independence. However, precisely because of the contingency of digital technology, and the inherent digital literacy of game communities, there are always other ways for resistance cultures to organise.

Conclusion

The point of this argument is not to uncritically accept that cultural production now takes place in a utopian participatory culture that overrides the oligarchistic nature of digital platforms. As Jenkins points out, it is not effective to claim that

“nothing can or will ever change”, and nor is it effective to suggest that “progressive change is the inevitable consequence of new media systems rather than something we have to struggle toward every step along the way.” (Jenkins and Carpentier 2013, 266)

Rather, the evidence provided from the case study of digital games is to accept that

all cultural practices are shaped by the technological assemblage from which they emerge; and recognise that game cultures are almost uniquely digitally connected and literate. This level of online connection has meant that in cases where the community has been able to act collectively, cultural production has more directly served the interests of those communities.

As wealth inequality grows and the GAFAM platforms each approach or exceed the wealth of most sovereign states, accruing that value often by being an intermediary for other exploited vendors, there are real reasons to be critical and concerned about the effects of platformisation. However, this concentration of wealth also speaks to a problem with our culture – expressed through economic, legal, and social policies that allow this level of concentration of power without appropriate accountability. The same culture which allows this consolidation of wealth, at the same time facilitates the growth of the working poor, and it is this culture which has enabled most of the abuses attributed to the technologies of cultural production. Digital game communities clearly illustrate that it is possible for informed, motivated and digitally literate communities to resist this consolidation. If communities of interest resolve to find contingent ways of collectivising, platforms will either help or they will be left behind.

References

A Bewitching Revolution, 2019. [video game] (PC) Colestia. Available at <https://colestia.itch.io/a-bewitching-revolution>, accessed 3 March 2020.

Adorno, T. and Horkheimer, M., 1997. *The dialectic of enlightenment*. London: Verso.

Apple, 2020. *App Store: Principles and practices*, [online]. Available at <https://www.apple.com/ios/app-store/principles-practices/>, accessed 27 April 2022.

Benjamin, W., 1969. The work of art in the age of mechanical reproduction. Translated by Zohn, H. In: Arendt, H., ed. *Illuminations*. New York: Schocken Books, 217-251.

Black, J., Hashimzade, N. and Myles, G., 2017. *A dictionary of economics*, 5th ed. Oxford: Oxford University Press.

Borderlands 2, 2012. [video game] (multiplatform) Gearbox Software, 2K Games.

Bulut, E., 2020. *A precarious game: The illusion of dream jobs in the video game industry*. Ithaca: ILR Press.

Busch, T., Chee, F. and Harvey, A., 2016. Corporate responsibility and gender in digital games. In: Grosser, K., McCarthy, L. and Kilgour, M. A., eds. *Gender equality and responsible business*. Sheffield: Greenleaf Publishing, 31-45.

Cave Game, 2009. [video game] (PC) Markus Persson, self-published.

Carroll, J., 2017. The realistic guide to pricing indie game marketing. *Game Developer*, [online] 27 March. Available at <https://www.gamedeveloper.com/business/the-realistic-guide-to-pricing-indie-game-marketing>, accessed 28 April 2022.

CD Projekt Group, 2021. *CD PROJEKT Group audio webcast – FY 2020 financial results*, [online]. Available at <https://www.cdprojekt.com/en/presentationtype/conference-calls/?accounting-year=2020>, accessed 28 April 2022.

Chiang, O., 2011. The master of online mayhem. *Forbes*, [online] 9 February. Available at <https://www.forbes.com/forbes/2011/0228/technology-gabe-newell-videogames-valve-online-mayhem.html#2826544a3ac0>, accessed 27 May 2020.

Chomsky, N. and Herman, E. S., 1988. *Manufacturing consent: The political economy of the mass media*. New York: Pantheon Books.

Colwill, T., 2017. Valve is not your friend, and Steam is not healthy for gaming. *Polygon*, [online] 16 May. Available at <https://www.polygon.com/2017/5/16/15622366/valve-gabe-newell-sales-origin-destructive>, accessed 27 February 2020.

Colwill, T., 2018. Steam developers speak: Maximum profits for Valve, minimum responsibilities. *Polygon*, [online] 19 October. Available at <https://www.polygon.com/2018/10/19/17959138/steam-valve-developer-support-pricing-reviews>, accessed 27 February 2020.

Conditt, J., 2021. Inside the sexual harassment lawsuit at Activision Blizzard. *Engadget*, [online] 5 August. Available at <https://www.engadget.com/activision-blizzard-lawsuit-discrimination-abuse-video-163056567.html>, accessed 28 April 2022.

