Navigating complex authorities: Intellectual freedom, information literacy and truth in pandemic STEM information

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Abstract
Traversing scientific information has become increasingly fraught, as the new information landscape allows anyone to access endless information with a few keystrokes. However, those trying to find information, understand authorities and navigate experts need a deeper understanding not only of the information itself, but also of how and why information is shared. Increasingly, questions of expertise, locale and bias are driving the scientific information ecosystem and creating or expanding disinformation, misinformation and propaganda efforts. Librarians are in the centre of this maelstrom of information and are obligated to help people learn to be critical of information. This article presents an illustrative case study, using the example of scientific information around the safety and efficacy of the Oxford-AstraZeneca vaccine to demonstrate how modern scientific information sharing is shaped by the ways in which misinformation and fake news spread.

Keywords
STEM, misinformation, critical evaluation of information, information literacy, fake news

Introduction
Librarians are working in a new information landscape in which Google offers up endless information with a few keystrokes. Navigating the ready availability of scientific information, and assessing what is accurate and what is misleading, has become increasingly difficult for everyone. Trying to find information, understanding authorities and experts, and contextualizing the information found accurately necessitates a deeper understanding not only of the information itself, but also of how and why information is shared (Baptista and Gradim, 2020). During times of crisis, such as the COVID-19 pandemic, science is moving fast, information rapidly changes, more is discovered and decisions must be made quickly (Ball, 2021; Goldenberg, 2021; Heaton, 2020). Without an understanding of the scientific process, it may seem that decisions are made without knowledge or are rushed, when in fact science is leaning on decades of prior research and knowledge (Ellyatt, 2021). Moreover, what we know about information and sharing changing information in times of upheaval remains the same in this crisis as in other recent cultural worries: it is easy to spread wrong information, especially when people are scared (Bangani, 2021; Kari and Savolainen, 2007).

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Libraries have traditionally espoused neutrality, as the IFLA states: ‘Librarians and other information workers are strictly committed to neutrality and an unbiased stance regarding collection, access, and service’ (IFLA Freedom of Access, 1999). Increasingly, the library profession must confront the inherent tension between intellectual freedom and proven scientific knowledge. This article emerged from professional reflections around neutrality with relation to information quality and accuracy during a pandemic. Discussions on how to navigate professional responsibilities around intellectual freedom specifically related to scientific misinformation have been prevalent in many library settings and a focus in many conversations with STEM (science, technology, engineering and mathematics) faculty colleagues in institutions across North America. These discussions impact almost every aspect of library professional practice: How do we communicate accurate information to patrons? How do we remain safe? How can we support local communities? What are our ethical responsibilities around sharing information, and how does this compete with formal library stances on information neutrality and intellectual freedom? What do we do with misinformation? While librarians do have professional associations such as the IFLA and Association of College and Research Libraries that provide guidance, they are not bound by a governing body which licenses and formally guides their practice (Association of College and Research Librarians, 2015; IFLA Board of Directors, 2016). While the Association of College and Research Libraries is situated in a largely North American context, the concepts and practices articulated in its framework are widely reflected across English and non-English-speaking library and information science contexts worldwide (Bush and Mason, 2016; Raju et al., 2017). Any guidelines about neutrality, professional practice or core values are largely driven by personal or institutional morals, and separating the personal from the professional can become fraught.

There has long been a known relationship between information seeking and social context, which has not been fully explored (Kari and Savolainen, 2007). Learning is fundamentally about finding information, then understanding, discussing, contextualizing and, ultimately, influencing and communicating it. Librarians place a great deal of emphasis on evaluating information, teaching people how to navigate complex information environments, which is largely grounded in the Association of College and Research Libraries’ (2015) Framework for Information Literacy. The ability to do so is generally referred to as ‘information literacy’, with critical literacy focused on developing critical consumers and users of information (Briggs and Skidmore, 2008; DeVoogd and McLaughlin, 2004; Linlin Huang et al., 2015). Progressively, questions of expertise, locale and bias are driving the scientific information ecosystem and creating or expanding disinformation, misinformation and propaganda efforts across actors (Bennett and Livingston, 2018; Mendoza et al., 2010; Starbird, 2019; University of Iowa Libraries, 2021). Increasingly, these issues are coming into conflict with the hallowed principles of intellectual freedom, creating tensions across stakeholder groups (Bennett and Livingston, 2018; Krafitt and Donovan, 2020; Starbird, 2019). Librarians have long realized that they are in the centre of this maelstrom of information, and are obligated to help people learn to be critical of the information they use to make decisions (Schrader, 2002).

