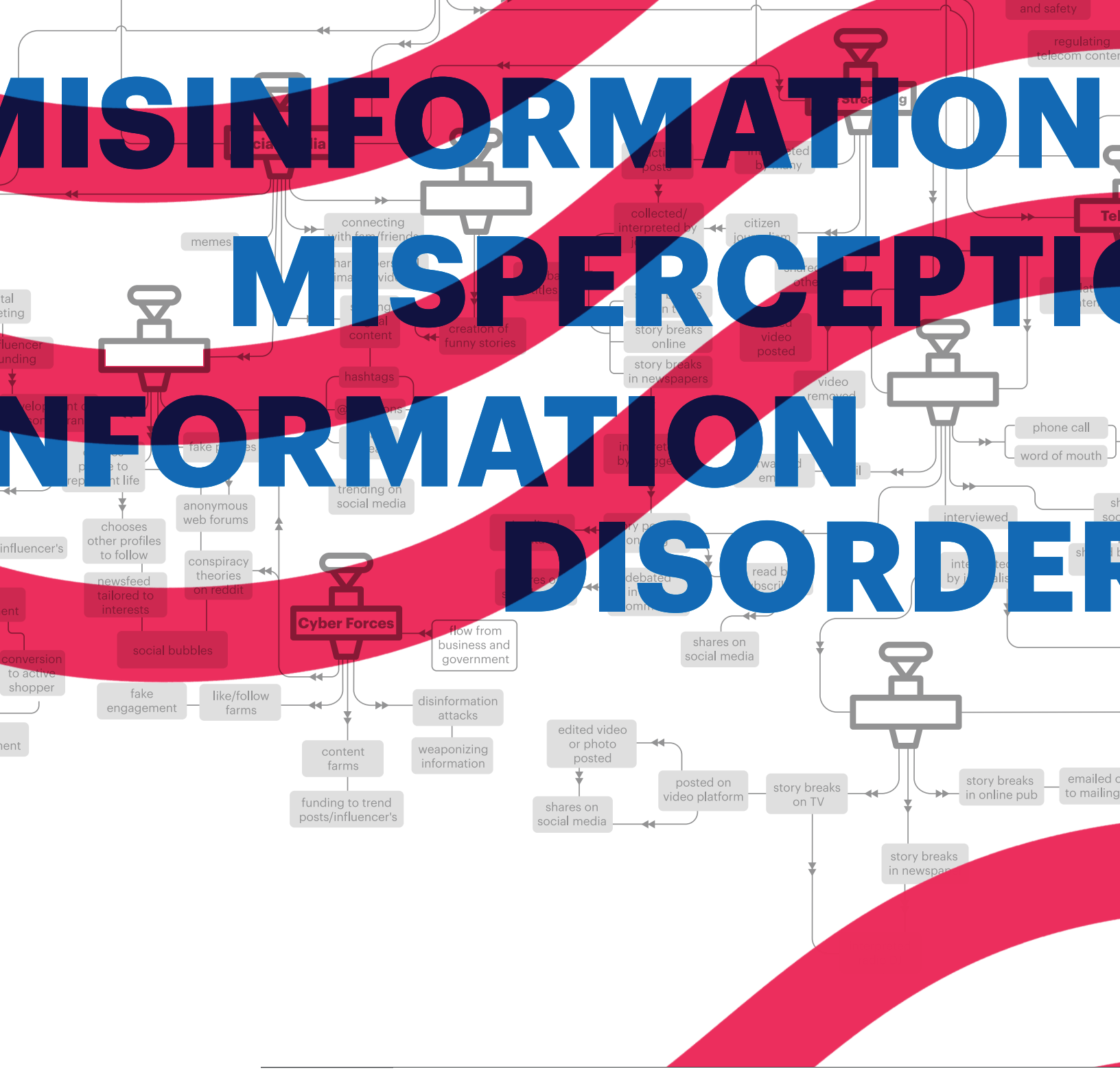

A MISINFORMATION BLUEPRINT:

Mapping warnings in an agile communication system

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Mapping warnings in an agile communication system

By April De Zen

A thesis exhibition presented to OCAD University
in partial fulfilment of the requirements for the degree of
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ABSTRACT

This thesis provides a high-level view of misinformation that builds an interdisciplinary framework for research to aid in future interventions. It utilizes Buchanan's wicked-problems approach of design thinking to investigate the drivers of misinformation and where it appears in the chain of communication. There are many forms of inaccuracies throughout the exercise of informing ourselves through communication media. This thesis works to identify misinformation's placement within information disorder, identify drivers of misinformation and highlight the potential entry points of misinformation into communication media. This research aims to allow us, as a society, a clearer direction for combatting a phenomenon of this size. The final output is a 'blueprint' of misinformation shown through a visual ecosystem of information disorder and a system map of communication media. The system map is used to draw attention to two things: (1) Where the drivers of misinformation have the potential to materialize and (2) The channels of communication which are subject to different valves of control. The final 'blueprint' is transformed into an interactive display to encourage engagement and awareness.

Key Words: fake news, misinformation, information disorder, communication media.

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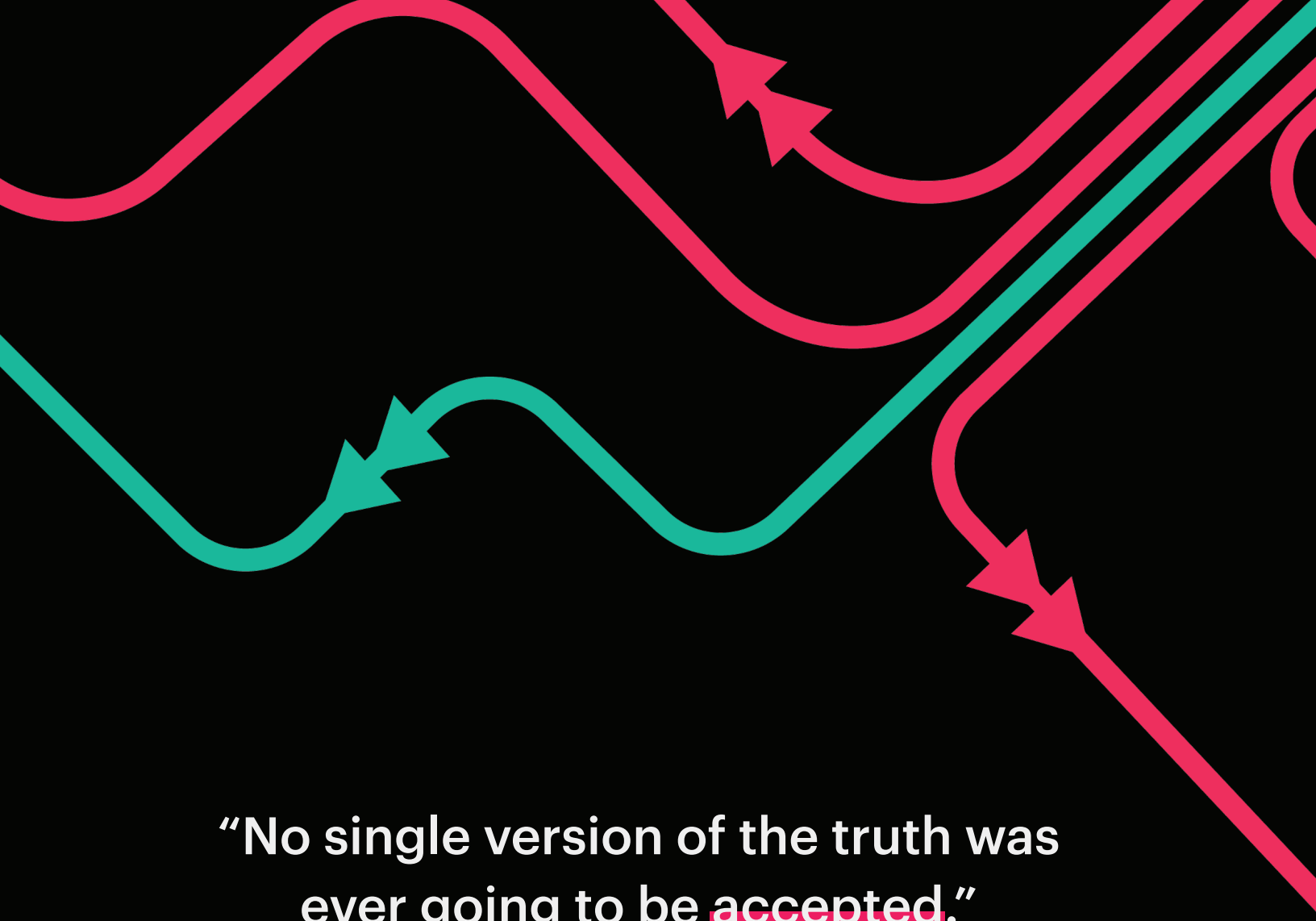


“No single version of the truth was ever going to be accepted.”

- SEAN ILLING AT VOX

Chapter 1
INTRODUCTION

AN ERRATIC DILEMMA WITH NO EDGES

THAT'S FAKE NEWS, these three words seemed to be everywhere in 2016. The idea of fake news captured enormous buzz after Donald Trump started fielding questions with complete disdain for certain media outlets. Trump attacked both CNN and BuzzFeed with this statement; "No, I'm not going to give you a question. You are fake news." (Jamieson, 2017) Trump supporters viewed this as a powerful sign of leadership; others did not.

Trump's form of reasoning is primarily destructive to any form of objection to his administration but it does shine a spotlight on an age-old dilemma.

As technology advances, the reach of single informational inaccuracies increase and spread. In 2017 these inaccuracies grew into a beast labelled 'Fake News' and the evidence of its existence seemed plastered on all media channels with stories about how to spot fake news and fact checking.

With this awareness came an urgency to escape or be eaten. Unfortunately there has been confusion on how to combat such an issue when there isn't a clear understanding of what fake news is. According to BBC news,

> The idea of fake news soon grew cloudy, misinformation, pranks, conspiracy theories, political spin, all this and more were being described using the catch all term 'fake news'. People around the world were throwing around the term 'fake news' with abandon. That's why some experts think the term has outlived its usefulness (Wendling, 2018, p. 2)

A survey conducted by Ipsos Public Affairs for BuzzFeed News finds "Fake news headlines fool American adults about 75% of the time" (Silverman & Singer-Vine, 2016, p. 1) This large-scale survey aimed to establish which news headlines people recall seeing and whether if not they consider it to be accurate.

> Of the people surveyed, nearly 33% recalled seeing at least one of a selection of fake news headlines from the election. The fake

> news headline recalled by the largest number of respondents is the story from hoax website the Denver Guardian. (Silverman & Singer-Vine, 2016, p. 3)

This survey forms the basis of the potential virality of sensationalized fake news during election season. The ease in which individuals, organizations and companies can use our modes of discovery against us is undeniable. "From August to November 2016, fake stories earned more shares, reactions, and comments on Facebook than real news stories." (Edkins, 2016, p. 1) These stories, disguised as insider information, seemly provide us a visceral connection to the daily lives without the editing and framing of large publications or government. It seems to provide an edge to those looking through the chatter and strengthening an ideal of being 'in-the-know' when so many are lost in the carnage of information overload. Knowing more than others is a seductive thought. Wrap that around a conspiracy theory circulated by a social media industry paid by virality regardless of validity and you have some understanding of what 2020 is like online.

Figure 1.1: Katz and partner wearing Pizzagate t-shirts (Robb, 2016)

'Pizzagate' is an example of an absurd fictional story driven by social media and named after the Nixon cover up. This fictional scandal stated that Hilary and Bill Clinton ran a child sex trafficking ring out of the basement of a pizza parlour. *Rolling Stone* did an exposé on what brought this absurdity to life and was able to locate a post on Facebook which was dated before any other accounts of Pizzagate. It was written by Carmen Katz and accused Bill and Hillary Clinton of operating an international child enslavement and sex ring. This post went viral and different versions were spread through several widely used social media platforms. Robb also consulted experts in the field to understand how one woman's facebook post could start a fire like Pizzagate. Robb's (2016) investigation lead to this finding;

> Katz fits neatly into a well-worn blueprint for disinformation campaigns. For a story to gain traction, propagandists' plant false information on anonymous chat boards, hoping real people will pick it up and add a human touch to acts of digital manipulation. (p. 2)

It is clear these ridiculous stories are spreading but can these stories actually be taken seriously by the masses? *The New York Times* broke a story that proves it can. "A man who fired a military-style assault rifle inside a popular Washington pizzeria in December, wrongly believing he was saving children trapped in a sex-slave ring"(Haag & Salam, 2017, p. 1) Not only are these stories being spread but that are being taken to heart, these fake internet stories are driving real world consequences.

Living in a world where there are 2.37 billion active Facebook users (Hutchinson, 2019), 1 billion active Instagram users (Statista, 2015) and 126 million active Twitter users (Kastrenakes, 2019), It is impossible to think we aren't exposed or immune to the dilemma of informational inaccuracies, vague/misleading stats or online fiction disguised as fact. A study done at Ohio State University looks into the potential influence digital misinformation had on the 2016 American elections and concluded; "exposure to fake news did have a significant impact on voting deci-

sions. What is not clear is if this influence was sufficient to have determined the outcome of this election."(Gunther, Beck, & Nisbet, 2018, p. 4) The level of influence over the masses is not only being exploited through wild Pizzagate accusations but misinforming the public can potentially throw elections and erode democracy.

These are a few examples of how inaccuracies function online, how susceptible to fictions we are and the public outcry for change. This research will investigate how we communicate and inform ourselves. The amount of public discussion around misinformation currently makes it a good time to survey what we know and combine it in a way that represents a journey of information dissemination through mass media. This exercise, although imperfect, also allows for charting where misinformation has the potential to occur within the spread of information.

THE JOURNEY THROUGH THIS RESEARCH

This research addresses two main research questions;

(1) What framework and visual(s) can help highlight where misinformation can appear?

(2) In which ways can the complexities of misinformation be publicly displayed?

The following chapters revisit the journey to shed light on the above research questions. Chapter three reviews what misinformation is and discuss the parameters of misinformation and where it is situated within current definitions of information and information disorder. Chapter four is an overview of the drivers of misinformation. Many of these drivers have been long established but there has yet to be a visual collection for quick reference. This chapter pulls these drivers together to visualize misinformation within a larger ecosystem and display the depth of understanding in a consolidated place. Chapter five uses Buchanan's (1992) wicked problem framework to deal with how content/information is spread and reviews many touch-points in which content/information can be influenced to allow for different mediums and audiences. A system map is developed and refers to these touch-points as 'valves' of control, which highlight the control over the flow of information to its audience. The system map is used to visualize how the valves established could work. Chapter six applied the list of drivers to the high-level system map graphic to highlight the potential of misinformation. This visual acts as a useful reminder of the cycles most content/information is subjected to before it reaches its audience. Colour coding was used to provide distinction to each misinformation driver within the system map. This exercise is used to provide a representation of the scale of communication media and showcase a variety of entry points in which content/information can be influenced. Chapter seven discusses the preparation and process of translating this research into an interactive public display.

This project does not delve into problem solving but focuses much of its attention on the development of a blueprint on the topic of misinformation. This high-level view is meant to compile and conceptualize the topic as a whole system. This blueprint of misinformation was established in hopes that its contribution may be helpful for those in the field of media to imagine actionable interventions.

MIS INFOR MAT ION

Chapter 2

WHY ME? AND HOW?

A BIT ABOUT ME

SPENDING THE LAST fourteen years as a visual designer and creative strategist, telling stories with engaging visuals has been a extensive part of my professional life. Being tasked with the creation of tangible outputs for theoretical or unrefined ideas is a regular occurrence in the field of design. At this point my brain has been trained to zoom out to consider the context of the idea and assess the problem-solving used to come to that idea.

Taking this approach allows me to understand the problem and factor it into the visuals used to educate or inform. Zooming-out of a problem like misinformation is seemingly insurmountable and can also cause those around me to question my sanity. This methodology, which was born from years of design problem-solving, will stand as the methodology for this research. I have zoomed-out to view the phenomenon of misinformation at a high-level view to see how this problem is connected or influenced by a larger communication system of information and media. For the following research to benefit from a high-level view, two methods needed to be taken on. The first is Buchanan's strategy for *Wicked Problems* (1992) and the second *Balancing Needs through Iterative Development* as outlined by Goodman, Kuniavsky, and Moed (2012).

CATALYST FOR SOCIAL DISCUSSION AND INTERVENTION

Usually, research involves a deeper dive into an issue through the lens of a specific field of study. This examination can yield insights specific to an area of practice that might have gone unnoticed or unsubstantiated. There is no shortage of targeted research to draw from when considering the amount of research done on a topic as old as misinformation. Instead, this investigation is an interdisciplinary study on our mass communication system and how misinformation is situated within. The purpose of this research is not to add another piece of specific knowledge to an ocean of study. Instead, it looks to take the existing expertise and piece it together in a visual manner to add ease in the process of assessment and strategy for media professionals and policy makers.

As covered in chapter six, Richard Buchanan (1992) states the issue with learnings becoming siloed within a particular field of practice. He points out the probability of "its fragmentation, as they have become progressively narrow in scope, more numerous, and have lost connection with each other and with the common problems and matters of daily life." (p. 3)

Many reports are indeed cited numerous times in the news or used for the continued growth of further academic research. I still believe it will be valuable to collect the existing pieces, survey what we understand to date and create a visual to act as a potential blueprint to represent the collective of our current understanding. This blueprint can be used to consider the usefulness of current strategies for combating misinformation and potentially increase the discussion and implementation of more effective strategies. Again this works closely to Buchanan's (1992)point of view, "Without integrative disciplines of understanding, communication, and action, there is little hope of sensibly extending knowledge beyond the library or laboratory to serve the purpose of enriching human life."(p. 6)

This research aims to aid in the pursuit of actionable interventions. To achieve this, some liberties need to be taken, and this is where Buchanan's (1992)wicked problems come into play. Buchanan states, "the wicked-problems approach suggests that there is a fundamental indeterminacy in all but the most trivial design problems-problems." (p. 15). By this, Buchanan (1992) means that not all issues can be separated into categories with clear distinctions of parameters. This approach will be leveraged in chapter six, when the system map is built out and explained. Building a system map of mass communication highlights many elements within that are indeterminate but will stand for the purposes of strategic design thinking. This approach brings multiple disciplines together to ignite social discussion and consider actionable interventions.

ITERATIVE DEVELOPMENT

I believe piecing together a larger puzzle of misinformation can be a necessary exercise to consider how to elevate the strain from a systemic issue. Considering the indeterminacy and 'wickedness' of misinformation, it makes sense to take an iterative approach to flush out the structure of a blueprint. According to Goodman, Kuniavsky, and Moed's (2012) model, it is less about reaching perfection on the first attempt and more about trying different things to see what works. "Iterative development hones in on the target, refining its focus and improving the product until it has reached its goal." (p. 30)

I found myself moving through an iterative cycle of examination, defining and creating many times. Often the creation stage would highlight many gaps that needed consideration, which lead me back to the examination stage. Further examination would usually change how some areas where defined, which affected the creation, and so on. This process was equally frustrating and helpful to the final work. Although many times re-examining would seem to flip the whole project upside down, it was necessary to reconsider individual decisions to accommodate gaps. Each version of the process will be addressed in chapter seven when I review the prototype development.