Counter-Strike: Global Offensive (CS:GO) 2012. [video game] (PC, PS3, Xbox 360) Valve and Hidden Path Entertainment, Valve.

Cyberpunk 2077, 2020. [video game] (multiplatform) CD Projekt Red, CD Project.

capitalism. Cambridge: MIT Press.

Epic Games, 2020. *Finance board presentation*, [online]. Available at <https://assets.documentcloud.org/documents/20696836/epic-apple-trial-epic-games-exhibit.pdf>, accessed 27 April 2022.

Epic Games, 2022. Frequently asked questions (FAQ). *Unreal Engine*, [online]. Available at <https://www.unrealengine.com/en-US/faq>, accessed 28 April 2022.

Fritz, B., 2012. Star Wars: The Old Republic – the story behind a galactic gamble. *LA Times*, [online] 20 January. Available at <https://web.archive.org/web/20130220151641/http://herocomplex.latimes.com/games/star-wars-the-old-republic-the-story-behind-a-galactic-gamble/>, accessed 27 December 2018.

Fron, J., Fullerton, T., Morie, J. F. and Pearce, C., 2007. The hegemony of play. In: *DiGRA '07 – Proceedings of the 2007 DiGRA international conference: Situated Play*, Tokyo, 309-318. Available at <http://www.digra.org/digital-library/publications/the-hegemony-of-play/>, accessed 20 November 2018.

Fortnite, 2017. [video game] (multiplatform) Epic Games, Epic Games.

Gammill, K., 2021. Meet the Microsoft Game Developer Kit (GDK). *Microsoft Game Dev Blog*, [online] 20 July. Available at <https://developer.microsoft.com/en-us/games/blog/meet-the-microsoft-game-developer-kit-gdk/>, accessed 28 April 2022.

Garda, M. B. and Grabarczyk, P., 2016. Is every indie game independent? Towards the concept of independent game. *Game Studies*, [online] 16(1). Available at <http://gamestudies.org/1601/articles/gardagrabczyk>, accessed 26 February 2018.

Genshin Impact, 2020. [video game] (multiplatform) miHoYo, miHoYo.

Gillespie, T., 2018. *Custodians of the internet: Platforms, content moderation and the hidden decisions that shape social media*. New Haven: Yale University Press.

Grayson, N., 2019. Steam's big discovery update is hurting some indie developers' games. *Kotaku*, [online] 16 September. Available at <https://kotaku.com/steams-big-discovery-update-is-hurting-some-indie-devel-1838157117>, accessed 28 April 2022.

Gurman, M. and Schreier, J., 2020. Apple cancels some arcade games in strategy shift to keep subscribers. *Bloomberg*, [online] 1 July. Available at <https://www.bloomberg.com/news/articles/2020-06-30/apple-cancels-arcade-games-in-strategy-shift-to-keep-subscribers?sref=ExbtjcSG>, accessed 28 April 2022.

129

Habermas, J., 1989. *The structural transformation of the public sphere: An inquiry into a category of bourgeois society*. Translated by T. Burger. Cambridge: MIT Press.

Harper, T., 2017. The big data public and its problems: Big data and the structural transformation of the public sphere. *New Media and Society*, 19(9), 1424-1439. DOI: <https://doi.org/10/gbtpn>.

Harvey, A., 2020. Freedom from the industry standard: Student working imaginaries and independence in games higher education. In: Ruffino, P., ed. *Independent*

Videogames: Cultures, Networks, Techniques and Politics. Milton: Taylor and Francis, 248-262.

Herman, E. S. and McChesney, R. W., 2001. *The global media: The new missionaries of corporate capitalism*. London: Continuum.

Hill-Whittall, R., 2015. *The indie game developer handbook*. New York: Focal Press.

Horkheimer, M. and Adorno, T., 1987. *Dialectics of enlightenment*. Translated by Cumming, J. New York: Continuum.

IGDA, 2021. *Developer satisfaction survey 2021: Summary report*, [online] International Game Developers Association. Available at <https://igda.org/resources-archive/developer-satisfaction-survey-summary-report-2021/>, accessed 28 April 2022.

130

Jackson, G., 2017. A guide to the endless, confusing Star Wars Battlefront 2 controversy. *Kotaku*, [online] 22 November. Available at <https://www.kotaku.com.au/2017/11/a-guide-to-the-endless-confusing-star-wars-battlefront-ii-controversy/>, accessed 27 May 2020.

