# Using Affordance to Understand Usability of Web3 Social Media

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## Abstract

Web3 social media refers to a new generation of platforms built on decentralized technologies, particularly blockchain. Although academia has investigated the newly emerging Web3 social media, it is not clear how users perceive the usability of such platforms and how these perceptions are influenced by the inherent characteristics of Web3. To address this gap, we utilize affordance theory to explore the unique usability of Web3 social media compared with Web2 social media. We conducted interviews with 32 participants who are experienced with Web3 social media and examined the affordances of Web3 social media from the perspectives of content creation, content consumption, and community interaction. We further discuss the correlation between the usability of Web3 social media and the underlying decentralized technology, and provide design implications for enhancing the usability of this new type of social interaction platform.

## CCS Concepts

• **Human-centered computing → Empirical studies in HCI**.

## Keywords

Social media, affordance, usability, Web3, blockchain

**ACM Reference Format:**

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## 1 Introduction

As the next generation of the Internet, Web3 aims to create a decentralized ecosystem that gives users greater control over their data and interactions [32, 44, 104]. It utilizes blockchain technology, a distributed ledger that records and validates data across multiple computers, to establish a decentralized infrastructure [20, 125]. This paradigm shift extends to social media, giving rise to a new type of platform known as Web3 social media [46, 52]. Web3 social media platforms leverage decentralized technologies, particularly blockchain [46, 49], to store user data distributed across multiple computers rather than on centralized servers, as is the case with Web2 social media, which are built on traditional Web server architecture commonly referred to as Web2 [46].

The integration of decentralized technologies as the back-end infrastructure in Web3 social media introduces novel functionalities at the front-end, which affect user activities and influence user experience, particularly when compared to Web2 social media [43]. Given the novelty of Web3 social media, understanding how users interact with these platforms can provide insights into how decentralized technologies influence the usability of social media, as well as how blockchain innovations reshape social interactions and meet user needs, thereby promoting the further development of social media platforms. However, previous studies have predominantly focused on a single component of Web3 social media, specifically the impact of cryptocurrency-driven reward systems [77, 78, 109]. There remains a gap in understanding users' perceptions of the broader usability of Web3 social media, particularly in terms of how the inherent characteristics of Web3 affect the usability of social media. Therefore, our study aims to use affordance theory to understand users' perceptions of Web3 social media and explore which affordances are constrained or enhanced by the inherent characteristics of Web3. Given that the social media ecosystem comprises content creation, content consumption, and community interaction [94], we propose the following research questions (RQs) to guide our investigation:

**RQ1:** How do users perceive the usability of content creation on Web3 social media?

**RQ2:** How do users perceive the usability of content consumption on Web3 social media?

**RQ3:** How do users perceive the usability of community interaction on Web3 social media?

To address these three RQs, we used a social media affordance framework to understand users' perceptions of the usability of Web3 social media. We first integrated two widely used social media affordance frameworks [16, 110] as a foundation. Then, we reviewed ten Web3 social media platforms based on academic references and discussions in Web3-focused media outlets to address missing affordance aspects in previous frameworks that appear in Web3 social media. Through this review process, we identified specific Web3 social media features associated with each affordance. As a result, we developed a framework with nine affordance typologies to guide our analysis of the usability of Web3 social media.

We then conducted semi-structured interviews with 32 participants who are experienced with Web3 social media. Our participants perceived that Web3 technology influences the usability of social media through specific affordances. For ***content creation***, participants observed that Web3 social media provides greater freedom in content editability and guarantees the persistence of content. However, they expressed concerns about the need to be cautious

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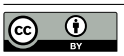


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with what they create, as the content could remain permanently visible on Web3 social media. Additionally, participants perceived that Web3 social media offers more granular visibility controls, allowing them to manage who can view their content with greater precision. For ***content consumption***, participants highlighted that Web3 social media empowers users by giving them control over their data, enabling them to actively choose the content they wish to make visible and moderate content. However, some participants raised concerns about slower search speeds due to content being distributed across multiple nodes rather than stored on centralized servers. For ***community interaction***, participants perceived that association and meta-voicing within Web3 social media are often tied to tokenization, with user behavior influenced by cryptocurrency, which can sometimes incentivize superficial engagement and reduce the motivation to create valuable content. Participants mentioned that a key affordance of Web3 social media is interoperability, which removes barriers between applications to enable seamless communication and information sharing across platforms.

Our study offers two key contributions to the Human-Computer Interaction (HCI) community. First, we apply affordance theory to understand how Web3 technology influences usability and user experiences, which expands our understanding of blockchain as an innovative computing system, highlighting its unique aspects in HCI compared to traditional computing systems. Second, based on the characteristics of Web3, we provide design implications across different layers to enhance the usability of Web3 social media. These insights offer new perspectives for the future development of the social media ecosystem.

## 2 Related Work

In this section, we begin by reviewing affordance theory in the context of social media, which serves as the foundation of our study. We then review existing literature on Web3 social media to clarify the motivation for our study.

### 2.1 Study on Social Media Affordances

Affordance refers to the potential actions that individuals perceive when interacting with objects in their environment [40]. Prior research in HCI has discussed many affordances of social media [66, 67, 94, 103], and there is a key subset of core affordances that delineates social media platforms from other forms of online media [94]: 1) content creation, 2) content consumption, and 3) community interaction.

*2.1.1 Content Creation.* Social media platforms afford users the ability to create a variety of content, including text, images, and videos, and share it on the platforms [16, 30, 54]. Features like posting, resharing, and tagging are embedded within these platforms to facilitate content creation and sharing [25, 122].

Many HCI scholars have studied what people share on social media platforms and how they choose to share various content, mostly focusing on the topic of self-presentation [17, 39, 86, 117]. For example, users can tailor their self-presentation to specific audiences by merging different groups who see the same content, or by unintentionally exposing private behavior intended only for select viewers [42, 74]. Studies have also shown that users manage multiple self-presentations by engaging with different social media platforms, where each platform allows for distinct portrayals of identity [26] and some maintain different roles within a single platform by creating multiple accounts [107]. The above reflects that users utilize privacy features to control the audience of their posts when using social media, presenting themselves in different ways on the platform and sharing different content [27, 59, 112].

Additionally, researchers have examined users' perceptions of content editability and found that censorship negatively impacts creators by restricting the visibility of their content. For example, creators complained that the platform automatically demonetized controversial content [80], and creators who are marginalized individuals complained about their experiences with being blocked or deleted unfairly [87, 100]. Studies have identified that creators faced challenges in content censorship: (1) opacity of review decisions [35, 41], (2) unfairness of review decisions [61, 113, 114], and (3) procedural barriers to reviewing appeals of decisions [5, 63], among others.

*2.1.2 Content Consumption.* Social media platforms enable users to consume various forms of user-generated content [16]. For example, seeing content in one's feed provides a wealth of consumable information [30]. This feature is used to stay updated on people and to find information [31, 64]. However, the visibility can lead to increased herding and decreased privacy as people can see so much information about others [76]. The affordances of visibility and accessibility allow users to monitor others' activities without their awareness, from virtually anywhere and at any time [36]. Extensive research has also focused on a specific form of content consumption known as "triggered attending", in which an algorithmic trigger alerts users to content they are prompted to consume [83, 88].

Research has examined how and why users consume content on social media. For example, one study found that seeing content from friends can increase social capital. Although passively consuming content does not boost social capital, it provides value to individuals with lower social fluency by helping them benefit from their social connections [19]. Another study pointed out that knowledge sharing can be supported because content can be seen by more than the people to whom the post was originally directed [75].

*2.1.3 Community Interaction.* Community interaction encompasses engagement with content and interactions with other users. Social media platforms offer features enabling users to respond to others' content, facilitating exchanges and sustaining ongoing conversations. For example, comments, private messaging, and reactions such as likes or emojis enable users to engage with or elaborate on others' content [16, 18, 64]. Scholars have described this as the affordance of meta-voicing [83] or as a mechanism for providing social feedback [26, 36]. Studies have also highlighted that frequent interactions and rapid feedback on others' content serve as indicators of social support [102].

Social media platforms provide functions that allow users to establish and manage connections with others [110]. Features relevant to forming and breaking these connections include initiating, accepting, or rejecting friend or follower requests, as well as unfriending or blocking people [25, 103, 110]. These actions allow users to curate their social circles and manage their online interactions. For instance, adding individuals to a friend list or a followers

list is considered a fundamental feature for fostering social connections [110, 111]. Various terms have been used in the literature to describe this affordance, including networked-informed associating [83], association [70, 110], and connectivity [36].