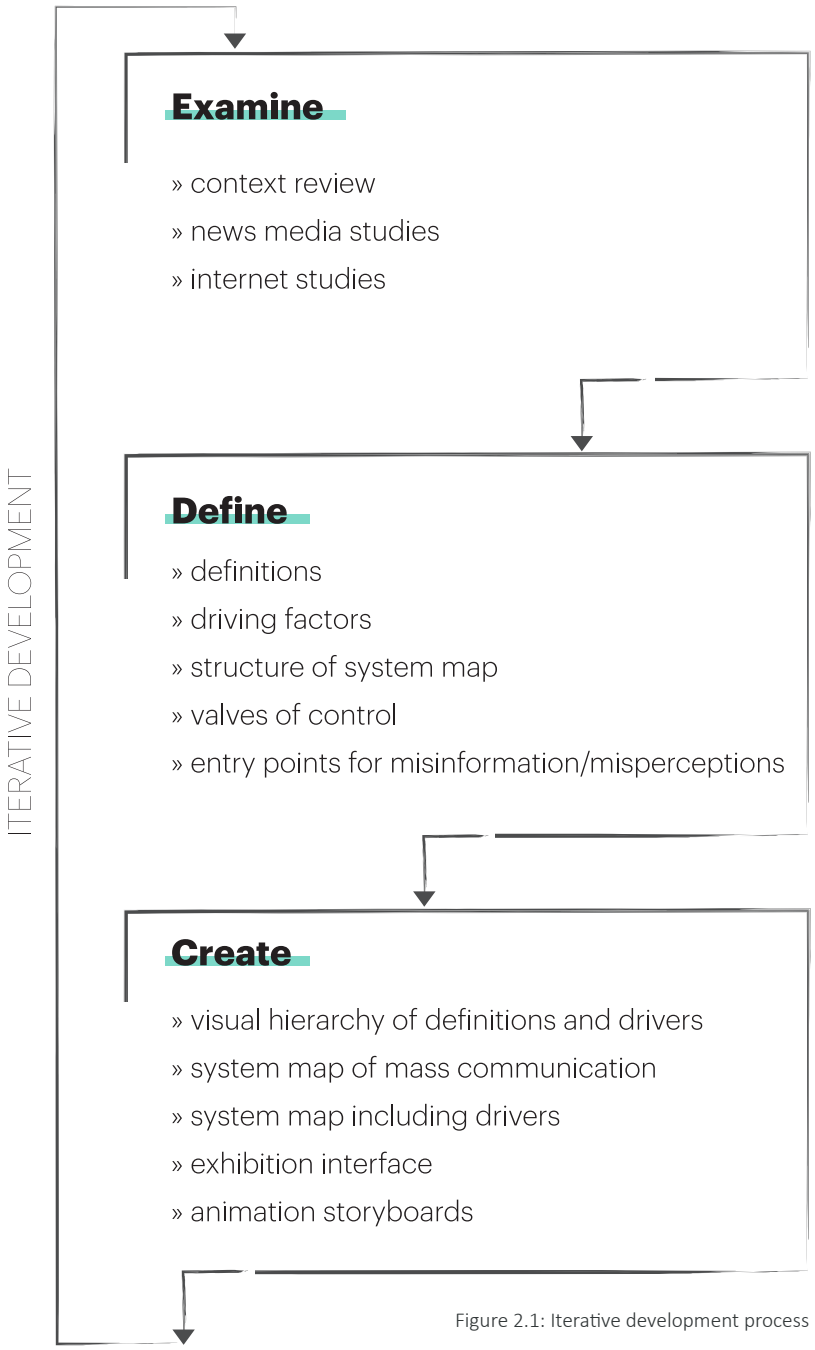
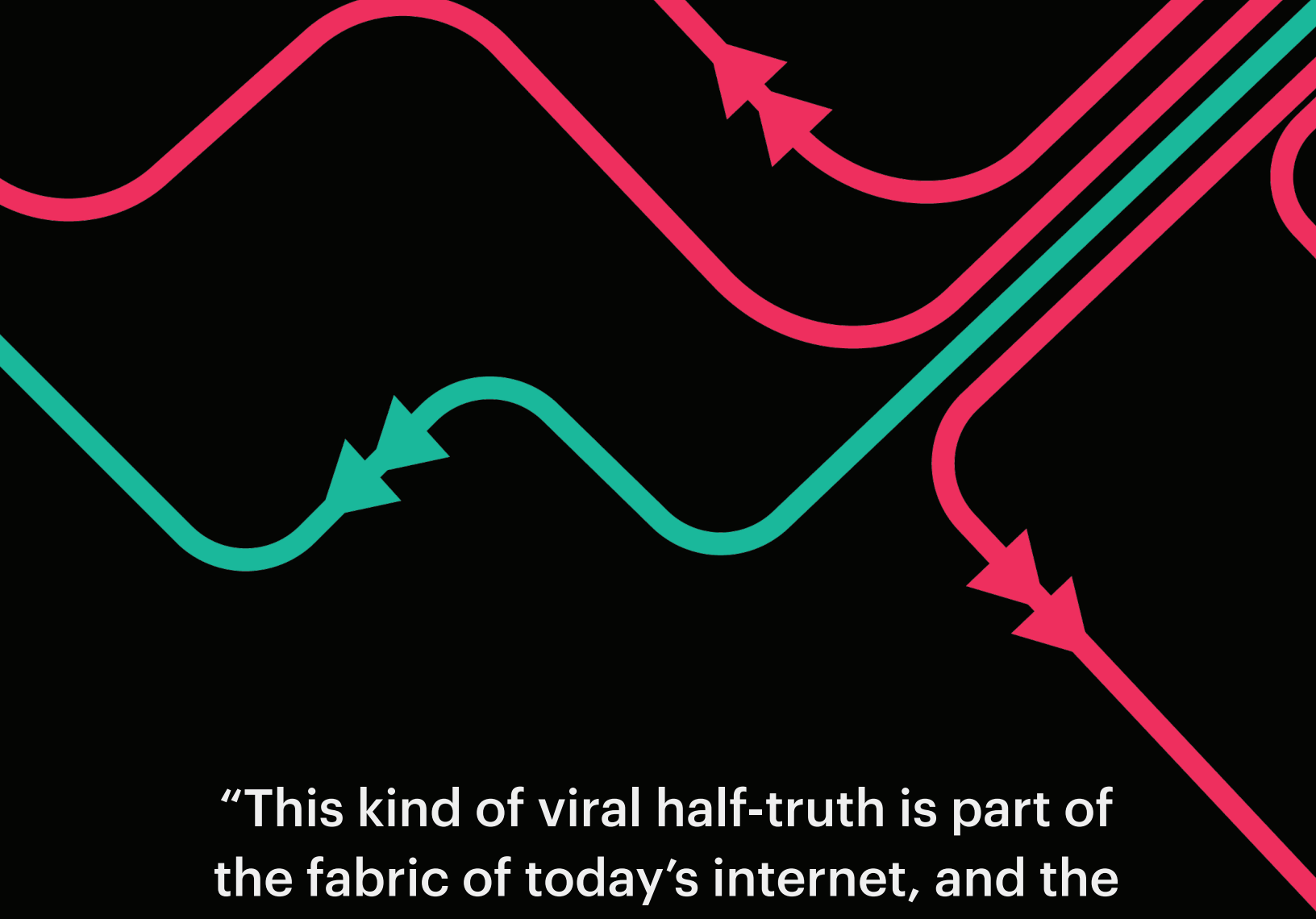


Figure 2.1: Iterative development process

Further to Figure 2.1, the iterative development process happened throughout each chapter in similar ways. For example, chapter three worked to define key definitions of information disorder. To do that, there needed to be a horizon scan to discern the current perspective among practitioners. This was followed by exploration through news stories and other internet and social media studies. The examination led to the ability to make clear decisions to select definitions and identify driving forces. The create stage sometimes happened in tandem with examining and defining. I found it easier to sketch out findings to determine whether it fits into the current model or if it needed to be re-designed. This cycle happened many times throughout the process of development.



"This kind of viral half-truth is part of the fabric of today's internet, and the kind of anger it inspired has been turned into a dangerous commodity."

- ADI ROBERTSON AT THE VERGE

Chapter 3

WHAT IS MISINFORMATION?

BEFORE AN ANALYSIS OF misinformation can be established, a definition of information, as it is used in this document, should be clarified. Unfortunately, there is no consensus on what information is, as Werner Ulrich (2001) mentions in his investigation of Information Systems; "We tend to talk of 'information' and 'knowledge' as if we knew what they are. We conceive of them like of objects that we can store, process and retrieve in material form." (Ulrich, 2001)

Bernd Carsten Stahl (2006) accumulated a series of definitions of information as he sought to explore the topic from a critical research perspective. To create a sound foundation for this research, a definition of information needed to be selected. Although no definition covered the depth of information within each industry or use, there was one that provided a useful perspective for the case of communication and media. This idea is to look at information as if it is a function;

> Information as meaningful data needs to have meaning to (human) agents. Such meaning is only relevant if information can affect actions or perceptions. Information without any consequences is arguably not information. (Stahl, 2006, p. 85).

By this, Stahl (2006) means information must have a change in state, from uninformed to informed. Stahl (2006) mentions that this approach sees information as a function, and its function is to inform. This definition of information considers the human factors and agents in the process of communication, which is why Stahl's (2006) definition is utilized throughout this research.

INFORMATION DISORDERS

Although the spread of misleading and inaccurate information has been splashed across many new outlets recently, it is not a new issue. Julie Posetti and Alice Matthews (2018) created a timeline of 'Information Disorder' through the ages which kicked off circa 44 BC with the smear campaign against Mark Antony by then-rival Octavian. Octavian's campaign was successful, and he became the first Roman Emperor. (Posetti & Matthews, 2018) Considering Stahl's (2006) definition of information, how can information stray into disorder? Claire Wardle and Hossein Derakhshan coined the term information disorder in 2017.

Wardle and Derakhshan (2017) drew from Jakob Nielsen's term 'information pollution' to describe irrelevant, redundant, unsolicited and low-value information. They argue that "contemporary social technology means that we are witnessing something new: information pollution at a global scale; a complex web of motivations for creating, disseminating and consuming these 'polluted' messages." (Wardle & Derakhshan, 2017, p. 4) For this reason, Wardle and Derakhshan (2017) created a framework for information disorders which is broken into three key terms. Misinformation, Disinformation and Mal-information. Their definitions of these three terms are as follows,

> Mis-information is when false information is shared, but no harm is meant. Dis-information is when false information is knowingly shared to cause harm. Mal-information is when genuine information is shared to cause harm, often by moving information designed to stay private into the public sphere. (Wardle & Derakhshan, 2017, p. 5)

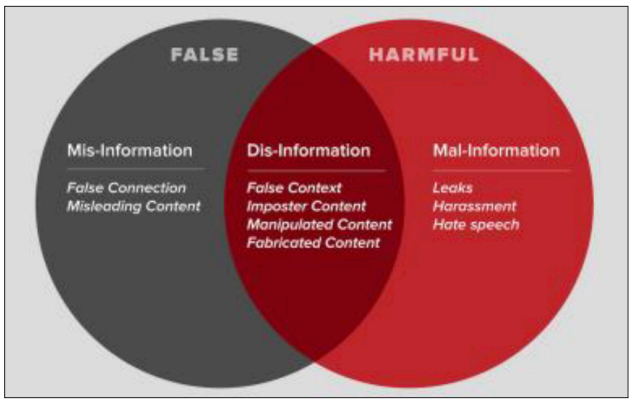


Figure 3.1: Wardle and Derakhshan's information disorder framework (Venn diagram)

Wardle and Derakhshan's framework of information disorder shows three different categories, information that is false, information that is harmful and the overlap between false and harmful information. Using a Venn diagram to display a framework that has the potential to evolve and change can be limiting. It would be useful to take this framework and add it to a broader ecosystem of information communications. In the visual to the right, Stahl's definition of information will is combined with Wardle and Derakhshan's (2017) framework. This visual allows for a united view of a growing ecosystem, which can be added to with further research.

MISINFORMATION AND MISPERCEPTIONS

Wardle and Derakhshan (2017) created their framework for information disorder to add clarity to a growing phenomenon. They also state there is a need to "think more critically about the language we use so we can effectively capture the complexity of the phenomenon." (Wardle & Derakhshan, 2017, p. 4) Considering this, Emily A Thorson, Laura Sheble and Brian G Southwell (2018) raised a useful thought after concluding their research on misinformation in mass media. They mention distinguishing false information and false beliefs could "open up several promising avenues of research." (para. 2) Their reasoning behind this is, "not all misinformation causes misperceptions, and not all misperceptions are caused by misinformation." (Thorson, Sheble, & Southwell, 2019, para. 2)

Drawing this line between information and belief has the potential to address further specific forms of intervention within the umbrella of misinformation. In the visual to the right, misperceptions will be added to the mix.

These are the key definitions that will be used in the following chapter to build out the bases of a system map of mass communication and information spread.

A MISINFORMATION BLUEPRINT:
Mapping warnings in an agile communication system

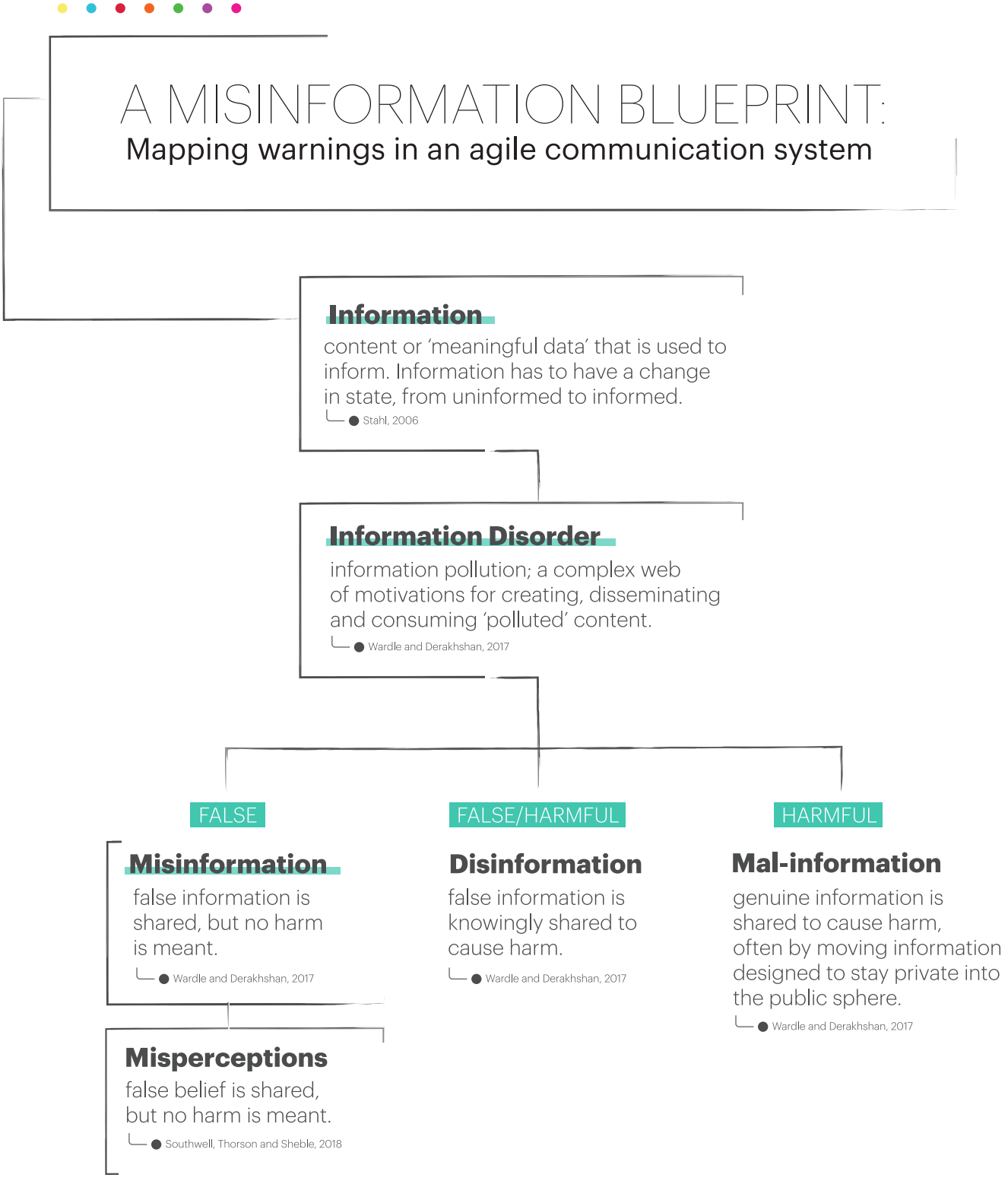
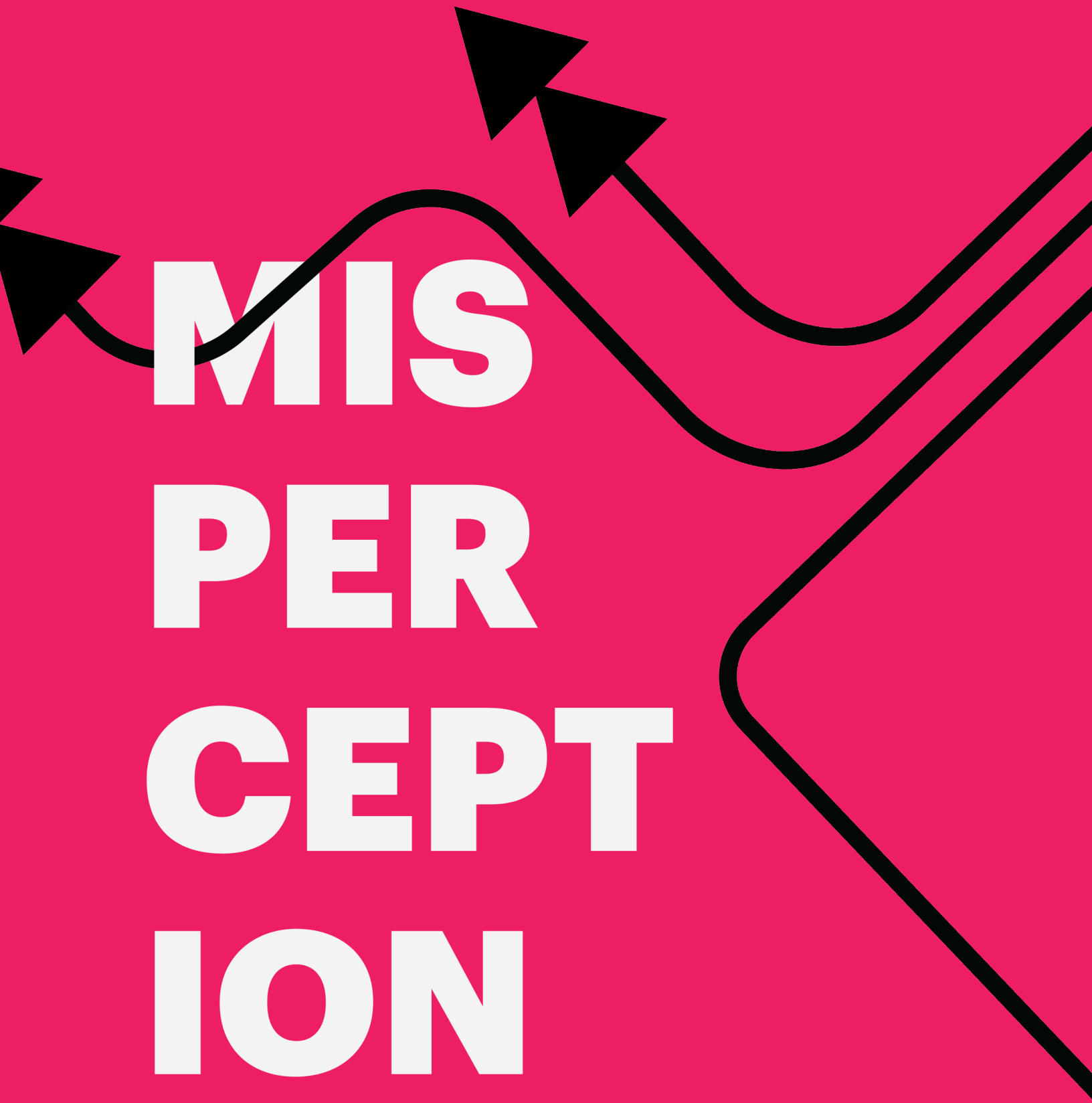


Figure 3.2: Visualizing an ecosystem for information which travels through the mass communication system



MISPERCEPTION

Chapter 4

WHAT ARE THE DRIVERS?