Science, while a powerful way to understand the world, is not truth. Science involves facts based on observable phenomena in the world – the shifting of light; observable mutations of DNA; how chemicals combine, react and interact (Popper, 2002). However, science is more than facts about the natural world. The arguably more interesting aspect of science is what we do with those facts – how we interpret, understand and build them into a picture, and then how we use that to make predictions or create hypotheses about the natural world (Popper, 2002). All scientific models and theories are an explanation of reality as we observe it, not a penultimate truth. Scientific theories change with time as we gather and analyse new data. As we get more information, we update our beliefs – beliefs are not truth if they can change. Science is, however, reality, and scientists always strive to be as accurate and clear as possible, even as science learns through moving and building deeper fundamental understandings. One common criticism of science by non-scientists is fundamentally something that most scientists love about sciences: science does not like to tell someone what the ultimate truth is. Science speaks about the universe through observation, and through the knowledge that observations are subject to bias, interpretation and experimental uncertainty – some observations can be wrong and some are updated as we learn more. Science scrutinizes scientific methods and models, engaging with conceptual nuances; there are fundamental realities of science, and we can trust in the process of science, even when knowledge changes (Popper, 2002).

This article presents an illustrative case study (i.e. a descriptive study that uses an instance of an event to show a specific situation), using the example of...
scientific information around the safety and efficacy of the Oxford-AstraZeneca (AZ) COVID-19 vaccine to demonstrate how, when information changes rapidly, it can easily be twisted into misinformation (Corry et al., 1997; Jain et al., 2016; Linlin Huang et al., 2015; Mendoza et al., 2010; Zannettou et al., 2017). It further considers approaches and recommendations for librarians to teach critical evaluation of information and integrate a scientific mindset towards information more cohesively in their practice. Finally, the article provides recommendations for forming collaborations with clinicians and public health practitioners as an approach to constructively and ethically counter scientific misinformation.

**STEM information needs**

Communicating scientific information to non-scientists is difficult, and the inability to do so has contributed to widespread mistrust and misunderstanding of scientific concepts and information (Bangani, 2021; Cornell University Library, 2021; Kari and Savolainen, 2007; Lenstra et al., 2018). There is emerging research, albeit limited, on the role of North American public libraries, how and where academic libraries work with communities around public health information, and the types of information typically shared in public library settings (Lenstra et al., 2018). This scholarship focuses on the preparedness of library staff to support health information seeking, how the types of sources are typically more general-knowledge-based, how library programmes and services contribute to health and wellness outcomes, and how libraries impact the socio-economic and socio-cultural determinants of health (Lenstra et al., 2018). Outside of this research on the health information work of public libraries, there is little written on how to engage with the broader scientific community. Academic libraries teach information and literacy skills – how to think critically about evaluating sources, and how to effectively connect resources with the public (Fabos, 2008; Purzer et al., 2014; Schrader, 2002; Walton and Archer, 2004). However, while we think about critically evaluating sources from our own context, what is largely missing from the research is where professional responsibilities lie around sharing health-focused or scientific information with non-experts in every library setting (Hang Tat Leong, 2013). Currently, the primary modes for broadly sharing knowledge and providing education about health or scientific information and misinformation are through the growing presence of published LibGuides and websites that are intended to combat information overload and fight fake news (Bangani, 2021).