## 2.2 Study on Web3 Social Media

Previous studies on Web3 social media mainly focus on several themes: 1) cryptocurrency mechanism [52, 109], 2) social network [22, 51, 71], and 3) content analysis [65, 92].

The cryptocurrency mechanism, as one of the key features of Web3 social media, has been the most extensively studied aspect by researchers. For instance, Thelwall [109] analyzed the relationship between reward mechanisms and content and found that longer, more sentiment-rich, or more positive comments received the greatest financial reward. Li et al. [77] explored the rewarding system of Steemit and found that the reward cryptocurrencies are sent to curators suspected to be bots. Guidi et al. [52] focused on block producers and highlighted their social impact on the platform. Zuo et al. [130] used the platform Memo.cash to investigate user-controlled content moderation mechanisms in Web3 and the study found that the cost of moderation influences users' ability to manage content.

There is growing interest in the social network structure of Web3 social media. Kim and Chung [71] examined Steemit's social network and found that larger networks offer greater incentives for participation. Guidi et al. [50] analyzed the follower–following graph of Steemit to explore how social and economic aspects intertwine and influence each other in this decentralized platform. Ba et al. [4] conducted a time-series analysis to reveal that cryptocurrency trends on Steemit influence the evolution of its social network, specifically link creation and "follow" actions.

For content analysis, Kapanova et al. [65] applied term frequency and topic modeling to posts published on the Steemit platform from 2017 to 2019 to identify prevalent discussion topics. The most common topics included personal information, food, travel, sports, and blockchain. Thelwall et al. [109] analyzed the first posts from 925,092 Steemit users to understand factors that drive higher rewards and found that new Steemit users tend to introduce themselves in their first posts rather than immediately sharing valuable content. Zuo et al. [131] also found that cryptocurrency is a popular topic discussed on the Memo.cash platform and that there is a significant number of malicious URLs shared on the platform.

Previous studies were limited to narrow topics within Web3 social media and had a fragmented understanding of users. There is a lack of systematic summaries regarding how users perceive the usability of this new type of social media platform. Our goal is to apply affordance theory to build a framework that guides our exploration of how users perceive the features of Web3 social media and how these perceptions, in turn, shape their evaluation of the platform's overall usability. Therefore, we propose three RQs to investigate users' perceptions of the usability of Web3 social media:

**RQ1:** How do users perceive the usability of content creation on Web3 social media?

**RQ2:** How do users perceive the usability of content consumption on Web3 social media?

**RQ3:** How do users perceive the usability of community interaction on Web3 social media?

# 3 Affordance Framework for Comparing Web2 and Web3 Social Media

To understand users' perceptions of the usability of Web3 social media, we aim to utilize a framework grounded in affordance theory to guide our research design. First, we combined two widely used affordance frameworks [16, 110] to develop a preliminary affordance framework. Next, we refined the preliminary affordance framework by analyzing features from ten Web3 social media platforms, including Steemit [106], Friend.tech [37], Lens [96], Mirror [90], Hive [55], Minds [89], Nostr [93], Bluesky [98], Mastodon [85], and Farcaster [34]. These platforms were selected based on prior research on Web3 social media and insights from online discussions on Web3-focused media outlets. Table 1 presents the final version of the affordance framework along with the analysis of features from Web2 and Web3 social media based on this framework. In the following subsections, we provide detailed explanations for each step of the process.

## 3.1 Identifying Social Media Affordances

We combined two widely used frameworks: one by Treem and Leonardi [110], and the other by Boyd [16], to construct our preliminary framework[1] to guide our investigation of Web3 social media features.

Inspired by the work of Page et al. [94], our study categorized social media interactions into three perspectives: content creation, content consumption, and community interaction. We then adaptively aligned the seven affordance typologies with these perspectives. Two researchers collaboratively allocated each typology to a specific perspective based on the typology definitions described in the studies of Treem and Leonardi [110] or Boyd [16].

From the perspective of content creation, we assigned the following affordance typologies: *editability*, *persistence*, *visibility*, and *replicability*. These typologies align with the functions of social media that enable users to produce and control content over time. Specifically, *editability* allows users to refine and tailor content over time, enhancing communication by enabling more thoughtful and purposeful sharing of information [110]. *Persistence* ensures the continued availability of content, allowing it to remain accessible for future use [16, 110]. *Visibility* provides users with control over what content associated with their persona is visible to others, thereby managing their online presence [110]. *Replicability* refers to the ability to replicate content, which influences how content spreads and is reused [16]. We classified the affordance of *scalability* as a synonym for *visibility*, given that its definition—Boyd [16] describes it as the potential visibility of content in networked publics being great—closely aligns with the concept of making content observable to a wide audience. From the perspective of content consumption, we classified *searchability* as a key affordance that empowers users to discover and access content within social media platforms [16, 94]. Finally, we assigned the affordance of *association* to community interaction. This affordance allows users to

[1]Treem and Leonardi [110] identified four affordances that focus on user interactions: visibility, editability, persistence, and association. Boyd [16] highlighted four affordances that emphasize content features: persistence, replicability, scalability, and searchability.

connect with others, which is vital for building and sustaining social connections within online communities [94, 110].

## 3.2 Analyzing Web3 Social Media Platforms

After establishing the preliminary affordance framework, we selected Web3 social media platforms for investigation to identify platform features and examine how they manifest across the various affordance dimensions.

*3.2.1 Platform Selection.* We selected the top 10 most discussed Web3 social media platforms based on insights from academic research and discussions on Web3-focused media outlets. Table 5 in Appendix B presents the frequency of Web3 social media platforms mentioned in academic research and online discussions.

First, we conducted a literature search on Google Scholar using terms such as "Web3 social media", "decentralized social media", and "blockchain-based social media" to identify which Web3 social media platforms have been studied. We reviewed thirty papers, including the references cited within these selected papers, to identify additional relevant studies that may have been overlooked during our initial search. Through this process, we identified Steemit [106] and Mastodon [85] as platforms widely discussed in prior studies.

In addition, we identified Web3 social media platforms that are widely discussed in online discourse. This step expanded the list of platforms derived from academic work by incorporating those that are prominent within the Web3 application ecosystem. We selected popular Web3-focused media outlets, including BlockBeats[2], Coingeck[3], Cointelegraph[4], and Dappradar[5], to search for keywords like "Web3 social media", "decentralized social media" and "blockchain-based social media". We collected sixteen articles from these four sources that discuss popular Web3 social media platforms, rather than news reports on the launch of new Web3 social media applications. In this process, we identified Farcaster [34], Friend.tech [37], and Lens [96] are popular Web3 social media platforms discussed in online discourse.

We listed the platforms mentioned in academic research and discussions from Web3-focused media outlets in Table 5 in Appendix B. From this list, we selected the top ten platforms that appeared most frequently, ensuring our study focused on platforms with widespread recognition and active user engagement. The final sample set includes Steemit [106], Friend.tech [37], Lens [96], Mirror [90], Hive [55], Minds [89], Nostr [93], Bluesky [98], Mastodon [85], and Farcaster [34]. A detailed description of each platform can be found in Table 6 in Appendix C.

*3.2.2 Feature Observation Process.* We followed the methodology of DeVito et al. [26] to examine the features of each platform, iteratively discussing how these features related to the identified affordances. During this observation process, we identified three additional affordances—moderation [62], meta-voicing [83], and interoperability [95]—which were integrated into the preliminary framework.

Through three weeks of exploratory usage on the ten sample platforms, the researchers documented their behaviors and experiences weekly. At the end of each week, we conducted inductive analyses of these observations, focusing on identifying and categorizing platform features within the affordance framework. For example, we identified features that allowed users to create and edit various types of content, such as text, images, and videos. These were coded as multiple inputs and structures, as they provided diverse ways for users to refine and modify their content. We categorized these features under the affordance of editability, as they enabled users to adjust and personalize their content. Similarly, we identified features related to content storage, such as whether content was stored on-chain or through decentralized solutions like Inter Planetary File System (IPFS). These were categorized as decentralized storage, reflecting how platforms ensure content persistence over time through different mechanisms.

We also identified several platform features that extend beyond the initial affordance framework we had constructed. For instance, we found that platforms enable users to moderate content through features such as liking, commenting, and tipping. Additionally, they allow users to switch between different applications built on the same social protocol using their cryptographic keys. We analyzed the associated keywords and conducted a literature review to understand how these features were articulated in prior studies. Through this process, we identified three new affordances: *moderation* [62], *meta-voicing* [83], and *interoperability* [95]. Finally, we developed a framework with nine affordance typologies to guide our analysis of the usability of Web3 social media.