GRASPING the differences and parameters between the forms of information discussed in the last chapter lays the groundwork for continued exploration behind the drivers of misinformation. Once the drivers of misinformation are established, they can be used to identify potential entry points within a more extensive system of mass communication. These drivers have been studied and documented by many professionals in varying fields of practice. The following is a collection of their efforts to aid in the clarity of misinformation.

This compilation is not intended to be a definitive ontology of misinformation; rather, it is meant to start a process of finding parameters around a topic that is malleable and ever-changing.

IS IT MISINFORMATION OR A MISPERCEPTION?

Considering the distinction between misinformation and misperceptions (false belief vs. false information), this can change how effective an intervention can be. For instance, if an individual is misled by incorrect information, that inaccuracy may not convert into a belief. Furthermore, a false belief is not always the direct product of misinformation. D Flynn, Jason Reifler and Brendan Nyhan (2016) state misperceptions can materialize in two ways.

> These beliefs may originate internally (e.g., as a result of cognitive biases or mistaken inferences) or with external sources (e.g., media coverage). Critically, some misperceptions are demonstrably false — e.g., weapons of mass destruction were discovered in Iraq after the U.S. invasion in 2003 — while others are unsubstantiated and unsupported by available evidence — e.g., Saddam Hussein hid or destroyed weapons of mass destruction before the U.S. invasion in 2003. (p. 2)

Figure 4.1: Nationalist Movement (Murphy, 2019)

This displays that misperceptions are not always a product of misinformation. Considering different avenues to combat information inaccuracies, fact-checking or debunking may change the mind of those who have received false information. Still, it would be inadequate for those who hold on to false beliefs. Heather Murphy (2019) at the *New York Times* investigated how white nationalists see what they want to see in DNA tests. A hate site called Stormfront houses many threads on 'white pride,' and in a recent movement, these white nationalists have been publicly displaying DNA tests to prove their lineage. Some of the tests posted publicly revealed that some white nationalists were not as 'white' as they thought. Murphy's (2019) investigation led her to Dr. Panofsky and Dr. Donovan, who was conducting research on the social dynamics of white nationalism on Stormfront. Panofsky and Donovan noted,

> In response, their fellow white nationalists tend to console them by offering potential reasons the results can't be trusted. Among them: skepticism about the tests' interpretations of the science or statistics, conspiracy theories about Jewish-owned genetic testing companies' multicultural agendas, and reminders about alternative ways of measuring whiteness. (as cited in Murphy, 2019, p. 2)

This study shows that debunking will not work if the misinformation has led to (or reaffirms) the development of a core belief. For this reason, the following drivers will be separated by misinformation or misperceptions for future research to consider effective solutions for each.

DRIVERS OF MISPERCEPTIONS (FALSE BELIEF):

The following is a list of drivers that allows false beliefs to circulate mass communication:

MEMORY:
Malleability of Memory

Harnessing the potential of memory is often practiced in school through language and mathematics. The repetition of learnings allows us to quickly recall how to ask for a cup of coffee or calculate the tax on that coffee. Not every event in our lives comes with that level of repetition, and even though we can remember our friends' names and addresses without issue, the time and date of a party she is throwing might become foggy in one's memory. These hazy memories are a widely researched area among psychologists, and there are many implications of how memory is linked to misinformation. This paper will not be able to cover all the links, but it will focus on the power that persuasion has on weak memories.

The Misinformation Effect was a term coined by Elizabeth Loftus in the nineties as part of an extensive study on how persuasion techniques in interrogation and courtrooms can alter details

of memory. She states that misinformation can cause people to falsely believe through suggested details. "Misinformation can even lead people to have very rich false memories. Once embraced, people can express these false memories with confidence and detail." (Loftus, 2005, p. 365) Through many studies by Loftus and other colleagues (2005), there have been countless occurrences where participants have internalized the misinformation as part of their memory.

> Long ago, researchers showed that certain experimental conditions are associated with greater susceptibility to misinformation. So, for example, people are particularly prone to having their memories be affected by misinformation when it is introduced after the passage of time has allowed the original event memory to fade. One reason this may be true is that with the passage of time, the event memory is weakened, and thus, there is less likelihood that a discrepancy is noticed while the misinformation is being processed. (Loftus, 2005, p. 361)

Although acceptable to falsehoods, Loftus (2005) noticed stronger memories could challenge and reject the misinformation. Time and memory strength are two ways in which we are acceptable to falsehoods. If misinformation is provided to a participant at a time when the memory starts to lose strength, there is a higher chance of the participant's acceptance of the misinformation. Loftus (2005) states that in these cases, "No discrepancy between the misinformation and original memory would be detected, and the subject might readily embrace the misinformation." (p. 362) This theory can also be linked to exposure of fictional content when memories of events are so weak and unformed that a simple meme mocking the occasion can add context that was never experienced.

Loftus (2005) also addresses the messy ways in which we are exposed to misinformation. "In the real world, misinformation comes in many forms. When witnesses to an event talk with one another, when they are interrogated with leading questions or suggestive techniques, when they see media coverage about an event, misinformation can enter consciousness and can cause contamination of memory." (p. 365) In summary, there are so many factors that can affect our ability to recall accurate memories, and this is just one small piece to that puzzle. One thing Loftus provides in her overview of the last thirty years of research is that memory is malleable. Once misinformation is adopted into one's mind, it can be retold as if it is truth. In this case, the individual spreading the inaccuracies does so unknowingly, and lack of intention to mislead others. This unintentionality places this category under the umbrella of misperceptions.

Figure 4.2: Dr. Elizabeth Loftus

VISUAL:
Perceptions of Visual Stimuli

The interpretation of the physical world can differ from one individual to the next. In 2015, such an argument was sparked on twitter with a simple dress. The debate revolved around whether a dress was white and gold or black and blue. It became a trending topic in a few short hours as many were adamant that their choice was correct; it was full twitter war. *The Guardian* took a moment to write about the twitter phenomena of #thedress.

Figure 4.3: #thedress that sparked 2017's twitter debate

> Colour illusions are images where the object's surrounding colours trick the eye into incorrectly interpreting the colour. What's happening with #TheDress is that your eye is either discounting the blue, so you're seeing white and gold, or discounting the gold, so your eye sees blue and black. (Fishwick, 2019, p. 3)

Fishwick (2019) also discusses how the human eye developed for sunlight and how the light is projected can alter the intensity of colour. This example shows how easily our eyes can be tricked, yet many still stand firm behind what we think we see.

Balcetis and Dunning (2006) revisited a collection of studies done on the motivational influences of visual perception. Their goal of this study on information processing was to establish a link between motivation and conscious awareness. While setting the stage for their research they identified three constants within field research. (1) "Perception is selective. People are not aware of everything that is going on around them." (Balcetis & Dunning, 2006, p. 612) They aligned this thinking with recent studies of attentional blindness. (2) "Perception is often biased." (Balcetis & Dunning, 2006, p. 612) The further explain how a person can perceive a hill as steep after they have spent thirty minutes on a treadmill. (3) "Perception is malleable. It is responsive to top-down influences that flow from the perceiver's cognitive and psychological states or environments." (Balcetis & Dunning, 2006, p. 612)

In this short overview, they identified many potential causes to an individual's capacity to spread incorrect observations without knowing they have done so. Based on studies, attentional blindness can cause an individual to miss details if their attention has been monopolized. It can also lead to only witnessing part of a dispute or agreement and developing a different understanding of what happened then those around you. Balcetis and Dunning (2006) also mention bias within perception; this not only applies to the appearance of depth but also what the implied depth would potentially mean to the viewer. "Perceptions of how steep a hill becomes more extreme after participants jog vigorously for an hour" (p. 612) Their last point being the malleability of perception. They work to determine that perception isn't only influenced by bottom-up sensory. They recognize the bottom-up influence within many cases of perceived information, but they do not believe it is the only influence. (Balcetis & Dunning, 2006) When mentioning the malleability of perception, they touch on the idea of top-down influences. By this, they mean the idea of seeing

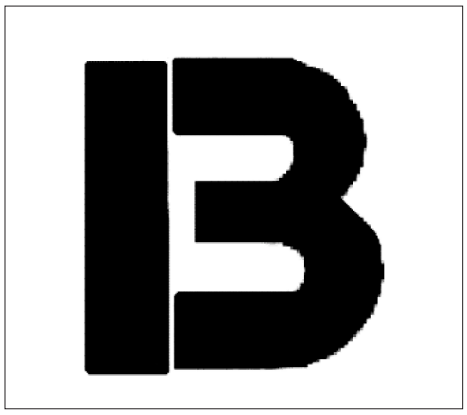


Figure 4.4: Balcetis and Dunning's display an image that could be a 13 or a capital B

what is preferable based on an individual's needs. They set up a study where participants were given two glasses of juice, one appetizing and other distasteful. After some time of sitting in front of two glasses, they were presented with a randomly selected number or letter. If a letter appeared then the participant would drink the agreeable juice. The screen was designed to display an image that looked like it could be a 13 or a capital B. They found "evidence that people's motivational states can influence their interpretation of ambiguous objects in their environment." (Balcetis & Dunning, 2006, p. 613)

If the outcome of this study is set in the system of misinformation, one could see how an individual could draw quick conclusions on happenings based on their needs or preferences. This theory illustrates the conclusion that within perception, context matters. All the examples listed above showcase the unintentional nature of these inaccuracies. An individual may not be aware that they are sharing inaccurate information based on false beliefs which determines this as a driver of misperceptions.

DRIVERS OF MISINFORMATION (FALSE INFORMATION):

The following is a list of drivers that allows false information to circulate mass communication:

SATIRE:

The Effects of Satire and Parody

Be it political satire or a comedic monologue on a late show; parody is the act of imitation and exaggeration for the sake of entertainment or comic effect. This form of communication can add flair to otherwise dry topics and can be very engaging. Everyone loves a good laugh, but can satire always be recognized as satire? Is it possible for individuals to differentiate an exaggeration from a proven fact? There have been instances where individuals were caught believing satire and congressman John Flemming was one. According to Young (2018), Flemming shared an article from The Onion with this caption, "More on Planned Parenthood, abortion by the wholesale." (paras. 1-2) Unfortunately for him, The Onion is a popular parody site.

Figure 4.5: John Flemming's post on Facebook

This example was not just an accidental slip up by a Congressman; it is not a far stretch to understand how some readers might question the motives of an organization if accusations seem legitimate. According to Young (2018), recognizing the irony is not the primary concern.

> By highlighting the real-life proportion of Planned Parenthood resources dedicated to contraception, cancer screening, and STD testing, the Onion marks the belief that the organization's main function is that of abortion provider as incorrect. The reader is thereby encouraged to reconsider the underlying logic of conservative critiques of the organization. (Young, 2018, paras. 3-4)

Young (2018) points out some nuances in satire is enough to make a person doubt an organization's intentions even if they know the content is satire. Landreville, Beam and LaMarre, (2009) researchers at Ohio State, investigated a similar question about the famous Colbert Report while it aired in 2009. They noted a pattern in viewers seeing and interpreting what they wanted to, too, regardless of Colbert's bias and political leaning. "Several key studies have shown that people process ambiguous information in ways that favour themselves." (Landreville, Beam & LaMarre, 2009, p. 214)

Figure 4.6: Stephen Colbert from 2009's Colbert Report

The participants in their study where aware that Colbert was a satirist and researchers noticed throughout the trials that a single message from Colbert could be used to strengthen the leftist leaning in a democrat and the rightist leaning in a republican. The research concluded that the ambiguity of satire leads to "biased information processing models provide an excellent framework for understanding how audiences see what they want to see in Colbert's political satire." (Landreville, Beam & LaMarre, 2009) Regardless of awareness, readers and viewers of satire can fall victim to false information or interpret the content to fit into their current beliefs.

> The problem, of course, is that the meaning of a humorous text is not in the text itself. It is constructed by the listeners as they infer what the author believes ought to be or what the author is describing actually is, hence the assertion that the use of irony remains a risky strategy. (Young, 2018, p. 213)

By this, she iterates her previous point of viewers seeing what they want to see when a joke doesn't explicitly emphasize its meaning. For this reason, any misleading or incorrect information passed through satire can be seen as unintentional and will be labelled as misinformation.

DATA:

Data Integrity & Inexperience

There is a magnitude of examples and research done on the ease of intentionally lying and misleading through graphs. (Cairo, 2015) By implementing or extracting the most straightforward detail, one could purposely manipulate the data to allow the chart to display the exact message the creator wishes. Alberto Cairo has written several books on this topic based on both his professional experience and academic research. He presents this argument; "Charts, graphs, maps, and diagrams

do not lie. People who design graphics do." (Cairo, 2015, p. 104) Cairo (2015) proves with many examples all the ways data manipulation by those who intend to mislead is quite straightforward, and those cases would establish its placement under the umbrella of disinformation. However, there is another factor to consider professional inexperience.

Cairo (2015) differentiates a lie from misleading, "Misleading is not the same as lying because a graphic can lead readers astray without the conscious intervention of its designer." (p. 104) For this research, misleading content is considered as dangerous and intentional as inaccurate content. However, Cairo (2015) uses the concept of 'misleading' as an unintentional act where a designer misleads based on their lack of understanding of the data. "On average, journalists and information designers are not seriously trained in the scientific method, research techniques, and data." (Cairo, 2015, p. 111)

Hemsley and Snyder (2016), notes there has been a jump in the usage and creation of data visualizations. They also highlight the complexities of evaluating the credibility of visualizations.

> The growing number of people making visualizations is a result of the increasing availability of information sources through open-data initiatives, commercial packaging of sophisticated digital visualization and design tools, and vast online social networks that connect previously siloed communities. (Hemsley & Snyder, 2016, para. 6-7)

The sphere of visualization creators has increased as mentioned above, yet to Cairo's (2015) point, the education of data and ethics has not risen with the tide.

Some charts and graphics often pop in other channels with the removal of vital information, making it difficult to trace the origin and original reason for the graphic. "It can also be challenging, even impossible, to determine the source once an image has entered the social media stream, where it can be incorporated into mash-ups or framed for new audiences with accompanying text." (Hemsley & Snyder, 2016, para. 6-7) Hemsley and Snyder's (2016) next point is a question of visual credibility. They also state that technological advancements in software have created the ease with which professional-looking graphics can be generated. "The test of authenticity and legitimacy is often reduced to a question of aesthetics: If it looks legitimate, then it must be credible." (Hemsley & Snyder, 2016, para. 5)

These programs that allow visualizations to look formally designed and carefully calculated is a façade. There is little expertise needed to use graph building software and create professional-looking graphics.

It is easy to jump to the conclusion that liars and cheats create inaccurate charts and graphs. Looking at thousands of lines of raw data in an excel spreadsheet without any understanding of what you're looking at is a problem when you are the one who needs to convey the open-source data visually. Keeping the integrity of the data when one lacks the experience or training to interpret the data accurately is where the line is drawn between intentionality. These studies place inexperience with data as a driver for misinformation since the ambiguous outcome is unintentional based on lack of education.

PRESS:
Poor Journalism

According to Emily Thorson (2018), there are three approaches that journalists have to choose from when reporting; 1) journalistic adjudication, 2) outsourcing to fact-checkers and 3) the he-said, she-said approach. (Thorson, 2018) By journalistic adjudication, Thorson (2018) means the consensus of how to handle reporting source narrative nationally. For example, should the standard be to fact check all politicians? Or should they only indicate when a politician is caught lying? This is currently up for debate, especially regarding political campaigning. The problem with journalistic adjudication is it can make a publication seem to be leading their audience to a specific political party when their intent is only to provide accurate content to their readership. The next two mentioned by Thorson (2018) highlight the central juxtaposition of the public press, fact-checking vs. he-said/she-said. Should a journalist risk the objectivity of the publication to expose incorrect information based on fact-checking results, or should they provide the statements of each party and allow the reader to select who is more believable? (Thorson, 2018)

Thorson (2018) also acknowledges the change in public awareness of political lies dressed up as political spin. She states, "the proliferation of political misinformation over recent years has intensified public calls for journalistic activism in adjudicating between factual claims." (Thorson, 2018, para. 11-12) This call-to-action puts publications in a problematic spot. Should they risk the objectivity of their publication or continue to release unchecked statements from political parties?

There is another factor in play that Thorson (2018) does not mention in her study listed above. Circular reporting has increased with easy access to information thanks to the internet. It is also easy to fall into this trap based on the multitude of entry points. Noah Tavlin (2015) from TED Education, describes circular reporting as such;

> This is when publication A publishes misinformation, publication B reprints it, and publication A then cites B as the source for the information. It's also considered a form of circular reporting when multiple publications report on the same initial piece of false information, which then appears to another author as having been verified by multiple sources. (Tavlin, 2015)

Once caught, the publications involved are usually viewed as sloppy and ultimately threatens public trust and the readership of each publication.

Above Tavlin (2015) offers a simplified representation of circular reporting, but there is much more to consider. This phenomenon isn't always an issue of speed vs. quality; there are moments when sources mislead a journalist. According to Green and Donahue (2018), a *New York Times* reporter named Judith Miller fell into the trap of circular reporting.

> As part of a series of articles, she cited sources that claimed Iraq had biological and chemical weapons and possibly even nuclear weapons. In a strange turnabout, it was the Bush administration that provided her with the sources' testimonies, including that of a former Iraqi chemical engineer. Then Miller's articles were cited by administration officials as one of the reasons to go to war with Iraq. (Green & Donahue, 2018, para. 4-5)

This case is a textbook example of circular reporting, and it shows that sometimes the cause of such an occurrence is not due to lack of effort or fact-checking. There are times when a journalist is misled by their sources and used as a pawn in a much larger narrative.

