

Chapter 3

People’s Experience of Information Overload and Its Impact on Infodemic Harms



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3.1 Introduction

In 2020, WHO approved “infodemic” as an official health topic, defining it as “an overabundance of information – some accurate and some not – that occurs during an epidemic” (WHO 2021, p. x). During an infodemic, we work to protect ourselves and our communities from low-value disinformation, including misinformation, mal-information, and outdated information. However, just as importantly, we also find ourselves faced with the task of managing what can feel like an onslaught of accurate and vetted high-value information.

The popular term for this onslaught of low and high value material is ‘information overload’, and Bawden and Robinson (2020) provide a useful definition:

Information overload can best be seen as the situation which arises when an individual’s efficiency and effectiveness in using information (whether for their work, studies, citizenship, or life generally) is hampered by the amount of relevant, and potentially useful, information available to them. (p.13).

Hartog (2017) sees information overload as a concept blending two realities that must be considered in parallel: our external encounters with information and our internal responses to it. Sometimes these responses manifest in a cognitive state such as confusion, disorientation, or fatigue. At other times, they appear as an emotion such as frustration, embarrassment, or helplessness. When amplified through the internal states of anxiety or distrust, or when exacerbated by external circumstances such as poverty or trauma, our internal responses to such information

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overload can trigger behaviours, with the potential to jeopardise our own health, and the health of others.

The range of reactions triggered by overload can be significant and at times contradictory. For some of us, it leads to hesitancy, paralysis, and avoidance around decision-making. For others, it encourages defensiveness, denial, and aggression in the face of new health guidance and directives. Overload can also lead to so-called compulsive doom-scrolling on the phone, while, for others, overload triggers the impulse to attend a so-called ‘COVID Party’ because they “*know they are going to get infected anyway.*”

3.2 Public Health Challenge of Information Overload

Over the past 20 years, information overload has attracted the attention of health-care organisations and researchers. During the period 2000–2018, 31 empirical studies were conducted in the area of health information overload (Khaleel et al. 2020), and a number of researchers have made connections between information overload and doubts about vaccines and vaccination programmes (Betsch and Sachse 2012; Cheung 2021; Nazaroff 2021; Wheeler and Buttenheim 2013). Honora et al. (2022) note that during the COVID-19 pandemic, information overload was linked to a number of resulting behaviours: hygiene care intention (Farooq et al. 2021), unusual purchase activity (Laato et al. 2020a), self-isolation intention (Farooq et al. 2020), and unverified information sharing (Laato et al. 2020a).

The sharp rise in people’s social media consumption throughout the COVID-19 pandemic has been identified as a major contributor to the rise of information overload (Global Web Index 2020). While it is common to see communication upticks during emergency events (Laato et al. 2020a; Mertens et al. 2020), early research showed that COVID-19 information shared over social media frequently overwhelms users and has a strong impact on their psychological well-being (Islam et al. 2020).

Wurman (1989) suggested that the continual cry to “*do your own research*” has brought back the concept of information anxiety. He went on to explain that anxiety was based on “the ever-widening gap between what we understand and what we think we should understand. It is the black hole between data and knowledge” (p.34). An extreme form of this anxiety can be seen in a condition known as cyberchondria, defined as an obsessive online search for health-related information (Gaspar et al. 2021). Cyberchondria generally takes the form of a fixation with searching for specific symptoms and tends to have the negative effect of “highlighting those symptoms in the searcher’s mind and leading to an escalation of concern about that symptomatology” (Gaspar et al. 2021, p.49). In a recent study on vaccine scepticism (Honora et al. 2022), researchers concluded that cyberchondria had raised fears as to the safety of the COVID-19 vaccine.

Among health workers, information overload also seems to be the new normal. In 2020, 4 months into the pandemic, researchers conducted a PubMed search for

academic publications related to COVID-19 (Valika et al. 2020). They found nearly 8000 articles on COVID-19, while similar searches for SARS and MERS yielded 277 and 58 articles, respectively. Since then, there have been approximately 10,000 new COVID-19-related publications added to public repositories each month (Chen et al. 2021).

The remainder of this chapter considers the benefits and drawbacks of two popular public health approaches to overload: emergency response and risk communication. We advocate broadening approaches in two ways. The first involves adopting a conceptual framework that views information overload as a techno-social phenomenon; the second adds an infodemic management approach to overload and links this to existing emergency response and risk communication measures. We find ourselves in agreement that while managing mis- and disinformation are critical elements of infodemic hygiene, “too much good information ... needs more research attention on the way it affects behaviour” (WHO 2021, p.3).

