Asset, Token, or Coin? A Semiotic Analysis of Blockchain Language

Olivia Sewell[1] · Lachlan Robb[1] · John Flood[2]

Abstract

Blockchain's language and terminology is confusing, contested, and rapidly changing. As a hype-driven technology, Blockchain is critical to an increasing number of projects that exist in a space of regulatory uncertainty. As communities of blockchain develop and evolve, the language they use to describe these functions changes. This causes concerns when attempting to have global regulatory certainty and clarity. Regulators and communities have different approaches to blockchain language, and this causes problems because of the translation between practical use in a community, and the legal effects created by regulators. Of particular concern is the lack of clear expression amongst the broader community regarding the concept of blockchain-related assets as these 'tokens', 'coins', and 'assets' form a key part of financial regulation. This project uses semiotics to study the diverse language associated with blockchain. This analyzes a series of self-proclaimed 'dictionaries of blockchain' to assess key definitions, themes, perceptions, and misconceptions present in these communities. The study involved a case analysis of the terminology used in Australia's proposed response to blockchain in comparison with that of wider communities. When comparing this to regulatory definitions and approaches, it becomes clear that this is an area that requires further attention. This project highlights the need for regulators to understand and use common terms in blockchain regulation. It is argued that this approach facilitates a better understanding of poorly understood concepts and clearly connects the law with those it intends to target.

✉ Lachlan Robb
robbl@qut.edu.au

1   School of Law, Queensland University of Technology, Brisbane, Australia

2   School of Humanities, Languages and Social Science, Griffith University, Brisbane, Australia

1 Introduction

Financial institutions generally fall within the purview of economists who examine the models underlying them, e.g., the Gaussian copula [1, 2]. In this paper we propose a different approach, one based on the language of institutions. How does language shape and engage with the institution? Is language implicated in the success or failure of the institution? How does language cross communities such as users and regulators [3]? We focus here on the relatively new field of blockchain, and explore its evolving and burgeoning lexicon as used by its innovators and regulators. The aim is to provide an understanding of blockchain's ordinary and public language use, which may be used to inform and strengthen Australia's approach to blockchain regulation. By undertaking a semiotic analysis of blockchain related dictionaries, glossaries and taxonomies that are claimed to capture the current language use by various blockchain communities, we lay bare its underlying structures.

This paper reports on a study examining the language use of regulators and broader blockchain communities. Its findings highlight the relative gap between common language use and Australia's proposed regulatory response, as demonstrated through the Australian Treasury's 2023 token mapping exercise. Indeed, we argue that if the Treasury continues along its present regulatory path, based on its own lexicon, its regulatory frameworks for the blockchain field will become less relevant and their utility will diminish. In the post-regulatory state non-state regulation co-exists with, and often precedes, state regulation and becomes a normal part of the decentred system especially as new forms of economic and social activity emerge that straddle the public and the private [4]. Emerging blockchain markets and communities are emblematic of these forces.

Blockchain is well known as the technology that underpins the cryptocurrency Bitcoin [5]. It is a type of Distributed Ledger Technology ('DLT') that proponents claim records transactions permanently, accurately, and anonymously[6]. While DLT itself is not new, blockchain is perceived as novel because of its innovative and wide-ranging applications, including applications in cryptocurrencies, finance, healthcare, and government [7]. The developing and evolving nature of blockchain technology and its lexicon make it a difficult target for regulation because the field of blockchain changes shape frequently [8, 9]. While there are certain applications of blockchain that arguably relate to existing financial regulation, such as cryptocurrencies [9], regulation needs to expand to clearly show how it captures uses of blockchain [10].

Semiotics is a field of study that inquires as to how meaning is created and transmitted through 'signs', such as words [11]. Semiotics explains how context and culture influence the way a person interprets or derives meaning from messages. One use of semiotics is to study the relationship between language, signs, and their legal effects [12–14]. Another use of semiotics is to analyse collections of words, such as dictionaries and glossaries, because these can reveal the associated meanings of terms and the taxonomic relationships that exist between them [15]. A semiotic exploration of blockchain can find critical data related to the

signs, values, and culture prevailing in the technology and blockchain communities [16]. As such, using semiotics to analyse the emerging blockchain lexicon through blockchain dictionaries, glossaries, and taxonomies can reveal important insights into blockchain communities, which can be used by regulators to ensure that their approach to blockchain regulation is clearly connected to the landscape.

This paper is presented in six parts. Part Two is a background and literature review of blockchain and semiotics. Part Three introduces the study of the semiotics of blockchain communities and discusses the method and data collection. Part Four reports on the results of the study. Part Five involves a case study of the Australian Government's proposed regulatory approach to blockchain. In Part Five we argue that the language used by the Australian Government is distinct to common language observed in the study. The findings are discussed in depth in Part Six. In Part Six we argue that there is a need for clarity of terminology and meaning, particularly relating to the concept of assets. We argue that regulators need to respond to blockchain in a technology neutral way that is guided by common understandings and language use.

2 Background and Literature Review

2.1 Blockchain

There is no definitive or agreed upon definition of what blockchain is. Instead, it is usually described with reference to its technological attributes and capabilities. Blockchain technology creates a digital record of events and objects, and is maintained by a decentralised network of computers [17]. It enables a community of users to record transactions in an open and shared ledger within that community [18]. These uniquely identified, linked transactions are referred to as 'blocks', and blockchain handles these blocks in a 'chain' [19]. All information within a block is generated automatically, and subsequently verified, meaning that it is not possible to change [6]. Each member uses a unique and confidential 'key' to sign a transaction meaning that transactions are also identifiable, yet anonymous. The technology has a variety of potential applications, such as cryptocurrencies, finance, healthcare, and government [7]. Bitcoin is the first, and most well-known, application of blockchain [4, 20].

Blockchain technology, nevertheless, is surrounded by hype. It is acclaimed by proponents to be something revolutionary. Much of the hype associated with blockchain is attributable to its widespread and innovative use [21]. For instance, blockchain's application in cryptocurrencies receives a significant amount of attention from the public [22, 23]. The hype surrounding blockchain is perpetuated by members of blockchain communities who are constantly finding and sharing new ways to use the technology.

Countless blockchain communities exist, formed upon members' shared interest in the technology [24]. For example, 'crypto' communities endorse blockchain's use in cryptocurrencies[1]; researchers and scholars are discovering potential new applications of blockchain [25]; and governments and regulators are attempting to regulate the use of blockchain.[2] Communities are therefore particularly influential to blockchain's development, recognition, and the hype and myth surrounding the technology [24]. For instance, it has been argued that crypto communities have created a new type of legal asset [26, 27]. However, there is no clear or shared understanding of the expression of this concept. This confusion means that it is unclear what is covered by regulation.

2.2 Semiotics

Semiotics has been used to explore the complex relationship between language, signs, and their legal effects [14, 28, 29]. This is a field of study that looks to how meaning is created and transmitted through signs and symbols. Umberto Eco stated that 'semiotics is concerned with everything that can be taken as a sign [30].' Eco regards a 'sign' to be anything which can 'stand for' something else [31]. Signs can take a variety of forms including, for example, images, gestures, objects, and words. A legal term, on its own, is generally considered to have a self-referential, self-closed meaning [32], which can become complicated by the nature of legislation [33]. Because the law interprets external reality in a unique way, legal language is considered to be different to ordinary language in that it is often technical, precise and/or vague [34]. From a semiotics perspective, the law and legal terms, represent a collection of signs that exist within a larger semiotic system [32]. Semiotic analyses of legal language show how 'law and language are closely linked to social and cultural events within a specific period of time and space' [35]. As such, it has been suggested that semiotic and cultural analysis of community language use should be considered as a part of law reform [36].

Legal semiotics is also echoed within key approaches of jurisprudence. HLA Hart argues that the law has an open texture which captures how perceptions of law alter over time. However, this causes complications with predicting the future applications of law due to the changing nature of language and public, cultural understandings of law and justice [37]. Law is a human construct, and by its nature, the meanings within the law can change and develop as like other aspects of society [38]. To this end, law is a critical expression of semiotics as the sign, signifier and signified have important effects upon society when the sign in question has legal force behind

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[1] Crypto communities are dedicated groups of people with a common interest in gaining and sharing knowledge about cryptocurrencies and blockchain technology. See, eg, 'Binance' < https://www.binance.com/en > .

