Fairness by Design: The Fair Game and the Fair Price on a Blockchain-Based Marketplace

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Abstract It is often believed that blockchain technologies can ensure fairness in online transactions and interactions. What does 'fair game' mean in a blockchain-based game, which rules cannot be broken by design, and how does this relate to the concept of a 'fair price'? In this chapter, I use the example of the best known blockchain-based game CryptoKitties (2017) to explore the idea of a 'fair price' both in theory and in practice, and to connect it to the concept of fairness in games. I turn to the essential works on fairness and cheating in game studies and check whether game ethics is applicable to so-called 'money games' on blockchain. Theoretically, decentralization of blockchain technology supports the idea of fairness; however, in practice, the game follows the same grey moral code as the preceding online games and virtual worlds. I suggest that the applicable understanding of fairness can be found in the 'code is law' principle that underlines both normative game studies and the ideology of blockchain.

Keywords Blockchain · Blockchain games · Technology ethics · Fairness · Virtual economies

1 Introduction. Why CryptoKitties?

CryptoKitties [46] is one of the longest-running games that utilize blockchain technology. Initially, the game was built on the first version of the Ethereum platform [4], although it exists in a transitional state between different blockchains since the Ethereum network was clogged in 2020 [20]. According to the original game design, its players could trade game tokens—'kitties'—for the cryptocurrency Ether, and then exchange it for other cryptocurrencies, real world money and goods [10]. Unsurprisingly, the possibility to cash out earnings afforded ethically questionable behaviour such as speculation [26], in the form of seeking "the maximum benefits

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from market fluctuations" [26], while, potentially, manipulating the prices [43], often at the expense of less experienced participants. The game itself, however, attracted its share of devoted players; to distinguish between economic and playful activities in the game, Lee et al. suggest separating item-selling, which is most often driven by speculative motives, from item purchasing, gifting, and breeding, which constitute the entertaining communal aspect of the game [26].

Initially, the developers of the game pursued educational goals: namely, they aspired to make blockchain technologies accessible to general public [10, 36]. However, broad audiences initially became aware of CryptoKitties because of the ridiculously expensive purchases that happened in the first month of its existence [7]. Some suggested that some of these purchases could be connected to money laundering, pointing at the infamous "Cat named Dragon", which was sold for 600 ETH (US $170,000 at the time) [11]. Is it a fair price for this token? Is this kitty worth the money? In the remainder of this paper, I will explore the origins of the playful ethics that exist in blockchain-based games.

Not long after their introduction, digital 'kitties' entered less playful markets of crypto assets such as Uniswap [44]—I suggest this was the moment when the economic component of CryptoKitties eventually overshadowed it as a game. Still, as long as the game was consensual and financially profitable for at least some of its most economically-minded players, is it possible to call it unfair? After all, the authors who speculate about the possible future of blockchain suggest that this technology can enable algorithmic fairness and nurture pro-social behaviour [8, 24, 31, 32] due to decentralization and wider participation. Still, blockchain-based games remain a niche entertainment, not least, due to high participation costs that, in the case of most popular games, require several hundreds of US dollars to even start playing actively (e.g. [39]; this was also author's experience with CryptoKitties). It is true that blockchain technologies grant everyone equal access to 'crypto games'—which is considered fair in the design philosophy of blockchain [24]. However, as LaPointe and Fishbane describe in their ethical framework for blockchains, fairness of such design is not the same as equity of opportunities for different categories of users [24].

2 Artificial Scarcity on Blockchain

Can blockchain technology make a virtual marketplace fair? Generally speaking, unfair advantage can be gained through misinformation or concealment of crucial information about the trade by one side (which is often the case in CryptoKitties, see [34]). Blockchain platforms address this problem by offering transparency of all transactions across the blockchain (unless a specialized 'mixing' service is applied, which is effective but also costly). To achieve this, blockchain platforms utilize cryptographically protected immutable ledgers of all transactions kept on each node of the network and updated in a decentralized way (e.g. by reaching consensus between a particular set of nodes). To add another level of fairness, the Ethereum platform, which was launched in 2015, introduced so-called 'smart contracts' that

automate transactions based on the pre-defined rule sets (some of such contracts can still be changed or terminated by the developers) [4]. Due to these features, blockchain is widely imagined as a technological enabler of trust [29] and even democracy [4] in the future.