Regarding the public health interventions that point to, monitor, or attempt to intervene in that “good information,” we agree with citizen advocacy group All Tech is Human (2022) that, “We need to be talking about, engaging with, and designing technology in a way that is aligned with our needs as humans, not users” (p.7).

3.3 Overload: Emergency and Risk Communications Approaches

Since its inception, WHO has been managing public concerns around information overload throughout a range of epidemics, including smallpox, HIV/AIDS, H1N1, Ebola, Zika, and now COVID-19. WHO's *Public Health Agenda for Infodemic Management* (2021) points out that from a public health perspective, an overload of so-called good information presents a paradox. For researchers working with tools designed to synthesise and curate large amounts of data, “too much information is a far better situation than a lack of information and scientific evidence” (WHO 2021, p.2). For most of the world, however, overload represents a burden rather than a benefit.

Bawden and Robinson (2020) state that “One answer to this paradox may be another; the paradox of choice...” (p.21). If we think of citizens as health advice consumers, it is worth noting studies of online shopping behaviour that show anxiety can increase in line with the number of alternative choices of brand (Li 2017). However, while too many choices during shopping can lead to anxiety, too many choices in an emergency setting can lead to far worse consequences.

3.3.1 *Emergency Response Approaches*

One of the oldest public health approaches to information overload in the context of health crises might be termed an emergency response (ER) approach. As emergency patient care focuses on interactions that tend to be local, immediate, and person-to-person, overload is often conceptualised in terms of managing time and location issues. A classic example is the question of how a paramedic ought to answer the question, “*How am I doing?*” when asked by a severely injured person in an ambulance versus how to answer the same question when asked by families of patients in intensive care units (Regaira-Martínez and Garcia-Vivar 2021).

It appears that emergency workers during COVID-19 similarly had to opt to manage overload issues through considerations of time and space. A recent example of such an ER strategy is from workers who created a 1-page centralised document, termed a quicksheet, and placed them around their medical facilities, enabling clinicians to access the latest COVID-19 guidelines, policies, and practical information quickly (Poonia and Rajasekaran 2020). A more technologically savvy strategy at a large urban hospital involved placing QR code stickers throughout the Emergency Department so that anyone with a phone could access a single-page website with the most recent and relevant COVID-19 updates (Baugh et al. 2021).

3.3.2 *Risk Communication Approaches*

The second approach to overload is one we might term the risk communication approach. WHO defines risk communication as the exchange of information, advice, and opinions between experts, community leaders, or officials, and those at risk in order to facilitate understanding and adoption of protective behaviours. Like ER, Risk Communications and Community Engagement (RCCE) acknowledges how overload can result from messages being delivered at the wrong time, in the wrong place, or in the wrong format. Indeed, a hallmark strategy of RCCE is clear delivery of core messages. Here, classic communication guidance prevails (Vraga and Jacobsen 2020). We are advised to keep messages as simple and clear as possible (CDC 2010; Heath and Heath 2007; Maibach 2012), share the most important information first (Holsanova et al. 2006; Pöttker 2003), craft a message to appeal to a target audience (CDC 2010; Heath and Heath 2007), and promote concrete actions (Witte 1994, 1995).

An important feature of RCCE is its emphasis on establishing community trust, especially among those who have been historically marginalised. Low levels of trust and confidence can affect group uptake and adherence to public health advice and interventions. From an RCCE standpoint, overload might occur due to how the message is delivered (for instance, using unfamiliar vocabulary) or because the perceived identity of the messenger is in question (it is hard to understand a message if you have doubts about the messenger). Even if a message is clear, and a messenger

is trusted, overload can still occur due to the style in which a message is delivered, for example being given too quickly or being delivered in what is perceived as a condescending tone.

3.3.3 *Existing Limitations*

There is near-universal agreement that public health communication during COVID-19 and beyond should be accessible, comprehensible, tailored to its audience, and integrated into a framework of community participation (Montesi 2021). However, there will always be limits as to what can be done using information deficit paradigms: that is the belief that information and education are sufficient to change human behaviour (Luetz et al. 2020). As Montesi (2021) points out,

years of research in the health sector show that human behaviour tends to be irrational, governed by social norms and driven by motivations that do not necessarily and exclusively derive from access to scientific and authoritative information. (p.3).

To understand why this is the case, Sect. 3.4 now delves deeper into the question of what information actually is and how it works at both an individual and group level. For this, we draw on a range of thinking in the areas of cognitive science, behavioural psychology, communications theory, and digital design. We begin by asking whether information overload is best thought of individually (as a cognitive event or an emotional state), socially (as a problem, with content delivered to specific audiences by specific messengers), environmentally (dependent on the constraints, options, and resources we have at hand in the moment), or all of these.