One might question why Miller believed that her source was credible in the first place. Melanie Green and John Donahue (2018), think the Commodity theory applies to the sources of a journalist. The desirability and scarcity of the commodity make it very difficult for a journalist to ignore. "Since communication is considered a commodity, if reporters have a source they trust, the source's desirability should increase if many other reporters want but did not have that source." (Green & Donahue, 2018, paras. 6-7) The commodity theory offers a psychological explanation as to why a journalist would hold such a source as if it is a valuable possession. A possession that might require a bit more scrutiny, but most of these sources are so rare that it might be impossible to find another willing to risk sharing their experience.

Given the lack of consensus on how journalists are to approach reporting and the rapid speed of dissemination, which fuels circular reporting, these are clear indications that the ecosystem of public press post-internet has opened the door to unintentional error.

Figure 4.7: Former *NYT* Reporter Judith Miller

DECODE:

The Interpretive Act of Academic Translation

Data is not always collected in the English language. There are many reputable universities and research labs around the world that are conducting innovative trials, testing and interventions to substantial world issues. Since English is the dominant language for many cross-European research projects and publications (van Nes Abma, Jonsson, & Deeg, 2010), these labs often need to translate their work from their native tongue to English for publication. A few professors and researchers from Amsterdam noted the act of translation as an "interpretive act; meaning may get lost in the translation

process."(van Nes et al., 2010, p. 313) This balancing act between English and non-English may inaccurately add meaning to the research that misrepresents the overall tone of the project. They added, "language is a two-way process; language is used to express meaning, but the other way round, language influences how meaning is constructed." (van Nes et al., 2010, p. 313) Considering this, the research needs to proceed with caution when translating their research or a reader on the other side of the world may interpret and cite their work inaccurately.

The team does not stop there; they also mention the influences of cultural meanings placed on non-English and English words. They also note, "Metaphors vary from culture to culture and are language-specific." (van Nes et al., 2010, p. 314) Many metaphors and expressions may be present in a participant interview and later need to be adapted to English.

The way a person understands the world can also be linked to language. "Language also influences what can be expressed, and some linguists even state that social reality as experienced is unique to one's language" (van Nes et al., 2010, p. 314) There are many Latin languages that affix a gender to inanimate objects. The sun in French would is 'le soleil,' which gives masculine connotation to the sun; this is another aspect that would be difficult to bring into the context of English.

Language has a persuasive power over meaning and interpretation. It could be argued that translation can be intentionally altered with little consequence for such an offence. Although this is valid outside of the academic community, within academia, a researcher's integrity is of the utmost importance. If their name were tarnished in the implication of adding unnecessary meaning or intentional bias to the interpretation of non-English data, they would risk everything they have built thus far. For this reason, translation within the Academic Community can be defined as unintentional and placed under the umbrella of misinformation.

CHAMBER:

Content Limitations, Community and Echo Chambers

Peter Törnberg (2018) created a network simulation model to study a possible relationship between echo chambers and the viral spread of misinformation. Throughout his research, he notes a few useful findings. The first is the change to the mass media system, "Today's media is less organized through centralized decision-making, and more through complex cascade processes, where news items spread like wild-fire over social networks through direct connections between news producers and consumers." (Törnberg, 2018, p. 1) He suggests that the decentralizing of decision-making makes it very difficult to understand where the content has come from and what the motives were for the creation of that content. Törnberg's (2018) network simulation model also shows how social media algorithms are amplifying the virality of certain content throughout echo chambers. He states,

> Not only algorithmic 'filter bubbles' affect what news and perspectives we are exposed to online, but that the mere fact of social media permitting a dynamic

> of social clustering can change the dynamics of online virality. The possibility of self-segregation can therefore affect not only what the segregated users see, but also what perspectives non-segregated users are exposed to. (Törnberg, 2018, p. 17)

This is one of the examples he provides to explain how online echo chambers function through an emergent network effect. A combination between "opinion and network polarization, quintessential of echo chambers, results in a synergetic effect that increases the virality of narratives that resonate with the echo chamber." (Törnberg, 2018, p. 16) Based on these content limitations and segregation provided by Törnberg's (2018) network simulation model, it is possible for individuals to receive repetitive content which holds either opinions or statistics that mislead or misinform the pocket of individuals within this online community. With enough repetition of misinformation there could be a misplaced public outcry for change or mass hysteria.

Misinformation has the potential to be circulated offline as well through close-knit communities. *Vox*'s Julia Belluz reported in 2019 that many of the registered outbreaks of measles were isolated to specific communities. Belluz (2019) sat down with a few members of the Orthodox Jewish community who decided not to vaccinate their children. The concern was not based on religion but profoundly rooted in the spread of misinformation through the neighbourhood. Even the influential rabbis within the community are on the fence about how to guide the community parents. When Belluz (2019) interviewed a mother within this community, she mentions, "The rabbis that don't think vaccines are the right way to go keep a low profile, she said, but I could name you a bunch of them." (as cited in Belluz, 2019, para. 24) This statement contrasts with Belluz's (2019) interview with Rabbi David Niederman, who states, "From a religious point of view, people have to vaccinate. Anything that causes harm — you have to do whatever you can to avoid that." (as cited in Belluz, 2019, para. 20) A similar version of mass hysteria can be caused by misinformation circulating through communities and online echo chambers. These emotional responses to a person safely and the repetition of misinformation through these segregated groups can create misguided doubt about a system or service that drives individuals to share their concerns with other loved ones. These examples show that the misinformation is spread without the intention of misleading or causing harm, which keeps content limitations under the umbrella of misinformation.

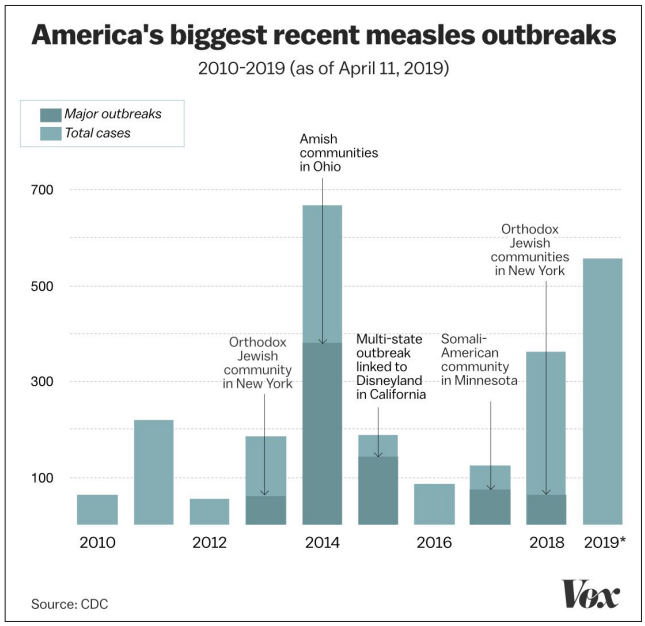


Figure 4.8: Graphic of measles cases from 2010 to 2019

Below is a list of the drivers established above:

DRIVERS OF MISPERCEPTION:

- Malleable Memory
- Effects of Visual Stimuli

DRIVERS OF MISINFORMATION:

- Effects of Satire
- Data Inexperience
- Poor Journalism
- Translation
- Content Limitations

These drivers are also added to the ecosystem of communication information to the right.

These seven established drivers of misinformation and misperceptions will be used to highlight potential areas of misinformation entry in a larger system map of mass media. The following chapter will work to identify the structure of the system map.

LIMITATIONS AND FUTURE CONSIDERATIONS

Due to time constraints on this project, not every possible driver of misinformation could be researched and presented as a driver. The following is a list of other potential categories of misinformation or misperceptions for future research; motivated reasoning, influencers, perceptions driven by personal bias, meme theory and political spin. Each of these potential drivers, once proven, could be added to the system map developed in the following chapter.

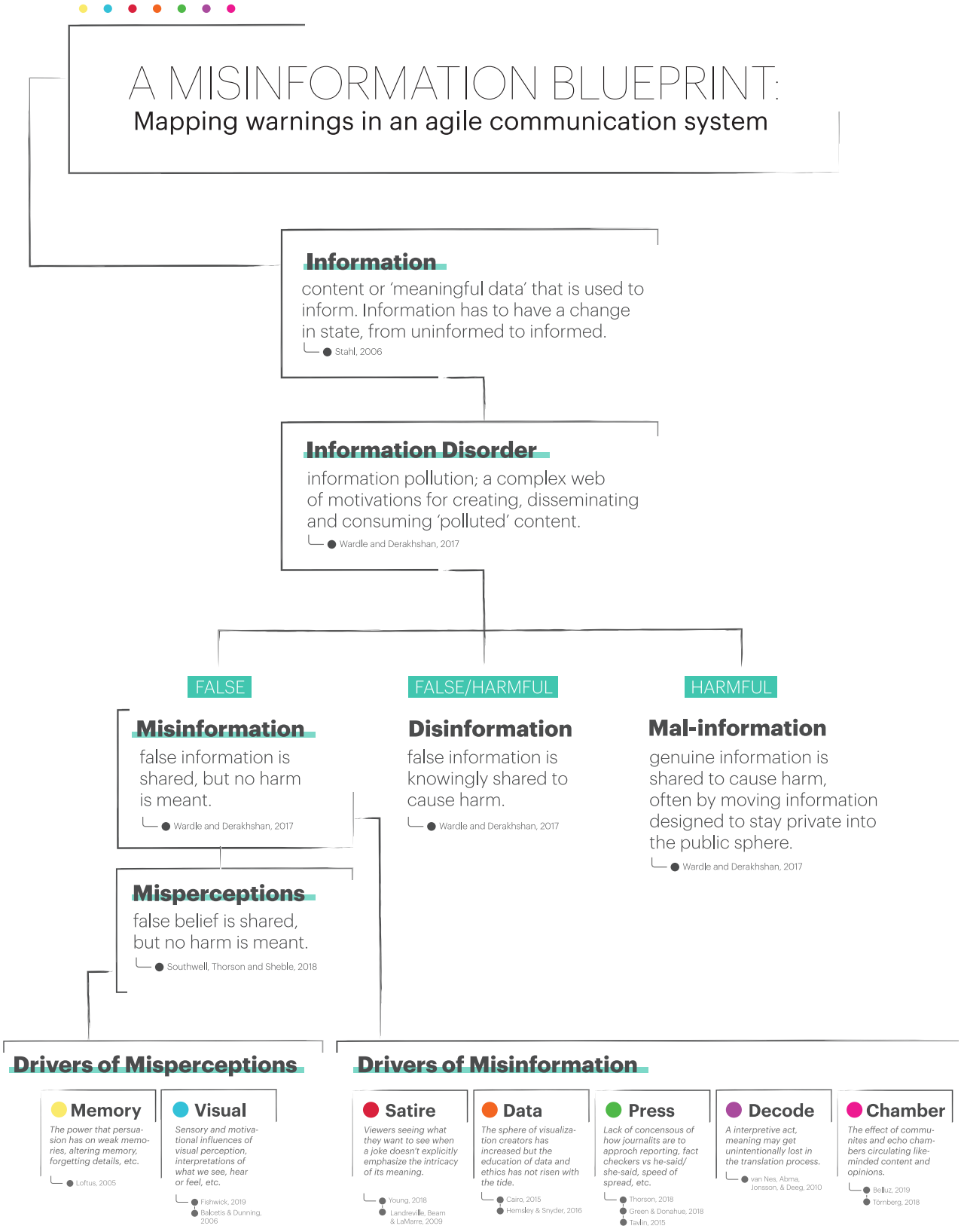
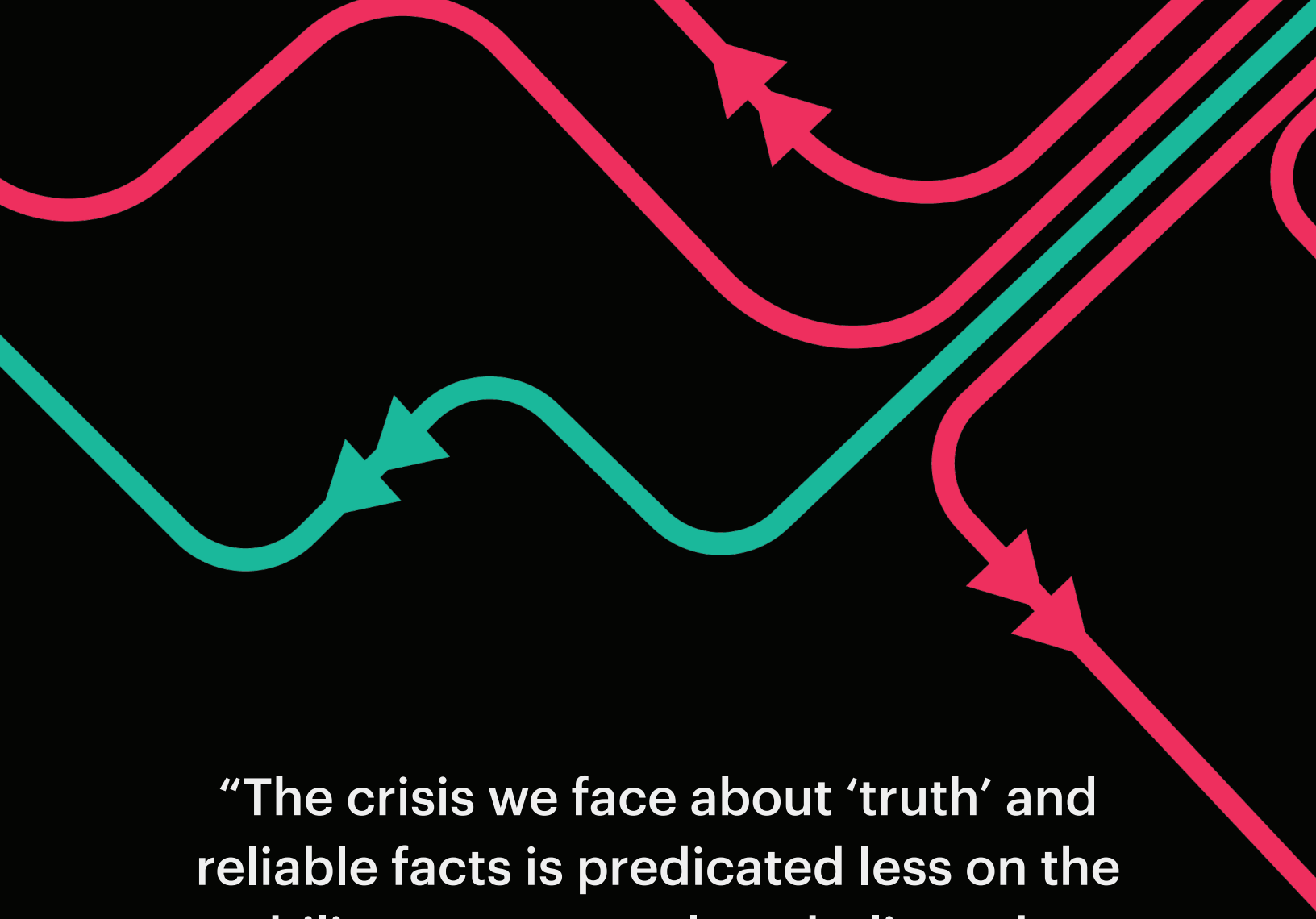


Figure 4.9: Visualizing an ecosystem for information communications, adding misinformation drivers



"The crisis we face about 'truth' and reliable facts is predicated less on the ability to get people to believe the wrong thing as it is on the ability to get people to doubt the right thing."

- JAMAIS CASCIO, FELLOW AT THE INSTITUTE FOR THE FUTURE

Chapter 5

The Spread of Communication

COMMUNICATION SYSTEMS AND WICKED PROBLEMS

MAPPING THE SCOPE OF a communication system is an imperfect task, and yet it is a task that opens the door to thoughtful conversation on the public exposure to misinformation. This research looks to map professional analysis and editorial exposes on misinformation. The amount of public discussion around misinformation currently makes it a good time to survey what we know and combine it in a way that represents a journey of information dissemination through communication.

This exercise, although imperfect, also allows for charting where misinformation has the potential to occur within the spread of communication media. Based on the scale of misinformation and the lack of boundaries of the problem, misinformation can be considered an example of Buchanan's (1992) wicked problems in design thinking. These types of design problems are defined as; "a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision-makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing." (p. 15) There are many different decision-makers throughout the flow of information through communication media. This research points out several decision-makers in the process of information dissemination, which will be called valves of control. These valves are not only an indication of a new path for content flow, but it also has the power to control the flow to this new channel. Considering the complexity of the information dissemination process plus all its senders and channels, misinformation meets Buchanan's (1992) criteria of a wicked problem. This research looks to identify where the drivers of misinformation could present themselves in a system map. The system map is displayed as a static graphic used to draw attention to two things: (1) Where the drivers of misinformation have the potential to materialize and (2) The channels of communication which are subject to different valves of control.

UNDERSTANDING THE MAP

The creation of any system map is filled with complexities and creating a system map for communication media at the current rate of change can become convoluted. Considering this I looked to other system thinkers to jump from. Using Meadows ideas of stocks and flows in her 1999 work on Places to Intervene, she states

> "There are usually inflows that increase the stock and outflows that decrease it. You can understand its dynamics readily, if you can understand a bathtub with some water in it (the stock, the state of the system) and an inflowing faucet and outflowing drain. If the inflow rate is higher than the outflow rate, the water gradually rises. If the outflow rate is higher than the inflow, the water gradually goes down." (Meadows, 1999, p. 4)

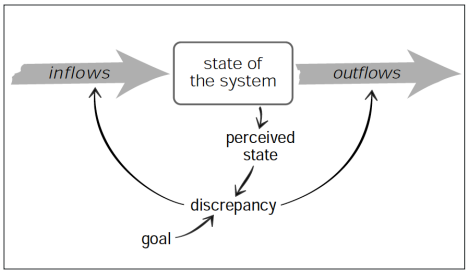


Figure 5.1: Meadow's "state of the system" diagram (1999)

Meadows example of the filling bathtub illustrates a cause and effect relationship between the inflow and outflow. The symbolism of the water helps visualize the co-dependency between inflow and outflow to stabilize the water level within the bathtub, or in this case – the system. Without release the water could reach unexpectedly high levels, without inflow there may not be enough water in the tub. This system map leverages Meadows stock and flow diagram to allow for a visual example of how each stock (communication/content) effects each flow (communication channel). (Meadows, 1999) Displaying communications in this manner also makes the flow of information visually apparent.

The system map will consist of four tiers. The first tier will represent why humans share and inform each other. The second tier will outline the categories of information/content to better understand why each item flows through select channels. The third tier uses Innis's (1951) work to highlight the many valves of control that influence the dissemination of information/content. The fourth and last tier represents what comes out of each valve and how the information/content is circulated after released.

