Grassroots community discussions on cryptocurrency, blockchain, and NFTs

A living recap of IGDA Climate Special Interest Group discussions regarding the successes, opportunities, pitfalls, and risks to date.

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Community Discussion Impact to Date

- IGDA Call to Action: Blockchain in Games
    - By extension, Ubisoft Strategic Innovation Lab's public position on the importance of energy efficiency and environmental impact in innovation.

Leveraging this document in your discussions? *Please let us know in the* ***#^\talking-crypto*** *chat in the IGDA Climate SIG Discord! We'd love to understand what's helpful, as well as what needs iteration or expansion.*

Calls to Action

Focusing less on the debate and more on **how to make informed decisions**? Here's a few ideas:

Define and measure value to your players and your bottom line.

When exploring the possibility of NFTs in your game and/or platform, seek answers to the following questions:

- What **unique value** does it actually give to players?
    - Does the added value NFTs bring absolutely **require NFT infrastructure**?
    - OR can it be done effectively **through existing technologies**?
- How may it **enhance OR disrupt player experiences**, especially for multiplayer games?
- Consider the **cost and resources required to manage the security of players' funds** in your game. Is the team well equipped to manage the risks of fraud, theft, and other criminal activity?
- What are the **costs of implementing NFT portability** well?
    - What are **current and projected development costs** to implement this across your portfolio?
    - What are the **maintenance costs**?
- Are there strong signals in the market that other games will also adopt this in a way that **enables true portability of player assets**, no matter what genre, engine, etc.?
    - What unique value does that portability add to the player experience?
- Current expectations are that NFTs are "forever".
    - How feasible is it to **maintain support for such items and their portability** in the long term?
    - What is the **end of life plan**?

Consider what else needs to be true in order for cryptocurrency's potential to be realized.
Cryptocurrency and Web3 afford a lot of opportunities, and there are major questions that need to be answered for every person to have the opportunity to benefit from it. Consider the **societal context** in which the technology is being used so far:

- How **accessible** is the technology currently?
- What **societal, political, and financial pressures** are there that may influence the uptake of this technology - depending on where people live, and what they have (or don't have) access to?
- What are the **edge cases**?

When advocating for climate action, continue to push for a sociocultural transition away from our dependence on fossil fuels. Innovation does not enable progress without real use cases and a sustainable path to implementation at scale.

- **Disincentivize** use of PoW cryptocurrency. Unfortunately, this is currently the majority.
- **Call** for greater energy efficiency and renewable technology so that a higher percentage of mining uses renewables.
- **Promote** energy efficient cryptocurrencies. (examples)
- **Support** the Crypto Climate Accord.

Community Assumptions

- **Artists are not the problem.** Regardless of this very polarizing debate, we should support artists and content creators (i.e. game developers). While we may have significant concerns about NFT and Play 2 Earn games, we as a community are committed to unlocking pathways to more environmentally conscious and sustainable game designs, business models, and technology use.
- **Technology, gaming, and the use of hardware in themselves are not the main issues.** Rather, it's on us as manufacturers and developers to make the process and experience of gaming more energy efficient.
- **Cryptocurrency is not likely to go away.** The questions, hopes, fears, and opportunities outlined in this doc are not about the technology, but about how it is implemented to the benefit, not detriment, of players and developers. [1]

Key Definitions [1]

- **Blockchain:** a digital ledger; a way of recording information lined up in chronological order over a network of computers. A new block is formed when a transaction of information happens, and that information is tied up nicely into a little block and added on as a new link. Each block uses encryption technology so it cannot be tampered with.
- **Cryptocurrency:** a digital or virtual currency that uses blockchain; a form of payment that can be exchanged online for goods and services.
- **Non-Fungible Tokens (NFTs):** a digital representation of a unique item on a blockchain, typically the Ethereum chain. It's a representation that can be owned, and where ownership can be transferred from one party or another. Anyone can make a digital copy of artwork or content, but there can only be one owner of the artist-minted NFT which represents said work.

[1] Jisu (2021). Debunking everything about NFTs - The Controversy, Technology and How They Affect Artists.