We outlined the definition of each affordance and provided a comparison of the corresponding features between Web2 and Web3 social media in Table 1. Features of Web2 social media in our framework are directly derived from previous research on Web2 social media [26, 59, 82]. We observed that Web3 and Web2 social media share several common features, especially in content creation. Both allow users to edit content through a variety of input methods and types, and they provide tagging systems to manage content visibility. Users can also easily replicate content across different platforms. However, the key distinction lies in content persistence: Web3 social media platforms use decentralized storage, while Web2 platforms depend on centralized systems. For content consumption, both Web2 and Web3 platforms offer visibility mechanisms to help users discover relevant content. The major difference arises in content moderation. Web2 social media platforms tend to have centralized moderation led by the platform itself, whereas Web3 platforms are more community-driven. For community interaction, Web3 social media platforms also share similarities with Web2 by offering mechanisms for association and feedback, as well as reward systems. However, the rewards on Web3 social media platforms are often more intricately tied to token incentives. Additionally, Web3 social media platforms introduce social protocols, enabling users to interact across different applications seamlessly, leveraging their wallets for greater interoperability.

## 4 Interview Study Method

We conducted remote semi-structured interviews with 32 participants to explore users' perceptions of the usability of Web3 social

[2]https://www.theblockbeats.info/en/
[3]https://www.coingecko.com/
[4]https://cointelegraph.com/
[5]https://dappradar.com/

**Table 1: Features comparison between Web2 and Web3 social media under the affordance framework. We first combined the works of Treem and Leonardi [110] and Boyd [16] to derive seven affordances. Specifically, we assigned the affordance of scalability [16] as a synonym for the affordance of visibility [110] because it refers to the potential visibility of content in networked publics. As a result, our preliminary framework consists of six affordances. Then, we reviewed ten Web3 social media platforms based on academic references and discussions in Web3-focused media outlets to address missing affordance aspects in previous frameworks that appear in Web3 social media. During the review process, we also identified related features of Web3 social media for each affordance. Therefore, we developed a framework with nine affordance typologies.**

| Perspective | Affordance | Definition | Features of Web2 social media | Features of Web3 social media |
|---|---|---|---|---|
| Content creation | Editability [110] | The extent to which a platform affords users the ability to edit the content. | Input structure and input types | |
| | Persistence [16, 110] | The extent to which a platform affords the continued availability of content over time. | Centralized storage | Decentralized storage |
| | Visibility [110] | The extent to which a platform affords individual determination of what content linked to their persona is visible to others. | Tag mechanisms, targeting mechanisms | |
| | | | Centralized settings | Granular settings |
| | Replicability [16] | The extent to which a platform affords users the ability to copy and redistribute content in ways. | Cross-platform sharing | |
| Content consumption | Searchability [16] | The extent to which a platform affords users the ability to discover and access content from others. | Visibility mechanisms (chronological/complex), access methods (public/sign-in), search | |
| | Moderation [62] | The extent to which a platform affords users the ability to restrict certain content. | Platform-driven (manual, user-reported, algorithm) | Community-driven (customization, consensus-based) |
| Community interaction | Association [110] | The extent to which a platform affords users the ability to form relationships with other users. | Association mechanism (follow, chat group) | |
| | Meta-voicing [83] | The extent to which a platform affords users the ability to provide direct responses to content. | Feedback levels available (none/binary/comments), feedback reward mechanisms | |
| | Interoperability [95] | The extent to which a platform affords users the ability to seamlessly transfer and control their data. | / | Standardized protocol |

media. Each interview lasted between 60 and 80 minutes. Prior to the main study, we pre-tested our interview protocol with three pilot sessions. After revising the protocol based on feedback from these pilot studies, we conducted the final round of interviews. Each participant was compensated $20 upon completing the interview.

## 4.1 Participants Recruitment

To ensure a diverse range of participants, we employed multiple recruitment strategies: 1) posting recruitment messages on the ten Web3 social media platforms mentioned in Section 3.2, 2) disseminating the recruitment message across Discord, Telegram, and Twitter channels, and 3) utilizing snowball sampling. Prospective participants were first asked to complete a screening survey, which

**Table 2: Demographics of the interviewees.**

| ID | Age | Gender | Occupation | Location | Exp. (yrs) | Web3 social media platforms usage |
|---|---|---|---|---|---|---|
| P01 | 35-44 | Male | Engineer | China | >3 | Steemit, Hive, Mirror |
| P02 | 18-24 | Male | Student | China | 1-2 | Steemit |
| P03 | 18-24 | Female | Student | China | 1-2 | Steemit |
| P04 | 25-34 | Male | Self-employed | Singapore | >3 | Mirror, Hive, Dtube |
| P05 | 25-34 | Female | Teacher | Singapore | >3 | Steemit |
| P06 | 35-44 | Male | Self-employed | Malaysia | >3 | Steemit, Hive, Minds |
| P07 | 35-44 | Male | Blogger | United Kingdom | >3 | Steemit, Mirror |
| P08 | 25-34 | Male | Self-employed | China | 1-2 | Steemit, Lens |
| P09 | 35-44 | Male | Self-employed | Malaysia | >3 | Steemit, Hive, Lens |
| P10 | 35-44 | Male | Blogger | United Kingdom | >3 | Hive, Minds |
| P11 | 25-34 | Female | Staff | Thailand | 2-3 | Hive |
| P12 | 35-44 | Male | Blogger | Algeria | >3 | Steemit, Hive |
| P13 | 25-34 | Female | Self-employed | Singapore | <1 | Steemit, Bluesky |
| P14 | 25-34 | Female | Blogger | Malaysia | >3 | Steemit, Hive, Mastodon |
| P15 | 25-34 | Male | Self-employed | Malaysia | >3 | Steemit, Hive |
| P16 | 18-24 | Female | Student | China | <1 | Steemit, Friend.tech |
| P17 | 25-34 | Male | Staff | Argentina | 1-2 | Hive, Mastodon |
| P18 | 25-34 | Male | Programmer | United Arab Emirates | >3 | Steemit |
| P19 | 25-34 | Male | Employee | Algeria | >3 | Steemit, Minds |
| P20 | 25-34 | Female | Teacher | China | 2-3 | Hive, Mirror |
| P21 | 25-34 | Male | Student | United Kingdom | 1-2 | Friend.tech, Farcaster |
| P22 | 18-24 | Female | Student | China | 1-2 | Bluesky, Mastodon |
| P23 | 18-24 | Male | Student | United States | <1 | Farcaster, Minds |
| P24 | 25-34 | Female | Self-employed | Thailand | 1-2 | Bluesky, Minds |
| P25 | 25-34 | Male | Self-employed | China | 1-2 | Bluesky |
| P26 | 35-44 | Male | Self-employed | China | 1-2 | Bluesky, Farcaster |
| P27 | 25-34 | Female | Writer | Thailand | 2-3 | Friend.tech, Lens, Minds, Nostr, Mastodon, Farcaster |
| P28 | 25-34 | Female | Self-employed | United State | 1-2 | Lens |
| P29 | 18-24 | Male | Student | Kenya | 1-2 | Bluesky, Minds |
| P30 | 25-34 | Female | Self-employed | Kenya | <1 | Bluesky |
| P31 | 25-34 | Female | Staff | United States | 1-2 | Minds, Bluesky |
| P32 | 25-34 | Male | Engineer | China | 1-2 | Bluesky, Farcaster, Friend.tech |

collected details such as age, gender, and experience with Web3 social media. Finally, we recruited 32 participants for the study: 19 were recruited via the snowball sampling channel, 3 through Discord channels, 3 through Twitter, and the remaining 7 directly from Web3 social media platforms. Table 2 details the demographics of 32 interviewees.

## 4.2 Semi-structured Interview Procedure

Prior to initiating the study, we obtained informed consent from participants to conduct and record the session. Participation was voluntary and ensured complete anonymity. Details about the interview protocol are provided in Appendix A. The interview was divided into four specific sections.

(1) *Experience with Web3 social media.* We asked participants which Web2 and Web3 social media platforms they typically used, what activities they engaged in on these platforms, and how frequently they used them. We then inquired about how they first learned about Web3 social media and what motivated them to adopt it as their platform of choice. This aimed to understand their initial exposure to and reasons for choosing Web3 social media.