Jenkins, H. and Carpentier, N., 2013. Theorizing participatory intensities: A conversation about participation and politics. *Convergence*, 19(3), 265-286. DOI: <https://doi.org/10.1177/1354856513482090>.

Jenkins, H., 2006a. *Convergence culture: Where old and new media collide*. New York: New York University Press.

Jenkins, H., 2006b. *Fans, bloggers and gamers: Exploring participatory culture*. New York: New York University Press.

Jenkins, H., Purushotma, R., Weigel, M., Clinton, K. and Robison, A. J., 2009. *Confronting the challenges of participatory culture*. Cambridge: MIT Press.

Johnson, E., 2017. Missing the mark: The importance of market fit. *Gamasutra*, [online] 18 July. Available at www.gamasutra.com/blogs/ErikJohnson/20170718/301540/Missing_the_Mark_The_Importance_of_Market_Fit, accessed 26 July 2017.

Johnson, M. R. and Woodcock, J., 2019. The impacts of live streaming and Twitch.tv on the video game industry. *Media, Culture and Society*, 41(5), 670-688. DOI: <https://doi.org/10/gfrjkw>.

131

Jorgensen, B., 2018. EA's 'Star Wars Battlefront II' misses expectations – market talk. *Dow Jones Institutional News*, [online] 30 January. Available at <https://www.proquest.com/wire-feeds/eas-star-wars-battlefront-ii-misses-expectations/docview/1992517800/se-2>, accessed 3 March 2020.

Keogh, B., 2021. Hobbyist game making between self-exploitation and self-emancipation. In: Sotamaa, O. and Švelch, J., eds. *Game production studies*. Amsterdam: Amsterdam University Press, 29-46.

Kerr, A. and Flynn, R., 2003. Revisiting globalisation through the movie and digital games industries. *Convergence*, 9(1), 91-113. DOI: <https://doi.org/10/dhj6kf>.

Kerr, A., 2019. *Global games: Production, circulation and policy in the networked era*. New York: Routledge.

Kerr, C., 2021. Steam refund abuse has Summer of '58 developer Emika Games considering hiatus. *Gamasutra*, [online] 27 August. Available at https://www.gamasutra.com/view/news/387574/Steam_refund_abuse_has_Summer_of_58_developer_Emika_Games_considering_hiatus.php, accessed 28 April 2022.

Klepek, P., 2020. Five months in, here's what developers think of Apple Arcade. *Vice*, [online] 21 February. Available at https://www.vice.com/en_au/article/xgqvea/five-months-in-heres-what-developers-think-of-apple-arcade, accessed 27 February 2020.

Kline, S., Dyer-Witheford, N. and De Peuter, G., 2003. *Digital play: The interaction of technology, Culture, and marketing*. Montreal: McGill-Queen's University Press.

Koster, R., 2018. The cost of games. *Venture Beat*, [online] 23 January. Available at <https://venturebeat.com/2018/01/23/the-cost-of-games/>, accessed 27 February 2020.

Kücklich, J. (2005). Precarious playbour: Modders and the digital games industry. *The Fibreculture Journal*, 5. Available at <https://five.fibreculturejournal.org/fcj-025-precious-playbour-modders-and-the-digital-games-industry/>, accessed 24 March 2021.

Leonard, M., 2022. Valve loses bid to end antitrust case over Steam gaming platform. *Bloomberg Law*, [online] 9 May. Available at <https://news.bloomberglaw.com/class-action/valve-loses-bid-to-end-antitrust-case-over-steam-gaming-platform>, accessed 13 May 2022.

Limpach, O., 2020. *The publishing challenge for independent video game developers: A practical guide*. Boca Raton: CRC Press.

Lolli, D., 2019. 'The fate of Shenmue is in your hands now!': Kickstarter, video games and the financialization of crowdfunding. *Convergence*, 25(5-6), 985-999. DOI: <https://doi.org/10.1177/1354856518780478>.

Machkovech, S., 2018. My confusing, 10-day journey to getting a UWP game to work on Windows 10. *Ars Technica*, [online] 3 October. Available at <https://arstechnica.com/gaming/2018/10/my-confusing-10-day-journey-to-getting-a-uwp-game-to-work-on-windows-10/>, accessed 26 February 2020.

Marcuse, H., 1964. *One-dimensional man: Studies in the ideology of advanced industrial society*. Boston: Beacon Press.

Marvel Strike Force, 2018. [video game] (Android, iOS, iPadOS) FoxNext and Scopely, FoxNext and Scopely.