[2] In Australia, the regulatory response to blockchain is currently being informed by government agencies such as the Australian Taxation Office ('ATO'), The Australian Treasury, and The Australian Securities and Investments Commission ('ASIC').

it. The way that the law may alter the relationship between the signifier and signified is an important process to semiotics.

2.2.1 Semiotics and the Use of Dictionaries

Dictionaries are collections of signs, signifiers, and signified meanings and can show how the relationships between these can change over time. The recording of a language, such as the creation of a dictionary or glossary, is a type of linguistic stocktaking in which the author/editor attempts to identify the store of words in the language and their recognised and accepted forms [39]. Analysing collections of words lends itself to the study of semiotics because examining these sources can reveal sets of concepts and their associated taxonomic relationships [15]. Studies of dictionaries have highlighted how these sources can be the reference for uniting terms and functions [40], how dictionaries can be critical for communities involved in language teaching or learning [41], and how they are used to maintain at-risk languages over time [42]. Within a broader context, dictionaries also demonstrate the internal/external binary of a tribal system—insofar that the language used by a group can delineate membership, a dictionary can be a way of bypassing this and gaining access. As the language of a community or tribe is meant for internal use only by community members, a dictionary provides access to these communities— either by design, or accidentally—and can provide needed public access albeit at the risk of revealing sacred or private information. For this reason, using semiotics to analyse dictionaries can provide deep and meaningful insights into the signs, values, and culture prevalent in communities. This analysis may be particularly useful where there are differences in the language used by related communities, or where there seems to be no shared understanding amongst communities as to the expression of concepts.

2.2.2 Semiotics and Blockchain

Semiotics has been used academically to understand aspects such as financial marketplaces [43, 44], language, signs and myth [45]. As such, the use of semiotics to analyse blockchain is a logical application that builds on this. Semiotics has been used to analyse blockchain and cryptocurrencies as it allows for a critical understanding of the signs, values, and culture prevalent in the emerging technology [16]. For example, Inwood has used the walkthrough method to analyse the discourse evident in white papers, websites and apps of blockchain start-ups [46]. The walkthrough method, like semiotics, aims to achieve an understanding of the underlying values and meanings present within a community.[3] Inwood's research achieved an

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[3] The walkthrough method is a data analysis method that involves analysing and understanding apps and websites from multiple dimensions and perspectives. It focuses on the multimodal features of websites and apps to achieve an understanding of the intended purpose, embedded cultural meanings, and the implied ideal uses and users. For further discussion see Ben Light, Jean Burgess and Stefanie Duguay, 'The Walkthrough Method: An Approach to the Study of Apps' (2018) 20(3) *New Media & Society* 881.

understanding of the key values present in blockchain start-up companies as represented by discourse in apps and websites [46]. However, this research was limited because it considered the language used by a single community in a narrow context. There is a need for research to analyse the diverse language associated with different blockchain communities, as this can highlight discrepancies in the way that different concepts are understood and described.

In summary, semiotics is a broad field of study that looks to understand the nature and meaning derived from the signs present in communities. Semiotics has been used to achieve a deeper understanding of the relationship between signs, the law, and their legal effects. This research has found that the law is a collection of signs existing within the broader semiotic system [32]. Another body of research looks to how a deeper understanding of communities can be achieved through analysis of the language used in dictionaries, glossaries, and taxonomies [47]. A small amount of research has used semiotics to analyse aspects of blockchain. For example, Inwood used semiotics to analyse language in white papers, websites and apps of blockchain start-ups to reveal the values present in that community [46]. However, research on blockchain communities is limited. There is a need for research to explore the values present in a diverse range of blockchain communities, as these perceptions can have implications on the way the law regulates blockchain. This paper reports on a study that addresses this gap through a semiotic analysis of blockchain related dictionaries, glossaries, and taxonomies.

3 A Semiotic Study of Blockchain Communities

The blockchain lexicon is currently being shaped by several communities of innovators and regulators, who do not necessarily correspond well with each other. This study was designed to demonstrate the diverse language associated with blockchain through a data-driven semiotic analysis of glossaries, dictionaries, and taxonomies. The nature of this research required categorisation and interpretation of the contents of these blockchain related texts. Importantly, the method selected for this study needed to describe the data in a transparent and relocatable manner. This study therefore involved a content and semiotic analysis of blockchain related terms and their respective definitions, as expressed by different blockchain-related dictionaries, glossaries, and taxonomies.

Semiotic analysis aims to understand and explain how a given sign is interpreted in a particular context. For instance, semiotic analysis has been used to analyse photography and advertisements [48, 49]; motivations of luxury buyers [50]; political internet memes [51]; and cartoons [52]. Semiotic analysis has also been applied in the digital context to online communication and social tagging [53], and crypto assets [54].

There is not a prescriptive method associated with semiotic analysis. However, semiotic analysis methods aim to relate signs within a text to their particular cultural and situational context [55]. Bell and Milic propose that this can be done by combining content analysis methodology with a semiotic analysis [48]. Content analysis is a research method that aims to describe and organise data [56]. Content analysis

often involves qualitative research techniques, such as coding of data, and quantitative research techniques, such as word counts [56]. As such, content analysis can provide a useful basis for the semiotic analysis of dictionaries, glossaries, and taxonomies which represent collections of terms.

3.1 Method Selection

The method used in this study builds upon the methodologies used by Bell and Milic who combined content and semiotic analysis methods to examine gender stereotypes in display advertisements in Australian magazines [48]. In that study, each display advertisement was analysed and coded according to its representation of values and variables [57]. Then, a semiotic analysis was conducted by applying principles of semiotics to the results [48, 58]. This study differs from Bell and Milic's in that it is an analysis of language and not the perception of images. However, the process of coding blockchain terms still proves useful to this study, as this provides an understanding of the themes present in the language which is required to understand how the language relates to its cultural and situational context [59, 60]. Therefore, in this study, blockchain terms were similarly coded according to their representation of values. The results from this process, and other relevant observations, were subsequently analysed using theories of semiotics and myth as explained by Eco and Barthes.[4]

3.2 Data Collection

This study involved the collection of data and subsequent analysis using qualitative and quantitative content analysis methods. Data collection occurred by drawing upon self-identified glossaries, dictionaries, and taxonomies of blockchain (referred to as 'texts'). These texts were identified through searches with keywords, as well as refinement to ensure a spread of jurisdiction, reputation, and role in society.

Step 1: An initial internet search was conducted using variations on the keywords of 'blockchain'[5] and 'glossary.'[6] From the results, texts were chosen that proposed blockchain related terms and respective definitions. The selection of texts comprising the sample were intentionally chosen so that there was representation of language use by a diverse range of cultures and communities. Texts were selected from communities with differing roles in society, motivations, and jurisdictions. The final sample contained 2078 unique terms and their corresponding definitions as

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[4] Eco and Barthe's theories have been accepted as a basis or theoretical framework for semiotic analysis of language use. See, for example, Danai Tsotra, Marius Janson and Dubravka Cecez-Kecmanovic, 'Marketing on the Internet: A Semiotic Analysis' [2004] *AMCIS 2004 Proceedings* 526; C Marlene Fiol, 'A Semiotic Analysis of Corporate Language: Organizational Boundaries and Joint Venturing' (1989) 34(2) *Administrative Science Quarterly* 277.

[5] This included the terms: 'blockchain', 'cryptocurrency', and 'crypto'.

[6] This included the terms: 'glossary', 'dictionary', 'taxonomy', 'classification', 'slang', 'words', and 'language'.

proposed by 19 texts. The texts that comprise the final sample are shown in Table 1 in the appendix.

Step 2: Once the texts were chosen, they were added into the database and each text was manually mined for terms and definitions.

Step 3: Once the data from the texts was extracted, the information was analysed for duplicates. This was done by ordering the data alphabetically and manually checking for overlapping terms and definitions that matched exactly.

The text Gemini was considered an outlier because of its size (1591 terms) compared to the average number of terms in a text (258 terms including Gemini, 184 excluding). To reduce the effect of Gemini on the data being collected, two datasets were created and a 'Gemini Excluded' dataset could be used to avoid skewed data.[7] The 'Final Total' dataset contained all terms from all texts (2078 unique terms from 19 texts).