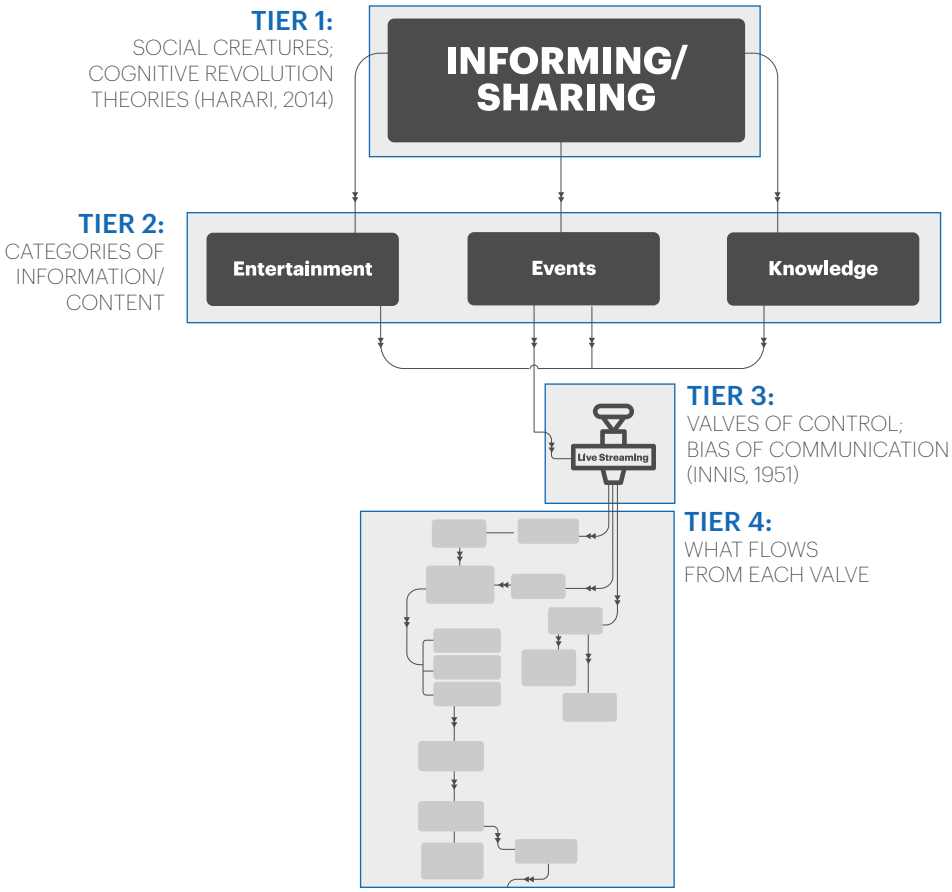


Figure 5.2: Overview of how to read the system map

HIERARCHIES OF INFORMING OURSELVES

This research aligns itself with the study of bias in communication, monopolies of knowledge (Innis, 1951) and design thinkings wicked problems (Buchanan, 1992). The majority of the system map will focus on the 'how' and 'why' information/content spreads the way it does but, it would be useful to take a moment to consider why humans feel the need to share and inform each other. Understanding the basis of the human need to share information could lead to a deeper understanding of how our communication system came to be.

TIER ONE:

Yuval Noah Harari (2014) provided a useful outlook on how communication and thinking developed through the evolution of Homo Sapiens. According to Harari (2014), Human communication consists of survival tactics, strategic thinking, gossip, and make-believe, which he calls the theories of the cognitive revolution. Harari (2014) believes it is very likely that all these theories ultimately drove the development of human language as we see it today. For example, gossip can inform us of the motivators and provide context. Storytelling can inform us of the events and facts. Make-believe can inform us to possibilities for the future or provide mythological reasoning to things we cannot understand. There are many connections to our content preferences and Harari's (2014) list of cognitive revolution theories. There seems to be no shortage of tv and radio warnings of potential danger, clickbait ads promising unrevealed details and stories being told through Hollywood or personal social media accounts. Harari's (2014) list also highlights why some forms of information/content interest us more than others and positions humans as social creatures. These theories establish the top tier of the systems map; Informing/Sharing.

Figure 5.3: At the top of the systems map this icon is used to display a human need to share and inform

TIER TWO:

The innate need for social interplay is a strong consideration for this study, but there is more at work. Coming back to Stahl's (2006) definition of information provided in chapter four, there needs to be a change in state, from uninformed to informed. (Stahl, 2006) Many pieces of content can fall under this definition, from hearing about Kim Kardashian's new make-up line to a major vehicle accident on the highway. Although both examples fit into Stahl's (2006) definition of information, the channel in which the information travels to us will likely change. The second tier of the systems map considers the categories of information/content. Not all channels are appropriate or useful for all forms of information/content. For instance, there is a low probability of reading about celebrity relationships in an encyclopedia or other means of historical analysis. It would also be highly unlikely to catch up on current events in 2020 through slow-paced channels like the written letter. Considering this, tier two will break the forms

of information/content into three categories: Event, Knowledge and Entertainment.

1. ENTERTAINMENT

Going to the movies, reading a murder mystery or watching your favourite television series is an enjoyable past time for many. It also serves as a nice break from our cultural routines and unsavoury current events in the news. For this system map, the category of entertainment represents information/content similar to Hollywood drama, shows based in fiction or comedy and online platforms that pump out casual and mindless content. Although these examples may not seem valuable to some, learning that Tom Hanks is starring in a new movie does change your current state to informed, which aligns with the identified definition of information. It also embodies all of Harari's theories of the cognitive revolution. It provides a channel in which a creator can take a viewer down a path of imagined scenarios without a need to stick to facts or evidence. Entertainment can bring make-believe to life in engaging and impassioned ways. It can also contain authentic details that can resonate through forms of gossips and re-enact on screen. Through live-action and written word, entertainment is used as an excellent format for storytelling. We find ourselves so immersed in some of these stories and make-believe characters that we will cancel plans to continue the imagined journey with them and even spend hours watching award ceremonies that reward the players for their performances. That said, not all channels frequently disseminate forms of entertainment.

2. KNOWLEDGE

Sharing our insights and learnings with other generations has been a common practice. Examples of this present itself in the free access to libraries and digital resources for reference showing how we preserve and spread the knowledge of past and present. For this system map, the category of knowledge represents information/content similar to encyclopedias, textbooks, exposes on past events and online information archives. These examples fit into Stahl's (2006) definition of information since its fundamental existence is to inform the uninformed. As for Harari's theories of the cognitive revolution, all can be found under the category of knowledge. We pass our stories of the past through books, encyclopedias and art. All of these outputs allow historical storytelling to pass onto the readers of

the future. Understanding the history of a past time would be barren if we didn't consider the religious or mythological influences of that time, which provides an example as to how the passing of make-believe falls under knowledge. The re-enactment of some of these historic events require details of the central figure's characteristics. These details help inform cultural and environmental influences in their decision-making processes, which is passed through ideal gossip.

It should be noted that there have been studies that point out many inaccuracies in the capture and documentation of historical events. Although the accuracy of historical analysis is valid and essential, it will not be addressed in the body of this research. If historical facts have been intentionally skewed, according to the definitions provided in chapter four, this would be a representation of disinformation as opposed to misinformation.

3. EVENTS

Tuning in to the news and catching up on current events is a staple in many cultures globally. It is how we stay informed of current events and gives us an idea of what is to come. For this system map, the category of events represents information/content similar to traffic and weather updates, policy changes, potential dangers locally and globally. Receiving updates on events also fits into Stahl's (2006) definition of information and becoming informed. This type of content is influenced by a few of Harari's (2014) theories of cognitive revolution; gossip and storytelling. Telling others about the events of the day is a very general and simplistic example of storytelling, but it does apply here. As mentioned above in knowledge, ideal gossip can bring light to individual influences and motivations that would otherwise be left unknown. These are essential indicators in the contextual foundation of the Event category. Make-believe is not part of this category because this type of content is meant to be a truthful representation of current events, not fiction. Although there are times when inaccuracies are spread by error or as a malicious covert attack, this is not the aim of this category. The purpose of this type of information is to inform others on the occurrences of the day while following ethical and creditable practices. It is possible that our bias and perceptions could jeopardize the credibility of the content, but this category is not meant to be fiction.

Figure 5.4: Second tier of the systems map, icons used to display the three categories of information

CHANNELS OF COMMUNICATION (VALVES)

TIER THREE:

We don't always have a direct line to these three categories of information/content, it often gets to us through a distributor. There are multiple powers and influencers behind these distributors before they reach us. Thanks to technology, there are also many ways around those powerful distributors. There is a potential issue with this advancement in technology. Once the masses adopt the new platform, it takes on a level of power similar to the more established communication distributors. On the day Mark Zuckerberg open Facebook up to the public, he probably had no idea that one day his small website would be capable of reaching the level of power and control it has today.

Figure 5.5: Icon used to display valves of control

Harold Innis (1951) coined the term monopolies of knowledge and his theories on bias, power and control still hold strong in the analysis of our current media system. Alexander Watson (2008) reviewed the link between Innis' work and news media. He noticed that information took on the role of a commodity and Innis' work was used to explain how the tendencies of information distribution created another kind of dependency between the organizations and the content released. Innis (1952) also notes that this phenomenon of power and control is a seemly inevitable process of historical formation. (Innis, 1952) Content as a commodity adds possible motivations behind the many different decision-makers throughout the process of dissemination. Each of these decision-makers have the power to control the information/content that flows through its channel. The icon of a valve will be used to visualize these decision-making touch-points in the system. A value is a useful visual to display how communications can be influenced once it passes through. Still, it can also show the emergence of new channels that would not exist if these values were not present. These values represent the paradox of Innis' (1951) monopolies of knowledge; without each valve, we are limited to how the information/content can reach us. At the same time, each valve comes with the influence and bias of its organization. Below is a list of the valves of control based on Innis' monopolies of knowledge theory (1951), which will be visualized in a system map of communication media. This exercise will note two things; (1) the indirect and direct links between the three categories of information and (2) the links between each of the valves of control.

1. GOVERNMENT

The valve that serves as 'government' represents the national laws and governance put in place by each country. All three types of communications flow into this valve to make sure businesses and organizations are following the country's regulations. As shown in the graphic, there are ways around the government valve.

2. BUSINESS(ES)

The valve that serves as 'business' represents the power of corporate funding and influence. All three types of communications flow into this valve to show the reach provided to 'business'

based on adopted capitalist ideologies. Big money is all the power you need to have details omitted, apply pressure to governments or re-frame information in a favourable way (to name a few). Although there are ways around this, the graphic also shows when corporate funding can sneak in and apply pressure and influence later on in the journey of communications.

3. TELECOM

The valve that serves as 'Telecom' represents radio and television. It has no direct line to the three types of communication and is heavily regulated by the government and influenced by business funding.

4. ENCYCLOPEDIA AND ACHIEVE

The valve that serves as 'Encyclopedia' represents the archival of historical events and academic research. 'Encyclopedia' is regulated by the government but also has a direct line from the third category of communication; knowledge. The internet paved the way for sites like Wikipedia to exist, and governments do not regulate these sites.

5. PUBLICATIONS

The valve that serves as 'Publications' represents the field of journalism. Three causes effect publications; (1) regulated by the government, (2) funded or owned by businesses and (3) receive their information from the interpretations of their reporters. There is also a direct link from the third type of communication, knowledge. Examples of this link are bloggers and citizen journalism.

6. WITNESSES

The valve that serves as 'Witnesses' has a direct line to the second category of communication, Events. These are the individuals that are present when an event occurs or something changes, and they hold the knowledge of what they have seen. Live streaming is another valve that flows into the witness valve, which was created by social media. The live streams are witnessed and interpreted by a much larger audience.

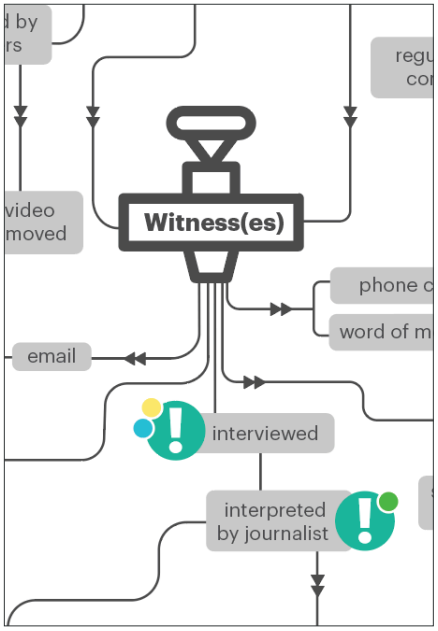


Figure 5.6: Snippet from larger system map used to display valves of control

7. FACT CHECKING

Within the system map, publications and journalistic integrity fuel the valve that serves as 'Fact-Checking.' Since publications are either funded or owned by businesses and can be regulated by the government, this provides an indirect influence on fact-checking by government and business.

8. SOCIAL MEDIA

The valve that serves as 'Social Media' has a direct line to two of the three categories of communication, events and entertainment. User-generated content makes these direct links possible. 'Social Media' is also highly influenced by advertising money, which connects it to business. Live streaming is also considered a valve, but it can only exist with the invention of social media.

9. LIVE STREAMING

The valve that serves as 'Live Streaming' has no direct links to the three categories of communications. As mentioned above, it only exists on social media platforms, so it is controlled by the social media valve as well.

10. ONLINE PROFILES

The valve that serves as 'Online Profiles' has no direct links to the three categories of information. Similar to live streaming, online profiles only exist on social media platforms, so it is controlled by the social media valve as well.

11. CYBER FORCES

The valve that serves as 'Cyber Forces' represents a powerful and well-funded industry. It has no direct links to the three categories of information, but it is funded by governments and businesses to distract, confuse or manipulate mass audiences. It can penetrate our communication systems through the online profile valve with fake profiles or anonymous internet platforms like 8-chan and reddit.

12. BRAND MARKETING

The valve that serves as 'Brand Marketing' has no direct links to the three categories of information. It is heavily controlled by business motivations, social media and publication campaigns.

13. DIGITAL ENTERTAINMENT COMPANIES

The valve that serves as 'Digital Entertainment Companies' has no direct links to the three categories of information. It is a growing industry based on the mass usage of social media platforms. The content they create is made to be easily shared, circulated and quickly ingested. An example would be boredpanda.com and BuzzFeed quizzes.

TIER FOUR:

These thirteen valves of control make up the third tier of the system map. Tier four represents possible outputs for each valve of control. This tier is not meant to be a definitive resource for all the possible outputs, and rather it aims to display the possibilities created by each valve.

Considering these factors, the following system map was created to simulate the flow of information through communication media. Emily A Thorson, Laura Sheble and Brian G Southwell (2018) mention, it would be worthwhile to "consider how to stop misinformation at the point of presentation or dissemination— before it enters the mass media." (para. 7) This map will now act as a guide to further explore the drivers of misinformation and its entry points.

INFORMING/ SHARING

Entertainment

Events

Knowledge

Business(es)

Government

Social Media

Live Streaming

Publications

Encyclopedia

Brand Marketing

Digital Entertainment Companies

Telecom

Online Profiles

Witness(es)

Cyber Forces

Fact Checking

flow from publications

guerrilla marketing

traditional marketing

digital marketing

billboards

ads

influencer funding

targeted ads

visualized data

development of personal brand

follower count

like count

social rating/ digital valuation

bloggers

level of influence

influencer's

passive engagement

active engagement

views

likes

click through to site

conversion to active shopper

paid for content generation/engagement

memes

connecting with fam/friends

sharing personal images/videos

sharing digital content

clickbait titles

creation of funny stories

hashtags

@ mentions

viral spread

trending on social media

creates profile to represent life

fake profiles

chooses other profiles to follow

newsfeed tailored to interests

social bubbles

anonymous web forums

conspiracy theories on reddit

fake engagement

like/follow farms

flow from business and government

disinformation attacks

weaponizing information

content farms

funding to trend posts/influencer's

reaction posts

interpreted by many

collected/ interpreted by journalists

citizen journalism

shared by others

edited video posted

video removed

story breaks on tv

story breaks online

story breaks in newspapers

interpreted by bloggers

story posted on blog

visualized data

shares on social media

debated in blog comments

read by subscribers

shares on social media

law enforcement and safety

law and governance

regulating content that can cause harm

democratic elections

regulating telecom content

regulating content

visualized data

phone call

word of mouth

shared by others

forwarded email

email

interviewed

shares on social media

shared by others

reaction posts

interpreted by journalist

visualized data

books translated into multiple languages

conduct interviews with survivors

modern point of view

new evidence

interpreted by journalist

published online/print

historical analysis

archive history

literature reviews

loss of readership

subscription models

news deserts

edited video or photo posted

shares on social media

posted on video platform

story breaks on TV

story breaks in online pub

emailed out to mailing list

story breaks in newspaper

interpreted radio DJ

story breaks on radio

story streams online radio

TIER 1:
SOCIAL CREATURES; COGNITIVE REVOLUTION THEORIES (HARARI, 2014)

TIER 2:
CATEGORIES OF INFORMATION/ CONTENT

TIER 3:
VALVES OF CONTROL; BIAS OF COMMUNICATION (INNIS, 1951)

TIER 4:
WHAT FLOWS FROM EACH VALVE

Figure 5.7: The full system map, created to simulate the flow of information through communication media.

MISINFORMATION

FLIP FOR THE FULL SYSTEM MAP

Chapter 6

Where Misinformation Creeps In

WICKED PROBLEMS

THE NEXT EFFORT WILL look to highlight where misinformation has the potential to creep in using the system map of communication media created in chapter five. This section will address each driver one at a time to survey the entry points of misinformation within the main systems map. This systems map will use Buchanan's wicked problems approach to design thinking to assess a magnitude of decision-makers and drivers which fall under the umbrella of misinformation.

"The problem for designers is to conceive and plan that does not yet exist, and this occurs in the context of the indeterminacy of wicked problems, before the final result is known." (Buchanan, 1992, p. 18) According to Buchanan (1992), the indeterminacy of a wicked problem should not hold back the problem assessment or solutioning. It is improbable to consider every entry point of misinformation with complete certainty, especially in a communication system that is continually adapting to new technology and changing to align with public opinion. Considering this, each driver will be placed on the system map that has the potential to allow misinformed information/content into communication media.

MEMORY:
Malleability of Memory

Memory (indicated in yellow), can enter the flow of content/information through three of the valves of control. (1) Witnesses; The process of interviewing a witness holds a level of influence that Loftus established through years of study. A witness could be asked leading questions or become impressionable to the hints and undertones in an interviewer's tone and body language. (2) Live Streaming; When live video is broadcasted on social media platforms and later removed from the archive due to terms and conditions agreements. This leaves only the memory of the video clip, which stretches and changes over time and exposure to the opinions of others. (3) Publications; The archival of past events can bring a publication to interview survivors of past events. The memory of the event has the high potential to fade over time and also be influenced by other survivors and media exposure.

VISUAL:
Perceptions of Visual Stimuli

Visual (indicated in dark blue), can enter the flow of content/information through two of the valves of control. (1) Witnesses; The information collected by interviewing a witness may be subject to what a witness believed they saw vs. the full representation of the event. Although the witness believes they are speaking the truth, there might be elements missing based on their Perceptions of Visual Stimuli. (2) Live Streaming; Live video on social media platforms can lead to a variety of interpretations of what is happening in the scene. There could be many things happening in the background that is being missed simply because our attention is on the foreground. Live Streaming can also spark reaction posts, which can take to form of streaming a video of yourself watching a live stream or the quick creation and post of an internet meme to share your interpretation of the event. Both the witnessing and the quick assessment and reaction of the live stream can be subject to not fully understanding the limitations to visual information and thus sharing an incorrect version of the stream.