(2) *Content creation experience.* We asked participants what type of content they created on Web3 social media and why they chose to focus on that particular topic. We also asked them to describe the process of creating a post on Web3 social media, detailing the specific steps involved and any challenges they encountered. Based on the steps and perceived differences mentioned by the participants, we followed up with more in-depth questions.

(3) *Content consumption experience.* We asked whether participants searched for or read content on Web3 social media. If they answered affirmatively, we followed up with questions about the types of posts they typically read, the reasons behind their choices, and whether they consumed similar content on Web2 social media. For participants who did not search for or read content on Web3 social media, we explored the reasons behind their lack of engagement and asked for suggestions on how the platform could improve to attract their readership.

(4) *Community interaction experience.* We asked participants about the ways in which they interacted with content and other users on Web3 social media. We encouraged them to describe their interactions through specific examples. Based on the interaction behaviors mentioned by the participants, we then asked follow-up questions to gain a deeper understanding of their social engagement on the platform.

## 4.3 Data Analysis

Data collected from this study includes transcription of the interviews and notes taken by the interviewers. We first manually corrected the transcripts against the recording and then analyzed the data using thematic analysis [57].

Initially, two researchers independently reviewed the textual data to familiarize themselves with the content. During this phase, they applied open coding by labeling notable quotations with relevant keywords or phrases in English. In the second stage, the two researchers collaboratively grouped these open codes into broader themes. During this process, they revisited the original quotations and memos to address any overlaps, conflicts, or disagreements. Overlapping and irrelevant codes were excluded, while new insights emerging from their discussions were incorporated into the open codes. These refined codes and themes formed the basis for the coding scheme used in the subsequent step. Finally, the two researchers jointly revisited the transcripts, systematically aligning the quotations with the refined codes and themes in accordance with the established coding scheme.

Since our study aims to understand how the inherent characteristics of Web3 affect the usability of social media, we included the perceived differences when participants compared similar Web2 and Web3 social media platforms in Section 5, focusing on differences in affordances resulting from the technological characteristics of Web2 and Web3. For example, a decentralized structure and token-based incentive mechanisms are categorized as technological differences between Web2 and Web3 social media, as they are inherent to the underlying architecture and operational principles of Web3 platforms. We excluded perceptions related to design differences such as user interface and functionality across various Web3 social media platforms. For instance, P13 mentioned that Steemit allows posts of any length, while Bluesky imposes character limits. P20 observed that Hive does not support converting content into Non-Fungible Tokens (NFTs), whereas Mirror does. These perceptions, influenced by platform-specific design choices rather than inherent technological differences, were excluded from our analysis.

To assess data saturation, we listed all relevant themes from each participant and organized them in the order of their interviews, from P01 to P32. We did not identify any new themes emerging in the latter interviews after P28, which bolstered our confidence in the claim that our dataset had reached theoretical saturation.

## 4.4 Ethics Consideration

Our study design and data protection measures were thoroughly reviewed and approved by our Institutional Review Board (IRB) to safeguard against undue participant risk. Participants had to read and sign a consent form before interviews, detailing data collection, voluntary participation, and the right to withdraw at any time. To protect participant anonymity, we implemented multiple measures. Firstly, participants' email addresses were used solely for scheduling interviews and were not linked to any of the collected data. Once the interviews were scheduled, the email addresses were securely stored separately from the interview data to ensure that there was no direct association between participants' identities and their responses. Secondly, we assigned unique, anonymized identifiers to each participant, which were used throughout the data analysis process instead of any personally identifiable information (e.g., replacing creators' usernames with generic tokens such as [participant name]). Thirdly, all data files were stored on secure servers with restricted access, limited only to the research team members directly involved in the analysis.

## 4.5 Limitation

Our study has identified two primary limitations: the limited sample size and the limited investigation into Web2 experiences. First, most of our interviewees are experienced users with at least one year of experience in Web3 social media. This may lead to a lack of perceptions from novice users in our sample. However, we believe this does not significantly impact our results. On one hand, users need a relatively long-term experience with social media to have a comprehensive perception. On the other hand, experienced users have also gone through the novice stage, so they can provide insights from different stages of their experience.

Second, the features of Web2 social media in our framework, as presented in Table 1, are directly derived from previous research on Web2 social media [26, 59]. The lack of our own investigation process might lead to some incompleteness. While we acknowledge this limitation, we believe it does not affect our core findings. During the interviews, participants shared their experiences with both Web2 and Web3 social media, offering insights into their similarities and differences. Therefore, the lack of direct observation of Web2 platforms does not compromise the validity of our comparison, as participants' input provided a well-rounded understanding of both types of platforms.

# 5 Results

In this section, we present findings related to our RQs: 1) users' perceptions of content creation (RQ1), 2) users' perceptions of content consumption (RQ2), and 3) users' perceptions of community interaction (RQ3). Table 3 summarizes our participants' perceptions of the advantages and disadvantages of Web3 social media.

## 5.1 Users' Perceptions of Content Creation

Our participants perceived that Web3 offers benefits for content creation by allowing users to freely edit and control the visibility of their content, while also ensuring its persistence and traceability. However, participants expressed concerns about the limitations of uploading large files and the challenges associated with the overly persistent nature of the content.

*5.1.1 Editability.* Participants (n=28) perceived that content editing on Web3 social media without restrictions allowed for greater freedom of expression. However, participants (n=11) also pointed out that editing large files could be limited by the constraints of blockchain technology.

**Table 3: Participants' perceptions on advantages and disadvantages of Web3 social media.**

| Perspective | Affordance | Advantages | Disadvantages |
|---|---|---|---|
| Content creation | Editability | Unrestricted content editing | Limitations in file size |
| | Persistence | Long-term content availability | Difficulties in content removal |
| | Visibility | Autonomy in managing content | / |
| | Replicability | Traceability of original content | / |
| Content consumption | Searchability | / | Inefficiencies in content searching |
| | Moderation | Community-based content moderation | Inconsistent content quality |
| Community interaction | Association | / | Instrumental social relationships |
| | Meta-voicing | Monetization opportunities | Speculative interaction behaviors |
| | Interoperability | Seamless data transfer | / |

*Unrestricted Content Editing.* Participants perceived that they experience fewer restrictions when editing and publishing content on Web3 social media platforms compared to Web2 platforms. P09 shared an experience of being repeatedly unable to edit and post content on Xiaohongshu, which hindered his ability to freely express himself. *"I encountered a situation on Xiaohongshu where, while editing content and preparing to post, I was notified that my content violated community guidelines. My content was simply a book review and food recommendations. Later, when I used Steemit and Hive, the same content was published instantly without any issues or sensitivity warnings"* (P09). Seventeen participants reported that the freedom to post content without such restrictions is one of the primary motivations for choosing Web3 social media platforms. *"I believe that the decentralized nature of Bluesky offers greater freedom in editing and expressing content, as there is no central authority imposing restrictions on what I can post. This is why I transitioned from Twitter to Bluesky"* (P31).

*Limitations in File Size.* Eleven participants complained about the limitations on large file uploads, particularly on platforms utilizing blockchain-based storage, such as Steemit and Hive. P18, a technical expert, pointed out that the limitations are due to block size constraints, meaning each block on the blockchain can only hold a certain amount of data, which restricts the size of files that can be uploaded. *"The Steem blockchain has a block size limit, so it doesn't allow users to upload files of any size. You can choose to use external links for file uploads"* (P18). P04 also mentioned that he often encountered errors when trying to upload original video files directly and had to provide links to external platforms to share his content instead. *"I manage both Hive and YouTube accounts. Sometimes, when I create a video and try to upload it to Hive, it often says the file is too large. So, I end up having to post the YouTube link instead. It's not very convenient because the readers then have to click the link and get redirected to another platform"* (P04).

*5.1.2 Persistence.* Participants (n=17) noted that content on Web3 social media is stored on decentralized networks, which mitigates the risk of content loss—an issue commonly faced on centralized Web2 social media. However, they also raised concerns about the permanence of their posts, as this not only guarantees long-term availability but also makes content removal more difficult.

