

***CryptoKitties* and the New Ludic Economy: How blockchain introduces value, ownership, and scarcity in the digital world**

Tanja Sihvonen

Communication Studies
University of Vaasa, Finland
tanja.sihvonen @ uva.fi

Alesja Serada

European Humanities University
Vilnius, Lithuania
alesja.serada @ gmail.com

J. Tuomas Harviainen

Tampere Research Center for Information and Media
University of Tampere, Finland
tuomas.harviainen @ tuni.fi

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EXTENDED ABSTRACT

CryptoKitties is an online multiplayer game (Axiom Zen/Dapper Labs, Canada, 2017) where the players are able to collect, breed, buy, and sell different types of virtual cats. It is based on blockchain technology and it uses the Ethereum network (*CryptoKitties White Pa-Purr*, 2018). Generally speaking, a blockchain can be thought of as a distributed, decentralized, and growing collection of records, or blocks, that are interconnected through cryptographic means. It is typically managed by a peer-to-peer network that adheres to a protocol of inter-node communication and the validation of new blocks. At the moment, the most talked-about uses for blockchain technology are cryptocurrencies such as Bitcoin, Ethereum, Ripple, Litecoin, Monero, and Dogecoin, and their social and financial implications (e.g. European Union, 2018).

Blockchains are distributed ledgers that require a peer-to-peer network and a consensus of decentralized and synchronized data to operate (Nakamoto, 2008). One of their purposes is to prevent double spending and to attribute digital ownership, for example, through *mining* where a user can claim ownership of new tokens contributing with a node. Thus they are particularly suitable for digital collection games where the purpose is to “*catch ‘em all,*” or to acquire the rarest possible items. As blockchains ensure the validity of blocks by resisting the modification of data by design, they enable the kind of artificial scarcity of digital goods that forms the basis of many online economies (Lehdonvirta & Castronova, 2014). In this paper, we look at the economic ramifications of cryptogames as well as their social implications and importance as showcase pieces for non-fungible tokens (NFTs), using *CryptoKitties*

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as a case study. Very little academic research on the topic exists as of yet; that is why we are also relying on journalistic sources in this paper.

In *CryptoKitties*, players can breed, develop, and decorate cartoon cats. If the cat resulting from breeding has some rare “cattributes” they can trade the cat to the highest bidder on the game’s own marketplace. There are six known cases where the trading prices of cryptokitties have risen to over \$100,000 (see Mala, 2018; Varshney, 2018), but typically these fluctuate between a few and a few dozen USD, or 0,001 and 600 ETH. Due to its mechanics based on the Ethereum blockchain, each cat is unique and cannot be traded by anyone other than its owner, not even the game’s developers (*CryptoKitties* Team, 2018).

In this paper, we aim at investigating *CryptoKitties* as an example of *blockchain-based game design and play*. This is important for two reasons. First, blockchain technology has been hyped to be the “game-changer” in areas like financial services, smart contracts, logistics, secure communication, and governance models. As digital games are often regarded an industry where technological advancements first get concretized, it would be logical to assume that also blockchains start figuring in a way or another in the development, packaging, distribution, and management of player response of digital games.

Second, in addition to *CryptoKitties*, there are other examples of existing cryptogames (such as *Cryptopunks*, *Gods Unchained*, *Ethermon*, *Blockchain Cuties*, *Axie Infinity*) that rely on the blockchain technology. Oftenmost these games are not developed by game companies nor is their design shaped by business expectation or profit orientation. Analytics services such as *DappRadar* (2019) inform us that blockchains are mainly used for two types of games: online casinos and collectibles. This is because the checking transactions in distributed online peer-to-peer networks are relatively slow, so any transaction in the game, from a trade to simply cancelling the trade, can take from minutes to several days depending on the fee and network load (see *ETH Gas Station*). As it stands, blockchain technology does not seem to be applicable for the design of most popular game genres such as first-person shooters or real-time strategy, although many attempts have been made in this direction (e.g. *EOS Knights*, *Epic Dragons*).

The average daily number of *CryptoKitties* players has been fluctuating within the range of 200–500 (see *DappRadar*, 2019), which is minuscule compared to many other multiplayer online games. Even if cryptogaming may still be an emerging – and currently over-hyped – trend, some games, *CryptoKitties* among them, have in the past year garnered significant financial interest. When the game design project was reconfigured as its own company Dapper Labs in 2018, it was able to raise \$12 million in venture capital, and later that year another \$15 million (Paez, 2018). At the time of writing, at least 1.3 million virtual cats have been bred by its users. Even though the game might not be an economic success story as of yet (see Wood & Lindman, 2018), it has been so popular that it has at times significantly slowed down the entire Ethereum network (Cheng, 2017).

Our paper aims at establishing an understanding of why blockchains are important for the study of games, and how blockchains may shape the future of game design and play. So far, blockchains have been approached in research through a range of domains, most of which have been either technical in nature, or about the most prominent uses of it, i.e., about cryptocurrencies such as Bitcoin (e.g., Yli-Huumo et al., 2016; Beck et al., 2017). Some work has also appeared that deals with the potential economic implications of the technology beyond just cryptocurrencies (see e.g. Campbell-Verduys, 2017). In addition, there are leisurely uses that the blockchain

technology is envisioned for (see Chohan, 2017), but research on these is still in its infancy.

Cryptogames, such as *CryptoKitties*, exemplify the phenomenon of blockchain-based gaming which has its own rules and mechanics of play. Of these, we are primarily interested in the creation of value through digital scarcity in this paper. Our objective is to first demonstrate how blockchain-proven ownership of scarce tokens, or virtual cats, is associated with their value in *CryptoKitties*, and second, how the breeding and marketplace aspects of the game (*KittyVerse*) function in terms of changing the rules of the game. This multilevel analysis enables a grounded discussion on the opportunities and business potential of blockchain-based game design.

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