SATIRE:
The effects of Satire and Parody

Satire (indicated in red), can enter the flow of content/information through three of the valves of control. (1) Live Streaming; As mentioned above, reaction posts can represent a misleading version of what was seen during a live stream. It also has the potential to add the element of parody to one's reaction to receive more views and engagement with the post. Although a person's motivation maybe to 'get a quick laugh,' the stretching of the story to allow for humour has the potential to mislead an audience in ways that are not always predictable. (2) Social Media; Internet memes have taken on a life of their own. Through the spread of quick read visuals, memes have the potential to mislead the viewer who is not sure where the comedy ends and the event details begin. (3) Digital Entertainment Companies; These companies include online publications like the Onion and Bored Panda, to name a few. These sites are designed to keep a person's attention with entertaining visuals and funny stories. Memes also play a large roll on these sites, blurring the lines between reality and a good joke.

DATA:
Visual Data Inexperience

Data (indicated in orange), can enter the flow of content/information through four of the valves of control. (1) Witness; Some individuals who witness an event first hand may choose to broadcast what they saw over blog posts, either their own or someone else's. The written word can lose attention if there aren't any exciting visuals to go along with it. Currently, several software platforms can allow a person with no data analysis experience to create colourful charts and graphs to go along with their writing. Unfortunately, the chart creator may not understand the complexity of the data, which will ultimately lead to skewing the data. (2) Brand Marketing; Similar to the content creation style of a blogger, brand marketers are not classically trained in data analysis, which also leads to skewing the data. (3) Publications and (4) Telecom; Both Publication and Telecom do hire data analysis to aid in storytelling with statistical data used to provide findings through visuals. Unfortunately, there are times when the public outcry for details does not allow enough time to collect enough data to provide the public with a clear view. This is currently the case with the collected data for active coronavirus cases mentioned in chapter five.

PRESS:
Poor Journalism

Press (indicated in green), can enter the flow of content/information through two of the valves of control. (1) Witnesses and (2) Publications; The relationship between these valves is quite interesting. In many ways, these two valves need each other; publication needs to find compelling stories to tell, and some witnesses are looking for a platform to elevate and amplify their story. This give-and-take relationship between witness and publication is the reason why 'interpreted by journalist' is flagged with the potential of misinformation. Both the witness and publication may be motivated to fabricate the story to attract more readers. Another thing to consider is a publication's attempts to utilize a high standard of ethics and integrity. Since there are direct links from the publication valve to the Business and Government valve, this can lead to the potential influence over the standards of research rigour requiring the writer to dash through the planned research process, which could compromise the writer's standards of ethics and integrity.

DECODE:
The Interpretive Act of Academic Translation

Decode (indicated in purple), can enter the flow of content/information through two of the valves of control. (1) Publications and (2) Encyclopedia; Both of these valves pull from findings and data completed by many research labs around the world. These labs write and release their reports in their native language, but many times they are required to write a version in English. Unfortunately, many phrases and words exist in other languages that do not exist in English. This is why translation can become an interpretive act, and some liberties have to be taken to attempt to explain. If it is too difficult to explain in English, these phrases and words are cut out of the English version. This has the potential to be misinterpreted by readers due to the pieces of lost context.

CHAMBER:

Content Limitations

Chamber (indicated in pink), can enter the flow of content/information through two of the valves of control. (1) Online Profiles; This valve has a direct link to Social Media because it needs this environment to exist. Under user profiles, there lays the ability to form online communities and tailor our viewable content creating echo chambers. Communities and echo chambers can serve a similar purpose, to create a safe place for those within. These safe spaces often share similar opinions and viewpoints, which inevitably blinds the individuals within to opposing ideas. This becomes a problem when inaccurate information begins to circulate within these close communities and echo chambers. (2) Publications; This valve has taken a hit since the internet made the content available online for free. The decreasing sales of printed publications have led to smaller local news outlets to close, causing news deserts. The larger publications now have to rely on subscription models for their articles online. These subscription models can limit the content to a reader in two ways, the reader subscribes and only reads the publication they pay for, or they choose not to subscribe and can never read anything from that particular publication.

OUT OF SCOPE:

Warnings that fall outside the parameters of misinformation

As mentioned in chapter three, each driver of misinformation will fit within the following definition; "Mis-information is when false information is shared, but no harm is meant." (Wardle & Derakhshan, 2017) That said, there are many warnings on this system map that have the potential to drive incorrect information into the flow of mass media. These warnings fall out of the scope of this project, and yet they are glaring threats that should be recognized for future research. These warnings, which will be marked with no colour distinction, have the potential to be categorized as possible drivers of mal-information and/or disinformation. "Dis-information is when false information is knowingly shared to cause harm. Mal-information is when genuine information is shared to cause harm, often by moving information designed to stay private into the public sphere." (Wardle & Derakhshan, 2017)

In review, this exercise allows for a view to the potential of one piece of misinformation to spread through many indirect points in the system map. Once an informational inaccuracy creeps in, there is a high chance that it will continue its journey through the system until it either becomes 'old news' or is later debunked. This map has the potential to grow with future contributions of missed avenues of misinformation. It can also be used as a tool to consider possible interventions now that the path of misinformation seems to move in some predictable cycles.

INFORMING/ SHARING

Entertainment

Events

Knowledge

Business(es)

Government

law enforcement and safety

law and governance

regulating content that can cause harm

regulating telecom content

democratic elections

Live Streaming

Social Media

Publications

Encyclopedia

flow from publications

Brand Marketing

reaction posts

interpreted by many

visualized data

guerrilla marketing

memes

connecting with fam/friends

Digital Entertainment Companies

collected/ interpreted by journalists

citizen journalism

Telecom

books translated into multiple languages

historical analysis

archive history

sharing personal images/videos

clickbait titles

shared by others

regulating content

loss of readership

literature reviews

traditional marketing

digital marketing

sharing digital content

creation of funny stories

story breaks on tv

story breaks online

story breaks in newspapers

edited video posted

visualized data

subscription models

billboards

ads

influencer funding

Online Profiles

hashtags

video removed

Witness(es)

conduct interviews with survivors

targeted ads

@ mentions

phone call

shared by others

modern point of view

new evidence

news deserts

visualized data

development of personal brand

viral spread

word of mouth

interpreted by bloggers

forwarded email

email

interpreted by journalist

follower count

social rating/ digital valuation

creates profile to represent life

fake profiles

trending on social media

like count

anonymous web forums

shares on social media

visualized data

story posted on blog

interviewed

bloggers

level of influence

influencer's

chooses other profiles to follow

conspiracy theories on reddit

shared by others

reaction posts

shares on social media

debated in blog comments

read by subscribers

passive engagement

active engagement

newsfeed tailored to interests

Cyber Forces

flow from business and government

shares on social media

views

likes

click through to site

conversion to active shopper

social bubbles

Fact Checking

fake engagement

like/follow farms

disinformation attacks

edited video or photo posted

posted on video platform

story breaks on TV

story breaks in online pub

emailed out to mailing list

paid for content generation/engagement

content farms

weaponizing information

shares on social media

story breaks in newspaper

funding to trend posts/influencer's

interpreted radio DJ

story breaks on radio

story streams online radio

TIER 1:
SOCIAL CREATURES; COGNITIVE REVOLUTION THEORIES (HARARI, 2014)

TIER 2:
CATEGORIES OF INFORMATION/CONTENT

TIER 3:
VALVES OF CONTROL; BIAS OF COMMUNICATION (INNIS, 1951)

TIER 4:
WHAT FLOWS FROM EACH VALVE

LEGEND:

Represents a valve of control

Highlights Misinformation

Drivers of Misinformation:

- Malleability of Memory
- Perceptions of Visual Stimuli
- The effects of Satire and Parody
- Visual Data Integrity meets Inexperience
- Public Press Post-Internet
- The Interpretive Act of Academic Translation
- Community, Echo Chambers and Content Limitations

Warnings that fall outside the parameters of misinformation

“As fast as a viral pathogen can spread in a world connected by air travel, bad information can move even faster.”

- JULIA CARRIE WONG AT THE GUARDIAN

FLIP FOR THE FULL SYSTEM MAP

Chapter 7
The Prototype Explained

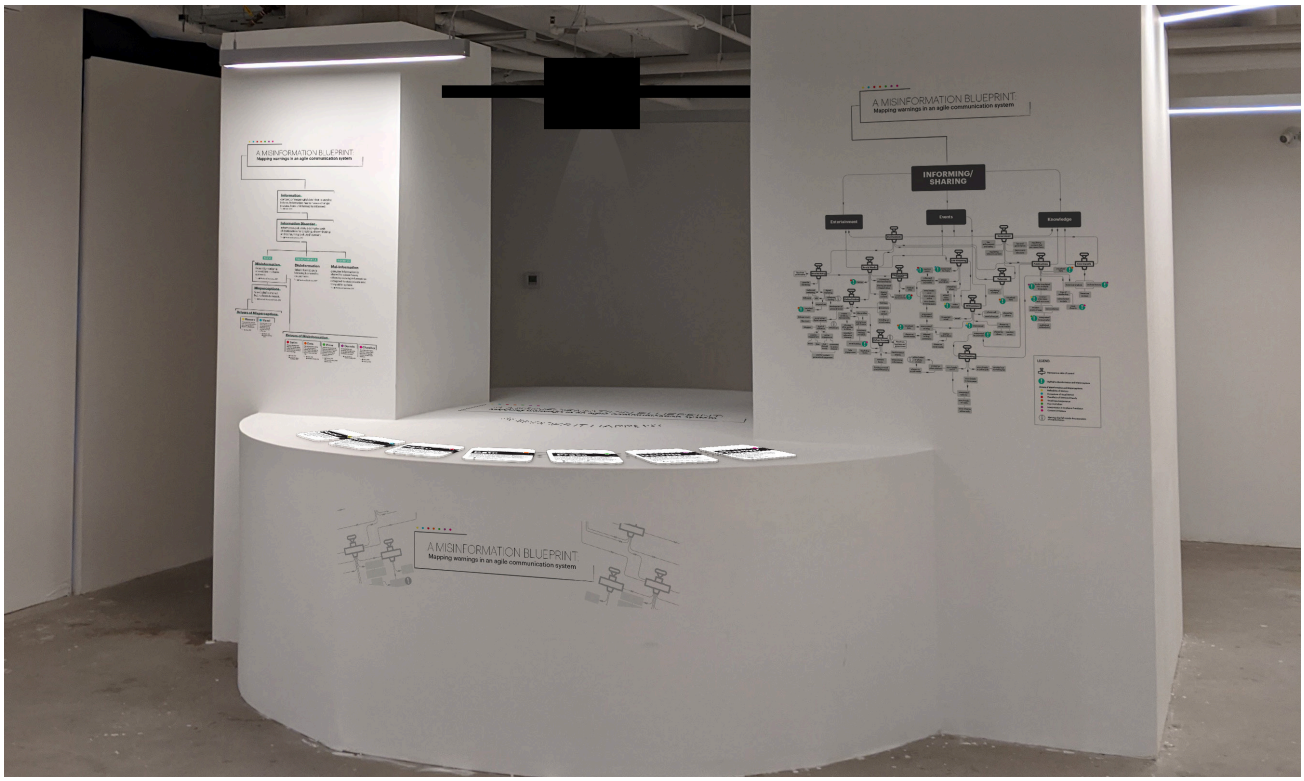


Figure 7.1: Mock-up of final prototype display (produced in photoshop)

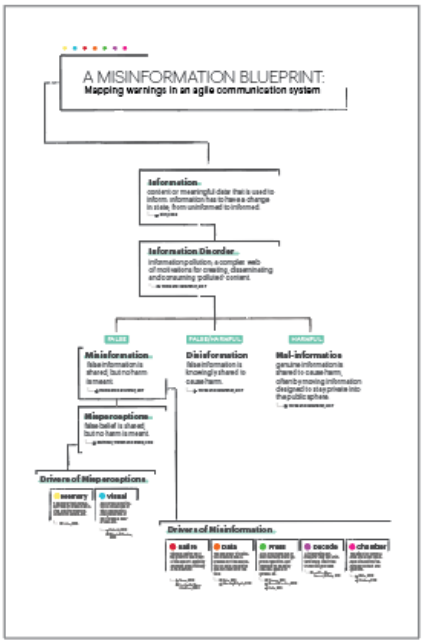
IN SUMMARY

THE GOAL OF THE prototype creation is to make research findings quickly assessable and ingestible.

Visual elements were developed to aid in the quick understanding of misinformations placement within information disorder, identified drivers of misinformation and the potential entry points of misinformation into communication.

This clarity is achieved through a combination of printed wall posters and an interactive display. The goal is to playful engage and audience with touch panels that will trigger quick animated videos to prompt curiosity. One engaged the wall posters to provide more detail on the research done. The following is an overview of each piece, which led to a showable prototype; Visual development, a system map, an interface, animations and wall posters.

LEFT PANEL



RIGHT PANEL

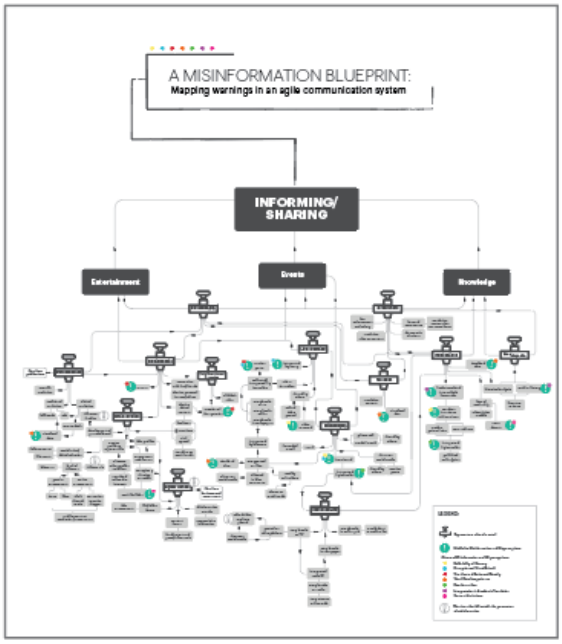
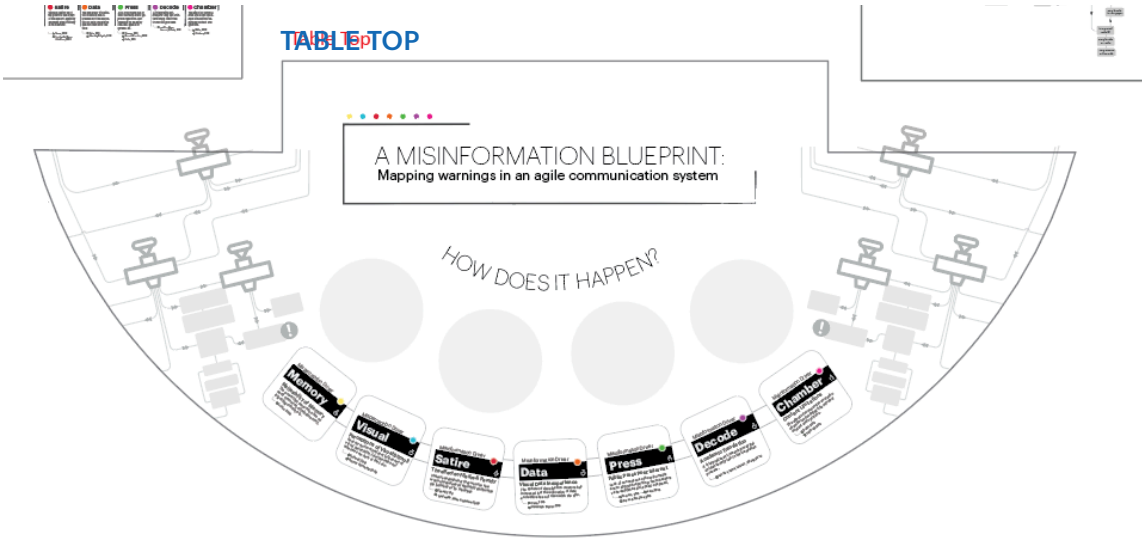


TABLE TOP



FRONT OF TABLE

Figure 7.2: Final prototype graphics

THE DEVELOPMENT OF VISUALS

While working through the contextual review and horizon scan, it was helpful to sketch out learnings as they came. Rotating through sketching, reading and analysing was the basis of the iterative development discussed in chapter three. During this process, new findings often conflicted with previously built graphics, and the structure of the definitions and system map would need to re-thought. Throughout this process, it was essential to make sure each diagram told a story. Visual storytelling can allow a viewer to move through each graphic quickly. This iterative process brought many challenges throughout the creative journey, but it also allowed for deeper reasoning behind the contextual and creative decisions. The following is a journey through the iterations of a misinformation blueprint.

1. DESIGNING AN ECOSYSTEM OF INFORMATION COMMUNICATIONS

Throughout the iterative development, there were many times when the decisions made in other visuals would directly affect the definitions within the ecosystem visual. An example of this was the inclusion of all aspects of information disorders. Previously this research only aimed to differentiate misinformation from information and disinformation but missed placing it within all information disorders. Another phase of the iterative development led to breaking all false beliefs from false information (misinformation vs. misperceptions). This decision changed many aspects of the research. The addition of misperceptions to information disorder required a re-evaluation of the drivers of misinformation and further clarification on which driver was based on false belief vs. false information.

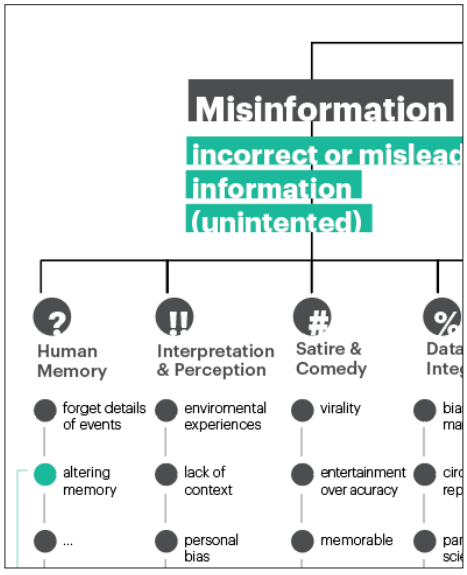


Figure 7.3: First version of defining the ecosystem of information communications

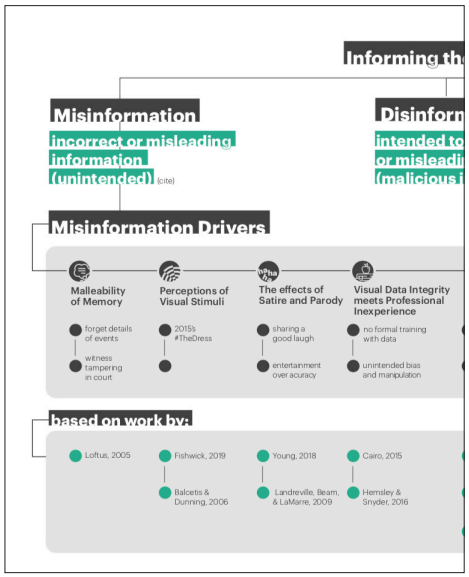


Figure 7.4: Next iteration, re-visiting drivers and definitions

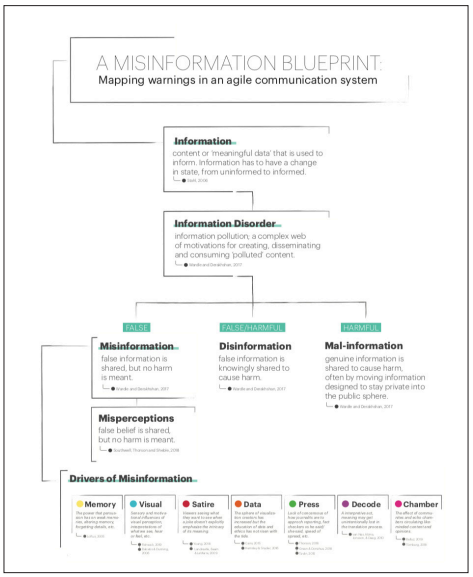


Figure 7.5: Another iteration of ecosystem, considering the inclusion of information disorder

2. DESIGNING A SYSTEM MAP OF MASS MEDIA AND MISINFORMATION

Building the system map was an involved undertaking. The main issue of developing a system map is the nature of mapping a moving target like communication media. There will never be a time when it is complete, and it is not meant to be complete. It is meant to be thoughtful and analytical. Each iteration brought a further understanding of the structure and connections to communication media. The initial stages involved only news media and demonstrated the flow of information from event to reader. The next few iterations included sharing personal stories and information/content that was created to entertain rather than to educate. The final iteration of the system map considered the powerful influence media and other amplified voices have over information/content. This stage is when the valves of control were added to the system map to visualize how the flow of information/content can be influenced and controlled. It also displays how many valves information/content needs to go through to get to its final reader.