In public blockchains, ethical behavior is further enforced by the proof-of-work architecture that incentivizes so-called 'miners' to verify only the rightful transactions. This architecture ensures trust between the parties that do not trust each otherwise—at least, this was the goal of Satoshi Nakamoto, the mythical creator of Bitcoin. Initially, Nakamoto designed a limited supply of Bitcoin, thus introducing the idea of value based on scarcity to the Bitcoin community; in his project, he hoped "to pick something that would make prices similar to existing currencies" [29]. This idea remains an integral part of a widely shared imaginary of Bitcoin as 'digital gold' [33], inspired by the cryptolibertarian agenda of the community, albeit not without emancipatory potential, as also seen from the left [1].

In short, the idea of scarcity-based value had been already established in cryptocurrencies, at least, on the semiotic level [28], long before cryptocurrency-based games. When the latter first appeared, their game designed incorporated 'artificial scarcity' as a seemingly natural basis for value, which can be seen from the white paper that described CryptoKitties' design. According to the creators of this game, the aim of their product was to explore digital scarcity and digital collectibles within the innovative space of blockchain technologies. An elaborate system of attributes and traits, 'genes', mutations and generations would ensure relative rarity, or, at least, highly uneven distribution, if not actual scarcity, of certain tokens in the game. However, the effective sales prices of tokens with different attributes were rarely aligned with their actual scarcity [37, 38]. Logically, if scarcity was the key to fair prices, it would be only reasonable to create a calculator of relative value based on scarcity. Nevertheless, despite several attempts in the community, this was never fully realized. The most commonly used calculator, KittyHelper, only shows 'the price floor', which the lowest price on the market for tokens with different traits and attributes. As of 2021, the average price for different categories of tokens is not present in its interface, because it appears to mean very little in the game. Same as on markets of real-life collectibles, big buyers are mostly concerned about the rarest and most valuable tokens, and such tokens are evaluated case by case, quite similarly to antiques or art works in the real world.

Rarity and uniqueness seem to be more productive, even if almost unpredictable, criteria to construct potential value of a 'cryptokitty' than scarcity. Uniqueness is literally in the name of a non-fungible Ethereum token (NFT), which each 'kitty' represents. Meanwhile, unpredictability is in the core logic of the game, which challenges luck, rather than skills, of its players. When the developers state that every blockchain token is unique, they suggest that there is always the chance that it will acquire higher value in the future—which is exactly the case of the Cat named Dragon. Paradoxically, it should be worthless according to the rules of the game, as it does not have any special attributes that would make it scarce. To the experienced player of the game, it is remarkable for its lack of any marketable traits that would allow it to sell it for any reasonable price. Still, the 600 Ether transaction is real and

registered on blockchain with no possibility to revert it, be it a mistake. We may say that it is the immutable record of this trade that actually assigns the declared value to the otherwise worthless kitty. Since the historical event of its purchase, the Cat named Dragon has been holding the unique title of the most expensive 'kitty' in the world, and if its owner decides to resell it, there will be enough competing buyers to raise its price even higher.