Step 4 Once the database was completed, cultural and contextual information about each of the texts was collected. This included objective information about the text, including: the type of author; the text's creation date; and any jurisdictional affiliations. It also included subjective information such as how the text was presented; if the language used by the author was inclusive or exclusive; whether the text appeared genuine or appropriated; whether the author presented the text with authority or neutrality; and any comments about the author's reason for creating the text.

Step 5 Next, each term in the database was 'coded', according to the 'themes of interest.' There were three distinct categories of codes, namely 'Construction', 'Focus', and 'Character'. The Construction codes related to the grammatical construction of the term, the Focus codes looked to the way that the term could be used, and the Character codes related to the character and nature of the term.

The Construction codes noted if any terms were of a particular grammatical structure or focus. This category included the codes 'proper noun', 'acronym', and 'slang'. Not all terms were captured within this category, rather it was used to note terms that held a particular characteristic.

The Focus codes looked to the industry, use, or typical association of the term within a broader, non-blockchain-centric community. This category included the codes 'neutral', 'legal', 'economic or financial', and 'technical'. Terms were typically coded into only one of these, however some duplication was possible. This was done based off the understanding of the researcher and may be subject to minor bias.

The Character codes captured broader ideas of the terms as they were sought to define different expressions of terms. The codes comprising the category were: 'quality', 'object', 'technique', 'expression', and 'structure'. Quality meant the term denoted a characteristic, grouping, or classification of something. Object meant the term denoted a 'thing'. Technique meant the term could be used to describe a way of dealing with an object or structure. Expression meant the term could be used to describe something. Structure meant that the term denoted a concept created by a cluster of objects.

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[7] This condensed version of the database was only used for specific analysis and is noted by use of the term 'Gemini excluded'.

Each term was assigned codes across all appropriate categories and could be assigned multiple codes within the same category. After all terms had been coded, the total frequency of each code was calculated and recorded in the database. A summary of the data collection steps, the information collected from the texts, and the selected codes is summarised in Table 2.

4 Results

This section outlines the results of a semiotic analysis and shows that there is no clear consistency between the terms used, the length of lists, or decisions on what words are 'essential' enough to form a reportable lexicon for each source. As such the language used by blockchain communities is inconsistent and this poses a clear challenge to regulatory agencies attempting to create clear and consistent legislation.

A variety of dictionaries, glossaries, and taxonomies ('texts') were analysed, originating from authors with different jurisdictional backgrounds, reputations, and roles in society. This study considered how these factors (representing the cultural and situational context) influenced the nature of the language used in a text. To find this, the background of each text was analysed and compared to the characteristics of the language used, such as the types of terms included (represented by codes), the size of the text, and the length and complexity of definitions provided. The relationship between texts was then compared by looking at how frequently each term appeared in the database (all texts) and whether terms appeared in multiple texts. Terms relating to the concept of assets were flagged as they were of particular interest to the study because these are the current objects of regulatory focus. These 'assets' include cryptocurrencies, tokens, coins and all of the creative ways in which different groups have attempted to reinvent terms to describe how digital objects can be held, sold, traded and owned. Overall, while there were commonalities and some observed link between an author's role in society and the nature of the language used, there was little overlap between the actual terms used by texts of a similar background outside of a core number of frequently occurring terms.

4.1 Factors Informing Cultural and Situational Context

The background and author of a text informs the cultural and situational context of the terminology it uses. This study analysed texts from authors with differing jurisdictional, reputational, and industry backgrounds. Data relating to each text's background was analysed objectively and subjectively based on the researcher's understanding of each text's subjective expressions of their own data, objective facts about how and when the data was recorded, and overt declarations about jurisdiction. Although no two texts were alike in all aspects, there were overlaps in some characteristics of the texts that were studied.

Tables 3 and 4 in the Appendix show a number of interesting points of data including how location, focus, and expression were all sporadic amongst the texts as well as details about publication times, complexity of definitions, publication

formats, audience of text, and number of entries found. However, for the purpose of this analysis we have chosen to focus on a number of key aspects including the frequency of terms with a particular focus on terms relating to assets.

4.2 Frequency and Distribution of Codes

The distribution of codes indicated the text's focus, and could be attributed to its background. Tables 3 and 4, in the Appendix, show text code distributions and the codes as a percentage of total terms in each text.

Despite differences in the cultural and contextual background of texts, object was the most common Character code in each text. Object terms usually made up 40–70% of an overall text (Table 4). Neutral and technical codes were the most frequent code from the Focus category. Neutral terms usually made up 40–80% of the overall text (Table 4).

The distribution of codes was mostly consistent across texts, with a high proportion of codes being neutral and/or object. A small proportion of the total codes were 'legal'. The texts containing the highest frequency of legal codes were Blockchain Research Institute ('BRI') (58% of the total text); Global Digital Finance Stablecoin ('GDF Stablecoin') (33%); The Australian Treasury (26%); Global Digital Finance ('GDF') (23%); Australian Taxation Office ('ATO') (15%); and Arab Monetary Fund ('AMF') (11%) (Table 3). The authors of these texts were academic (3 texts) or government bodies (3 texts). Unlike other texts, these texts contained a relatively low frequency of technical and economics/finance codes, with the government texts being the only texts to contain no economics/finance codes (Tables 3 and 4). There was also little presence of Construction codes amongst these texts. In relation to the Character codes, these texts contained a relatively high number of quality codes, but a relatively low frequency of expression codes (Tables 3 and 4).

Slang was generally uncommon. However, journalist and community authored texts contained a relatively high frequency of slang codes (26–35%) (Table 4). In comparison to the other texts, these texts also had a relatively high frequency of economics and finance codes (3–11%) (Table 4).

4.3 Size, Complexity and Overlap of Texts

The size and complexity of a text, and how terms overlapped between texts revealed where there were likely to be similarities in the language use of different texts. Tables 5 and 6 mirror Tables 3 and 4 showing the overlap of terms between texts. Table 5 shows frequency of overlapping terms in texts. And Table 6 shows overlapping terms in texts as a percentage of column text.

Most texts consisted of between 40 and 190 terms (13 texts). The largest texts were Gemini (containing 1591 terms) and InterWork (containing 399 terms). The smallest texts were BRI and GDF Stablecoin, containing only 12 terms each.

For the purposes of assessing the frequency of terms, this research adopted three categories. Terms defined in only one text are referred to as 'unique terms'; terms

defined in two to three texts are 'rare terms'; and terms defined in seven or more texts are 'common terms.' Every text contained at least 1 unique term. Excluding Gemini, just over half of the terms in the database were common or rare terms (421 terms), and the remaining were unique terms (396 terms). Most objects were common terms. However, apart from the terms 'Bitcoin' and 'Gas', terms coded as proper nouns and objects were always unique or rare terms. This is likely because of the specificity of a proper noun, and because most originated from the largest texts (200 proper nouns appeared in Gemini and InterWork as shown in Table 3).

4.4 Assets

Terms relating to blockchain assets presented an interesting expression of the codes and unique terms as shown in Table 7 in the Appendix. Every text defined some asset-related terms, with most texts defining between 3 and 10. Government and academic texts usually defined a relatively high number of asset-related terms. For example, the Australian Treasury defined 6 asset-related terms and of these terms, 4 were rare or unique. Of the 53 asset-related terms defined in the database, 44 were rare or unique terms.

The term 'cryptocurrency' was defined by 10 texts, however it was not defined by the texts with a high frequency of legal codes (Table 7). Despite being defined by 15 texts, the term 'stablecoin' was not defined by the AMF, BRI, GDF or the Australian Treasury. The Australian Treasury did not provide a definition for 'coin', but did provide a definition of 'crypto asset'. The proliferation of rare and unique asset-related terms suggests that this concept lacks clarity and consensus across communities. The reason for this confusion and how it may be cleared was an important consideration of this study and was specifically explored in a case study of the Australian Treasury text.

In summary, a variety of texts from different cultural and situational backgrounds were analysed. While the background of each text influenced the codes or types of terminology appearing within a text, all texts were made up of mostly neutral and object related terms. However, despite commonalities in the backgrounds of texts, there was limited predictable overlap of terms outside of a core number of frequently occurring terms. 'Assets' seemed to be an important concept as every text defined at least one related term. However, there seemed to be little consensus regarding the expression of this concept as most asset-related terms were unique or rare. Ultimately, the unpredictability of overlap between texts, and the prevalence of unique terms demonstrates the lack of cohesion and clarity in the blockchain lexicon—something that regulators must ultimately recognise and respond to, particularly in relation to the concept of assets.