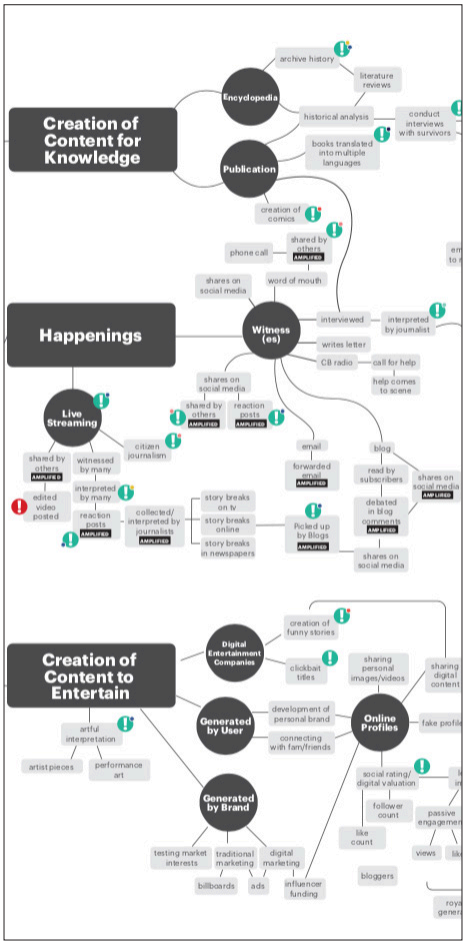


Figure 7.8: Third iteration of system map, considering the motivations for sharing and informing

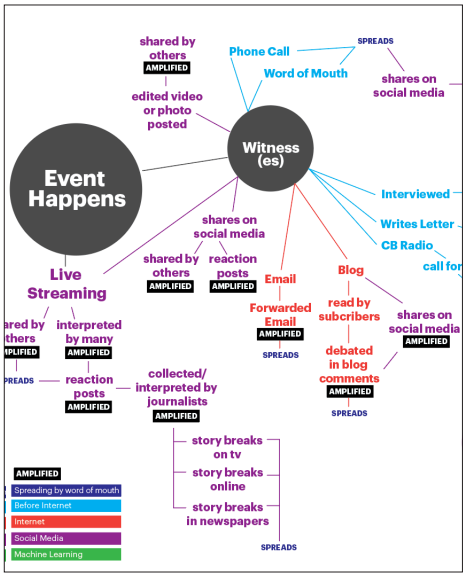


Figure 7.6: First version of system map, considering a news media flow

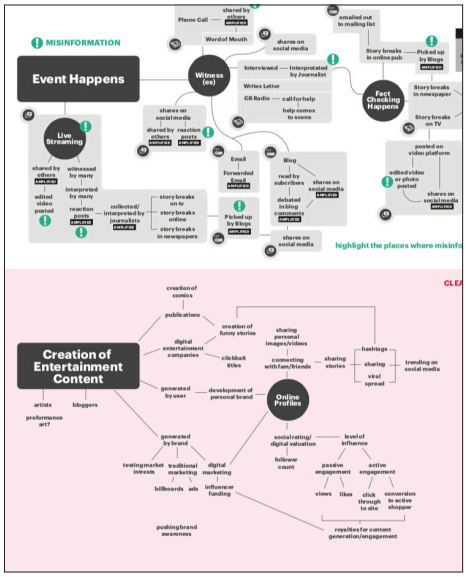


Figure 7.7: Second iteration of system map, considering entertainment and sharing stories

2. DESIGNING THE ANIMATIONS

The animations for the projection was another piece to the puzzle. Selecting which part of the research would work well in an interactive format depended on how engaging the storyboards for each video were. It took a few iterations to iron out what was working and what wasn't. Figure 7.9 shows the initial testing stage, which displayed a few definitions with a scrolling animation applied. This trial helped to recognize the need for enticing animations since the version was quite dull. It also helped to refine the length of each video. The animation applied to each definition was to fast to read and disappeared too quickly. The next iterations would be ten to fifteen seconds long, based on the previous trial. There were a few tests done regarding the styling of each video in regards to colour, imagery and legibility. Figure 7.10 shows the testing done to incorporate the system map into the final projections. Ultimately, this did not work and will be discussed later in this chapter. Figure 7.12 shows the final styling incorporated into all videos of the exhibition. The rendered images were created using Royalty-free stock images for the final video outputs.

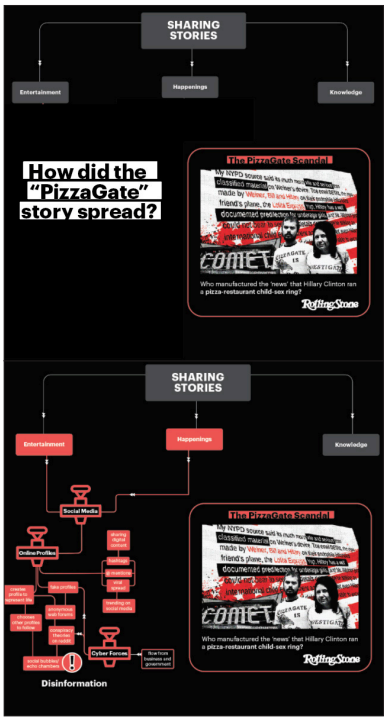


Figure 7.10: Testing a storyboard using the system map

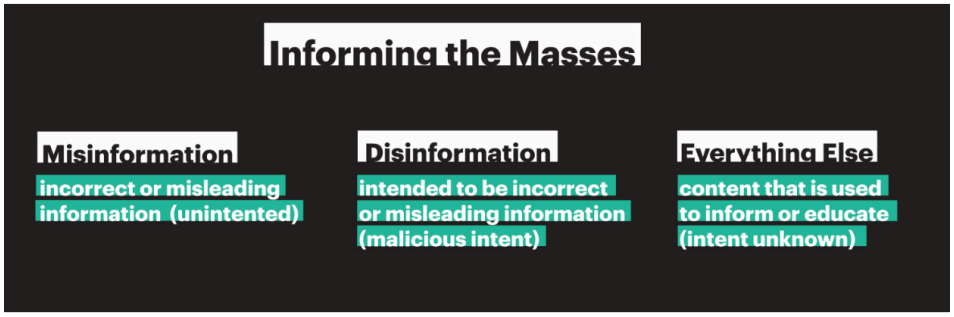


Figure 7.9: First version of animations testing proof-of-concept

Figure 7.11: Second version of animation style and storyboard

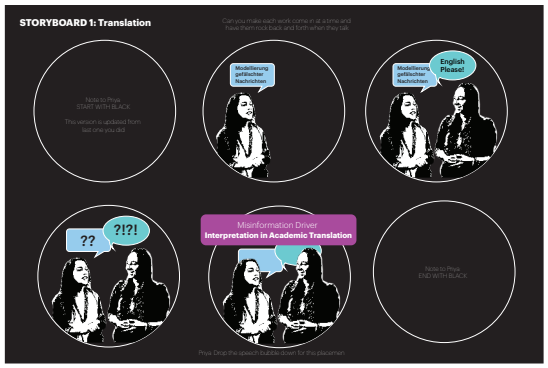


Figure 7.12: The selected animation style and storyboard

AN INTERACTIVE DISPLAY

The interactive display component consists of animated information graphics that are activated through a touch control panel. The interface is made of smooth acrylic, which is laser etched with content. Each panel is painted with conductive paint to activate a video when touched. The tactile nature of this display adds playfulness to an otherwise dry topic. The first iteration of this display involved the videos to be projected on to the adjacent wall from the interface. The main issue encountered with this approach was the disconnect from interface to projection. The experience held many gaps between looking down at the interface and looking up the projection. This lead to the choice to project down onto a tabletop, which also held the acrylic interface. This change made for a fluid experience when moving the eye from the interface to the projection. It also allowed for a more simplified version of the interface since a lot of content could be kept only in the video or vice versa. Overall, this playful interaction added life to the overall exhibit.

Figure 7.13: First version of working prototype

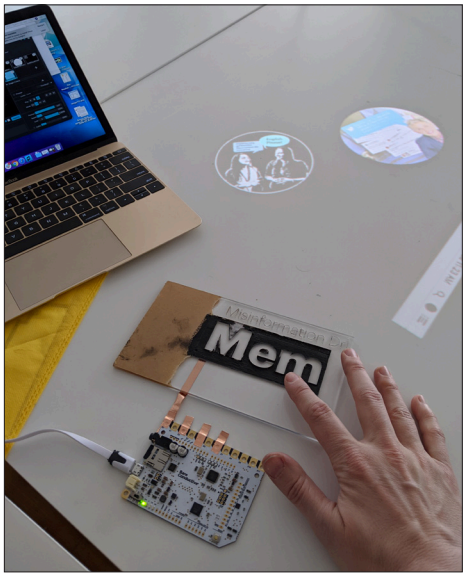


Figure 7.14: Testing of prototype

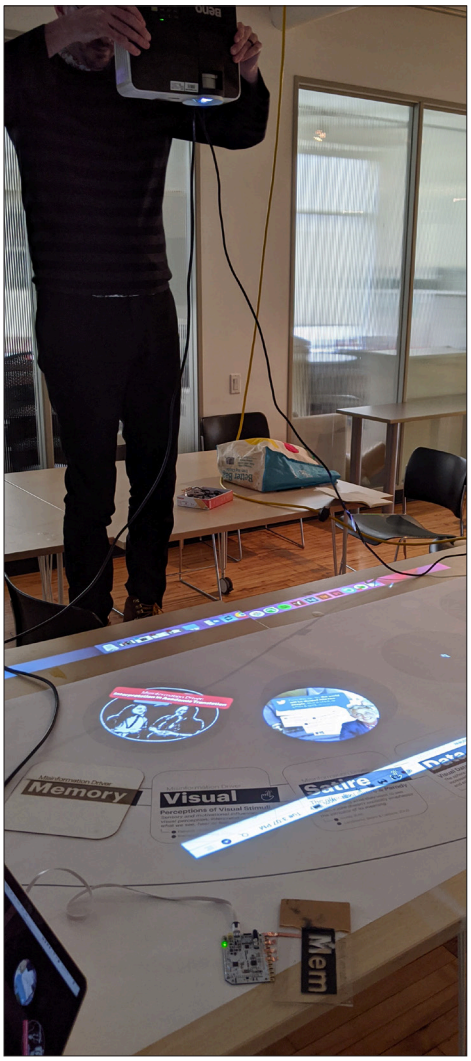


Figure 7.15: Testing of prototype, legibility of projected animations and frame positioning

THE INTERFACE DESIGN

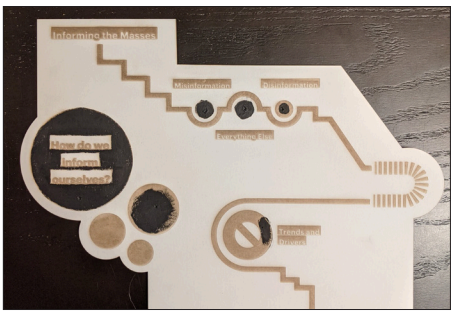


Figure 7.12: First iteration of interface, front and back

The first iteration displayed in figure 7.12 shows the initial testing of the interaction. This interface was part of a proof-of-concept to see if this interaction made sense as a way to display the research done. The interface was connected by a micro-controller to spots of conductive paint using copper tape. This exercise proved the interface would instantly trigger a video once touched. The next iteration was more thoughtful of the design and the content that should be on the interface.

Figure 7.13: Next iteration of interface, icon for touch introduced

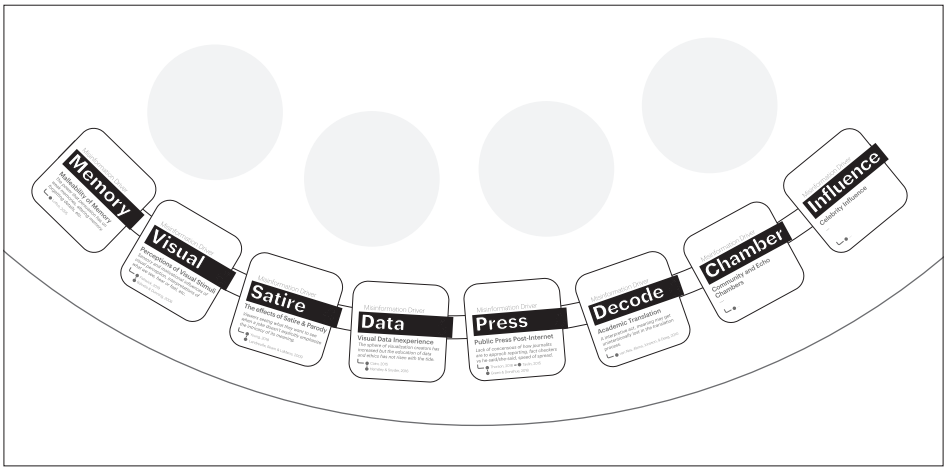


Figure 7.14: Next iteration of interface, this version was selected and tweaked for final version

There were some successes and failures with this version. The key success of this version was the icon (figure 7.15) used to indicate where a person should touch to trigger the display animation. Using iconography to indicate where the interactive points are worked very well. There were a few shortcomings to this iteration. The first issue was the amount of content on the interface; it was crowded and cluttered.

The next was the disconnection between the interface and the projection location. As mentioned before, the interface design took shape once the decision to change the direction of the projected animations. Once the projector was pointed down at the tabletop, it made the interface make a lot more sense. The next iteration shown in figure 7.14 is very close to the final version used at the exhibition. This version only displays the drivers of misinformation and misperceptions, which removed a lot of clutter to the finished piece. This interface also removed the redundancy in the content and the interactive spaces. This was all combined into one area and continued to use the icon to indicate touch. Figure 7.14 also shows four light grey circles that indicate the location of the projected videos one triggered.

Figure 7.15: Icon used to indicate touch

THE PRINTED GRAPHICS

The original idea was to animate the system map along with the other visuals. The testing process of the projected system map proved to be more difficult than originally thought. The resolution of the projector was too low to accommodate for text at the designed sizing (as seen in Figure 7.20). Testing on higher resolution projectors did not solve the problem either. The content was too small for the projection to be legible. Projectors also slightly sway when there is movement in the room, which further distorted the complexity of the system map. At the end of testing, the decision was made to print the final system map and display it on the wall next to the interactive display. This seemed to be the best solution since it almost seems necessary to get close to the graphic and follow the connection lines with your fingers. Figure 7.21 is a mock-up to represent how the final printed poster will look at the final exhibition.

All of these components are meant to be displayed at the final exhibition at the Toronto Arts and Media Centre (TMAC). The final prototype was explicitly adapted to TMAC to utilize as much of the area as possible. There will be posters custom fit to the columns to the right and left of the circular tabletop. The first poster will display the ecosystem of information definitions. The second poster, to the left of the interactive display, will showcase the system map. The center will display the laser cut acrylic interface with a projector mounted directly above the tabletop. Enough room was provided to fit the interface and the projected videos comfortably. Together it creates 'A Misinformation Blueprint.'

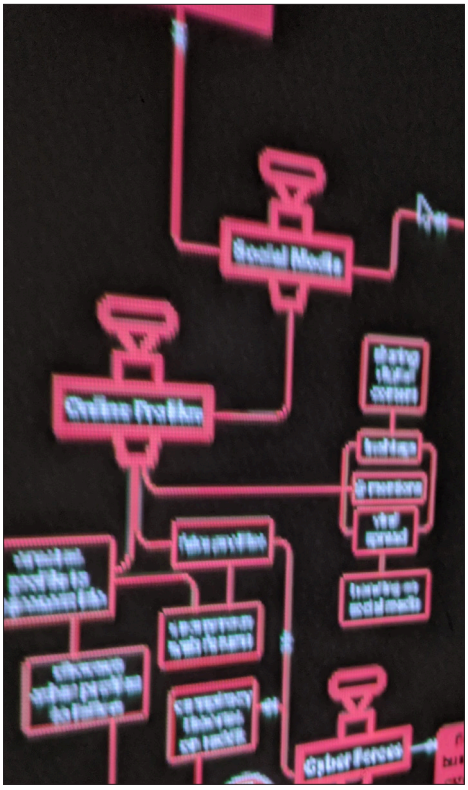


Figure 7.16: Problems with the resolution quality of the projector

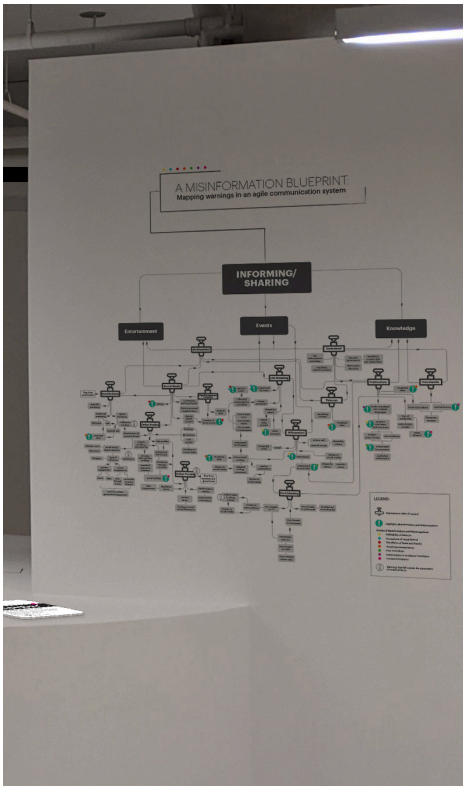


Figure 7.17: Mock-up of the final printed poster for the exhibition

CHANGE OF PLANS

Early March 2020, Ontario implements social distancing to combat the threat of Covid-19 and closes schools until further notice. In order to maintain social distancing procedures, The Toronto Media and Arts Centre (TMAC) closed for public safety. The planned thesis exhibition was moved from TMAC to an online show. Since the original prototype was designed for an open event with many participants physically touching the interface, there needed to be alterations to accommodate an online showing. This prototype was re-imagined to fit in a digital situation.