Scarcity was not the only economical concept for the developers of the game to play around: they also introduced mechanisms to evaluate demand for particular tokens. While the open market was set up to determine the prices of 'second hand' tokens, the fair price of the 'first hand' tokens was decided by the reverse auction [10]. The 'smart contract' established the initial price of these so-called Generation 0 'kitties' based on the state of the market; the price slowly decreased with time, and players would buy the token when its price matched their assumption of its value. This would be fair enough to establish the price equilibrium, at least, on the first-hand market; however, as soon as the game was exposed to human players, its initial logic was immediately subverted in many speculative practices. Most economically-thinking players immediately took to 'flipping', which means reselling tokens for profit, typically short term [37]. In order to fetch the rarest or the cheapest kitties, most technically savvy players immediately started creating trading bots—a practice that appeared to be unfair to the players who could not afford a bot or did not know programming. This created a new form of information asymmetry that allowed most wealthy and educated players to win the game consistently in the economic terms [34]. However, when asked directly, these players still consider the game general fair.

Gradually, the community deciphered the complete 'genome' of CryptoKitties, built 'breeding calculators' and even 'autobreeders' based on it [12], which sometimes made human participation in the game rather inefficient. Still, all this was considered a meaningful part of the game—playful practices that were commonly accepted by the core player base as 'fair'. When I started my research of pricing in CryptoKitties, my goal was to find a meaningful distinction between 'fair' and 'unfair' price. It took me a long time to realize that my subjective ethics do not apply in the virtual world. For instance, many players set the prices far above the expected price on the market, and novice players sometimes buy into this—their loss! I first saw it as unfair, but it appears to be a universally accepted way to play—same as negotiating at a bazaar. When I asked the players about what they consider fair in the game, some of them suggested that an inflated price is not unfair, as this is also a part of play. Later, I asked the developer of another successful blockchain-based game in a private conversation, how they differentiate between honest players and speculators, and he replied: "All players are speculators! This is the essence of the game". The same can be said about CryptoKitties, which demonstrates once again that the concept of a 'fair price' appears to have a playful dimension that complicates any economic description of it, as well as ethical evaluation.

To sum it up, neither reverse auction nor calculation of relative scarcity would be sufficient to establish what is considered a 'fair price' in CryptoKitties. Same as at oriental bazaars [18], also used for video game trading [13], the pricing is always performative and relational. In the end, the idea of a 'fair price' seems to

emerge from dynamic trading practices and social relations: generally, the community has some kind of a shared idea about what is fair in the game at each particular point of it. Although this question of 'right' and 'wrong' prices has always baffled the community of blockchain gamers, the inevitable information asymmetry and completely puzzling unpredictability of prices never 'spoilt the game' for its core players.

3 Why Are Games not Always Fair?

The question of (un-)fairness appears to be much more complicated in game studies, as well. A game is considered fair when everyone has an equal and fair chance to win the prize that is proportional to their input [5]. Cheating creates the unfair advantage for the cheater [9], although this unfairness is often perceived rather than calculated. In mainstream game studies, a fair game is often understood more broadly as an ethical game [40]. All its players not just get even or fairly proportional chances to win, they also have an equal right to enjoy the game in general. This right comes with the responsibility of being a 'virtuous player' who cooperates with other players, avoids cheating and confrontation other than in a rule-driven combat or competition. This is the desired norm in several foundational works of game studies [6, 21, 40], as well as many later developments of video game ethics.

Edward Castronova, a game economist, was one of the first to study fairness in virtual worlds. He developed his vision based on early multiplayer games such as Ultima Online and Second Life. Castronova is also one of the most consistently neoliberal scholars: he sees the purpose of play in accumulation of 'gaming capital' based on meritocracy. To comply with this purpose, virtual worlds must have pre-designed conditions and rules set by the 'coding authority'; these rules are deemed fair if the player accepts them. For instance, if a game world reproduces gender inequality, a player is free to leave this world for a different one with different rules "in which both genders are equally skilled and equally objectified", supposedly built by a nongovernmental organization to prove their point [6, p. 142]. Such ethical code is based on a set pre-defined external rules that do not account for internal conflicts of a social systems. Theoretical 'fairness' is easily distorted to sanction unfair and antisocial behaviour towards less privileged or simply less lucky members of the gaming community. The rules of such community are still negotiable, even if not always 'virtuous': for instance, the members of a particular online game to be unfair to female players, but punish cheating, deception and antisocial behaviour in other situations [41].