**The changing world**

*Culture and a brief history of fake news*

Information reflects people and culture (Gleick, 2011; Gorn, 1963; Schramm, 1974). In what has now become a global information society, online information shared via the World Wide Web – the Internet – has become its own distinct culture, which includes everything from memes, cat videos and pornography to fully peer-reviewed credible scientific information (Fletcher, 2018; Gleick, 2011; Schramm, 1974). Historically, information had some sort of filter – whether by the physical form in which it was presented or by access limitations, such as who could be in a speaker’s audience or in the locale where it was housed (Gleick, 2011; Gorn, 1963; Schramm, 1974; Waisbord, 2018). Today, it is increasingly difficult for anyone to distinguish a credible book from a journal, or a blog post from a newspaper article (Fletcher, 2018). This melding of form and function into a monolithic force of information creation and dissemination, functioning at an ever-aggressive pace, has dramatically increased information that is misinterpreted, misrepresented or intentionally sensationalized, while making it significantly more difficult to separate the credible from the fantastical (Brindha et al., 2020; Molina et al., 2021; Montané et al., 2005; Mouro and Robertson, 2019; Waisbord, 2018).

Sensationalism in information is not a new phenomenon. In the mid 1700s, the Catholic Church’s false explanation of the Lisbon earthquake spurred Voltaire to speak out about religious dominance, catalysing the Enlightenment (Bressan, 2011). Modern newspapers, when they came on the scene in the early 19th century, used what today we call ‘fake news stories’ to enhance circulation – such as the Great Moon Hoax to sell newspapers (Vida, 2012). Competition between the publishers Pulitzer and Hearst ultimately led to what was then called ‘yellow journalism’, which played a role in leading the USA into the Spanish–American War (Campbell, 2003). With the rise of the Internet, fake news has again come to the fore – both as a system and as its own cultural reference. Even the first Men in Black movie referred to tabloids being secretly reality:

Kay: Best investigative reporting on the planet. Read the *New York Times* if you want. They get lucky sometimes.

Jay: I cannot believe you’re looking for tips in the supermarket tabloids.
Fake news gets views and clicks (Molina et al., 2021; Vosoughi et al., 2018; Waisbord, 2018). Fake news and misinformation on the Internet have moved beyond clear entertainment into intentionally exaggerated or falsified reporting (Bangani, 2021; Copenhaver, 2018; Martel et al., 2020; Sullivan, 2019). The intention is to manipulate individual people and, ultimately, a culture. The way information is shared has also largely changed – fake news thrives on creating suspicion of ‘mainstream media’ and science (Bangani, 2021; Sullivan, 2019). It is transmitted largely from links posted online that are shared through friends and peers. Seeing that 25,000 people have liked an article gives a sense of confirmation bias that the information is acceptable, comfortable and believable, regardless of its actual quality or reliability (Baptista and Gradim, 2020).

Fake news preys on the feelings and worries that people have. The emotional aspect of its content encourages people to believe things that are not true (Martel et al., 2020). Part of what makes fake news powerful is that even if it is not true, it feels like it could be. It echoes a worry and gives an easy answer when answers are not easy. Reading it helps a person feel powerful when they feel powerless (Martel et al., 2020). This is important because the emotional aspect of fake news is echoed by emotional responses to intellectual freedom (Duby, 2018; Sullivan, 2019). Within the context of the COVID-19 pandemic, as the pandemic progressed and vaccines were developed, people either reacted by doubling down on science or ignoring the realities of how severe COVID-19 could be, relying on fake news to validate their assumptions (Van der Linden et al., 2020). Until it became real and individuals or others close to them got sick, for many, it was possible to act as if the pandemic was not occurring.