3.4 Understanding Information Overload

The concept of information overload first became popular in the 1970s, when Toffler (1970) defined it as “the excessive flows and amounts of data or information that can lead to detrimental computational, physical, psychological, and social effects” (p.311). With the rise of social media and virtual collaborations, the concept has made a recent comeback (Roetzel 2019).

While it may feel more practical to think about information overload in terms of poorly placed, timed, or delivered communication in need of correction, this understanding is incomplete. We know from personal observation that individuals can react to the same content, volume, timing, and presentation of messages in wildly different ways, with behavioural responses as varied as their reactions. What is needed is a conceptual understanding of overload that accommodates these differences.

One attempt to do just this is the Stimulus Organism Response (S-O-R) Framework, which conceptualises information overload as looping of sorts, in

which stimuli (messages, messengers, and physical conditions like pain) impact organisms (individuals or groups), that trigger responses (thoughts, emotions, behaviours). As Soroya et al. (2021) note, although S-O-R is used most frequently in studies of consumer behaviour, (Chopdar and Balakrishnan 2020; Gao and Bai 2014; Xu et al. 2014), it has more recently been used to better understand public behaviour during COVID-19 (Laato et al. 2020b; Zheng et al. 2020).

While there is significant value to the S-O-R Framework, it seems to have limitations when faced with the techno-social realities of information circulated via social media. Those familiar with debates about cancel culture understand that we are not just generating, receiving and circulating messages in digital environments. We are also coaxed, encouraged, and manipulated into engagement with technologies expressly designed to amplify emotions on the move, at times morphing what began as an emotional exchange between two individuals in the company of friends into a full-blown internet movement with thousands of participants.

3.4.1 Emotional States

To illustrate this sort of understanding as a techno-social loop, we have created the illustration (Fig. 3.1), displaying an individual with emotional states in the centre. A common understanding of information is that it can make us feel in a particular way. Research has found that negative states created through the emotional loops of overload can have adverse implications for psychological well-being (Jones et al. 2021).

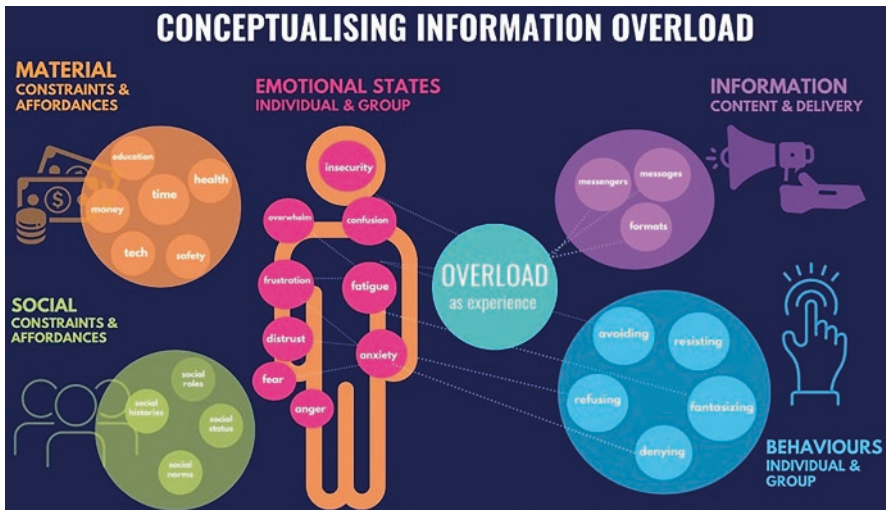


Fig. 3.1 Conceptualising Information Overload. (Source: Image created by Terri Senft; Creative Commons Attribution-ShareAlike 4.0 International License. <https://creativecommons.org/licenses/by-sa/4.0/>)

However, anyone who has ever had to read instructions on a package while in an emergency situation knows that pre-existing emotional states can, and do, affect how we experience information.

In Fig. 3.1, we highlight some possible pre-existing emotional constraints that might impact how someone receives a piece of information, including insecurity, confusion, fatigue, anxiety, feelings of being overwhelmed, frustration, distrust, fear, and anger. As one example, anxiety levels brought upon by negative sentiment of COVID-19-related social media content can be seen to trigger avoidance, which can then lead to loss of vital important community information (Fu et al. 2020).

Emotions can trigger behaviours in individuals. When related to overload, these behaviours can range widely. However, there is one thing they all have in common: in some way, they all represent attempts to soothe, lessen, or eliminate negative emotions. Our behaviours are also shaped by our environmental constraints and affordances: that is the limits and opportunities in whatever context in which we find ourselves operating. When it comes to information overload, the most significant environmental factors relate to materiality and sociality.