As Eco stipulates 'it is impossible to establish a semiotics of communication without a semiotics of signification [60, 61],'and as such the signification and development of the code must precede the communication of the code. If social relationships come about through communicative and significative processes, this raises a question about the extent to which a single community, even a powerful one, can impose its codes over others. The results indicate that there is a lack of consistency

between existing lexicons/glossaries/dictionaries of blockchain. There are some points of overlap, but there a number of terms that shift in focus depending on the nature of the source and how they look to prioritising different types of terms, the focus of the database, or the character. This poses a challenge to regulators because this lack of consistency impacts their ability to clearly and accurately create rules that can be understood by blockchain communities. Our case study of the token mapping exercise by the Australian Treasury shows the tensions inherent in such an endeavour.

4.5 Case Analysis: The Australian Treasury and Token Mapping

At the time of writing, Australia has been exploring regulatory options for blockchain platforms and digital assets, however the language and terminology they have chosen to adopt raises concerns because it prioritises inventive neologisms over common usage. In early 2023 the Australian Treasury embarked on their 'token mapping' exercise[8] and in October 2023 they released proposals for licensing pathways [62]. This mapping process has been designed to develop a shared understanding of 'crypto assets' in the context of Australian financial services regulation [60]. This involved highlighting how existing financial regulation could be expanded to target crypto assets [62]. To achieve this purpose, the Australian Treasury proposed a 'bespoke crypto asset taxonomy' and provided a glossary of blockchain related terminology [63]. This glossary was entered into the database for this study.[9] An analysis of this text highlighted two distinct problems. First, the Australian Treasury introduce several neologisms which do not address the need for clarity but instead create more confusion. Second, the Australian Treasury have adopted a technology specific approach to regulation which runs the risk of quickly becoming obsolete. Overall, the case study highlights that the Australian Treasury uses distinct language from other blockchain communities, and this is likely to cause confusion as to how the activities of these communities are regulated.

Regulators play an important role in developing lexicons. There is an inherent relationship between the language used in the law, and the language used by the broader community, and this is reflected by legal semiotics perspectives suggesting that legal terms are signs that form part of the broader semiotic system [64]. While legal terms are generally considered to have a self-closed, self-referential meaning [65], the language used in regulatory instruments can be influential to the development of signs and meaning amongst the broader community [66]. The results support this statement as, for example, terminology originally developed in the context of financial services regulation has been used by blockchain communities to signify similar concepts. The way communities understand and describe concepts is therefore influenced by the legal force assigned to them by regulators. In this way, the

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[8] 'Token mapping' forms part of the multi-stage reform agenda for developing regulatory settings for the crypto sector. See Australian Government: The Treasury, *Token Mapping* (Web Page, 2023) < https://treasury.gov.au/consultation/c2023-341659 > .

[9] This text has been reported on in the results tables alongside the other texts as 'the Australian Treasury'.

language regulators use influences the way innovators and other blockchain communities develop and interpret signs.

However, insofar that regulations form part of the production of meaning within the broader cultural semiotic system, they are also considered to be a product of the communities and practices that they regulate [67]. This is emphasised by Hart who argues that the law has an open texture, which describes how the law can change to reflect changes in public perceptions of law and justice [37]. If the law has an open texture, this suggests that while regulators will influence public perceptions and language use, they must also be guided by the same. This is particularly important in an environment where there are rapidly changing perceptions, such as with blockchain. Blockchain regulation needs to capture and clarify the public's perception of blockchain use by assigning appropriate legal force to key concepts such as 'assets', 'tokens', and 'coins'.

The Australian Treasury uses distinct language from the communities it targets. The Australian Treasury text contained 47 terms and of these, 13 (28%) were common, 3 (6%) were uncommon, 8 (17%) were rare, and 23 (49%) were unique.[10] Of the unique terms within the Australian Treasury text, many were neologisms based upon existing concepts. These neologisms were alternative terms proposed by the Australian Treasury in which a unique sign was assigned to a signifier and signified meanings that could be attributable to other terms. For instance, the term 'protocol software' was used by the Australian Treasury to signify 'a type of software (often referred to as a 'protocol client') [68].' The Australian Treasury was the only text in the database to use the terms 'protocol software' or 'protocol client', however, the term 'client' was used by two other communities to signify the same concept. A neologism, as a new term, has no common understanding or use—or even can overtly represent a clear statement that it should not be falsely confused with a different (but related) term. As such, communities are unlikely to adopt the terminology or meanings associated with these neologisms. Neologisms will not provide clarity but will rather create more confusion and uncertainty surrounding blockchain regulation.

The use of neologisms in blockchain regulation is likely to result in uncertainty of regulatory outcomes. Neologisms are not clearly connected to common concepts and ordinary meanings. The use of neologisms in regulation means that it is unclear to communities how blockchain is covered by the regulation. This becomes particularly complicated when the definitions provided are vague. For example, the Australian Treasury defines the terms 'on-ramp' and 'off-ramp' as 'an arrangement for trading between fiat money and crypto tokens.' The difference between the two is not described. As this term is not otherwise used by blockchain communities and the concept that these terms are referring to is unclear, it is uncertain what the regulatory effect of this neologism would be. As such, there is a need for the Australian Treasury to assign legal force to terms that already have an ordinary meaning, as this would give a clearer indication of the activity or object that is to be regulated.

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[10] For the purposes of this study, we defined 'Common Terms' as those that appeared in 7 or more texts, 'uncommon terms' appeared in 4–6 texts, 'Rare terms' appeared in 2–3 texts, and 'Unique Terms' appeared only in 1 text.

The regulatory effects of neologisms will become even more uncertain in the future. Blockchain is continually developing, and this is reflected by changes to the lexicon. However, while there are new terms constantly added, the results suggest that the meaning of commonly used terms have changed and developed to reflect changes in development and perceptions. For instance, the expression of the concepts of 'coin' and 'token' have grown and developed to encompass the more nuanced concepts of 'stablecoin' and 'non-fungible token (NFT)'. When these new concepts and taxonomic relationships develop, the meaning of the term signifying the overarching concept is expanded to encompass the meanings attached to its qualifiers. Neologisms, or unique terms, do not develop in this way and can therefore be considered a static representation of a concept. As such, where neologisms are used in the law, these are unlikely to keep up with developments in the technology and public perceptions.

There is an obvious need for clarity surrounding blockchain assets which the Australian Treasury must respond to.[11] While the Australian Treasury have attempted to influence public understanding of these concepts by assigning legal force to asset-related terms, this is unlikely to provide clarity. Instead, this is likely to cause more confusion as the approach involves introducing more neologisms to describe pre-existing ideas and concepts. Neologisms are disparate signifiers and lack obvious connection to the language currently used and understood by innovators. This means that the public is unlikely to respond to, or understand, their use in regulation. A better approach is to attach clear meaning to key terms.

There are numerous key terms that are easily identifiable by the public. If these key terms are used by regulators, it will clearly demonstrate a connection between the regulation and the communities it intends to regulate, as Scott argued at the beginning of this paper [5]. Where communities can identify this connection, it allows for their understanding of a concept or term to be shaped by the legal force assigned to it. Further, as the interpretation of regulatory terms is influenced by the ordinary meaning attached to the term, the use of key terms will clearly connect the regulation to current perceptions or understandings. Therefore, the use of key terms will allow for the regulation to keep up with rapid changes in the technology and perceptions surrounding aspects of it. Overall, a regulatory approach encompassing common language is likely to promote a better understanding of assets amongst broader communities, provide more predictable regulatory outcomes, and be resilient to changing perceptions and developments of blockchain technology.