**Misinformation, mental models and ‘truth’ in science**

Mental models of information lean heavily on the concept of sense-making, where an individual takes in information and tries to make meaning of it (Westbrook, 2006). The information shapes the individual and, in turn, is influenced by the development of individual understanding (Dervin et al., 1982). When presented with new information, research indicates that people react in one of two ways: by using the new information to confirm an existing mental model or by using the new information to build new models that challenge existing perspectives (Vandenbosch and Higgins, 1996). Media information has subsequently been shown to heavily influence how people perceive their social environment (Roskos-Ewoldsen et al., 2004). Thus, information shared over the Internet must confirm existing knowledge and align with an individual’s social group, or it must create a new mental model that is not adversarial to that social group. Information online is also troublesome as it frequently uses bits of reliable content that is taken out of its original context and remixed for maximum effect online (Baran and Davis, 2014). This lack of context, coupled with the need to further a mental model that aligns with a dominant social group, creates an ideal breeding ground for misinformation to spread, as any dissenting viewpoints developed by an individual can be quickly quashed by social groups.

**Critical reflections: an illustrative case study of the AZ vaccine and information rollout**

‘One should always consult with a trusted medical professional about vaccines, dosing and any medical decision.’ This is not intended as medical advice. This example is being used to demonstrate a situation which many librarians have faced. Having to navigate the accuracy of online information, especially where the evidence base is rapidly emerging, is challenging. Librarians in many settings often have to navigate supporting findings and understand health information, working with users with varying levels of education, trust and comfort with health information. This case helps demonstrate the inherent ethical and intellectual-freedom-based tensions within the present culture of scientific misinformation, which can impact interactions between users and librarians.

We have chosen to use an illustrative case study approach, with news stories and social media conversations as context-specific real-time artefacts of the ongoing conversation, information and misinformation in relation to the AZ COVID-19 vaccine (Corry et al., 1997; Mercer and Weaver, 2021). Illustrative case studies are used to be primarily descriptive. They use one to two instances of an event to demonstrate a situation, specifically with the goal of making the unfamiliar familiar, and to give the reader a common language and context about a topic.

**Background**

Prior to the development of the new COVID-19 vaccines, the process of developing vaccines took several years, with prior new vaccine developments having brief and limited media attention (HPV, shingles;
Further, no existing vaccine was indicated to prevent/reduce the severity of currently known coronaviruses. As the pandemic emerged, vaccine development was expedited in unprecedented ways (Ball, 2021; World Health Organization, 2021). The new vaccines were evaluated for safety, efficacy, delivery, dose regimen, stability, emergency use, manufacturing and dissemination, albeit in a much more rapid timeline than has been historically common (Centers for Disease Control and Prevention, 2021; World Health Organization, 2021). The speed in developing a COVID-19 vaccine caused some concerns over safety from the public, which resulted in vaccine hesitancy, citing lack of confidence around the speed of production, intentions behind the vaccine production, development, efficacy and even the severity of COVID-19 itself (Rutjens et al., 2021). To date, two main types of vaccines for COVID-19 protection have been approved for use in Canada and the USA: messenger RNA (mRNA) vaccines, which cause cells to build a foreign protein (spike protein) that stimulates an immune response (Pfizer-BioNTech, Moderna), and adenovirus vector vaccines, which produce an antigen to elicit an immune response (AZ, Johnson & Johnson). This study will use the AZ vaccine rollout as a case study around issues of communication and intellectual freedom.

**Information communication missteps**

The AZ vaccine was approved for use in Canada on 26 February 2021. According to regulators around the world, AZ is an efficacious and safe vaccine. Despite this, as the months rolled on, public confidence in AZ crumbled (Ellyatt, 2021). AZ did not start strong, even though it was one of the most anticipated vaccines in history. During the clinical trial, doses were administered improperly to some study participants. Additionally, after one participant in the trial died, the trial was halted, with no plain-language explanation that this is a normal process. AZ’s efficacy being 62%, rather than the 95% seen in the Pfizer and Moderna vaccines, further brought into question why anyone would want to get it (Coupland, 2021; Ellyatt, 2021). AZ’s impressive 100% rate of preventing severe cases and hospitalizations was largely lost in translation. Further, when a press release was published disclosing a trial from the USA finding that the vaccine was 79% effective, the company was called out by the US National Institute of Allergy and Infectious Diseases for publishing outdated and misleading data (Kemp, 2021). Adding to the confusion, Canada stated that the vaccine should not be given to those older than 65 because of insufficient data, which further diminished public confidence (Ellyatt, 2021; Stone, 2021). Soon after, concerns over blood clots, largely in young women, led to use of the vaccine being put on hold. After further evaluation, AZ was approved again for use, first in those over 55 and then in those over 40. Subsequently, AZ was put on hold once more due to increased concerns about an exceedingly rare side effect known as vaccine-induced thrombotic thrombocytopenia (VITT; Ellyatt, 2021). At the time of writing this article, AZ is approved as a second dose in Canada in certain cases, but no longer as a first dose.

