

The Unanticipated Use of Platforms in Disseminating Misinformation

Ava Lew

University of Toronto, al.lew@mail.utoronto.ca

Online platforms, such as social media, are socio-technical environments in which the reciprocal interactions and mutual shaping occurring among platforms, users and society stems from the design, function and use of these digital tools. The application of a socio-technical approach allows for a comprehensive understanding of the unanticipated use of platforms in the dissemination of misinformation. A more holistic understanding can assist in the design and evaluation of platforms and their features in order to help identify, prevent or mitigate unanticipated uses, like the dissemination of misinformation.

CCS CONCEPTS • Information systems~World Wide Web~Web applications~Social networks • Human-centered computing~Human computer interaction (HCI)~Interaction design

Additional Keywords and Phrases: Socio-Technical, Misinformation, Platforms, Design, Evaluation, Social Media, Computers and Society.

1 INTRODUCTION

If we can detect software errors through design, testing and evaluation, then why wasn't the use of platforms to disseminate misinformation, particularly at scale, anticipated during the design and development phases? In my research, I apply a socio-technical approach to examining online platforms and the widespread dissemination of misinformation. A socio-technical approach allows for obtaining a holistic understanding of the issue, which can assist in the design and evaluation of platforms and their features or help identify and mitigate unanticipated uses, like the dissemination of misinformation¹. My work draws on real-world examples of misinformation dissemination, as empirical evidence of how platforms (including social media (SM) and social networks (SNs)) afford this unanticipated use, as well as the actions taken to address this phenomenon.

Platforms are complex, multilayered and analytically messy [1]. They possess unique qualities that distinguish them from other technologies and afford the dissemination of misinformation. Platforms, especially SM or SNs, are socio-technical environments in which the reciprocal interactions and mutual shaping occurring among platforms, users and society, stems from their design, function, use and effects. The application of narrow, linear interpretations, or an approach that is predominantly technologically- or human-centered, provides only part of the picture of these socio-technical environments, which can lead to misleading conclusions [1]. Therefore, a holistic accounting for the technological, human and social aspects at play in these socio-technical environments is necessary when addressing their use in the spread of misinformation.

2 ISSUE

*"We never intended or anticipated this functionality being used this way – and that is on us.
And we did not find it ourselves – and that is also on us" [2].*

* Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for all other uses, contact the owner/author. © 2021 Copyright held by the owner/author.

¹ The word 'misinformation' is used here as catchall phrase and, since proving intent is beyond the scope of the study, it encapsulates notions disinformation (which requires intent), hate, 'fake news', or any type of information that is misleading or not true, regardless of whether it is intentional.

The above quote from Sheryl Sandberg, Facebook's chief operating officer, is in response to the unanticipated use of the platform to spread misinformation, racism and hate [2, 3]. Others have also observed the use of platforms in ways that were not intended, such as in activism [4]. In light of this, unanticipated use is the use of platforms in ways that were not intended, anticipated, uncovered and addressed during the design and development stages. Unanticipated uses, like the dissemination of misinformation, are also not noted as intended forms of use in public documents, discussions or statements made by the representatives of platform organizations.

The question of why unanticipated uses are not anticipated or uncovered during the development of these platforms or their features presents an enigma, especially when common design and evaluation objectives involve anticipating types of use, or preventing and correcting unintended errors during users' interactions with technological systems [5, 6, 7, 8]. One reason may be that typical notions of unintended system behaviour or use, often classified as errors, do not speak to the unanticipated use of SM, SNS, or similar platforms.

3 BACKGROUND

Debates over the broad spread of misinformation online became heightened during the 2016 presidential campaigns in the United States (U.S.). With misinformation affecting democracies, elections, public health, and various sectors of society, it is now, in itself, a global pandemic. The spread of misinformation continued throughout the 2020 presidential campaigns and elections in the U.S., during the coronavirus disease (COVID-19) health crisis, and remains a challenge to this day. Further, because the function, use and effects of platforms are not necessarily confined to the platforms from which they originate or that are used to promote misinformation, the spread of misinformation online achieves a scale that reaches into the off-line world and produces consequences, like people believing that COVID-19 does not exist.

Over the years, platform organizations have struggled to locate ways to eliminate the use of their platforms in spreading misinformation. For example, Facebook's ongoing struggle to effectively address the unanticipated use of its platform in the dissemination of misinformation includes replacing humans with algorithms, which proved ineffective in detecting misinformation [9], adding human censors, and combining the use of algorithms and humans to detect misinformation and hate speech [10, 11].