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[11] As is seen in other projects in other jurisdictions, see, eg, the Final report released by the UK Law Commission into Digital Assets. Law Com No 412, Digital Assets: Final report 27 June 2023, available at https://www.lawcom.gov.uk/document/digital-assets-final-report/. This report began with a Glossary that contained 60 terms and had 28 matches within the dataset. This was a total overlap/consistency of terms of 46% which was comprised of 30% common, 5% uncommon, 12% rare, and 53% unique (This is comparable to the Australian Token mapping overlap of 51% total, comprised of 28% were common, 6% uncommon, 17% rare, and 49% unique.) it should be noted that in the UK law Commission final report many of the unique terms had a distinct legal definition (ie, bailment, lien, intermediary, conversion, novation) but they still also created neologisms of asset terms (ie the decision to use the term crypto-token as something distinct to cryptoasset or digital asset).

5 Discussion

The results highlight the confusion and lack of consensus amongst communities around the definition and expression of blockchain assets. This is not surprising given how young the blockchain enterprise is compared to other technologies such as machine learning. It is of particular concern to regulators, as assets form an important part of financial regulation. The complications arising from little overlap of terminology between innovators and regulators, and the challenges associated with unique terms, were explored further in a case study of the 'Token Mapping Exercise', which represents the Australian Government's flawed proposed approach to blockchain assets.

The community demarks the semiotic potential of a sign, or blockchain term. Signs must be interpreted and assigned meaning by their author as they do not carry any inherent meaning [69]. This means that the value or meaning ultimately taken from a sign is derived from the broader cultural and contextual factors underpinning each community [70]. As these factors vary greatly between communities, a sign may have multiple meanings. These meanings can become further complicated by 'semiosis', which is the process through which a sign is reinterpreted and assigned meaning by its relations with other signs within the semiotic system. As it is possible for a sign to appear with any number of other signs (or in different 'situational contexts'), semiosis is a potentially unlimited process [69]. Just as differences in cultural and situational contexts may change the meaning of a sign, signs may also develop different connotations within different communities which are not mutually exclusive [71]. The results highlight the development of language within blockchain communities and the differences that arise due to variation of cultural underpinnings.

A community's language choices seemed to be most heavily influenced by their identified role in society. The role, whether innovation, education, or regulation, influenced the nature of the terms identified and how these were defined. For instance, government and academic communities who created a text to inform regulation of blockchain tended to assign legal meaning to a greater number of terms in comparison to other texts. However, unlike other more social communities, regulatory communities placed little value upon terms which denoted a financial or economic concept, or proper nouns, slang, or acronyms. While this may suggest that regulators are interested in defining distinct aspects of the technology to innovators, there are several concepts which overlap between these communities. The difference lies in the expression and value placed upon the concept. In other words, communities use different signifiers to express similar concepts, to signal slight differences in the meaning and value placed upon the sign. This suggests that the meaning derived from a blockchain term may be influenced by the assumed purpose of the authoring community.

A blockchain term may also be assigned a more specific meaning through its relationship with other signs. In the database, there are several combinations of general terms and more specific terms, which represent an altered or more refined expression of a general concept. This is particularly evident in cases where a neutral term

appeared alongside another sign to signify a proper noun. For example, the term 'client' (which had a defined meaning on its own) also appeared in this study within terms such as 'consensus client' and 'Aragon client'. While the term client on its own denotes an object, when combined with other terms its meaning was refined to be a client acting in a specific way or on a specific blockchain. In this case, the additional term formed part of the context which altered and refined the meaning from what would be derived from the general use of the term. This suggests that a particular interpretation of a blockchain term may be achieved through careful use of surrounding language.

The blockchain lexicon contains numerous borrowed terms that have developed connotations or alternative meanings because of their use by cryptocurrency communities. Connotations have usually developed from terms that have been borrowed from other contexts. For example, financial and economic terms that were originally developed to describe concepts unrelated to blockchain have been borrowed to use in a cryptocurrency context. While in this new context, these terms denote the same concept as their original use, the use of these terms by blockchain communities means that these terms have now developed connotations relating to blockchain or cryptocurrencies. For example, the term 'dead cat bounce' was developed in a financial context to describe the temporary increase in the price of an asset during a long period of decline. While this term is still accepted and used in its broader financial sense, it is taken by blockchain communities to be relating to the value of a cryptocurrency, or other blockchain asset [72–75]. Where terms have been borrowed from a financial context, there seemed to be consensus amongst communities regarding the meaning of these terms.[12] Ultimately, terms which have a common and clearly understood meaning are more likely to be used by blockchain communities.

Other borrowed terms used by blockchain communities have developed an alternative meaning. There are numerous terms used by blockchain communities to signify a different concept to that which was originally accepted. One example of this is the use of the term 'wallet'. While this term has a well-understood ordinary and natural meaning in a general context, the term is used by crypto communities to signify the storage place of blockchain assets. The term wallet is common amongst the blockchain lexicon and appeared in 11 texts in the study. However, the use of this borrowed term seems to cause some confusion. This was indicated by a desire to use other signs to differentiate the term when used in a blockchain context from its ordinary meaning.[13] For example, the term wallet appeared in multiple texts alongside the terms 'physical', 'online' and 'crypto'. In other cases, texts proposed a different signifier altogether, such as the term 'storage', to signify the same concept. This desire to introduce terms and alternative signifiers demonstrates the need for clarity in the space, which can be achieved by a clear use of the term and assigned signified meaning.

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[12] Of the 61 financial and economic terms that appeared in the database (Gemini excluded), 41 were used similarly by more than one text.

[13] Within the database, the term 'wallet' appeared with 28 other signs.

Assets are an important concept that require clarification. Despite differences in cultural backgrounds, there was a recognised need by all communities in this study to define asset-related terms. Excluding terms that were recognised as proper nouns, there were 53 asset-related terms present in the study, and every text contained at least one asset-related term.[14] However, most terms within each text were unique or rare, meaning that they only appeared in one to three texts. Where an asset term was common, there seemed to be inconsistencies in the definitions provided by texts. For example, the term 'coin' was defined as being 'a colloquial term for a cryptocurrency' by one community [76], and 'representation of a digital asset built on a new blockchain' by another [77]. These definitions do not provide any clarity regarding what can be classified as an asset, as there is also no settled understanding on what a 'cryptocurrency' or 'digital asset' is. These inconsistencies in the terminology and definitions describing blockchain assets signals confusion amongst communities of users and innovators.

A clearer understanding of blockchain assets is important to the expansion of existing financial regulation. Assets are the essential target of financial services regulation because these are the coins/tokens that are held or distributed by people and are commonly at the centre of legal issues [78]. Therefore, clarity and certainty in the definitions of these assets is needed if there is a hope of having clear regulation relating to taxation, property rights, financial services, licencing, AMLCTF, and governance. While some applications of blockchain may be captured by existing financial regulation [10], blockchain-related assets, or 'crypto assets', represent an emerging class of assets that may exist beyond the scope of this regulation [79, 80]. It is of interest to regulators to understand the extent of this gap so to properly expand current regulations to address unregulated applications of blockchain.

Generally, there is a strong link between how communities interact with blockchain and their corresponding language use. While there is a core set of generalised terms used by most communities, there are differences in the expression of concepts, usually related to differences in cultural underpinnings of a community and/or surrounding language. This means that several terms and concepts do not carry a clear or consistent meaning across communities. In particular, the concept of blockchain assets is not clearly defined or expressed by any community. There is therefore a need for regulators to assign a clear meaning to this concept, as assets form an important part of financial regulation. Blockchain users require a clear understanding of how these applications are recognised by the law. Complications may arise where distinct language is used in regulation, where it is then unclear to communities how it applies to their use of blockchain.

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[14] See Table 6 Appendix.

5.1 Technology Neutrality

A technology neutral approach to regulation helps to avoid some of the challenges associated with the regulation of blockchain as a technology. The constant growth and development of technology, such as blockchain, means that it presents itself as a moving regulatory target [81]. Technological development can either be accelerated or hindered depending on the regulatory approach [82]. Therefore, technology poses a complex challenge for regulation as it should prevent harm but also incentivise beneficial development [83]. When regulation has been designed for and reflects outdated technology, it requires constant reform to reconnect it to the current landscape [84, 85]. As such, regulation that specifically targets technology has the risk of becoming obsolete very quickly as it struggles to keep up with development [79, 85]. There is therefore a need for a 'technology neutral' approach to blockchain which focuses on the use of the technology rather than objects of it.