The AZ rollout in Europe provided more confusion (Dyer, 2021; Mahase, 2021; Wise, 2021). After AZ gave Britain priority access to the vaccine, the European Union objected by halting shipments to Britain. In parallel with confusing messaging around safety, efficacy and VITT, the AZ vaccine was not approved for use in the USA – not because it was denied but because the company had not submitted a request for approval. The ongoing confusion soon prompted claims, largely on social media, that the AZ vaccine was ‘second class’ (McKenzie-Sutter and Paglinawan, 2021). Canadians asked, if it was not good enough for use in the USA, why should they use it (McKenzie-Sutter and Paglinawan, 2021)? The Economist (2021) said: ‘The public is spooked’. The author Douglas Coupland (2021) stated: ‘The AstraZeneca fiasco is the latest example of the Gen X curse’. This culminated in concern about what would come next for those who had received one dose of the AZ vaccine (Potter, 2021). The resounding messaging by many who have received a dose is summed up nicely by Coupland:

> will mixing an mRNA vaccine with AZ backfire in some hideous way? Maybe. Maybe not. Will I go with Pfizer? As any Gen Xer knows, there’s not much other choice. Ugh. Will an AZ plus an mRNA work on a vaccine passport? No one has said. On we go. (Coupland, 2021)

The mixed messaging of this rollout has caused untold anxiety, apathy and malaise, and ultimately created an environment that is ripe for both the creation and spread of misinformation. The AZ vaccine rollout compounded already frayed nerves around COVID-19 vaccines and made people more susceptible to believing that they should wait before getting vaccinated, with some even believing that vaccines in general are not safe, despite robust and long-standing scientific evidence of their life-saving value (Adhikari and Cheah, 2021; The Economist, 2021; Flanagan, 2021; Goldenberg, 2021).
Given the ineffective communication, inconsistent messaging, rapidly changing information and general lack of public trust, how can librarians, who ‘have a responsibility both to guarantee and to facilitate access to expressions of knowledge and intellectual activity’ (IFLA Freedom of Access, 1999), meet the requirements of the plurality of information while taking up the mantle to fight against fake news and misinformation?

**Discussion**

A library’s duty to users is to give them the information they want (IFLA Freedom of Access, 1999). Yet when some of that information is patently false, how can libraries provide access to all materials and information? If a user comes to a library asking for support in ‘proving’ that vaccines are dangerous, what does one do when that information is counter to public health safety guidelines? Equally, what would one hypothetically do if one’s own morals, or political or religious views, regarded vaccines as dangerous? When intellectual freedom comes into play, we must ask ourselves if it is our responsibility as librarians to provide access to all information, or whether we need to reframe the question as ‘How do we provide access to all information with context and critique?’

The American Library Association states:

> Intellectual freedom is the right of every individual to both seek and receive information from all points of view without restriction. It provides for free access to all expressions of ideas through which all sides of a question, cause or movement may be explored. (American Library Association, 2007, para. 2)

Important and necessary as this statement is, the ‘without restriction’ qualifier is concerning. Our professional responsibilities can perhaps start to echo those of other professionals who are grappling with similar problems (Weese, 2021). For example, pharmacists and physicians in Canada do not need to prescribe birth control, or the morning-after pill, if it goes counter to their beliefs. What they must do is respectfully and non-judgmentally direct patients to clinics that provide these services. As librarians, we must be allowed to maintain our own personal ethical boundaries while still allowing access to information from all points of view. That said, the librarian’s job should be to contextualize that information appropriately (Becker, 2017; Taala et al., 2002). Placing misinformation within its proper context does not stop people from accessing it, in the same way as putting labels on medication to effectively inform about risks does not stop people from taking it.