3.4.2 *Material Affordances and Constraints*

Material constraints and affordances refer to external environmental elements such as financial security, time, health, education, and safety. All of these impact how incoming information can be processed. Examples of an individual with a material constraint include being too unwell or too overworked to process additional incoming information fully. An individual with a material affordance might be someone with access to a teacher or family member who can help translate a health directive into more everyday language for better comprehension. The degree of technological literacy someone has can also be understood as a material constraint or affordance (Allen and Shoard 2005).

Certainly, technology belongs to the world of material affordances and constraints. There is a wealth of research underscoring the impact of the digital divide on information overload among cancer patients (Jiang et al. 2019), as well as literature documenting the cognitive and emotional toll of living among ambient, “always on” devices (Misra and Stokols 2012). Although it could use updating, the Perceived Information Overload Scale remains an interesting intervention in this regard. Adapted from the Cancer Overload Scale, the Perceived Information Overload Scale asks people to respond to questions about their interactions with “cyber-based” sources of stimulation such as computers and mobile phones, as opposed to “place-based” sources of stimulation such as offices or home environments (Misra and Stokols 2012).

3.4.3 Social Affordances and Constraints

Social constraints and affordances refer to things such as our social roles, social histories, social norms, and social status. Being a part of a group that speaks the same language or shares the same faith can create a sense of social normalcy. If an individual has a social role or social status within a culture that formerly limited information, literacy, or perceptions of belonging, information overload can result (Ndumu 2019). Additionally, a growing body of evidence shows that nationalism can be related to distrust of international organisations and law (Herrmann et al. 2009; Von Borzyskowski and Vabulas 2019).

3.4.4 Behavioural Responses

Scientific research has yet to prove a clear causal link between emotions and actions: different people can, and frequently do, act differently while experiencing the same emotions. That said, research has long shown that negative emotions associated with information overload can shift the quality of an individual's decision-making (Speier et al. 1999). Figure 3.1 highlights some common adverse behavioural responses to overload, including avoiding, fantasising, resisting, refusing, and denying the information and the messenger conveying the information. During COVID-19, researchers have linked overload to irrational actions such as panic buying and engaging in bogus precautionary medical measures (Bermes 2021). When linked to information fatigue, overload can lead to information avoidance (Guo et al. 2020), passivity in information searches, and increased distrust of information in general (Ganggi 2020; Lehman and Miller 2020). This, in turn, can create environments ripe for misinformation (Guo et al. 2020).

3.5 Information Overload: an Infodemic Management Approach

In this section, we now sketch the outlines of what might be called an infodemic management approach to overload. As noted from the techno-social perspective, the reach of networked communications is a double-edged sword. On the one hand, messages placed on digital platforms, enhanced by technological mechanisms such as engagement algorithms, newsfeed collation, and trending topic alerts, can be spread quickly to communities, both online and offline. On the other hand, communities find themselves with limited capacity to control the quality, volume, and pace of messages they receive each day on devices and platforms owned by private companies who view them as primarily consumers and not members of the public requiring care. The unnecessary deaths of thousands of Iraqis who ingested

methanol believing it to be a cure for COVID-19 (ABC News 2020) is just one example of what happens when a relatively small number of people experiencing negative emotions such as anxiety engage in socially contagious behaviours, impacting many beyond one's immediate circle.

An infodemic management approach to overload aims to remain constantly vigilant in the face of these realities. Every day a story appears in the news showing how digital communications companies are aware of, struggle with, shift blame or, sometimes, completely deny even the most rudimentary obligation of care to the public they serve. When it comes to public health measures, this digital burden of care is taken up by infodemic management.

Building on precepts from emergency response infodemic management stresses, the importance of responding to issues such as overload with well-timed, data-supported interventions is clear. According to the *Research Agenda for Infodemic Managers*, this includes delivering “the right information at the right time in the right format” so that people are “informed and empowered to adopt behavioural practices during epidemics to protect their health, that of their loved ones and their communities” (WHO 2021, p.IV).

From risk communication, infodemic management takes as axiomatic that communication without trust will fall on deaf ears. In the context of social media, this means heeding warnings from citizen organisations such as All Tech is Human (2022) that efforts to secure public trust cannot stop at the level of local communities. It must extend to every technological interaction with which we find ourselves engaged, including news, shopping, socialising, learning, accessing health services, sharing medical records, and engaging in contact tracing.