Marx, K. and Engels, F., 1974. *The German ideology*. New York: International Publishers.

Marx, K., 1990. *Capital*. London: Penguin Books.

McWhertor, M., 2013. Ex-Microsoft creative director Adam Orth on dealing with internet hate and toxicity. *Polygon*, [online] 6 November. Available at <https://www.polygon.com/2013/11/6/5075106/adam-orth-xbox-one-gdc-next>,

accessed 3 March 2020.

Mickle, T., Horwitz, J. and Kubota, Y., 2019. Apple, Google pull Hong Kong protest apps amid China uproar. *Wall Street Journal*, [online] 10 October. Available at <https://search-proquest-com.ezproxy.library.uwa.edu.au/docview/2302922917?accountid=14681>, accessed 27 February 2020.

Microsoft, 2017. *Universal Windows Platform* [computing platform] Microsoft, Microsoft.

Minecraft, 2011. [video game] (multiplatform) Mojang Studios, Mojang Studios.

Newzoo, 2019. Top 25 public companies by game revenues, [online]. Available at <https://platform.newzoo.com/general-rankings>, accessed 27 April 2022.

Nicoll, B. and Keogh, B., 2019. *The Unity game engine and the circuits of cultural software*. Cham: Palgrave Macmillan.

Nieborg, D. B. and Poell, T., 2018. The platformization of cultural production: Theorizing the contingent cultural commodity. *New Media and Society*, 20(11), 4275-4292. DOI: <https://doi.org/10/gdcf7f>.

O'Donnell, C., 2012. The North American game industry. In: Zackariasson, P. and Wilson, T. L., eds. *The video game industry: Formation, present state, and future*. New York and London: Routledge, 99-115.

Garrelts, N., ed. *Understanding Minecraft: Essays on play, community and possibilities*. Jefferson: McFarland and Company, 7-22.

Revolution of Our Times, 2019. [video game] (PC) Spinner of Yarns, Spinner of Yarns.

Ruggill, J., McAllister, K., Nichols, R. and Kaufman, R., 2017. *Inside the video game industry*. New York: Routledge.

Shadow of the Tomb Raider, (2018) [video game] (PC, PS4, Xbox one) Eidos-Montréal, Square Enix Europe.

Shenmue III, 2017. [video game] (PC, PS4) YS Net, Deep Silver.

Smith, A. N., 2015. The backer-developer connection: Exploring crowdfunding's influence on video game production. *New Media and Society*, 17(2), 198-214. DOI: <https://doi.org/10.1177/1461444814558910>.

Smith, M., 2018. How much does it cost to setup a gaming company and make a game? *Gamasutra*, [online] 4 June. Available at https://www.gamasutra.com/blogs/MichaelSmith/20180604/319306/How_Much_Does_it_Cost_to_Setup_a_Gaming_Company_and_Make_a_Game.php, accessed 27 February 2020.

Song, H., Jung, J. and Cho, D., 2017. Platform competition in the video game console industry: Impacts of software quality and exclusivity on market share. *Journal of Media Economics*, 30(3), 99-120. DOI: <https://doi.org/10/ghp4rr>.

Sotamaa, O., 2010. When the game is not enough: Motivations and practices among computer game modding culture. *Games and Culture*, 5(3), 239-255. DOI: <https://doi.org/10.1177/1555412009359765>.

Srinivasan, A. and Venkatraman, V.N., 2018. Architectural convergence and platform evolution: Empirical test of complementor moves in videogames. *IEEE Transactions on Engineering Management*, 1-17. DOI: <https://doi.org/10/ghp4rs>.

Star Wars: Battlefront II, 2017. [video game] (PC, PS4, Xbox one) DICE, Electronic Arts.

Steamworks Development, 2022. Steam – 2021 year in review. *Steam*, [online] 9 March. Available at <https://store.steampowered.com/news/group/4145017/view/3133946090937137590>, accessed 27 April 2022.

Švelch, J., 2019. Resisting the perpetual update: Struggles against protocological power in video games. *New Media and Society*, 21(7), 1594-1612. DOI: <https://doi.org/10/ghp4tj>.

Swanner, N., 2019. Apple Arcade: Game developers still don't have answers they need. *Dice*, [online] 16 September. Available at <https://insights.dice.com/2019/09/16/apple-arcade-game-developers/>, accessed 27 February 2020.

Sweeney, T., 2016. Microsoft wants to monopolise games development on PC. We must fight it. *The Guardian*, [online] 4 March. Available at <https://www.theguardian.com/technology/2016/mar/04/microsoft-monopolise-pc->

[games-development-epic-games-gears-of-war](#), accessed 26 February 2020.