Libraries have placed a heavy emphasis over the last five years on creating sources and educating people on identifying fake news information (Cornell University Library, 2021; Fordham University Libraries, 2020; MIT Libraries, 2021). While this skill is crucial, it misses the point that what we need is an educated population that is capable of critically evaluating all forms and types of information (Lamont et al., 2020; Mercer et al., 2020; Mercer and Weaver, 2021). This is notoriously difficult when the Internet provides an overwhelming amount of false information that masquerades as legitimate. As a field, while not universal, there is an existing clear commitment to enlightening users about fake news, demonstrating reconciling access to information with making false information clear (Auberry, 2018; Bangani, 2021; Copenhaver, 2018). By deepening this to include the depth and breadth of the entire information landscape, there can be support around providing access to information, encouraging lifelong learning and supporting independent decision-making. Ultimately, facilitating access to expressions of knowledge and intellectual activities, and making available the widest swath of materials that reflect the diversity and plurality of society, can be done while including context.

**Critical evaluation of information as a catalyst for change**

The important takeaway from the above case study is that even as health information rapidly changed, vaccine approvals did go through the proper regulatory bodies. If approved, the vaccines are safe, even with the risks of known side effects. So, what do we as librarians do with scientific misinformation? Do we provide and protect universal access? Do we try to change it? Do we tell people when we think they are wrong?

Scientists are trained to use rigorous and logical processes, make value judgements, weigh statistics and decide on the right path forward (Popper, 2002). These methods also inform training for physicians and other clinicians. Librarian training teaches similar methodologies: we learn to be critical of information, evaluate information, and contextualize and facilitate access to information (Crook et al., 2016; Fabos, 2008; Schrader, 2002). How can we use our training and positions of trust within our communities to positively affect the ability of all our users – educational, academic and the general public – to learn how to critically assess information?

One way of providing users with context is to educate ourselves more deeply about, and then to use established techniques around, information literacy
and critical evaluation of information (Mercer et al., forthcoming). Critical evaluation of information makes use of evaluative frameworks like RADAR (rationale, authority, date, accuracy, relevance) and CRAAP (currency, relevance, authority, accuracy, purpose) as initial structures and processes for individuals to make surface-level determinations about the authority, relevance, accuracy and credibility of any information source (Blakeslee, 2004; Mandalios, 2013; Mercer and Weaver, 2021; Mercer et al., forthcoming). In critical evaluation of information, this approach is supplemented by discussion that brings context, including scientific and information professional knowledge, to the conversation with students and lay individuals.

Critical evaluation of information can be an informal interaction as much as it can be a classroom-based lesson. Conversations with community members and partnerships with health authorities about scientific misinformation under this practice can include reference questions such as: Where did you first hear this? Have you found out why people are telling you this? Have you looked at where the sources are? Do you find the information overwhelming? Would you like me to help walk you through it (Crook et al., 2016; Kickbusch, 2001; Nutbeam, 2000; Sørensen et al., 2012)? The librarian asking these questions does not need to be an expert in science, nor do they have an inherent judgement on the type of information the patron is asking for (Goldenberg, 2021). What the librarian does have is a responsibility to use the evaluative framework tools such as critical evaluation of information to explicitly teach individuals how we, as professionals, evaluate and critique information so that they can learn to mirror and, ultimately, internalize such a practice in their own mental models of scientific information.