*Long-term Availability of Content.* Over 60% of participants emphasized that they are drawn to Web3 social media due to its content persistence. They appreciated that, unlike on Web2 platforms, where content is often subject to the platform's control and can be deleted or modified without notice, content on Web3 social media benefits from long-term persistence due to its decentralized nature. Participants perceived that persistence is ensured by data stored across distributed networks, such as blockchain, making it resistant to tampering and ensuring its availability over time. For instance, P01 switched to using Web3 social media to document his life because he doesn't worry about his content being deleted without reason on decentralized platforms. *"I use Steemit as an archive of my life records because I don't worry about the platform deleting my content. Once it's published, I know it's stored on the blockchain, which is difficult to alter"* (P01). Moreover, five participants highlighted that the persistence of content on Web3 platforms also means they don't have to worry about losing their posts if the platform shuts down. For instance, P20 felt that decentralized content is less likely to be lost, unlike content stored on centralized platforms. *"I previously used a niche platform to write notes, but after the platform shut down, I was unable to retrieve my previously recorded book notes. Subsequently, I tried using more well-known platforms, such as Medium, to document my notes, but I still had concerns about losing my content again. Later, when I discovered the Mirror platform, I was pleasantly surprised. Content can be converted into NFTs and permanently stored on Arweave, with multiple computers recording my content. Therefore, even if one of them shuts down, I can still retrieve my content"* (P20).

*Difficulties in Content Removal.* Eleven participants expressed concerns about content persistence, which influenced their self-presentation strategies, as their preferences for sharing content could change over time, and they did not want past content to be exposed to the public. Participants perceived that content on Web3 social media is stored in a decentralized manner, making it difficult to remove. As P05 pointed out, for content already recorded on the blockchain, even if it can be modified, the previous publishing traces will still be recorded. *"Once content is on the blockchain, it is almost immutable. If one day I regret posting this content, it may not be possible to delete it with a single click. Even if it can be modified, the previous publishing records will remain on the blockchain. This means that all modification traces will be permanently recorded and cannot be completely erased"* (P05). Given the perceived difficulty

in removing content, participants carefully considered the appropriateness of their posts before sharing. As P25 explained, he used to share updates without much thought on Web2 platforms, but now, with the increased permanence of content on Web3, he felt more cautious about his posts. *"I used to post personal updates, like work photos or travel pictures, on Facebook and Instagram. But now, on Bluesky, I'm more selective—only sharing text-based content and avoiding photos. I feel more cautious because Web3 platforms offer more permanence, and I'm aware that my posts could stay visible for a long time. This makes me more selective about what I share"* (P25).

*5.1.3 Visibility.* Participants (n=14) observed that similar to Web2 social media, Web3 social media platforms also provide numerous settings allowing users to control content visibility. However, the key distinction is that Web3 platforms generally offer users greater autonomy in managing visibility, enabling them to interact with smart contracts to set personalized visibility rules.

*Autonomy in Managing Content.* According to our participants, Web2 social media platforms provide various settings for users to manage content visibility, but the ultimate control lies with the platform itself. If the platform removes or modifies these settings, users have no way to manage their content visibility. In contrast, Web3 social media platforms offer users greater autonomy. While they still provide visibility settings within the user interface, an additional feature allows users to interact directly with smart contracts to set personalized visibility rules. This feature has been praised by participants. As P28 mentioned the advent of Web3 has empowered users to manage their content without being restricted by the platform's settings. *"The platform allows developers to use smart contracts, and while it might be a bit difficult for regular users, the fact that such a feature exists is a big step forward. It lets us manage our content the way we want"* (P28). This viewpoint is also supported by P18, who pointed out that the open-source protocols of Web3 social media grant users greater control to independently decide who can see their content. *"On traditional social media, users often cannot fully control the visibility of their content. The platform's privacy policies or algorithms determine what users can see, who they can interact with, and how content is distributed. However, on Web3 social media, many platforms use open-source protocols, which means the core code of the platform is public. Technically proficient users can modify these protocols based on the code to build their own application ecosystems, further enhancing control over their data and content"* (P18).

*5.1.4 Replicability.* Participants (n=26) perceived that content on Web3 platforms can be replicated just as easily as on Web2 platforms, a feature inherent to the nature of digital media. However, the key distinction lies in the fact that, with the help of blockchain, the content can be traced back to its original creator mentioned by nine participants.

*Traceability of Original Content.* Participants observed that the ability to replicate content does not undermine its credibility; rather, it offers a mechanism to establish the origin and integrity of digital posts. P07, a blogger, highlighted his authority in the space and shared his experience of posting on Steemit. He emphasized that the traceability provided by blockchain enables him to avoid issues like content theft or misattribution. *"On Web3 platforms, even if my content is shared or copied by others, I can always trace it back to the original source on the blockchain, which gives me confidence that my work is properly attributed"* (P07). This ability to trace content back to its origin through decentralized systems offers a layer of transparency and verification that is often lacking on Web2 platforms, where content replication can obscure the source and lead to issues such as plagiarism or misattribution. *"Web3 platforms allow creators like me, as a blogger, to maintain ownership of my work by providing proof of authorship. This helps reinforce the credibility of my content and discourages unauthorized reproduction without proper attribution"* (P10).

## 5.2 Users' Perceptions of Content Consumption

For content consumption, participants found the usability of content searchability on Web3 social media to be limited, primarily due to the slower search speeds caused by decentralized data storage. However, they valued community-based moderation, which reduces censorship biases typical of centralized Web2 platforms. They also highlighted the challenge of inconsistent content quality, as the decentralized nature of moderation leads to less reliable filtering.

*5.2.1 Searchability.* Participants (n=12) perceived that both Web2 and Web3 social media platforms offer visibility mechanisms such as chronological and trending feeds to discover content. However, they observed that when it comes to keyword-based searches, the speed of content retrieval is slower on Web3 platforms compared to Web2 platforms.

*Inefficiencies in Content Searching.* Participants expressed frustration with the content search experience on Web3 social media platforms, primarily due to slower search speeds, which hinder keyword-based searches. P09 explained that the slow search performance is likely attributed to the decentralized nature of Web3 platforms, where content is stored across distributed networks. This structure leads to longer retrieval times compared to centralized Web2 platforms. Additionally, the lack of advanced indexing and optimization techniques, commonly found in traditional platforms, further contributes to the delay. *"Web3 social media platforms utilize decentralized storage mechanisms. Unlike Web2 platforms, which rely on centralized servers, Web3 platforms distribute data across multiple nodes, requiring retrieval from various sources rather than a single server. Moreover, due to the limitations of blockchain storage capacity and processing speed, especially when the platform's content volume is large, the response time for search queries is generally slower"* (P09). This suboptimal search experience has led users to reduce their search activity on Web3 platforms, often opting to browse only the homepage content or switching to Web2 platforms for more efficient searching.

*5.2.2 Moderation.* Participants (n=21) noted that both Web3 and Web2 social media platforms employ content moderation. However, in Web3 platforms, moderation authority is decentralized and delegated to the community, rather than being controlled by centralized platforms. However, our participants mentioned that this decentralized approach can lead to inconsistent content, particularly when moderation is tied to token-based incentives.

*Community-based Content Moderation.* Participants on Web3 social media platforms reported feeling a new sense of power and responsibility as they are no longer just passive consumers of content, but active participants in content moderation. Unlike Web2 platforms, where content governance is controlled by centralized entities, Web3 platforms empower users to take part in shaping the content ecosystem through community-driven moderation. As P08 mentioned, content moderation in Web3 is not a top-down process dictated by the platform, but rather a decentralized, community-led effort in which users can contribute to defining what is visible and acceptable. *"We always want to see a variety of content on social media, but the platform's content moderation often stifles this. It's like a one-size-fits-all approach that limits individual expression and fails to cater to diverse viewpoints. In Web3, content moderation is more flexible, allowing users to decide what they want to see"* (P08). P22 points out the difference between Reddit and Mastodon, noting that Mastodon offers more independence because its servers adhere to a shared covenant. *"I know Reddit also has community rules for its subreddits, but it is a mix of official platform policies and volunteer moderators for governance. In contrast, Mastodon does not have a central authority like Reddit, and its independent servers follow a shared set of principles"* (P22).

*Inconsistent Content Quality.* However, fifteen participants expressed concerns about the effectiveness of community moderation in ensuring consistent content quality, particularly when moderation is tied to token-based incentives. For example, users who abandoned Steemit mentioned that the subjective value of social content is difficult to assess, and it is easily influenced by content production weighted by token-based voting. P02 frequently observed that on Steemit, there is a wide disparity in content quality. Some posts are poor quality but earn significant rewards. This is because these posts receive upvotes from users with large token holdings, which influences other users to upvote as well. *"I've seen a lot of inconsistent content on Steemit. Some posts are really well thought out, but they get almost no upvotes. Meanwhile, there are posts with little substance that get tons of upvotes just because they were liked by users with large token holdings. It feels like people follow the crowd and upvote without even checking the content's quality"* (P02). Balancing decentralized moderation with platform-level content quality management, particularly in light of token reward mechanisms, is a critical challenge that platforms currently face.