Challenges relating to constant developments in technology can be overcome by a neutral approach that redirects the focus from the technology to a clearer understanding of activities and behaviour [10]. For blockchain, this would involve looking at the use of the technology in the areas of finance and assets rather than overregulating specific instances of the technology. Following this approach would mean that the regulation is more adaptable to new technologies. For this reason, regulators should clearly state how existing technology neutral regulation applies to novel uses, such as with blockchain technology [86]. However, this approach becomes difficult when there are no clear definitions or agreement on terminology—as demonstrated by the contested blockchain lexicon. This makes it difficult for regulators to understand how the technology is being used and therefore create a technology neutral approach [87]. While the Australian Treasury have recognised this need for a technology neutral approach to blockchain [88], they complicated this by using neologisms that confuse common understandings of terminology. The Australian Treasury have not proposed a technology neutral approach to blockchain regulation. The Australian Treasury was focused on defining terms relating to objects of blockchain, rather than the behaviour associated with the technology. Of the 47 terms in the text, 36 were objects (77% of the overall text) and 8 were techniques (17% of the overall text). As crypto assets are the identified regulatory target, it would be reasonable for there to be some prevalence of object terms [86]. However, of the 36 object terms defined by The Australian Treasury, only 6 of these were related to assets. The prevalence of object terms in the text therefore indicates a technology specific approach by the Australian Treasury. The language used by the Australian Treasury needs to better reflect the use of blockchain by communities, as opposed to specific objects.

The use of common language in blockchain regulation may support a technology neutral approach. Through common understanding and use, key terms referring to

an activity can be clearly attributed to any resulting objects. On many occasions, a term in the database which signified a technique or process appeared within other terms that signified an object or quality. For example, the 'wrapping' of an asset resulted in a 'wrapped asset', 'wrapped Bitcoin', 'wrapped Ether' and so on. Therefore, understanding the terminology used to signify the process behind the relevant object targeted by the regulation, and shifting the focus to this, will allow the regulation to be more technology neutral.

Terms relating to use usually carry more well understood and developed meanings. In the database, terms relating to the use of the technology were usually attributed to a more complex definition, as these terms were used in multiple contexts and usually appeared alongside other signs. Their repeating nature also meant that terms relating to use were more likely to be common or rare terms, as opposed to unique terms. For example, although not defined by the Australian Treasury, the term 'mine' appeared in 16 texts. When used on its own, this term signified an activity. However, when interpreted alongside other signs, it was reinterpreted to mean an object or quality. The consensus of this term also meant that variations of 'mine' appeared within 30 unique terms in the database.[15] Therefore, not only does the use of terms relating to use of blockchain fit with a technology neutral approach, but communities are more likely to connect with these terms and further evolve their meaning.

In summary, blockchain regulation requires a technology neutral approach. This has not been achieved by the Australian Treasury who show an intention to regulate the objects of the technology as opposed to how it is used. Overregulating aspects and objects of blockchain as opposed to the behaviour associated with it is a problem because it means that regulation will struggle to keep pace with development. This kind of regulatory approach will require constant reform so that it stays reflective of the current landscape. The results of this study show that blockchain communities have a tendency to repeatedly use variations of terms relating to the use of blockchain in a variety of different contexts. For this reason, the meaning of key terms relating to the use of blockchain are likely to continually develop with changes in the technology. Terms denoting new objects or applications of blockchain are often variations of the key term that signifies the process involved. As such, when regulation uses common key terms relating the use of blockchain, it will be clear how it captures objects. Therefore, a technology neutral approach that utilises key 'use' terms is likely to be even stronger and 'future proof' than a technology neutral approach that uses neologisms.

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[15] This included variations of the terms 'mine', 'mining' and 'miner'.

6 Conclusion

Building on the broad body of semiotics literature, this paper explored the semiotics of blockchain communities. This involved an in-depth analysis of blockchain related dictionaries, glossaries, and taxonomies. The study revealed the diversity in the expression of blockchain concepts and objects across different communities in the space. Apart from a small selection of key terms, there seems to be a desire for all blockchain communities to introduce new terms into the lexicon. This diversity in the language use, and the meanings assigned to terms, indicates that there is confusion surrounding some blockchain concepts. Of particular concern is the confusion and questions regarding 'what is an asset', which is an important concept for financial regulation.

The potential complications arising from this confusion was explored in depth through a case study of the Australian Treasury's proposed regulatory response to blockchain. Overall, this revealed a need for regulators to connect with common language in relation to blockchain. Recognising a need for a technology neutral approach, regulators need to be guided by those developing and interacting with blockchain. This facilitates a strong and clear connection between the public and regulation. This study demonstrates how semiotic analysis can be useful in the development of technology regulation as it allows for a deeper understanding of public perceptions and interactions with technology. This presents opportunities for further research of language use in other areas of technology and artificial intelligence, where the lexicons also present unique challenges for regulators.

Appendix

See Tables 1, 2, 3, 4, 5, 6 and 7.

Table 1 Full text information

Count	Name used	Full reference
1	AICPA	Association of International Certified Professional Accountants, 'Blockchain Universal Glossary', *AICPA: Resources* (Document, 13 January 2022) < https://www.aicpa-cima.com/resources/download/blockchain-universal-glossary >
2	AMF	Salch, Ayman and Nouran, Youssef, 'Financial Technology Glossary', *Arab Monetary Fund* (Document, December 2020) < https://www.amf.org.ae/sites/default/files/publications/2021-12/financial-technology-glossary.pdf >
3	ATO	Australian Government: Australian Taxation Office, *Crypto Assets Glossary* (Web Page, 23 November 2022) < https://www.ato.gov.au/individuals/Investments-and-assets/crypto-asset-investments/crypto-assets-glossary/ >
4	Binance	Binance, *The Words of Crypto: Time to Understand the Language* (Web Page, 2023) < https://academy.binance.com/en/glossary >
5	BRI	Tapscott, Don, 'Token Taxonomy: The Need for Open-Source Standards Around Digital Assets', *Blockchain Research Institute* (White Paper, 19 February 2020) < https://www.blockchainresearchinstitute.org/project/token-taxonomy-the-need-for-open-source-standards-around-digital-assets/ >
6	BTA	Blockchain Training Alliance, 'Global Glossary of Blockchain Terms 2.0', *Glossary of Blockchain Terms* (Document, April 2019) < https://blockchaintrainingalliance.com/pages/glossary-of-blockchain-terms >
7	CNET	Van Boom, Daniel, 'From Dogecoin to DeFi: A Blockchain Glossary for Beginners', *CNET* (Web Page, 5 April 2022) < https://www.cnet.com/personal-finance/crypto/daos-dogecoin-defi-and-more-a-blockchain-glossary/ >
8	Consensys	Consensys, *A Blockchain Glossary for Beginners: Definitions of Crypto and Web3 Terminology* (Web Page, 2023) < https://consensys.net/knowledge-base/a-blockchain-glossary-for-beginners/ >
9	Emerald	Baker, H.K., Nikbakht, E., and Smith, S.S., 'A Glossary of Blockchain Terms', *The Emerald Handbook of Blockchain for Business* (9 March 2021)
10	Ethereum.org	Ethereum, *Glossary* (Web Page, 31 March 2023) < https://ethereum.org/en/glossary/ >
11	Fintech	Cag, Derin, '140 + Blockchain and Crypto Words: The Ultimate A-Z Glossary', *Fintech* (Web Page, 23 November 2021) < https://fintechmagazine.com/financial-services-finserv/140-blockchain-and-crypto-words-ultimate-z-glossary >
12	Forbes	Hooson, Mark, 'Cryptocurrency Glossary Of Terms & Acronyms', *Forbes Advisor* (Web Page, 29 September, 2022) < https://www.forbes.com/advisor/au/investing/cryptocurrency/crypto-glossary-of-terms-acronyms/ >
13	GDF	GBBC Digital Finance, *Code of Conduct: Taxonomy for Cryptographic Assets*, (Document, 2018–2022) < https://www.gdf.io/wp-content/uploads/2019/08/0010_GDF_Taxonomy-for-Cryptographic-Assets_Proof-V2-260719-1.pdf >
14	GDF Stable-coin	GBBC Digital Finance, *Stablecoin Taxonomy and Key Considerations*, (Document, 2018–2022) < https://www.gdf.io/resources/stablecoin-taxonomy-and-key-considerations/ >
15	Gemini	Gemini, *Explore: Glossary* (Web Page, 2023) < https://www.gemini.com/cryptopedia/glossary >
16	Interwork	Interwork Alliance, 'The Blockchain Super Glossary' (Public Google Document, 2018) < https://docs.google.com/document/d/1Vdwa4R_XXhSQFU7ELXheT55FyWorwZXbSWRYjYGetqA/edit?pli=1#heading=h.4a5o9bua04ay >
17	N26	N26, *Your Definitive Crypto Glossary* (Web Page, 2023) < https://n26.com/en-eu/crypto-glossary >
18	Reddit	u/veegred, 'List of Abbreviations and Terms Commonly Used in Cryptocurrency Trading and Investing' (Reddit, 31 January 2021, 7.44 pm AEST) < https://www.reddit.com/r/CryptoCurrency/comments/l997oj/list_of_abbreviations_and_terms_commonly_used_in/ > u/Basoosh, 'ethtrader Glossary of Terms' (Reddit, 21 June 2017, 6.36am AEST) < https://www.reddit.com/r/ethtrader/comments/6igtto/ethtrader_glossary_of_terms/ >
19	The Australian Treasury	Australian Government: The Treasury, *Token Mapping Consultation Paper* (Consultation Paper, February 2023) < https://treasury.gov.au/consultation/c2023-341659 >