The question of practical game ethics has been reframed by Mia Consalvo in her empirical study Cheating. Gaining Advantage in Videogames [9]. Her studies of 'gaming capital' reveal that it does not always correspond to the rational ideal of 'meritocracy', but is rather a construct within the existing economic and social relations that arise in and around gaming cultures. Gaining and especially maintaining and acknowledging symbolic capital in games implies that the gamer shall not cheat.

Gaming communities usually have some kind of a shared vision of fairness, as well as communal agreements that support pro-social interactions and enable joyous and relatively conflict-free collective play.

Let us take a closer look at some of the multiple understandings of cheating that Consalvo's research reveals. For instance, in the eyes of some players, unfairness comes from gaining an advantage from the external information that does not belong to the space where the game challenge is taking place. From this viewpoint, cheating is use of any other sources of information apart from the affordances of the game itself [9]. Meanwhile, if we apply this understanding to the game of CryptoKitties, we will find it unfair by design. It seems to have run on informational asymmetries from the start: for example, unequal opportunities between the players who can and cannot code, and, of course, the privileged position of those who already had a history of owning cryptocurrencies. Finally, it would be impossible to play the game without referring to external sources of information in the first year of its existence: the game mechanics were obscure, and it did not even have a complete player guide [12]. Players had to leave the 'magic circle' of the game and ask the community how various features of CryptoKitties worked. Even though there was very little drama in the community as compared to an average server of a multiplayer game, there was always the risk that the early adopters would play a trick or two on the newcomers, which would typically cost them certain amounts of the cryptocurrency Ether. In the end, limiting the access to the external sources of information would make it almost impossible to play the game, as its very point was exploration of the novel blockchain technology.

Unsurprisingly, the inherent informational asymmetry between seasoned players and newcomers have not resulted in a particularly healthy market. Due to it, the prices on the marketplace were often intentionally inflated far above the generally agreed benchmark with the hope to catch a clueless newbie or an ignorant 'crypto whale', or generally to manipulate the price level for certain tokens. All this is nothing new in multiplayer games: Consalvo mentions similar fraudulent transactions, aimed to inflate prices of in-game objects, in the early digital children's game Whyville in 2006 [9, p. 117]. Allegedly, the same techniques has been consequently used on the emerging markets of NFTs in 2021.

Yet another conceptualization of fairness, according to Consalvo, states that the game is fair when it is played truthfully to the game code and design. Consalvo connects this idea to the 'code is law' principle, which she finds in Lawrence Lessig [9, p. 90]. This is where we discover the genetic link between the understanding of 'fairness' in video games and on cryptocurrency markets. Many blockchain adopters reproduce the same belief as Lessig, which originated from the early cyber-anarchism [16]. To them, 'code writers' of the internet are also its 'lawmakers'. To 'play fair' is to act according to the affordances of the code, allegedly designed in an 'algorithmically fair' way. This may seem redundant, as the rules set in smart contracts cannot be broken by design [4]; however, interests of other players or market participants are not a part of this rule-based technocentric ethical system. According to its adopters, exploitation of weaknesses of other players is fair as long as the pre-established rules are followed and the original code of the game is not corrupted. It must be noted,

though, that communities of blockchain adopters have their own ethical code that prohibits openly anti-social behaviour such as stealing another person's cryptocurrency or 'mining' it on someone else's property without permission [3, p. 96]. Speaking of CryptoKitties, there have always been ambiguous cases that tested even this, rather straightforward 'law is code' principle, such as trading bots or exploits that allowed gaining Ether by force-executing the 'birthing contract'. However, there are no coded rules in the game that would discourage speculation. The code of the game puts no limits on the price one might want to value their property for sale, so they are free to name any price (such as, 600 Ether for the Cat named Dragon), and other players are free to pay the price if they have the money. It is the responsibility of players to reduce information asymmetry and 'do their own research' before conducting a trade.