- **Proof of Work (PoW):** a consensus algorithm that confirms transactions and creates new blocks to the chain. Miners compete against each other to do these confirmations via complicated mathematical puzzles and computing power.
- **Proof of Stake (PoS):** a consensus algorithm that uses a staking mechanism in the form of economic incentives to secure network security; considered a more energy efficient alternative to PoW, but does not require commitment like electricity or time. As a result, is not decentralized and may be more susceptible to manipulation.
- **Web 1.0:** the "read-only" phase of the World Wide Web, in which internet users are able to view information online - but do not have the functionality to respond through comments and feedback.
- **Web 2.0:** the "write" phase of the World Wide Web, in which internet users are able to interact with content and with each other (ex. YouTube, Facebook, Wikipedia). We are currently here.
- **Web 3.0:** the "executable" phase of the World Wide Web, where machines and applications can intelligently interpret human behavior and provide personalized experiences based on your unique needs and preferences. This concept also assumes decentralization and token-based economics - whereby there isn't a centralized source of assets (ex. banks). In Web3, developers do not build and deploy applications that run on a single server or database. Instead...

Pro/Neutral Arguments

Decentralization helps us avoid past mistakes.

Blockchain technology is **decentralized[2].** As a result, it can:

- **Remove monopolies.** The 2008 economic crash was caused by major banks over-speculating the housing market. Decentralization enables a more unbiased system where no one person can overplay/underplay the market.
- **Enables transparency.** Everything is recorded, cannot be tampered with, nor destroyed. Reduces risk of manipulation and fraud.
    - **Provides legitimacy to a digital file.** NFTs solve the problem of duplication by adding a certificate that is verified and cannot be destroyed.
- **Stop inflation.** All major currencies are fiat (i.e. infinite resource, constructed value). Printing more money only helps those at the top as they get to spend it before it reaches the bottom.
- **Unify the global economy.** There are numerous different currencies, exchange rates, laws, taxes, fees, and geopolitical factors that need to be considered when engaging with our current financial systems. A global currency that is agnostic can resolve this.

Redistribution power and wealth can benefit everyone.

- **Downstream effects on the fossil fuel industry.** Central banking allows a very small powerful rich group of people to devalue the assets of everyone holding that currency, and then redistribute it. In the end, it's a MASSIVE transfer of wealth between the poor and lower middle class to the rich. This may have

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[2] Note that for NFTs this depends on implementation. NFT systems where the items are stored on a central file server (e.g. the company's) and in which the blockchain is used as an immutable ledger of receipts of ownership are not truly decentralized. Some decentralized blockchain-based file storage exists but is in an early stage and so far most game companies are choosing to retain control over storage (e.g. Ubisoft Quartz). This further feeds the argument about value-add of NFTs over traditional company-run marketplaces.

downstream effects on the fossil fuel industry. Major banks still fund fossil fuels. Keeping money in traditional banks gives them leverage to lend money to oil, coal, and gas companies.

- **Benefits developing countries.** Many underdeveloped countries have unstable economies and lack infrastructure for a centralized banking system. Stabilized currency, true ownership, and accessibility can reduce risk of political financial corruption.
    - Many crypto artists actually hail from places like Africa, Eastern Europe, and Latin America — all regions rich with histories of political and economic instability.[1]
- **Gives more power to players.** By cutting out intermediaries, players can have more direct control over the items they own. In-game items (and their token) will no longer be bound to a single game's environment, allowing for interconnection and application in other games.
    - **Value is added to digital art.** Digital artwork and/or content made by anyone, anywhere can be sold or auctioned as an original.
- **Unlocks players' earning potential.** NFT and Play 2 Earn games afford the opportunity for players to make money off of what they collect. For instance, an Axie Infinity player in the Philippines can play for 2 hours a day and earn 8,000-10,000 pesos ($155-$195) per month - nearly half of what he makes at his current job as a content moderator working 9-hour graveyard shifts.
    - **Value for players' time.** Reddit cofounder Alexis Ohanian predicts play-to-earn crypto will be the only type of games people play in 5 years.

Comparative energy output is lower.

- **Traditional banking is less energy efficient.** Traditional banking is using approximately twice as much energy as cryptocurrency (i.e. physical locations, ATMs, bank servers).
    - **CAVEAT:** For this to be true, PoS implementation and cryptocurrency need to become more energy efficient.
- **The footprint of other tech sectors is still worse by comparison.** While bitcoin/cryptomining is bad, it still outputs a relatively small amount of carbon relative to all tech. For context, bitcoin's carbon footprint in 2020 amounted to 36.95M CO2 emissions (2.3%) compared to 190.9M from data centers and 439.9M from end-user devices.
- **Reduces carbon footprint of artists.** Use of NFTs can cut out the ecological costs of mass producing merchandise and traveling.