The *HX: Aligning Our Tech Future with Our Human Experience* report (All Tech is Human 2022) articulates six main principles to secure this public trust. The first of these, participatory design, is meant to “balance the power between those who create products and the people and communities that consume or utilize the products” (p.13). From an overload perspective, the argument here is that when communities receive training in how to design and deploy media to others, they themselves organically become more discerning and self-regulating media consumers. WHO is shortly releasing a participatory design toolkit focused on infodemic management, piloted by the humanitarian group MercyCorps in Haiti, Puerto Rico, Iraq, and Northern Nigeria (WHO EPI-WIN 2021).

The second principle, prioritising public good over profits, relates to the third, which states content moderation is always a trade-off (All Tech is Human 2022, p.15). Charged with protecting the public from health dangers associated with managing too much information, officials can advocate for government power to use blocking, censoring, filtering, or other limiting measures to better control what can be seen on digital platforms. All Tech is Human (2022) points out the inherent dangers to rights of free speech and individual expression rights that come with such government power but concedes that leaving matters entirely in the hands of corporations is not the answer either. An infodemic approach in this case might work directly with receptive partners on individual platforms, raising concerns and developing projects in tandem with community and engagement teams. An example

dealing specifically with overload is WHO development of the COVID-19 Chatbot on WhatsApp (WHO News Room 2020).

The fourth principle, digital citizenship, “considers the impact of digital technologies on a range of human rights – including children’s rights – which include rights of conscience, expression, access, participation, association and protection.” For HX, digital citizenship also includes “the digital, media and social literacies of the digital age – as well as the digital divide. (All Tech is Human 2022, p.16).

WHO will soon release a toolkit focused on teaching adolescents to measure and report on teen sentiment around health measures using a method called a rapid online interaction community assessment. This method was recently piloted during the CDC’s Teen COVID-19 Vaccine Confidence Assessment in San Mateo California. In a first-ever effort to enlist young people as co-researchers, the CDC worked with teens from the Mid-Peninsula Boys and Girls Club, asking them to gather peer sentiment regarding vaccines both from their offline peers and from online teen exchanges on platforms such as Tik Tok and Instagram. One interesting finding of this study was that for many teens, “*too much information*” had a social dimension, being frequently used as a way to bring up topics normally seen as too personal, deep, or politically polarising in environments where people were generally trying to relax and have fun (Senft 2021).

The fifth principle, tech augmentation, is guided by the question, “What is lost – and what is gained – by digitizing human connection?” (All Tech is Human 2022, p.17) and can be seen in connection with the sixth principle, tech and well-being. Here, well-being is understood as “workplace culture, work/life balance or integration, digital wellness, and mental health. It also includes issues of diversity, equity, and inclusion and other elements of community building” (p.18). An example of a programme designed to encourage public health workers to grapple with these is WHO’s Global Infodemic Manager Training, which includes a three-week simulation exercise in which trainees must work in transnational teams (operating in different time zones) over WhatsApp to respond to a series of emergency infodemic-related events occurring in a fictitious location. At the end of the 3 weeks, the team must have developed and then deliver a video pitch of evidence-driven policy recommendations for intervention to a fictional Minister of Health that trainees are instructed has a short attention span (WHO 2021).

3.6 Conclusion

This chapter has considered information overload as a component of infodemics. After detailing the upsurge of information overload during the COVID-19 pandemic, we explored the advantages and limitations of two popular public health approaches to information overload: emergency management and risk communication. While acknowledging the ongoing importance of treating overload via appropriate timing and placement of messages, as well as the critical importance of forging bonds of community trust related to messengers and messaging, we argue

that these tactics alone are inadequate to address the nature of the digital realities of intentional algorithmic amplification of human emotional states online. To address these issues, we call for an infodemic management approach in which information overload is conceptualised as a techno-social dynamic that moves us from personal encounter with messages and messengers into digitally, and otherwise, networked responses that can (at times) tip into dangerously contagious behaviours.

Regarding interventions, we understand why public authorities (health and otherwise) may be tempted to treat information overload through advocating for state-run censorship, filtering, and other content moderation methods. Nonetheless, we advise adoption of a more balanced approach, where a desire to protect the public does not eclipse the human right to individual free speech and expression. For inspiration, we look to the principles of emerging citizen advocacy movements such as Human Experience Design. For many of us who must use digital media to work, study, receive news, or connect with loved ones over a distance, advice to manage information overload by simply logging off feels out of touch with reality. We advocate health interventions over digital platforms and in local environments that centre on public good rather than corporate priorities and that still respect the fact that many people have little choice but to live at least some of their lives online. In this way, we can help communities build resistance to health information overload during the ongoing COVID-19 situation and in the future.

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