## 5.3 Users' Perception of Community Interaction

Participants perceived that the community interactions on Web3 social media are similar to those on Web2, as both allow users to build relationships and react to content. However, a key difference is that these interactions in Web3 are influenced by tokenization incentives. Additionally, participants praised the interoperability of Web3 platforms, which allows for seamless interaction and data exchange across different applications.

*5.3.1 Association.* Participants observed that Web3 social media, through its integration of cryptocurrencies and tokens, introduces new incentive models that both enhance users' enthusiasm for forming connections and reshape social behaviors. However, this tokenization of social interactions can lead to more instrumental relationships.

*Instrumental Social Relationships.* Participants mentioned that they can access transaction information on blockchain networks, allowing them to identify users with significant assets and observe their behaviors. For instance, P03 observed that when users first join the platform, it is difficult to gain substantial rewards without forming relationships with influential users. *"Web3 social media is a combination of social interactions and finance. If you want to earn tokens, you need to connect with influential users and build relationships with them. Rewards on the platform are often tied to social interactions and personal networks, and only by establishing connections with these influential users can you effectively participate in token earning. Without a strong network, it's hard to achieve meaningful rewards on your own; many opportunities on the platform require social relationships to seize"* (P03). Moreover, several participants (n=8) mentioned that while their engagement with Web2 social media was often driven by intrinsic motivations, such as personal interests or emotional connections, the token system in Web3 platforms has shifted social interactions towards being primarily driven by external economic incentives. This shift encourages users to form more transactional relationships based on practical benefits. *"I used to only follow family and close friends on Facebook to keep up with their lives. But on Minds, it's different—I actively engage with and follow people I don't even know, especially those who hold significant assets on the platform. I want to connect with them"* (P23).

*5.3.2 Meta-voicing.* Participants (n=26) recognized that Web3 social media allows for meta-voicing through various forms of interaction, such as reposting, liking, and commenting, similar to Web2 platforms. However, participants perceived that their behavior in expressing opinions or interacting with content is easily influenced by incentives provided through tokenization.

*Monetization Opportunities.* Twenty-four participants reported that they were drawn to Web3 social media platforms because they could earn rewards for behaviors that were previously part of their routine interactions on Web2 platforms. For example, participants of Steemit and Hive highlighted that earning tokens through interaction was one of the main motivations for using these platforms. *"Web3 platforms use token economics to build and sustain vibrant online communities, which is why I use these platforms. On platforms like Instagram and Facebook, likes don't yield any rewards. But now it's different; on Steemit, I can earn rewards simply by liking posts. It's the same action, but one comes with financial benefits, and of course, I prefer to use that"* (P15). Web3 social media platforms have transformed Web2 social media by turning seemingly simple social actions into economically valuable ones, motivating users to engage more actively and interact with content. *"I used to like and comment on posts frequently when I was using Medium, but I never imagined that switching to Hive would turn these actions into something that could actually earn me rewards. Even though the earnings are not much, it's still a motivating factor"* (P12).

*Speculative Interaction Behavior.* The incentives behind meta-voicing behavior have been criticized by participants. They pointed out that Web3 social media platforms encourage users to migrate

quickly from Web2 platforms through economic incentives, but this model has also led to the emergence of the "token farming" phenomenon. For instance, some participants mentioned that on these platforms, users often mindlessly like content to earn rewards, without regard for the quality of the content. *"I observed a lot of low-quality posts, such as 'I'm so happy today', receive a lot of likes. People like them not because the content is good, but because they notice that the post has already received likes from 'whales'. These whales are probably the same person using different accounts. When whales like a post, it means the post has high rewards, and if you like it, you can also share in the spoils. So, why would anyone care about the quality of the content? Liking is enough to earn tokens, and once they get their reward, they leave without caring about the platform's development"* (P13). This situation turns the very nature of meta-voicing—expressing opinions, likes, and comments—into a transactional act. Participants also mentioned that this undermines the platform's development, as it is unclear whether interactions with content are genuine, driven by appreciation, or simply motivated by rewards. *"Incentivizing people with tokens may increase the number of interactions, but it doesn't guarantee that these interactions are meaningful or contribute to the real growth of the community. As a creator, I see many likes and comments on my posts, but I don't know if people genuinely like my content, or if they're just chasing rewards"* (P29).

*5.3.3 Interoperability.* Participants (n=14) praised the interoperability of Web3 social media platforms, as they enable the seamless transfer of personal data across different applications through the use of social protocols, which allow for standardized data exchange between platforms.

*Seamless Data Transfer.* Participants perceived that the Web3 social media platforms they used were based on decentralized social protocols, such as Lens and Farcaster, which are not just standalone applications but rather application protocols. By connecting through a wallet to applications built on these protocols, personal information can be seamlessly synced across different platforms, making the process highly convenient. As P27 perceived users can seamlessly migrate their data through applications built on Lens Protocol. *"Users need to mint an NFT using their wallet to represent their identity. As long as your wallet holds the NFT representing your identity, you can use your wallet to connect to all applications in the Lens ecosystem, and all social data will be linked to this NFT. With Lens, you can create and manage your social graphs, and these graphs and social content can seamlessly migrate between different applications in the Lens ecosystem"* (P27). This is in contrast to Web2 social media, where platforms generally operate as "walled gardens", as perceived by our participants. Each platform locks user data and content within its proprietary ecosystem, making it difficult for social activities to flow seamlessly between platforms. *"Every time you switch to a new platform, you have to create your profile and social network from scratch. Your social card and historical content cannot be easily migrated to the new platform. This closed structure restricts data flow, causing social identity and information to remain confined within a single platform"* (P31). The decentralized social protocols in Web3 social media overcome the limitations of Web2, where users lack control over their data and face challenges in transferring it across different services.

# 6 Discussion

In this section, we first discuss how the characteristics of Web3 impact the usability of social media. We then analyze how the integration of tokens, an innovative component of Web3, is transforming the dynamics of social media. Finally, we propose design implications to guide the future development of Web3 social media.

## 6.1 How the Characteristics of Web3 Impact the Usability of Social Media

As we already mentioned in our findings, most of the affordance differences of Web3 social media stem from the innovations in Web3 technology. In this section, we use a technological perspective to discuss how the characteristics of Web3 influence the usability of social media (cf. Table 4).

**Table 4: Summary of the impact of Web3 characteristics on social media affordances.**

| Characteristic | Affordance |
|---|---|
| Decentralization | Editability, moderation |
| Tokenization | Association, meta-voicing |
| Anonymity | Interoperability |
| On-chain storage | Searchability, persistence, replicability |

The most notable characteristic of Web3 is decentralization, which means that data, management, and system infrastructure are stored, managed, and shared across distributed network nodes rather than relying on centralized servers [20, 118, 121]. This characteristic reduces the risk of data being removed or altered by a centralized party, ensuring greater permanence and control for users [45, 58]. In Web3 social media systems, this is perceived by users to significantly impact the usability of social media, including aspects such as editability and moderation. As highlighted in Section 5.1.1 and Section 5.2.2, participants expressed satisfaction with the freedom of posting content on Web3 social media and their self-organized moderation. This indicates that the characteristic of decentralization fundamentally influences social media affordances when developed based on Web3 infrastructure.

Another fundamental characteristic of Web3 is tokenization, which involves the use of tokens that allow users to earn rewards for contributions [20, 116]. In Web2 social media, users often provide content and engagement without receiving direct compensation, while platforms monetize this content through advertisements and other revenue-generating mechanisms [81]. However, Web3 changes this dynamic by using tokens to reward users directly for their participation. The introduction of tokenization creates new economic incentives for social media users by ensuring that the value generated on the platform is more equitably distributed [44]. This model fosters a more democratic ecosystem, where users are incentivized to participate actively, as mentioned in Section 5.3, rather than being passive consumers of content controlled by centralized entities.

Anonymity is another key characteristic of Web3, relying on blockchain to generate unique identifiers for each user that are not linked to their personal identity, with corresponding private keys generated through elliptic curve cryptography. This ensures

that users do not need to repeatedly register for different Web3 social media applications using the same blockchain infrastructure; instead, they can use a universal Web3 identity and password. This anonymity and identity interoperability is based on a standardized set of protocols and methods, such as the World Wide Web Consortium (W3C) Decentralized Identifiers (DIDs) standard [99], which ensures that DIDs can be consistently parsed and used across different decentralized platforms and applications. Through these standardized protocols, users can control and transfer their identity data, as we mentioned in Section 5.3.3. Web3 users can use a wallet to seamlessly switch data across applications built on a standard Web3 protocol, which significantly enhances the affordance of interoperability.