Not all cryptos are alike.

- **Some are more energy efficient than others.** Here are some examples.
- Energy improvements are on the way for some of the bigger energy consumers.

Con Arguments

Note: for a full, 2-hour explanation of the problem with NFTs, check out Dan Olson's video.

Ecological impact of current implementation is severe and well-documented.

- **Offsets are an impossibility.** According to a 2022 report by NFT Club - "over its lifespan, it is estimated that an average NFT will produce 211kg of carbon dioxide (CO2) into the atmosphere as a result of the process of creating and purchasing the digital artwork. A single tree can offset 60kg of CO2 on average, therefore it will take 3.52 trees to offset the life of an NFT".
    - "Adding *any* NFT to a blockchain uses around 83kg of CO2, or 1.38 trees. Therefore, all primary mint sales of NFTs have this cost, regardless of their financial value".
    - "Once the NFT has been mined, added to a blockchain and minted, the carbon cost of each individual piece continues. Every time a bid is submitted for an NFT it costs 23kg of CO2 (0.38

trees), every sale of an NFT produces 51kg of CO2 (0.85 trees), and every transfer of an NFT produces 30kg of CO2 (0.5 trees)".

- **Inefficiency is one of the biggest issues**. Even the Ethereum founder calls it a "tragedy" that the electricity utilized accounts for 90% of its cost.
    - **CONSIDERATION:** There are many different methods to calculate carbon output. As a result, carbon calculations related to blockchain data are as accurate as the current data and research available - with the caveat that there are still many unknowns.
- **Rising e-waste.** David Rosenthal reported: "Bitcoin's annual e-waste generation adds up to 30.7 metric kilotons as of May 2021. This level is comparable to the small IT equipment waste produced by a country such as the Netherlands. That's an average of one whole MacBook Air of e-waste per "economically meaningful" transaction".
- **There is no ethical PoW crypto in a climate crisis.** PoS, while more energy efficient, is a solution in search of a problem.
- **There's little data present to show that it's possible to drastically improve the energy efficiency of cryptocurrency.** In the meantime, the climate crisis is already happening - and growing use of electricity slows down the speed at which we can shut down coal and gas plants.
- Barring significant and immediate efficiency gains, **cryptocurrency would use electricity in the ballpark of the total worldwide generation we have today** (it already uses more electricity than the whole of Argentina). Decarbonization is more critical than improving the energy efficiency of cryptocurrency.

Case Study: Marathon

Source: Bitcoin miners revived a dying coal plant – then CO2 emissions soared

Bitcoin mining companies have revitalized coal power plants in Montana, New York, Pennsylvania, Kentucky, and other areas. As a result, coal burning - and carbon dioxide emitted - drastically increased.

"This isn't helping old ladies from freezing to death, it's to enrich a few people while destroying our climate for all of us. If you're concerned about climate change you should have nothing to do with cryptocurrency, it's a disaster for the climate." - Anne Hedges, Co-Director of the Montana Environmental Information Center

Absence of clear, unique value proposition for NFT in games. Specifically, it is unclear what value it truly gives to the player experience.

To date, the hypothesis that crypto and NFTs give more ownership and power to players has not resulted in clear demonstrable value to the players themselves.

- Nintendo president Shuntaro Furukawa said he was interested in the ideas of the metaverse and NFTs, but that "there is no easy way to define specifically what kind of surprises and enjoyment the metaverse can deliver to our customers".
- **Disruption of multiplayer experiences.** If anything, critics state there's a major risk of disruptive players using AFK bots to farm gameplay hours to collect NFT items, as opposed to enjoying the game itself - negatively impacting the multiplayer ecosystem.
- **Activities that leverage NFTs and blockchain are already possible with existing technologies.** It is unclear what the value add is, because it is already possible to do the following without the use of crypto marketplaces and NFTs:
    - Give items in game marketplaces unique identifiers.
    - Track purchases and transfers of in-game assets.
    - Provide access to bonus features and unlockable content.

    - Rollback (i.e. refund NFT minters who sold below floor and offer a refund to holders).
    - Donate directly to charities.