4 Designing Fair Competition

According to the normative game ethics, players become moral beings by following the rules of the game. This remains true if the rules of the game violate personal ethical code of players in real life, e.g. in violent games. From the perspective, as presented by Miguel Sicart, the player-subject is defined by the rules of the game, and her main virtue is fidelity: "The fidelity of the player is present as long as her actions are coherent with the game rules and the game world, and do not contradict a rule" [40, p. 74]. When we study games as ludic systems that consist of rules, we have to accept that in-game rules override extraludic ethics—which, by the way, can also be used in productive and positive ways to create ethically interesting games, as Sicart later describes in more detail.

Following the rules is particularly important in multiplayer games. Sicart stresses that cheating breaks the game experience: it is detrimental not only for the cheater, but for other players as well. By prioritising the rule system of the game, its ethics appeal to the broader technocratic "code is law" principle. Such rule-based game ethics rightfully dominate in highly competitive games: most of such games are not about reaching the consensus between the participants and certainly not about the situation when everybody wins. To the contrary, competitive games always include an element of justifiable suffering, such as the risk to lose, to feel frustrated and humiliated. The ethical threshold for the potential harm is decided by the community, and, just as any social rules, it is always highly contextual and constantly negotiated. Nguyen and Zagal come up with two criteria for ethical competition: "It depends, first, on consent and second, on the motivational set-up of the players" [30], namely, their willingness to endure a certain degree of violence. As a result, there is no ethical problem in spoiling the game for the disadvantaged (i.e. less experienced) members in many multiplayer games, as long as everybody follows the rules of the game itself.

This leaves designers of multiplayer games with the almost impossible challenge to make the competition as fair as possible, at least, at the level of the game system, which some players will inevitable try to exploit, while others will complain and

threaten the developers. Skewed chances in the game are the usual source of discontent (the second one being game developers, personal and professional qualities). As early as in "Synthetic Worlds" [6], Castronova observes early gaming communities trying to negotiate with developers about a fairer and more balanced game—a scene familiar to anyone who has ever participated in any multiplayer game, from Destiny 2 to FarmVille 2. Mia Consalvo provides a similar description of the world of Final Fantasy XI. Speaking of virtual economies, players may even require developers to prevent other players from gaining an unfair advantage by financial means [22].

Is fair competition even possible? It appears that Roger Caillois disputed the possibility of fair competition in games long before digital games even came into being [5]. As long as players of a game originate from different social stratas, they will always have advantages and disadvantages predefined by their access to wealth, education and training, before the game has even begun. The only case of absolutely fair competition appears to be gambling, and exactly this mechanics lies at the core of CryptoKitties [35]. Gambling, however, is unethical when it becomes an addiction, and this side of blockchain-based games also needs urgent research.

In summary, the rule-based approach to game ethics, which prioritises games as systems, is not without its merit: it provides novel creative opportunities and relative simplicity of designing and running games. Still, we might wonder how following external rules makes us a 'virtuous player': these rules could have been set by a potentially immoral subject or a corporate entity such as a business firm, who produce almost all popular games. Besides, this type of game ethics does not protect the underprivileged, such as the players who do not have enough symbolic or financial capital to participate in a game to the fullest degree—or just those who have entered the game at a later stage. In the end, CryptoKitties was not designed as a competitive game—it was envisioned as creative exploration of blockchain technologies that everyone could try for themselves. Unfortunately, this Utopian project ended up in much frustration for casual and not particularly wealthy players.

5 Second Morality?

Literature on cheating suggests that buying in-game wealth and power on external markets for real money is often considered an unfair advantage [9, 22]. Interestingly, 'crypto game' developers are very eager to give the players the right to buy and sell their in-game rewards for real money, which contrasts with the traditional ethics of early MMO games, where buying and selling items violated implicit and even explicit rules of the game[9, p. 164]. Today the ability to buy and sell in-game upgrades, power-ups and particularly mighty weapons became the basis for extensive monetization [27], especially in the free-to-play games that are sometimes criticized as 'pay to win'. Upon closer inspection, almost all blockchain-based games are 'pay to win' by design, but this is the topic for another time.