Another characteristic of Web3 is on-chain storage, where many Web3 applications store all data on a decentralized blockchain [21, 126]. Many Web3 social media platforms also follow this design and inherently maintain on-chain storage. This characteristic ensures that all data is consistently shared across multiple nodes. For instance, many blockchain systems utilize the Merkle Patricia Trie (MPT) structure to store and verify data [123]. The root hash of the tree is used as a consistency check for the data, with each node of the tree stored in a key-value database [119]. This data storage characteristic enhances the persistence and replicability affordance of Web3 social media, as we have shown in Sections 5.1.2 and 5.1.4. On the other hand, this characteristic also negatively impacts the searchability of Web3 social media, as any query operation on the blockchain requires retrieving the corresponding node representing the data from the appropriate tree structure before accessing the key-value database. This process is very slow and costly, leading to a perception of lower search efficiency mentioned by our participants in Section 5.2.1.

## 6.2 How Tokenization is Transforming Social Media

The fusion of social media and tokenization introduces a new economic layer to social interactions. It has given rise to an intriguing concept known as Social Finance (SocialFi), which opens up a novel way of merging the financial elements of Web3 with the realms of social engagement and online interaction [49, 124]. However, this integration introduces challenges as it ties user behavior to financial incentives.

In essence, SocialFi transforms interactions into economic transactions, enabling content creators and users to earn tokens for their contributions. It fosters an ecosystem where tokens incentivize activities like content creation, sharing, and collaboration. As discussed in Section 5.3.2, actions such as liking and commenting often serve not just social purposes but also as opportunities to earn rewards. These microtransactions, a hallmark of Web3 social media, provide users with a direct way to monetize their content [47]. Unlike traditional platforms struggling with monetization, token systems offer creators immediate support and diversified revenue streams, reducing reliance on advertising [80].

The mode of tokenization introduces challenges to the social media ecosystem, often giving rise to speculative behavior. As discussed in Sections 5.3.1 and 5.3.2, our participants noted that relationship-building on Web3 social media platforms tends to be unstable, with many users prioritizing short-term gains over the development of meaningful communities. Once they accumulate sufficient tokens, many users leave the platform, resulting in high attrition rates and low user retention. This behavior is further influenced by fluctuations in token prices; when prices rise, users may quickly exit after realizing substantial gains, which exacerbates the difficulty of maintaining a long-term user base. Consequently, the initial enthusiasm driven by economic incentives often fades as these incentives diminish, leading to reduced user engagement [33]. From a psychological perspective, social interaction is fundamentally about connecting with like-minded individuals, rather than pursuing material rewards [56]. When users engage in social behavior primarily to earn tokens, their motivations shift from genuine social connection to financial gain. This shift alters their social purpose, making their engagement less authentic and ultimately unsustainable in the long term.

Another challenge in Web3 social media is that low-quality content often overshadows high-quality content, similar to the principle described by Gresham's Law [101]. As discussed in Section 5.2.2, participants reported a decline in content quality on Web3 platforms. Creators typically rely on token rewards for income, and this model often incentivizes them to produce content that can quickly attract attention, rather than investing more time and effort into creating in-depth work. This is because platforms reward users' interaction behaviors with tokens, rather than directly rewarding the depth and quality of the content itself. While these platforms attempt to maintain content quality through community-driven moderation mechanisms, this approach faces several challenges in practice. One common issue is that users who hold more tokens within the community tend to have more influence in content moderation, which may lead to biased moderation standards that align with their values or interests. This imbalance in power distribution is a core paradox of decentralized governance [78].

## 6.3 Design Implications

According to our participants' perceptions, we found that while Web3 offers certain benefits to the social media ecosystem, it still faces usability challenges. These challenges arise from issues spanning the infrastructure layer to the top-layer applications. To create more user-friendly Web3 social media platforms, we aim to offer design considerations across different layers to enhance the usability of Web3 social media.

In the infrastructure layer, we propose improving indexing mechanisms and using a hybrid storage approach to address the issues of low search efficiency and limited file upload size. Although many Web3 social media platforms have adopted a mixed data storage management approach by combining on-chain and off-chain data [52], searchability is still perceived as limited in many scenarios, as discussed in Section 5.2.1. To address this issue, we propose combining key-value storage with Distributed Hash Table (DHT) [38] technology to enhance the efficiency of content location. DHT distributes content indexes across multiple nodes and combines them with key-value storage to ensure fast, structured access to data for efficient information retrieval. Furthermore, a multi-layered data management solution would significantly improve the efficiency of data handling in Web3 social media. Not

all data needs to be shared across all nodes; instead, data can be stored according to its importance in different structures. Critical operations, such as user profile information and token transactions, would be stored more broadly to leverage the blockchain's security and transparency. In contrast, high-frequency actions, such as content uploads, likes, shares, and comments could be stored in fewer nodes, reducing the need for extensive sharing consensus. This approach would reduce strain on the blockchain and address the limitations of uploading large files.

In the protocol layer, we suggest utilizing community governance to refine token reward protocols. Web3 social media platforms design token reward protocols to incentivize user participation. However, this approach introduces several challenges, including speculative interactions and relationship building, as discussed in Section 5.3.1 and Section 5.3.2, which can undermine the platform's ecosystem. We propose utilizing community governance, a key feature of Web3 governance, to refine token reward protocols. Token reward protocols currently focus on encouraging basic interactions, such as likes and shares. We suggest expanding these mechanisms to include criteria like content quality, participation diversity, and long-term community contributions, which would be developed through collective discussions and consensus within the governance framework.

In the application layer, we propose optimizing the user interface to allow for more flexible content management. Participants in our study observed that the permanence of content on Web3 social media leads to increased caution during content creation. The permanence of content arises from the decentralized storage systems, which prioritize immutability and censorship resistance. This contrasts with the editable, centralized storage models of Web2 social media. As a result, Web3 social media faces the significant challenge of balancing content permanence with user flexibility. To address this, we propose a "content confirmation period" function. During this period, users have the opportunity to retract, modify, or adjust their content within a specified timeframe before it is permanently stored on the decentralized network. Initially, the content will be placed in a temporary buffer zone, allowing for flexible edits. Once the user confirms the content, it will be permanently uploaded to the network. This approach aims to reduce user concerns about permanent storage while providing greater control over content and self-presentation.

## 7 Conclusion

Our study utilizes a social media affordance framework to explore users' perceptions of the usability of Web3 social media platforms. First, we identify the key features of Web3 social media platforms. Next, we conduct interviews with 32 participants to gain insights into their perceptions of the usability of Web3 social media, focusing on content creation, content consumption, and community interactions. Furthermore, we discuss how the inherent characteristics of Web3 influence social media and provide design implications across various layers to enhance the usability of Web3 social media.

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# A Interview Protocol

Thank you so much for taking the time to participate in our study. My name is [INTERVIEWER NAME] and I am a researcher from [UNIVERSITY NAME]. Our research is trying to understand users' experience and practices with Web3 social media. Throughout our discussion, I'll be asking you a series of questions. Remember, there is no right or wrong answer. We are keenly interested in your unique experiences and opinions.

Would it be okay if I audio-record our session for note-taking accuracy? Please be assured that your identity will be kept confidential, and your real name won't be mentioned in any of our publications or presentations. You're free to ask questions or pause the interview at any point. May I have your consent to record this call?

## A.1 Part 1: Experience with Web3 Social Media

**1.** Which Web2 social media platforms do you usually use?
  **1.1.** How much time do you typically spend on the Web2 social media platforms you mentioned?
  **1.2.** What do you typically do on these platforms?
**2.** Which Web3 social media platforms do you usually use?
  **2.1.** How much time do you typically spend on the Web3 social media platforms you mentioned?
  **2.2.** What do you typically do on these platforms?
**3.** [If there is a difference in time spent or activities between Web2 and Web3 social media platforms], could you explain why your time spent/activities differ between these two types of platforms?
**4.** When did you first come across Web3 social media platforms?
**5.** How did you learn about Web3 social media platforms?
**6.** When you first learned about Web3 social media, did you immediately try using it?
  **6.1.** Yes: What factors motivated you to start using it?
  **6.2.** No: Why did you immediately decide not to use it?
**7.** When you first encountered Web3 social media, how did you perceive it compared to Web2 social media platforms in terms of similarities and differences?