There is a lack of data on poverty reduction - instead, reported exploitation of communities in poverty.

- **A First World Solution for Third World Countries**. Currently, there is no data to prove that cryptocurrency will reduce poverty.
    - Axie Infinity is a prime case study for NFT games exploiting poor players who want to make a living wage, as opposed to enjoying a game. Over 40% of all active Axie Infinity players are from the Philippines, with the second highest market being Venezuela, which has had over 100% in inflation since 2015 and has been in economic collapse since 2013.
- **Requires financial mobility.** A bank account is generally a prerequisite to accessing cryptocurrencies.
    - The poor do not have access to bank accounts or financial services.
    - Cryptocurrency can be used as a payment for work, but the unbanked do not have the privilege to work and be paid in a digital currency that has little to no use in the real world.
- **Requires technological access.** To be a miner, a user needs to have computers powerful enough to solve extremely complex mathematical problems. The unbanked are unlikely to have cryptography expertise, computers, nor the ability to pay for electricity required.

Case Study: Axie Infinity

Source: The Biggest NFT Video Game's Economy Is Collapsing Because NFT Games Don't Work

"Player-to-Earn models require constant user growth. The real money economy of a game like Axie Infinity is zero sum—no money is produced inside the game, so the only money anyone can take out of the game is money somebody else has put into it. Everybody's goal in the game is to make money; they're all "playing to earn," but the only players investing more money into the game than they expect to take out of it are new players who have to buy stuff to get started." - Daniel Friedman

In Axie Infinity, players spend in-game currency to breed new monsters (NFTs). The game's explosive growth was almost entirely driven by laborers in the developing world using borrowed NFT assets to grind for currency to sell to investors who were investing in the game. These "scholarships" were sponsored through a manager - usually a player in the developed world with a lot of monsters or a speculative crypto investor.

As each sponsored "scholar" joined the game to grind and sell NFTs, each one contributed to the oversupply of currency, which drove down its price. These players were not trying to create their own large collections; ergo, they weren't creating more demand. As the value produced from completing in-game tasks plunged below the minimum wage in the Philippines, many of those players have stopped logging in.

As a result, game developers and player communities are severely opposed to NFTs.

- **Gamers don't want NFTs.** Controversies over loot boxes, microtransactions, and unethical monetization have made players wary and/or aware of exploitation and/or addiction risk.
- **Developers are not interested in NFTs.** In GDC's annual State of the Game Industry Report (2021), 70% of 2,700 game developers reported they were not interested in NFTs. When they "asked how developers felt about cryptocurrency and NFTs being called "the future of gaming", the vast majority of respondents spoke out against both practices, noting their potential for scams, overall monetisation concerns, and the environmental impact"".
- S.T.A.L.K.E.R. 2 fans expressed outrage; as a result, the development team cancelled all NFT features.
- Ubisoft devs don't understand company's NFT push, either - and are actively pushing back hard.

    - Ubisoft attempted to mitigate backlash on the environmental impact front by stating Quartz would run on Tezos (an energy efficient and eco-friendly blockchain). However, that did not last, as their partner Frontier started selling tokens on OpenSea using Ethereum.
    - When Ubisoft celebrated their employees' hard work by giving them NFTs, they were met with employee confusion and frustration.
- Konami released Memorial NFTs of screenshots from the Castlevania series, intended to celebrate its 35% anniversary. The launch has received widespread backlash from players.
- The Last of Us and Arkham Knight actor Troy Baker announced an NFT partnership with Voiceverse for Voice NFTs. Due to the severe criticism from fans, he withdrew his partnership and apologized.
- Team17 attempted to release collectible Worms NFTs, garning severe criticism from their employees and players. Team17 has since withdrawn their NFT program, but not without huge cost to their employee and player trust.
    - Aggro Crab, makers of Going Under, released a public denouncement: "We at Aggro Crab condemn Team17's decision to produce and engage with NFTs. We believe NFTs cannot be environmentally friendly, or useful, and really just an overall fucking grift," wrote Aggro Crab. "Needless to say, we will not be working with them on further titles, and encourage other indie developers to do the same unless this decision is reversed."
- The World Wildlife Fund had originally established a program to create NFTs and Learn 2 Earn games. It has since withdrawn its launch after drawing severe criticism.
    - NOTE: the artist who was commissioned for royalties is not getting paid.
- "You don't want your pricing to vary when anchored to people's wages." Gabe Newell and Valve chose to ban NFT games from Steam because the majority of transactions were fraudulent and it is an unreliable medium of exchange that can directly severely impact a person's livelihood.