As for now, almost all online games have internal virtual economies and markets for various digital commodities. Prices are usually set by developers, publishers,

or game marketing specialists—in other words, some kind of a 'coding authority'. Some multiplayer games (for instance, Team Fortress 2 (2007) and Counter Strike: Global Offensive (2012) published by Valve) and virtual worlds, such as Second Life (2003), have peer-to-peer markets where players can trade in-game objects and set their own prices. As soon as the prices get out of control of the 'coding authority', speculation with digital commodities flourishes, sometimes despite all technological limitations and preventive measures, on which honest and virtuous players insist. An early case of such speculation in massive multiplayer online games has been first thoroughly described in an autoethnographic study by Julian Dibbell, later published as a personal narrative [14].

For the most part, the spirit of CryptoKitties is reminiscent of these 'grey' markets of virtual goods sprawling around the Steam game platform and even external 'black' markets of game items and characters in multiplayer games such as World of Warcraft. These game markets of the not quite forgotten past are notorious for cheating, speculation and legal disputes [2, 15, 17, 19, 42]. On the other hand, libertarian economists, such as Castronova and his like-minded colleagues Lastowka and Hunter, tend to conceptualize in-game speculation in mostly positive economic terms [25], with the hope that the equilibrium of prices is achievable, and virtual economies will eventually mature into the state of efficient self-regulation. This is also the goal of blockchain-based games, although the most long-living one seems to demonstrate stagnation rather than maturation in economic terms.

Interestingly, the same game may be found ethical or unethical when seen from either a normative (rule-based) or a descriptive (player-centric) approach in game studies. From the cyberlibertarian perspective, Second Life is an ethical virtual world, because its rules allow players to gain wealth proportionally to their time and input [6]. However, such claims should not be taken by face value, as many similar virtual economies, such as EVE Online, also allow players to gain wealth much faster by piracy and grey market trade. To Sicart, EVE Online is an ethical game because everybody has equal chances in it. He is aware of piracy, but he suggests that the informal pirate code is at least as important as the official rules of the game (refusing to be a pirate in Eve Online may disrupt gaming experience of other players). Learning to be a cosmic pirate is such an important part of the game that players lose their 'virtual subjectivity' if they do not engage into it to the degree required by the community [40, p. 72]. This is in line with the idea of different subjectivities that an individual wears 'inside' and 'outside' of virtual worlds.

An interesting question here is at which point the 'inside subjectivity' becomes responsible for their deeds according to the jurisdiction that their physical body belongs to. This is inevitable when the players who have lost their virtual property seek justice at a real life court [15, 22]—and it becomes even clearer when real-life financial crimes are conducted by the use of the affordances of virtual worlds. It has been noted many times that design of Second Life affords financial crimes in the real world [42]. The same, to a much greater degree, is true for the affordances of blockchain technologies [22, 42], which calls for more research in its highly speculative markets.

In this light, the final point to consider is the double morality of game owners and publishers. Initially, developers of CryptoKitties criticized the practice of manipulating scarcity on virtual markets as unfair [10] (see also [27] on its negative impact on virtual economies). Blockchain technology provided an antidote: the code of CryptoKitties should prevent even the developers themselves from creating new 'scarcities'. However, Dapper Lab started doing exactly that later the same year. Since 2018, developers have been regularly introducing new limited edition 'fancies' to keep the game alive. These new categories of tokens have always had higher value than regular 'kitties' on the inflated market. This is very different from projects like CryptoPunks [23], which have a limited amount of tokens that cannot be exceeded, and these tokens are in fact only getting more expensive. Their actual scarcity has led to a curious project that creates a digital double for an existing CryptoPunk on Ethereum, so another layer of value is developed on the crypto market, which offers financial rewards in the form of bounties, lending and depositing particularly rare tokens that may not even change hands in the process [45], also somewhat similarly to the real world art market. While developers of CryptoKitties pointed at CryptoPunks as an example of a fizzled-out project in 2018, the latter are still highly valued in 2021, and they still deliver the initial agenda of their creators, as any piece of 'crypto art' should aspire to do.