During his testimony before the U.S. Congress to discuss, among other things, Facebook's role in the spread of misinformation, Mark Zuckerberg, Facebook's chief executive officer, admitted that the company's focus on "making sure we built good tools" superseded ensuring those tools were used for good [12]. He also revealed plans to increase the development of artificial intelligence (AI) to eradicating misinformation [12, 13]. However, this plan assumes a techno-fundamentalist stance that advocates the development of increasingly more technology as a solution to a socio-technical problem. Such approaches has long been seen as problematic [14] and do not appear to go far enough in balancing the intertwined technological, human and social dynamics when accounting for the design, use and effects of platforms in the dissemination of misinformation.

The unanticipated use of platforms in the dissemination of misinformation is a *wicked problem* [15, 16, 17] in that it involves current technologies, is complex, widespread, and solutions are not simple [18] – or easily found. In addition, such problems can be seen as opportunities or threats, and can have global outcomes if not attended to [18]. Mumford [16, 19] calls for the use of socio-technical approaches in addressing such problems. Although she points to some legal offences in her discussions [16], the use of platforms to widely disseminate misinformation fits the description of a wicked problem – and in some cases blurs or cross legal lines.

4 A SOCIO-TECHNICAL APPROACH

When it comes to addressing the use of platforms in the dissemination of misinformation, the driving socio-technical principle to improve the quality of life [14, 20, 21] prioritizes solutions that achieve harmony among technology, users, and society. For instance, the Effective Technical and Human Implementation of Computer-based Systems (ETHICS) is a socio-technical system design method that focuses on the design of technological systems while ensuring that their design, evaluation and implementation improves organizational or work environments, and enhance employees' satisfaction and quality of work life [19, 22, 23]. As denoted by the acronym, an ethical foundation underlies this approach. Even the International Organization for Standardization (ISO) now recognizes the need to address social responsibility at all levels of an organization, including its products, services, and technologies [24]. A socio-technical approach aims for this balance by directing focus to the technological, human and social composition of platforms and the contexts in which they operate, as well as how issues are viewed, methodologically interrogated and solved.

In my research, I focus on the dissemination of misinformation as an example of platform unanticipated use, as opposed to other unanticipated uses like use of the wallstreetbets subreddit in retail trading, or the development and use of the hashtag, which can be viewed as a neutral unanticipated use. This is because the dissemination of misinformation is an adverse use that not only forces platform organizations to adapt and evolve in attempting to locate solutions, but also provides a powerful lesson in what can occur when design and evaluation processes do not make room for anticipating and addressing the broader implications of the function and use of these systems. As in the case of misinformation dissemination, such lessons are remarkably evident once these socio-technical systems integrate and coalesce within the larger ecosystem and society.

To obtain a holistic view of the use of platforms in disseminating misinformation, I employ socio-technical and affordance concepts in identifying and interrogating the networks of platforms and their features that underlie instances of misinformation and encourage their dissemination. Extending the notion of affordance allows for analyzing the affordances provided by platform features, both individually and in aggregate. This analysis also includes discretionary use – a quality that distinguishes these platforms from technologies that only allow non-discretionary use. At the micro-level, this process involves identifying, tracing and mapping the use of platform features and their affordances. At the macro-level, the process entails uncovering and examining, in aggregate, the network of features, affordances and uses that extends into the surrounding ecosystem and, ultimately, sectors of society.

In keeping with the socio-technical move from micro- to macro-level analysis [20], the dynamics related to these processes and the changes to platforms are taken into account. This involves identifying a series of platform changes implemented to counter the dissemination of misinformation, and assessing the implications and effect of these platform changes. Next, is drawing a contrast to determine the fit between platform changes and what was learned from examining the function, use, and underlying structure of the instances of misinformation.

One reason for integrating micro- and macro-level analyses is to widen our lens on the issue in order to increase our understanding of the role of platforms in disseminating misinformation, which can lead to solutions. The ability to access and draw on a range of diverse, yet relevant, knowledge and skills when dealing with the use of platforms to spread misinformation can increase the choices available to tackle the problem. Having access to an increase in the number of possible solutions from which to choose can also increase the chances of being able to manage or solve the problem. This perspective is related to the notion of requisite variety, which requires a reliance on diverse knowledge and multidisciplinary skills to effectively comprehend and deal with complex systems and problems [19,

25]. In regards to the unanticipated use of platforms in disseminating misinformation, this may include the perspectives, knowledge and experience of diverse users, as well as relevant multidisciplinary skills that designers and other specialists bring to the process of designing, evaluating, or locating solutions related to technological use and users. Informing the approach used in the study are the concepts mentioned above, in conjunction with variance, adaptability and other key socio-technical concepts [26].