Contains full reference information for each of the texts included in database constructed for research

Table 2 Data Collection Steps

Step		
1	Discovery of texts	Searches based on keyword variations of (a) 'blockchain', 'cryptocurrency', and 'crypto' (b) 'Glossary', 'dictionary', 'taxonomy', 'classification', 'slang', 'words', 'language'
2	Population of database	Extracting data from texts. Adding: (a) Term (sign) (b) Definition (signifier)
3	Database refinement	Reduction of entries into the database by combination of: (a) duplicate terms (b) acronyms and expanded acronyms (c) terms with slight alterations of spelling (d) overt similarity
4	Categorisation of texts	Collection of data related to text: (a) Objective creation information (author, creation date, jurisdiction affiliation) (b) Subjective expression and tone (how information is presented, use of 'we' or 'they', authority, neutrality and reputation)
5	Coding of terms	Coding of terms entered into the database against three groups of codes: (a) Construction of term a. Proper Noun b. Acronyms c. Slang (b) Focus of term a. Neutral b. Legal c. Economics and Finance d. Technical (c) Character of term a. Quality b. Object c. Technique d. Expression e. Structure

These are the steps taken to gather the data and form the database used in this research

Table 3 Frequency of codes in each text

	Construction				Focus				Character				
	Total	Proper Noun	Acronym	Slang	Neutral	Legal	Economics ans Finance	Technical	Quality	Object	Technique	Expression	Structure
AICPA	40	1	3	1	22	3	1	23	8	27	13	1	1
AMF	36	4	8	3	22	4	0	20	7	23	12	3	3
ATO	20	0	1	4	11	3	0	9	3	15	6	0	0
Binance	156	17	33	29	63	11	15	71	28	76	60	33	10
BRI	12	0	2	1	9	7	0	0	7	6	2	0	0
BTA	125	16	30	4	56	5	4	65	25	81	44	7	6
CNET	61	9	18	21	23	4	2	22	11	32	16	19	4
Consensys	161	21	31	10	64	11	4	97	31	96	60	19	6
Emerald	72	5	17	4	31	2	1	49	26	35	35	3	5
Ethereum	186	24	38	9	52	6	2	152	27	101	79	19	10
Fintech	106	7	29	31	39	9	12	44	22	46	38	29	7
Forbes	65	7	16	4	36	5	4	32	20	42	15	10	5
Gemini	1591	161	161	63	312	26	46	282	101	391	333	73	71
GDF	47	2	6	4	36	11	4	9	8	34	7	6	4
GDF Stablecoin	12	0	0	1	9	4	0	2	8	6	3	0	1
InterWork	399	39	109	75	162	21	32	162	100	186	129	80	24
N26	45	3	13	15	19	2	6	13	10	20	10	20	2
Reddit	148	32	48	39	53	6	21	43	16	78	48	40	5
The Australian Treasury	47	0	3	3	28	12	0	12	16	32	8	3	1
Total	2083	586	460	164	896	71	113	709	377	1331	592	226	89

The 'Total' column represents the total number of terms included in the text. The 'Total' row represents the total number of times that the code occurred. Both the total column and row accounts for terms appearing in multiple texts

Table 4 Frequency of codes as % of total terms in each text

| | Construction | | | | Focus | | | | Character | | | | |
	Total	Proper Noun (%)	Acronym (%)	Slang (%)	Neutral (%)	Legal (%)	Economics and Finance (%)	Technical (%)	Quality (%)	Object (%)	Technique (%)	Expression (%)	Structure (%)
AICPA	40	3	8	3	55	8	3	58	20	68	33	3	3
AMF	36	11	22	8	61	11	0	56	19	64	33	8	8
ATO	20	0	5	20	55	15	0	45	15	75	30	0	0
Binance	156	11	21	19	40	7	10	46	18	49	38	21	6
BRI	12	0	17	8	75	58	0	0	58	50	17	0	0
BTA	125	13	30	3	41	5	3	59	25	59	42	5	5
CNET	61	15	30	34	38	7	3	36	18	52	26	31	7
Consensys	161	13	19	6	40	7	2	60	19	60	37	12	4
Emerald	72	8	27	6	44	3	2	68	37	55	44	5	8
Ethereum	186	13	20	5	28	3	1	82	15	54	42	10	5
Fintech	106	7	27	29	37	8	11	42	21	43	36	27	7
Forbes	65	11	25	6	55	8	6	49	31	65	23	15	8
Gemini	1591	10	10	4	20	2	3	18	6	25	21	5	4
GDF	47	4	13	9	77	23	9	19	17	72	15	13	9
GDF Stablecoin	12	0	0	8	75	33	0	17	67	50	25	0	8
InterWork	399	10	27	19	41	5	8	41	25	47	32	20	6
N26	45	5	35	35	43	5	8	32	27	43	24	41	5
Reddit	148	22	32	26	36	4	8	29	11	53	32	27	3
The Australian Treasury	47	0	6	6	60	26	14	26	34	68	17	6	2
Total	2083	10	17	10	31	5	5	33	14	40	28	11	5

Total means the total number of terms included in the text. The percentage figure represents the percentage of terms that related to the code specified in the column

Table 5 Frequency of overlapping terms in texts

	Total	AICPA	AMF	ATO	Binance	BRI	BTA	CNET	Consensys	Emerald	Ethereum	FintechMag	Forbes	GDF	GDF Stablecoin	Gemini	Interwork	N26	Reddit	The Australian Treasury
Total		**52**	**39**	**20**	**156**	**12**	**125**	**78**	**161**	**73**	**186**	**140**	**65**	**47**	**12**	**1591**	**399**	**45**	**101**	**47**
AICPA	**52**		13	8	19	0	17	10	30	25	16	20	21	4	1	42	35	7	17	9
AMF	**39**	13		6	17	2	17	7	23	18	15	14	15	6	0	32	29	6	12	7
ATO	**20**	8	6		10	2	5	8	12	7	9	10	7	6	1	12	11	5	9	7
Binance	**156**	19	17	10		3	44	35	65	31	53	60	38	11	1	137	105	21	55	9
BRI	**12**	0	2	2	3				3	1	3	3	3	3	1	5	6	0	3	2
BTA	**125**	17	17	5	44			16	52	32	33	39	28	7	3	76	80	16	32	8
CNET	**78**	10	7	8	35		16		31	16	22	33	25	9	3	62	50	21	37	10
Consensys	**161**	30	23	12	65	3	52	31		36	88	56	38	11	2	114	100	20	44	13
Emerald	**73**	25	18	7	31	1	32	16	36		28	29	26	6	1	58	53	12	19	9
Ethereum	**186**	16	15	9	53	3	33	22	88	28		36	26	9	3	95	69	14	37	10
FintechMag	**140**	20	14	10	60	3	39	33	56	29	36		36	12	2	96	83	29	61	14
Forbes	**65**	21	15	7	38	3	28	25	38	26	26	36		10	1	49	51	24	29	12
GDF	**47**	4	6	6	11	3	7	9	11	6	9	12	10		0	16	17	5	11	5
GDF Stablecoin	**12**	1	0	1	1	1	3	3	2	1	3	2	1	0		6	4	2	2	0
Gemini	**1591**	42	32	12	137	5	76	62	114	58	95	96	49	16	6		214	35	87	18
Interwork	**399**	35	29	11	105	6	80	50	100	53	69	83	51	17	4	214		36	81	16
N26	**45**	7	6	5	21	0	16	21	20	12	14	29	24	5	2	35	36		27	7
Reddit	**101**	17	12	9	55	3	32	37	44	19	37	61	29	11	2	87	81	27		9
The Australian Treasury	**47**	9	7	7	9	2	8	10	13	9	10	14	12	5	0	18	16	7	9	