Vast majority of games are not built for asset portability (and there are no documented plans to enable this at scale).

- **Industry-wide portability technology does not exist.** Support of NFTs in games runs under the assumption that all future games will support blockchain portability across all games. It is unclear how this will be implemented on a practical level - given art styles, tech stacks, platforms, rendering technologies, UGC, etc.
- **It is unclear what happens when a game is no longer maintained.** If a URL is moved, or a server that hosts content goes offline - players cannot access their assets. Companies can get into huge trouble if gamers come out and all collectibles have disappeared.

Cryptocurrency is largely valued on speculative estimations.

- **Perceived value in itself is still subjective.** In this sense, cryptocurrencies and NFTs can still be perceived as scams and/or volatile investments because there is no framework of measurement regarding what the actual value is.
- **Perceived value is based on the perspective of enthusiasts**. There are no guarantees regarding the stabilization of cryptocurrency, given the perceived value is still based on the perspectives of enthusiasts who already have access and/or are in positions of existing financial influence.
- **NFTs do not actually confer any rights in the intellectual property of the asset owned.** Therefore, those who purchase NFTs end up with an intangible digital record - "a deed for an asset that can be copied at zero cost, with zero repercussions".

Absence of regulation does not mean absence of existing predatory behaviors.

- **Socioeconomic and environmental inequality go beyond the fiat system.** Perceptions of value, even within the realm of cryptocurrency, are inevitably tied to the mental models and decision-making criteria that influence our current systems.
    - Valve's economist-in-residence, Yanis Varoufakis, stated: "Within our present oligarchic, exploitative, irrational, and inhuman world system, the rise of crypto applications will only make our society more oligarchic, more exploitative, more irrational, and more inhuman."
- **NFT marketplaces are already centralizing control.** Marketplaces like OpenSea and MetaMask are key examples.
    - NOTE: As of February 2022, OpenSea reported that a hacker used a phishing attack to steal $1.7M in NFTs from its users.
- **NFT marketplaces already reflect the same inequalities that exist in current art and financial systems.** The founder of the Token Economy group at the Alan Turing Institute (also a mathematics professor from the University of London) released a paper reporting that "the complexity of dealing with cryptocurrency for the average person... has made the market less horizontal than some would like to believe. The concentration of transactions among a small group of traders suggests that key players are emerging in the NFT marketplace, much as they exist in the art world."
- **Cryptocurrency is still largely facilitated and controlled by those who already have access to technology and wealth.** Dogecoin founder, Jackson Palmer, denounced cryptocurrency for this reason.

Lack of regulation makes it difficult to protect against criminal behavior.

- **Money laundering, fraud, and drug deals.** Cryptocurrency and NFTs have been used to launder money, do tax fraud, and drug deals. The Chainalysis report noted that $8.6B worth of cryptocurrency-based money laundering was tracked in 2021.
    - COUNTERPOINT: Huge proportion of money laundering within the fine art world (and likely to transfer to NFTs) is actually from banks.
    - COUNTERPOINT: a recent CIA report concluded that 1-2% of bitcoin is involved in criminal transactions; it's 5% for USD cash.
- **Cyber attacks.** According to the BBC, North Korean cyber-attacks have stolen more than $50M of digital assets and have been used as an "important revenue source" for Pyongyang's nuclear and ballistic missile programme.
- **Wash trading.** This term refers to the execution of a transaction in which the seller is on both sides of the trade. This can paint a misleading picture of the asset's value and liquidity.
- **Art theft.** Cryptocurrency platforms (ex. Rarible, Opensea) exist that enable anyone to upload artwork, allowing thieves the opportunity to steal content and make a profit.
- **Ransomware scams.** As of 2021, the biggest use of bitcoin/ethereum in the actual purchase of products/services (and not pure speculative "investment") is in the paying off ransomware scams - not a good look for any respectable currency. With the transaction rates for bitcoin being so slow, it's not suitable to replace fiat currency.
- **Federal bans.** There are movements to ban banks and online payment channels from using cryptocurrency.