Taplin, J., 2017. *Move fast and break things: How Facebook, Google, and Amazon cornered culture and undermined democracy*. Boston: Little Brown and Company.

Thorhauge, A. M., 2022. The steam platform economy: From retail to player-driven economies. *New Media and Society*, 1-21. DOI: <https://doi.org/10.1177/14614448221081401>.

Thurrott, P., 2021. Microsoft officially deprecates UWP, [online] 19 October. Available at <https://www.thurrott.com/dev/258377/microsoft-officially-deprecates-uwp>, accessed 28 April 2022.

Totilo, S., 2022. Eight more women allege sexism at PlayStation, intensifying lawsuit. *Axio*, [online] 10 March. Available at <https://www.axios.com/sexism-playstation-lawsuit-sony-e0f42c61-8467-4940-884a-1885eb8189ff.html>, accessed 11 March 2022.

Tyni, H., 2020. Double duty: Crowdfunding and the evolving game production network. *Games and Culture*, 15(2), 114-137. DOI: <https://doi.org/10.1177/1555412017748108>.

Ubisoft, 2021. *Ubisoft reports full-year 2020-21 earnings figures*, [online]. Available at <https://www.globenewswire.com/news-release/2021/05/11/2227490/0/en/UBISOFT-REPORTS-FULL-YEAR-2020-21-EARNINGS-FIGURES.html>, accessed 27 May 2022.

Ubisoft, 2020. *Ubisoft reports full-year 2019-20 sales and earnings figures*, [online]. Available at https://ubistatic19-a.akamaihd.net/comsite_common/en-

[US/images/04ubisoft%20fy20%20earnings%20pr%20english%20final_tcm99-361804_tcm99-196733-32.pdf](https://www.ubisoft.com/press/04ubisoft%20fy20%20earnings%20pr%20english%20final_tcm99-361804_tcm99-196733-32.pdf), accessed 27 April 2022.

Walton, M., 2016a. Epic CEO: “Universal Windows Platform can, should, must, and will die”. *Ars Technica*, [online] 4 March. Available at <https://arstechnica.com/gaming/2016/03/tim-sweeney-to-microsoft-universal-windows-platform-can-should-must-and-will-die/>, accessed 26 February 2020.

Walton, M., 2016b. Microsoft needs to stop forcing console-like restrictions on Windows Store PC games. *Ars Technica*, [online] 29 February. Available at <https://arstechnica.com/gaming/2016/02/microsoft-needs-to-stop-forcing-console-like-restrictions-on-windows-store-pc-games/>, accessed 26 February 2020.

Warren, T., 2019. Microsoft’s Universal Windows Platform app dream is dead and buried. *The Verge*, [online] 30 May. Available at <https://www.theverge.com/2019/5/30/18645609/microsofts-universal-windows-app-dead-microsoft-store-windows-store>, accessed 26 February 2020.

Werning, S., 2019. Itch.io and the one-dollar-game: How distribution platforms affect the ontology of (games as) a medium. *On_Culture: The Open Journal for the Study of Culture*, 8, 1-23. DOI: <http://geb.uni-giessen.de/geb/volltexte/2020/15093>.

Whitson, J. R., Simon, B. and Parker, F., 2018. The missing producer: Rethinking indie cultural production in terms of entrepreneurship, relational labour, and sustainability. *European Journal of Cultural Studies*, 24(2), 606-627. DOI: <https://doi.org/10.1177/1367549418810082>.

Wolf, J. P., 2008. The early days (before 1985). In: Wolf, J. P., ed. *The video game explosion: A history from PONG to Playstation and beyond*. Westport: Greenwood Press, 29.

World of Warcraft, 2004. [video game] (PC) Blizzard Entertainment, Blizzard Entertainment.

Zackariasson, P. and Wilson, T. L., 2012a. Introduction. In: Zackariasson P. and Wilson, T.L., eds. *The video game industry: Formation, present state, and future*. New York: Routledge, 1-14.

Zackariasson, P. and Wilson, T. L., 2012b. Marketing of video games. In: Zackariasson P. and Wilson, T.L., eds. *The video game industry: Formation, present state, and future*. New York: Routledge, 57-75.

343 Industries, 2013. Xbox One: A modern, connected device. *Xbox News*, [online] 6 June. Available at <https://news.xbox.com/en-us/2013/06/06/connected/>, accessed 3 March 2020.