5 SOCIO-TECHNICAL HEURISTICS

A set of socio-technical heuristics derived from the analysis and literature will also be proposed and explored later on to assess their usefulness in identifying and/or mitigating unanticipated uses, like the dissemination of misinformation. As an example of what this might look like, below is an outline of socio-technical heuristics or guidelines that are based on key concepts similar to those covered here, as well as in discussions on a range of other unanticipated platform use [1]. Key socio-technical concepts comprising the heuristics are in bold.

1. The design and/or evaluation should aim to obtain a holistic view that accounts for actual and potential technological, human and social function, use and effects of the platform or its feature(s) (**holism**).
2. Design and/or evaluation should identify and consider how the function and use of the platform or pf feature(s) is positioned within the platform's environment or the surrounding environments of the ecosystem and society (**boundaries**).
Identifying the boundaries of operation also assists in establishing the context of examination.
3. Identify and map the ways in which the platform/feature(s) is connected, including how it interfaces or integrates with other components and the larger ecosystem (**system open configuration**).
Mapping a platform's configuration helps to identify the potential reach of the function, use and effects of a platform/feature(s). This includes the ways in which a platform might permit an unanticipated use, how such uses might emerge, and the variance or extent of their associated effects.
4. Employ a context-specific assessment of the function, use and effects of the platform/feature(s) (**context**).
Identifying and establishing the contexts, boundaries, surrounding environments, including sectors of society, that might be impacted, assists in uncovering how the multiple layers of platforms interface, which makes their complexity more lucid and manageable.
5. Design and/or evaluation should include a focus on users, and incorporate the participation of diverse users and all stakeholders (**diversity**).
Gathering input from diverse users and stakeholders is likely to increase the ability to identify issues and/or solutions related to the design, function and use of the platform or feature(s) [19, 27].
6. Incorporate a diverse range of relevant skills and knowledge in the design and/or evaluation process (**multidisciplinary skills, requisite variety**).
Requisite variety can help in identifying, anticipating and locating solutions to unanticipated uses.
7. Design and/or evaluation should account for how the introduction of a new feature or platform can influence (or be influenced) by other aspects of the system or surrounding environments (**variance**).
Accounting for how a new platform/feature(s) affects or is affected by other aspects of the platform, ecosystem or society allows for uncovering the resulting interactions, relations and other dynamics that might lead to unanticipated use, behaviours, or changes in these socio-technical environments.

8. Aim to identify and anticipate any potential unanticipated emerging behaviors or uses (**emergent properties**).

This is informed by a combined assessment of information from the previous steps, including the context, structure and ways in which the platform/feature(s) is connected to the ecosystem or society.

9. Design and/or evaluation should be informed by knowledge about the platform's history (changes, challenges and effects), including prior forms of unanticipated use (**self-regulation/behaviours**) and the ways in which the system has adapted and evolved over time (**adaptive feedback**).

Lessons learned from the challenges, changes and how effective a platform has been at adapting – including what worked and didn't work – may not only assist in recognizing the potential for unanticipated use, but can also help in locating solutions in cases of adverse use.

6 CONCLUSION

In contrast to some other types of technological systems, SM, SNS and related platforms do not operate in a vacuum. A socio-technical approach makes room for attaining a more integrated, unified understanding of the function, use and effects of platform features and affordances in the dissemination of misinformation. Identifying platform changes aimed at eliminating misinformation, their effects and how they reshape or contribute to the evolution of platforms, will also help in locating solutions and, thereby, enhance these socio-technical environments and the sectors of society in which they operate. In addition, the development of a set of socio-technical heuristics may help in identifying, mitigating or preventing adverse unanticipated uses. Likewise, identifying positive unanticipated uses can be modelled on to enhance the socio-technical environments of platforms.

ACKNOWLEDGMENTS

Thanks to the Natural Sciences and Engineering Research Council of Canada (NSERC) RGPIN2017-04883 for funding to attend this conference.