**Librarian and expert collaboration**

While librarians are experts at finding and using information, we may not be experts in the information itself (Goldenberg, 2021). Part of our ethical responsibility is to recognize and honour the boundaries of our own knowledge while using the tools of our profession to educate our users. The IFLA adopts a definition of information literacy that states: ‘Information literacy is the adoption of appropriate information behavior to identify, through whatever channel or medium, information well fitted to information needs, leading to wise and ethical use of information in society’ (IFLA Freedom of Access, 1999). Librarians have an obligation to this ethical use of information, which inherently means working against misinformation – especially misinformation that harms the individual or societies at large. This places a boundary on unfettered intellectual freedom but should not be viewed as censorship. Continued adherence to neutrality or providing information without context violates information ethics, and incorporating tools and methods into our practice that combat misinformation is an appropriate approach to navigating these concerns (Becker, 2017).

Beyond supporting the discovery and evaluation of credible information, librarians need to emphasize collaborations that are embedded in their practice. Fake news is an attack on thinking. The evidence on how emotion plays into fake news is not clear, though emerging evidence suggests that heightened emotionality is predictive of greater belief in fake news (Martel et al., 2020). Further, how people emotionally process fake news may play into how susceptible they are to believing false information. Evidence demonstrates that emotion may be a reason why people fall for fake news, and while a person with high emotional intelligence may be less likely to fall for fake news, the question remains of how and when people fall into believing false information, especially when it plays into their pre-existing belief systems (Martel et al., 2020; Preston et al., 2021). While the evidence and information around this may be emerging, one cannot ignore the colloquial awareness of emotional aspects, particularly those around engaging in trust in scientific and health-focused information (Hesse et al., 2005; Kim, 2016). In other words, ignoring the complex emotional aspects is not the path forward. By partnering and working with clinicians and public health initiatives as a matter of course when it comes to assisting patrons in finding health information, librarians can help support finding, using and accessing information by modelling trust in expertise. There is a place for librarians to take a similar stance, as J Scott Weese (2021) stated in a public letter against misinformation being spread by a colleague at the University of Guelph: ‘With freedom comes responsibility. That applies to academic freedom too. It should not be used to provide cover for misrepresentation and misinformation’. It is not that people should not be supported in finding information, but we must equip people with the ability to evaluate diverse information and not use intellectual freedom as a similar cover for facilitating access to misinformation. Librarians can do this by providing a bridge between experts and users, using their knowledge of information and ability to assess and critique it. This can ultimately help to build the ability to critique information within lay users. Within the boundaries of intellectual freedom, librarians have the embedded
skills already in their practice of evaluating information – by giving people context around evaluation, librarians can support finding authorities and experts who can help then translate information into known contexts and world views that already align with their own.

Conclusions
Within the way that intellectual freedom has been traditionally discussed in the library and information science field, we have an obligation to provide our users with the information that they are seeking and have requested, without interference. In the current climate of misinformation – in this case, contextualized with scientific misinformation – a strict adherence to the ideals of intellectual freedom needs to be questioned and weighed against other areas of responsibility and expertise. Librarians and other information professionals generally agree and have taken a strong stance about not supporting misinformation, have categorized it as feeling similar to being in an information war, and that the problem of misinformation is a symptom of a deeper problem, though tensions can remain, especially in cultural-specific contexts (Becker, 2017; Kendrick and Damasco, 2015; Neely-Sardon and Tignor, 2018). There is an opportunity to build a deeper understanding of how information literacy training transitions beyond a single instruction session and helps people navigate information in their everyday lives. What we have seen is that there is a clear gap in information literacy training that works for people when they are met with completely unboundaried information without any context.

Moving forward, there is a significant opportunity for librarians to align themselves more formally with other field-specific experts and navigate how public trust in libraries can be used to combat misinformation. There has been an articulated need for library and information science professionals to actively identify rumours and misinformation, and begin to reframe their practice to acknowledge the tension between providing unrestricted access and providing epistemological protection. It is possible that access does not need to be provided without context. As Jain et al. (2016, p 2015) say: ‘People have a right to know whether the information they are seeing is trustworthy or not’.

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