6 Conclusion. Ethics of Blockchain Versus Ethics of Its Adopters

Can fairness be reinforced by immutable ledgers, 'smart contracts' and financial incentives, as the latest projects of blockchain-based governance suggest? A 'fair price' on a crypto market does not have a fixed transparent value secured in blockchain, and is acquired in a process akin to bargaining on an oriental market [18]. In this paper, I hope to have demonstrated that such price is established in a playful collective action, as a part of supposedly 'fair game'. This playful attitude may be characteristic to blockchain-based markets in general.

In technocentric communities of 'crypto gamers', game ethics is mostly derived from the same 'code is law' principle that is so important for the blockchain community. In game studies, the 'code is law' principle corresponds to the rule-based (normative) perspective that places game rules above real life ethics and laws. Ideally, a fair game encourages all its participants to play in an honest and rational way, and this encouragement is not limited to game rewards: it includes, for example, the sense of belonging to a certain community and acquiring symbolic capital. In practice, when game ethics is externalized as a system of rules set in code in an 'unreal' virtual world, nothing—not even one's moral compass—can prevent the player from cheating and abusing others, as soon as there is space for free play in the codified game system. This is also noticeable in CryptoKitties. In theory, the game was designed in accordance with the principles of 'ethical games' [40]: blockchain is expected to ensure transparency of transactions, and its 'smart contracts' are set

up to produce artificial scarcity. In practice, we can observe ubiquitous speculation, cheating and other deviations from prescribed prosocial behaviour. Still, this does not spoil the game for the most faithful players.

Long before blockchain-based games, empirical studies have consistently revealed the anti-social side of multiplayer game worlds. In fact, the in-game morality of its players does not seem to differ much from their general ethical disposition [17]; cheating and speculation inevitably emerge in collective play and flourish in some communities that tolerate or even encourage such behaviour as a part of the game. Virtual worlds apply 'double morality' to the actions of in-game and out-of-game subjects, which may afford offensive behaviour in the game and even financial crimes in the real world. Still, researchers believe that game communities can, and will, rule themselves in a democratic way to prevent cheating and abuse. This is one of the contributions that blockchain-based games can possibly offer to more generalized game research. Almost every blockchain-based game in 2018–2019 demonstrated very active collective decision making among players and developers, even though, probably, it was due to the community rather than the technology. I suggest that this can be a potentially valuable tendency to follow in game development—as long as reliance on community does not become a tool to extract free labour from its members, which would be a different kind of unfairness.

In gaming, blockchain is suggested to provide 'trustlessness' by removing intermediaries, such as game publishers, from interactions between players. However, it does not prevent neither players nor developers from exploiting each other's trust and creating new information asymmetries. In this regard, blockchain-based games do not differ from early online multiplayer games. The ethics of blockchain-based games is not defined its 'smart contracts' and immutable ledgers. Instead, it is the collective responsibility of their developers and users. There is nothing special about blockchain that could prevent its unethical application—in fact, some of its properties, such as decentralization and anonymity, actively invite cheating, speculation and gambling. In the end, game publishers are responsible for their product regardless of technology they use, and they have to comply with legal regulations when playful unfairness bleeds into the real world. Not all players are 'virtuous', neither all of them want to be, and the same is true for game developers. If the rules of a 'fair game' allow speculation, then any price is 'fair', but this also means that, much like in gambling, the only safe strategy to avoid losses is to avoid the game altogether.

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