REFERENCES

- [1] Ava Lew. 2021. Flipping the script: A Socio-technical approach to platforms and unanticipated uses. *Computer* 54, 4 (April, 2021). 35-44.
- [2] Sheryl Sandberg. 2017. Last week we temporarily disabled some of our ads tools.. Facebook. (20 September 2017). Retrieved: <https://www.facebook.com/sheryl/posts/10159255449515177>.
- [3] Sheryl Sandberg. 2018. Sheryl Sandberg to MIT grads: Facebook 'didn't see all the risks' of its technology. Video. (8 June 2018). CNN Business. Retrieved: <https://money.cnn.com/2018/06/08/technology/sheryl-sandberg-mit-speech/index.html>.
- [4] Niels Brügger. 2015. A brief history of Facebook as a media text: The development of an empty structure. *First Monday*, 20, 5 – 4 (May 2015). Retrieved: <https://firstmonday.org/ojs/index.php/fm/article/download/5423/4466>.
- [5] Alan Dix, Janet Finlay, Gregory D. Abowd, and Russell Beale. 2004. *Human-Computer Interaction - Third edition*. Pearson Education Limited.
- [6] Rolf Molich, and Jakob Nielsen. 1990. Improving a human-computer dialogue, *Communications. ACM* 33, 3 (March 1990), 338-348.
- [7] Don A. Norman. 1988. *The Design of Everyday Things*. Basic Books, New York.
- [8] Bruce Tognazzini. 2003. First principles of interaction design. *Interaction design solutions for the real world*. AskTog. Retrieved: <http://asktog.com>.
- [9] Lee Rainie, and Janna Anderson. 2017. Code-dependent: Pros and cons of the algorithm Age. Pew Internet & American Life Project. Pew Research Center. Washington, DC. Retrieved: http://assets.pewresearch.org/wp-content/uploads/sites/14/2017/02/08181534/PI_2017.02.08_Algorithms_FINAL.pdf
- [10] Julia Angwin, and Hannes Grassegger. 2017. Facebook's secret censorship rules protect white men from hate speech but not black children. ProPublica. Retrieved: <https://www.propublica.org/article/facebook-hate-speech-censorship-internal-documents-algorithms>.
- [11] Spandana Singh & Koustubh Bagchi. 2020. How Internet Platforms Are Combating Disinformation and Misinformation in the Age of COVID-19. Open Technology Institute, (June 2020).
- [12] CNN Live. 2018. Mark Zuckerberg testifies before Congress. (10 April 2018) CNN.com.

- [13] Tarleton Gillespie. 2020. Platforms Throw Content Moderation at Every Problem. In Zimdars, M., & McLeod, K. (Eds.). (2020). *Fake News: Understanding Media and Misinformation in the Digital Age*. MIT Press, Cambridge, MA.
- [14] Enid Mumford. 1983. *Designing Human Systems for New Technology: The ETHICS Method*. Indiana Univ. Press, Bloomington, IN
- [15] Richard Buchanan. 1992. Wicked problems in design thinking. *Design Issues*, 8, 2 (Spring 1992), 5-21.
- [16] Enid Mumford. 1999. *Dangerous Decisions: Problem Solving in Tomorrow's World*. Springer Science & Business Media, New York, NY.
- [17] Horst W. J. Rittel. 1972. On the planning crisis: Systems analysis of the first and second generations. *Bedriftskonomen*, 8, 390-396.
- [18] Joanna Porra, and Rudy Hirschheim. 2007. A lifetime of theory and action on the ethical use of computers: A dialogue with Enid Mumford. *Journal of the Association for Information Systems*, 8, 9, (September 2007), 467-479.
- [19] Mumford, E. 2003. *Redesigning Human Systems*. Information Science Publishing, Hershey, PA.
- [20] Eric Trist. 1981. The evolution of socio-technical systems. Occasional Paper, 2 (June 1981). Ontario Quality of Working Life Centre. Toronto, ON
- [21] Günter Ropohl. 1999. Philosophy of socio-technical systems. *Society for Philosophy and Technology Quarterly Electronic Journal*, 4, 3 (Spring 1999), 186-194.
- [22] Peter Adman, and Lorraine Warren. 2000. Participatory sociotechnical design of organizations and information systems—an adaptation of ETHICS methodology. *Journal of Information Technology*, 15, 1, 39-51.
- [23] Bernd C. Stahl. 2007. ETHICS, Morality and critique: An essay on Enid Mumford's socio-technical approach. *Journal of the Association for Information Systems*, 8,9 (September 2007), 28.
- [24] ISO. 2010. *ISO 26000:2010 Guidance on social responsibility*. International Organization for Standardization. Geneva, Switzerland
- [25] David Lazer, Matthew A. Baum, Yochai Benkler, Adam J. Berinsky, Kelly M. Greenhill, Filippo Menczer, Miriam J. Metzger et al. 2018. The science of fake news. *Science* 359, 6380 (March 2018), 1094-1096.
- [26] Ian Sommerville. 2016. *Software Engineering*. Pearson Education, Harlow, U.K.
- [27] Tom Tullis, Stan Fleischman, Michelle McNulty, Carrie Cianchette, and Marguerite Bergel. 2002. An empirical comparison of lab and remote usability testing of web sites. In *Proceedings of Usability Professionals Association Conference*.