Total' represents the total number of terms present in the text

Table 6 Overlapping terms in texts as % of Column text

	Total	AICPA	AMF	ATO	Binance	BRI	BTA	CNET	Consensys	Emerald	Ethereum	FinTechMag	Forbes	GDF	GDF Stablecoin	Gemini	Interwork	N26	Reddit	The Australian Treasury
Total		52	39	20	156	12	125	78	161	73	186	140	65	47	12	1591	399	45	101	47
AICPA	52		25%	15%	37%	0%	33%	19%	58%	48%	31%	38%	40%	8%	2%	81%	67%	13%	33%	17%
AMF	39	33%		15%	44%	5%	44%	18%	59%	46%	38%	36%	38%	15%	0%	82%	74%	15%	31%	18%
ATO	20	40%	30%		50%	10%	25%	40%	60%	35%	45%	50%	35%	30%	5%	60%	55%	25%	45%	30%
Binance	156	12%	11%	6%		2%	28%	22%	42%	20%	34%	38%	24%	7%	1%	88%	67%	13%	35%	6%
BRI	12	0%	17%	17%	25%		17%	25%	25%	8%	25%	25%	25%	25%	8%	42%	50%	0%	25%	17%
BTA	125	14%	14%	4%	35%	2%		13%	42%	26%	26%	31%	22%	6%	2%	61%	64%	13%	26%	6%
CNET	78	13%	9%	10%	45%	4%	21%		40%	21%	28%	42%	32%	12%	4%	79%	64%	27%	47%	13%
Consensys	161	19%	14%	7%	40%	2%	32%	19%		22%	55%	35%	24%	7%	1%	71%	62%	12%	27%	16%
Emerald	73	34%	25%	10%	42%	1%	44%	22%	49%		38%	40%	36%	8%	1%	79%	73%	16%	26%	12%
Ethereum	186	9%	8%	5%	28%	2%	18%	12%	47%	15%		19%	14%	5%	2%	51%	37%	8%	20%	5%
FintechMag	140	14%	10%	7%	43%	2%	28%	24%	40%	21%	26%		26%	9%	1%	69%	59%	21%	44%	10%
Forbes	65	32%	23%	11%	58%	5%	43%	38%	58%	40%	40%	55%		15%	2%	75%	78%	37%	45%	18%
GDF	47	9%	13%	13%	23%	6%	15%	19%	23%	13%	19%	26%	21%		0%	34%	36%	11%	23%	11%
GDF Stablecoin	12	8%	0%	8%	8%	8%	25%	25%	17%	8%	25%	17%	8%	0%		50%	33%	17%	17%	0%
Gemini	1591	3%	2%	1%	9%	0%	5%	4%	7%	4%	6%	6%	3%	1%	0%		13%	2%	5%	1%
Interwork	399	9%	7%	3%	26%	2%	20%	13%	25%	13%	17%	21%	13%	4%	1%	54%		9%	20%	10%
N26	45	16%	13%	11%	47%	0%	36%	47%	44%	27%	31%	64%	53%	11%	4%	78%	80%		60%	16%
Reddit	101	17%	12%	9%	54%	3%	32%	37%	44%	19%	37%	60%	29%	11%	2%	86%	80%	27%		9%
The Australian Treasury	47	19%	15%	15%	19%	4%	17%	21%	28%	19%	21%	30%	26%	11%	0%	38%	34%	15%	19%	

Table 7 'Asset' terms by frequency in texts. The 'Y' denotes if a text listed the term

Term	Total	AMF	AICPA	ATO	Binance	BRI	BTA	CNET	Consensys	Emerald	Ethereum	Fintech	Forbes	Gemini	GDF	GDF Stablecoin	InterWork	N26	Reddit	The Australian Treasury
TOTAL		4	3	4	8	6	6	7	10	3	5	6	8	29	10	6	25	2	6	6
Coin	7				Y	Y	Y	Y	Y				Y					Y	Y	
Consumer Activity Rights	1														Y					
Consumer Coupon Rights	1														Y					
Consumer Ownership Rights	1														Y					
consumer tokens	1														Y					
Crypto-asset / Crypto asset	6	Y	Y	Y					Y						Y					Y
Crypto-Backed Stablecoin	1													Y						
Cryptocurrency	10				Y		Y	Y	Y	Y		Y	Y	Y	Y		Y			
Currency	1																Y			
Derivative	2													Y			Y			

Table 7 (continued)

Term	Total	AMF	AICPA	ATO	Binance	BRI	BTA	CNET	Con-sensys	Emer-ald	Ethereum	Fin-tech	Forbes	Gem-ini	GDF	GDF Sta-ble-coin	Inter-Work	N26	Red-dit	The Aus-tralian Treas-ury
Digital Asset / Virtual Currency	6	Y	Y				Y		Y					Y			Y			
Digital Com-modity	2												Y				Y			
ERC 20	7				Y		Y		Y			Y		Y			Y		Y	
ERC 223	2				Y									Y			Y			
ERC 721	5				Y				Y		Y			Y			Y			
ERC 4907	1																Y			
Exchange Coin/token	1													Y						
fiat-backed coin	2													Y		Y				
Financial Instru-ment	1													Y						
Governance Token	3													Y						Y
Index Token	2													Y						Y
Intellectual Property (IP)	1													Y						

Table 7 (continued)

Term	Total	AMF	AICPA	ATO	Binance	BRI	BTA	CNET	Con-sensys	Emer-ald	Ethereum	Fin-tech	Forbes	Gem-ini	GDF	GDF Sta-ble-coin	Inter-Work	N26	Red-dit	The Aus-tralian Treas-ury
Interest Bearing Asset	1													Y						
Investment Tokens	1	Y																		
license or consumer activity rights tokens	1														Y					
Memecoin	4							Y				Y	Y	Y						
Mining Reward	1													Y						
NFT	13			Y	Y	Y		Y	Y		Y	Y	Y	Y	Y		Y		Y	Y
Non-Custodial	1													Y						
Non-Fungible / Non-Fungibility	2													Y			Y			
Non-physical assets	1															Y				
Off-Ledger Currency:	2												Y				Y			

Table 7 (continued)

Term	Total	AMF	AICPA	ATO	Binance	BRI	BTA	CNET	Consensys	Emerald	Ethereum	Fintech	Forbes	Gemini	GDF	GDF Stablecoin	InterWork	N26	Reddit	The Australian Treasury
On-Ledger Currency	1																Y			
Private Currency	2								Y								Y			
Semi-Fungible Token (SFT)	1																Y			
Singleton	3					Y					Y						Y			
Smart Token	1													Y						
Social Token	1													Y						
Stable Token	1																Y			
Stablecoin	15		Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	
Store of Value	3				Y									Y			Y			
Synthetic Asset	1													Y						
Tangible Asset	1													Y						
Token (Crypto)	3									Y				Y						Y

Table 7 (continued)

Term	Total	AMF	AICPA	ATO	Binance	BRI	BTA	CNET	Con-sensys	Emer-ald	Ethereum	Fin-tech	Forbes	Gem-ini	GDF	GDF Sta-ble-coin	Inter-Work	N26	Red-dit	The Aus-tralian Treas-ury
Token (Fungible)	2														Y		Y			
Token (Hybrid)	2					Y										Y				
Token (real estate-backed)	1															Y				
Token (Security)	3					Y								Y			Y			
Token (Soul-bound (SBTs))	1																Y			
Token (Utility)	4					Y		Y						Y			Y			
Token	15	Y		Y	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y		Y	Y
Tokens backed with baskets	1															Y				
Wrapped Assets	1																		Y	

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