## A.2 Part 2: Content Creation Experience

**1.** Have you posted content on Web3 social media?
**Yes** :
**2.** Can you describe your experience when posting content for the first time?
**3.** [Screen Sharing] If convenient, could you share screenshots of the different types of content you have posted on Web3 social media? If not, could you describe the content you have posted?
  **3.1** What types of content do you typically post?
  **3.2** Why did you choose to post that particular content and those topics?
  **3.3** Could you describe the process for posting a post on Web3 social media? What specific steps are involved in the process?
**4.** Have you ever felt unsure or reconsidered something you posted on Web3 social media? If so, could you share more about that experience?
**5.** Could you share your thoughts about your earnings from content creation on Web3 social media?
**6.** What has your experience been like with content creation on Web3 social media? Are there any particular aspects that you find challenging or rewarding? Could you provide examples?
**No** :
**7.** What reasons have prevented you from posting content on Web3 social media?

8. Do you have any concerns or challenges that have stopped you from posting content on Web3 social media?
9. Do you plan to try posting content on Web3 social media in the future? If so, what support or information would help you complete this process?

## A.3 Part 3: Content Consumption Experience

1. Do you consume content on Web3 social media?

**Yes** :

2. Could you please describe how you typically use Web3 social media for content reading or searching throughout the day?
3. How do you usually search for content you want to read on Web3 social media?
4. How does the process of searching for content compare to Web2 social media?
5. What actions do you usually take on content that interests you (or doesn't)? Why?
6. What has your experience been like when consuming content on Web3 social media? Are there any aspects you particularly enjoy or find challenging?

**No** :

7. What reasons might prevent you from consuming content on Web3 social media?
8. Have you ever tried consuming content on Web3 social media? Did you encounter any difficulties?
9. What improvements do you think Web3 social media could make to attract you to read more content on the platform?

## A.4 Part 4: Community Interaction Experience

1. Do you interact with other users on Web3 social media?

**Yes** :

2. What kinds of interactions have you engaged in on Web3 social media?
3. [Based on the interactions participants mentioned], can you share how you feel about these interactions on the platform?
4. How would you describe your overall experience with interacting with others on Web3 social media?

**No** :

5. Why don't you interact with others on Web3 social media?
6. Do you interact on Web2 platforms, and if so, how?
7. Do you plan to engage in interactions on Web3 social media in the future, and what support would help you with this process?

# B Overview of Web3 Social Media Platforms Discussed in Academic Research and Web3-Focused Media Outlets

**Table 5: Frequency of Web3 social media platforms mentioned in thirty academic papers and sixteen articles from Web3-focused media outlets.**

| Platform | Academic research | Web3-focused media outlets | Frequency |
|---|---|---|---|
| Steemit | [3], [28], [48], [50], [51], [53], [68], [77–79], [108, 109] | [24], [97] | 14 |
| Mastodon | [60], [73], [92], [105], [127, 128] | [24], [97] | 8 |
| Friend.Tech | [115] | [1], [11], [13], [15], [24] | 6 |
| Farcaster | | [7, 8], [10], [12], [15] | 5 |
| Hive | [2], [47], [91] | [84], [97] | 5 |
| Minds | [23], [46], [69] | [84], [97] | 5 |
| Lens | | [9], [15], [24], [120] | 4 |
| Mirror | | [6], [9], [14], [97] | 4 |
| Nostr | | [12, 13], [15], [24] | 4 |
| Bluesky | [72] | [24], [97, 98] | 4 |
| Memo.cash | [129–131] | | 3 |
| Dtube | [29] | [84] | 2 |
| CyberConnect | | [9], [24] | 2 |
| Snort | | [97] | 1 |
| MAIN Community | | [97] | 1 |
| Ecency | | [97] | 1 |
| Gab | | [97] | 1 |
| Lenster | | [97] | 1 |
| BitClout | | [84] | 1 |
| PeakD | | [97] | 1 |
| Huddln | | [24] | 1 |
| Post.Tech | | [24] | 1 |
| VIMM | | [24] | 1 |
| Liketu | | [24] | 1 |
| Chingari | | [24] | 1 |
| LunarCrush | | [24] | 1 |
| Playbux | | [24] | 1 |
| Galxe | | [24] | 1 |
| Phaver | | [120] | 1 |
| Rally | | [15] | 1 |
| Torum | | [9] | 1 |
| Tipcoin | | [15] | 1 |
| Social X | [23] | [84] | 2 |
| Flote | | [84] | 1 |
| Cent | | [84] | 1 |
| Blockster | | [84] | 1 |

# C Introduction of Top Ten Web3 Social Media Platforms

**Table 6: Introduction of top ten Web3 social media platforms.**

| Platform | Introduction |
|---|---|
| Steemit | Steemit stands out as the pioneering blockchain-powered social media platform that offers incentives to both content creators and curators. Users can generate and share blog posts on Steemit, which can then receive replies, reposts, or votes from other users. Unlike conventional social media platforms that usually don't reward their users, Steemit issues three types of rewards to its users: (1) producer reward; (2) author reward; and (3) curation reward. All data generated by Steemit users are stored in the Steem blockchain. |
| Mastodon | Mastodon operates on open-source software and functions within a federated network of independently administered servers, referred to as "instances", which are interconnected via the standard protocol ActivityPub. These interconnected instances enable seamless user interactions while preserving the autonomy of local moderation. Mastodon employs a decentralized framework, delegating content moderation responsibilities to local instance administrators. It follows a non-profit financial model, relying on grants and crowd-sourced funding instead of commercial monetization. |
| Friend.tech | Friend.tech is a decentralized social platform built on the Base blockchain. It enables the tokenization of social interactions by allowing users to buy and sell "keys" linked to specific accounts. These keys represent a creator's influence and grant holders access to exclusive benefits, such as private chatrooms and direct one-on-one communication. To get started, users must obtain an invite code and deposit Ether (ETH), which is used to purchase keys from other users. Buying a key enables users to establish direct and personal connections with their favorite creators or influencers. |
| Farcaster | Farcaster is a decentralized social graph protocol built on the Optimism blockchain, a Layer 2 scaling solution for Ethereum. Farcaster employs a hybrid approach to decentralization, storing user identities on-chain and managing posts and social connections off-chain. To deter spam and bot activity, users are required to pay an annual $5 fee, which provides them with a storage unit allowing a limited number of posts, comments, and reactions. Additionally, Farcaster offers a development platform that allows developers to build and deploy decentralized applications (dApps), which can be seamlessly integrated into the Farcaster network to provide users with a variety of functions and services. |
| Hive | Hive is a content blogging platform built on the Hive blockchain, which was created as a hard fork of Steem. The Hive blockchain mints new Hive tokens and distributes them into a community rewards pool. These tokens are awarded to users for their contributions based on the votes their content receives. |
| Lens | Lens is a decentralized social graph that enables developers to build social dApps while allowing creators to retain ownership of their content and audience. Additionally, users mint NFTs for every profile they follow, fostering a unique and personalized social experience. Built on the Polygon blockchain, Lens leverages NFTs to represent users' social graphs and content. All activities are recorded in the user's wallet. |
| Mirror | Mirror is a decentralized publishing platform that allows creators to publish, own, and permanently store their creative works on-chain. It offers tools for writers to publish articles, essays, and other forms of written content. Users can mint their content as NFTs, facilitating unique ownership and trading opportunities. All written works are permanently stored on Arweave, a decentralized data storage solution that the Mirror protocol accesses to retrieve and read data. |
| Nostr | Nostr is a decentralized social networking system based on a set of open protocols. It consists of two key components: relays and clients. A relay functions as a server, receiving messages from users and asynchronously forwarding them to others. Users interact with relays by sending and receiving messages via a client. A client can be any application (e.g., mobile or desktop) that implements the Nostr protocol. |
| Minds | Minds is an open-source and distributed social network. It rewards users with MINDS tokens for creating popular content, referring friends, or providing liquidity. The tokens can then be used to promote users' content or send tips to content creators to show support and unlock special perks. Minds offers a monthly premium subscription that gives users access to exclusive content, the ability to become verified, and the ability to remove boosted posts from their feeds. |
| Bluesky | Bluesky is a decentralized social platform developed in parallel with Twitter. Bluesky offers built-in feed algorithms while also empowering users to create their own custom feed generators, giving them greater control over their content experience. The platform is built on the Authenticated Transfer Protocol (AT Protocol). AT Protocol creates a standard format for user identity, follows, and data on social applications, allowing applications to interoperate and users to move across them freely. |