PLAN B

Conversion from a physical exhibition to an online show was tricky. The original prototype is meant to stimulate conversation about the misinformation drivers while participates playful interact with the interface and projections. Converting this experience into a website cuts off the informal interactions between participants and creates a singular experience and erases all hope of impromptu conversation.

Touching physical interfaces were changed to clicking a digital version through a website. Figure 7.18 displays the demonstration of the website interaction. Although unplanned, the change from a public forum to an undisturbed personal encounter with the research could lead to a better understanding of misinformation. The videos developed for the TMAC event were quick to allow for many participants to play with the interface at once. If the website were to be revamped, it might be beneficial to lengthen each video and add more information since the participant's attentiveness would increase without distraction for a longer period.

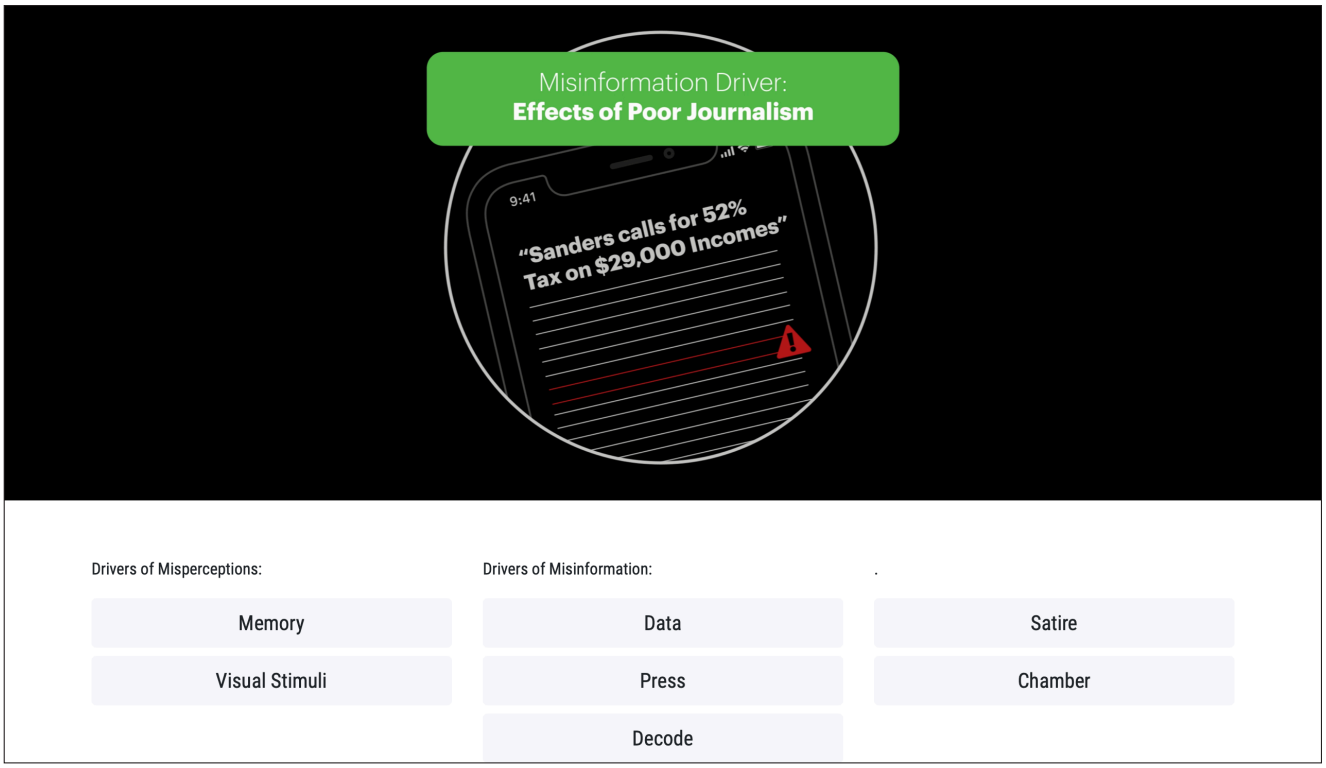


Figure 7.18: Website created for online show, www.april-dezen.format.com

MIS PER CEPT ION

Chapter 8
CONCLUSION

FINAL REFLECTIONS

THIS BLUEPRINT can be used to consider the usefulness of current strategies in place for combating misinformation and potentially increase the discussion and implementation of more effective strategies. This research aims to examine the phenomenon of misinformation at a high-level. An interdisciplinary framework was developed to achieve this view.

The purpose of the developed framework is to aid in future strategy and interventions of misinformation. Two frameworks were established, a series of definitions to build parameters around the ecosystem of information communication and a set of misinformation drivers. The second framework was addressing the requirements or tiers of communication media to create a system map. The system map used Meadow's (1999) stock and flow diagrams to develop the structure of the map. (Meadow, 1999) The system map also Used Buchanan's (1992) wicked-problems approach to design thinking to indicate the location of each driver of misinformation within the system map of communication. Together the two frameworks act as a 'blueprint', which can be used to survey and analyze the phenomenon of misinformation. The system map is used to draw attention to two things:

(1) Potential entry points; Where the drivers of misinformation have the potential to materialize.

(2) The valves of control; Channels of communication that are subject to different decision-makers.

POTENTIAL ENTRY POINTS

As shown in chapter six, misperceptions have a higher potential to occur in the earlier stages of dissemination. Misperceptions, a sub-category of misinformation dealing with false belief, has a high potential to appear under the witness valve when the human processing of stimuli occurs. Misperceptions also appeared under many valves that rely heavily on interviewing witnesses. As mentioned within the listed drivers, memories can fade or alter over time. On the other hand, misinformation tends to materialize later in the dissemination process after it's passed through a few valves of control. To name a few, Content limitations and incorrect visualized data both occur after information/content has made its way through two or three valves of control.

THE VALVES OF CONTROL

As shown in chapter five, there are many different decision-makers throughout the process of dissemination. Each decision-maker has the power to control and/or influence the information/content as it passes through its valve of control. Some information/content even passes through multiple valves, tweaking and distorting the meaning before it reaches us. All that considered, these valves not only influence and control, but its existence is the creation of a new way to receive information/content. The valves are paradoxical in nature, bringing new forms of self-expression and storytelling while holding the ability to restrict and control.

CURRENT STRATEGIES TO COMBAT MISINFORMATION

How information disorder is handled differs from county to country. Poynter (2020) created an interactive map to highlight the approach each country is taking to mitigate the effects of misinformation. Figure 8.1 shows the map they have created with a legend. It highlights that countries like India and Sir Lanka are participating in media shutdowns, and countries like Russia,

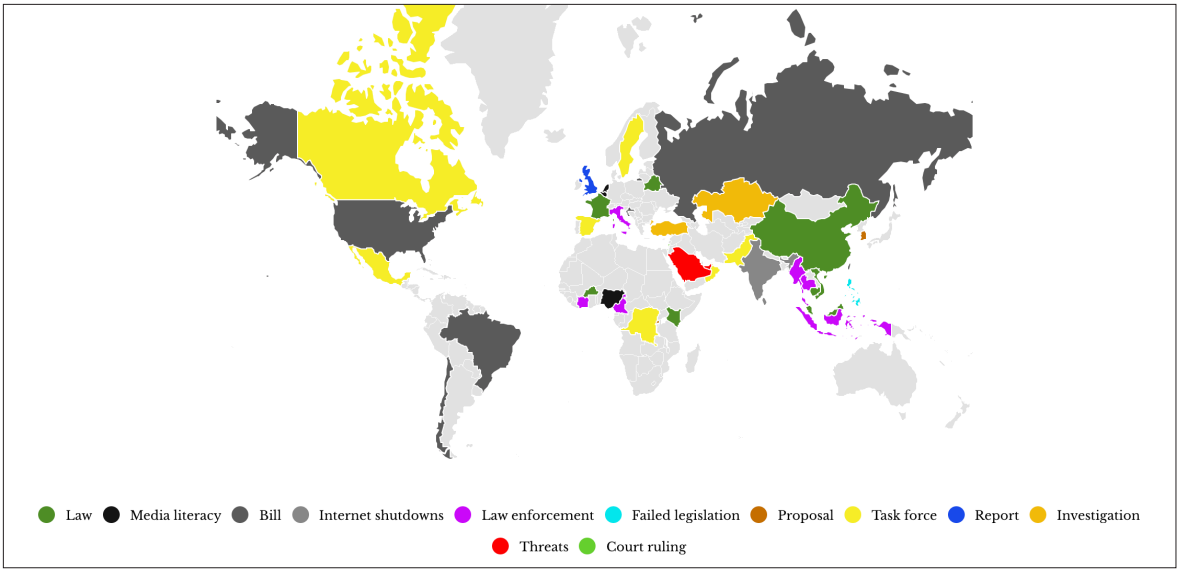


Figure 8.1: Poynter's chart of government action against online misinformation

USA and Brazil are passing bills to hold social networks accountable. (Poynter, 2020) Italy has implemented an online reporting portal, "where citizens could report misinformation to the police." (Poynter, 2020, para. Italy) This colourful map shows that there is no global consensus on how to handle the issue of misinformation in the digital age.

Outside of government action, media literacy seems to be a large part of the strategy to combat information disorders. Some of the loudest voices we hear come from news media or social media with articles and 'listicles' like, "How to spot fake news" (Parks, 2019) or "Fake Or Real? How To Self-Check The News And Get The Facts". (Davis, 2016) As mentioned above, many other initiatives are running at the legislative levels to combat the issue, but many citizens are unaware or lack faith in the outcome. Having no insights or trust in government actions can make media literacy seem like the only plausible way to elevate the strain. This puts a lot of responsibility on the readership to mediate a systemic issue that is reasonably out of their control. Is challenging audiences to decipher fact from fiction the best action while we wait for the slow pace of government reform? Some, like Sinan Aral (2020), believe it is. Aral (2020) presented his point of view at TED this year based on his research, which analyzed the driving forces behind fake stories reaching larger audiences faster than the verified stories on twitter. His findings show that bots circulate as many fake stores as verified stories, which drew him to the conclusion that the bots are not to blame. Aral (2020) believes the cause of this is novelty.

> If you read the literature, it is well known that human attention is drawn to novelty, things that are new in the environment. Reading the sociology literature, you know that we like to share novel information. It makes us seem like we have access to inside information, and we gain in status by spreading this kind of information. (Aral, 2020)

Aral (2020) was able to prove his "novelty hypothesis" with a sentiment analysis of the replies to the false stories and the verified stories. The analysis showed more surprise detected in the replies to the false stories than to the verified stories, which verified the presence of novelty. His talk ended with a call to action to be "vigilant in defending the truth against misinformation with our technologies, with our policies and perhaps most importantly, individual responsibilities, decisions, behaviours and actions." (Aral, 2020) Although Aral's (2020) take on this situation is for each user to assume responsibility in the state of the internet, or in this case, twitter, I believe this view is shortsighted. Looking at his research findings, there is one point that was overlooked. He mentions sociology studies, which point to his novelty theory, but at no point does he question if these platforms are being designed to exploit human tendencies. The exploitation might be based on attention metrics and platform performance as opposed to circulating information disorder and eroding democracy, but the question Aral (2020) missed is; Can we have one without the other? Relying on the public to be able to spot information disorder is a simple band-aid placed

Figure 8.2: Aral's 2020 TED talk

on top of a gushing wound. Although Aral (2020) does mention technologies and policies within his call to action, he places the most emphasis on changing human behaviour. Based on the drivers of misinformation addressed in this research, there is much more than just novelty at work.

Believing the things seen online is a problem. The introduction discussed the Pizzagate controversy (Robb, 2016), which showed how a rumour of sex trafficking in a pizza parlour could give birth to a vigilante. What is seen online is shaping our state of mind. It is carried from the digital to the physical world. This makes the combat of information disorders pertinent to our time, but how can we begin to tackle an issue of this size? Without clarity, it leaves us making poor decisions or no decision at all.

Reflecting on this journey, I found a few key insights:

(1) The division between misinformation and misperceptions. The separation of false belief and false information allows for a better understanding of how to intervene in the spread of falsities. Combating each of these in the same fashion would not be sufficient. For instance, debunking may be productive for false information but may cause defensive reactions if used to combat false beliefs.

(2) Potential entry points of misinformation vs misperceptions, The system map shows that both of the identified drivers of misperception presents itself earlier in the flow of communication than misinformation does. For instance, witnessing an event has a high potential for anomalies in visual stimuli.

(3) The entry of decentralized influencers which could exhibit the same power as any other decision-maker within communication media, such as information attacks from cyber forces and satirical content from digital entertainment companies.

Although solutioning was not the final output for this project, further exploration on any of these three insights has the potential to grow into useful and actionable interventions.

THE PLANNED OUTCOME

The plan for the final exhibition was an interactive display which utilized touch panels to trigger projection on a tabletop. The goal was to playfully engage participants and spark their interest to look deeper into the research done. The layout would also include printed panels of the ecosystem of information disorder and the system map of communication media. Unfortunately, due to a global pandemic, this vision was never realized in a public exhibition. Instead,

it was re-designed to become part of an online showcase. The touch interface was presented as a clickable web page that would allow site visitors to interact with the misinformation drivers through their screens.

LIMITATIONS

Time constraints were a significant limitation of this project. The scope was aggressive, and not every avenue could be explored. Based on this limitation, not every driver of misinformation and misperceptions could be addressed. These will be listed below in future research. Time also cut short the exercise of the system map. I hoped to simulate a few case studies using the visuals of the system map. This will also have to be paced under future research. Managing the scope of this project was problematic at times. This project would never and can never be complete. Being clear with the parameters of this project was challenging because so many defined avenues had the potential for more depth and further investigation. Keeping the research high-level was not always easy.

FUTURE RESEARCH

As mentioned above, not every possible driver of misinformation could be researched and presented as a driver. The following is a list of other potential categories of misinformation/misperceptions for future research; motivated reasoning, celebrity influencers, perceptions driven by personal bias, meme theory, political spin and cognitive dissonance. Each of these potential drivers, once proven, could be added to the system map. It would be beneficial to the research to select case studies and run it through the system map. This exploration will not only ground the system map in reality, but it can also highlight any potential areas that are currently not represented on the map. Since mapping a moving target can never be a perfect process, adding a 'case study' check-in would help bring new and evolving elements to the map.

This research aims to allow us, as a society, a clearer direction for combatting a phenomenon of this size. When it comes to information disorder, There is a long way to go and much more to consider, but the point of this thesis was to start. Misinformation needs to be addressed, and we cannot do so if we consider it impossible. This is a journey that needs our attention as much as our energy. It needs generations born before the internet and those born after. This blueprint has the potential to evolve with all of us.

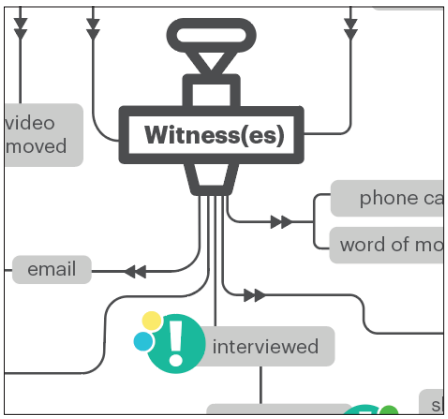


Figure 8.3: Snippet from larger system map

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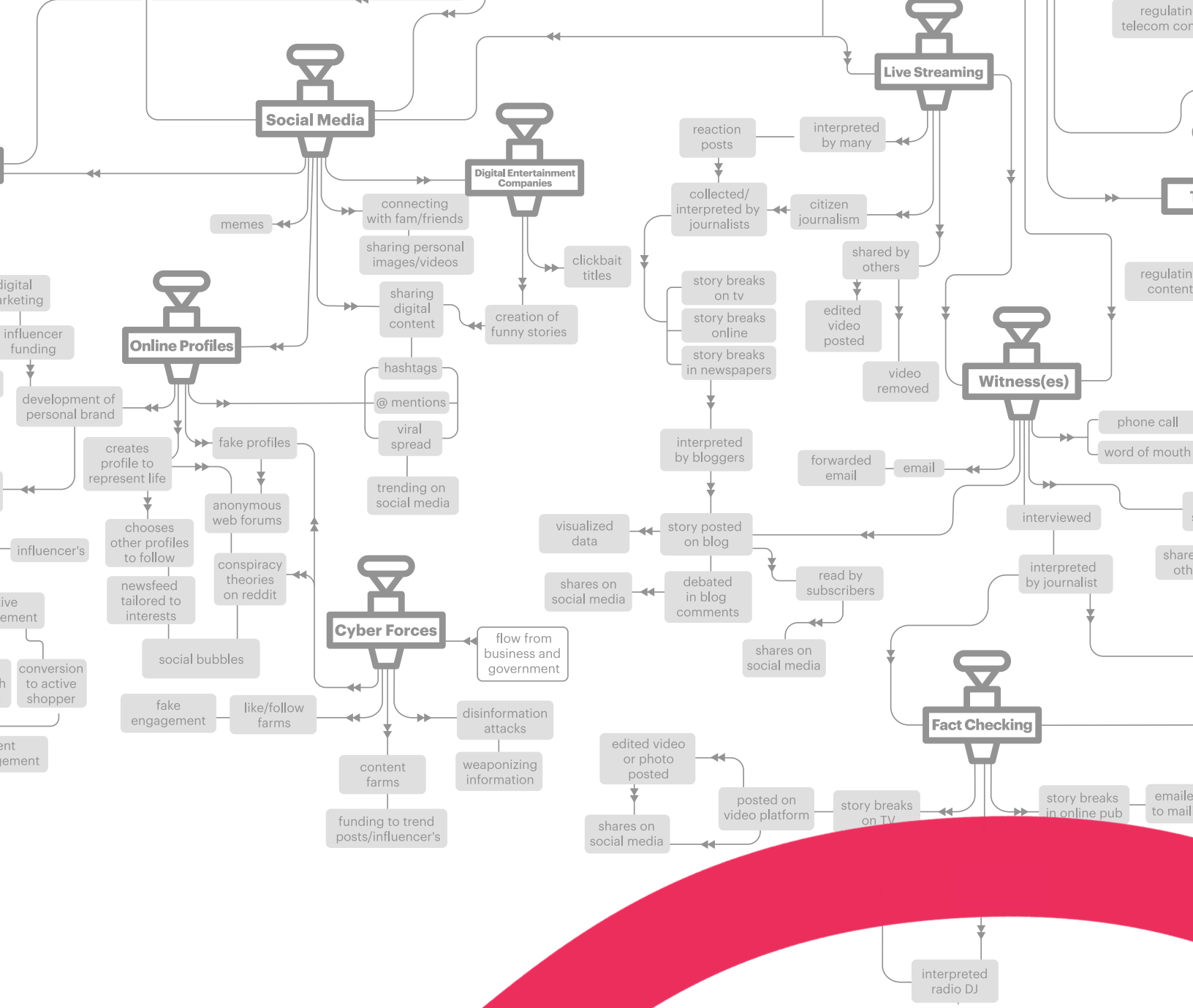
Social Media
Live Streaming
Digital Entertainment Companies
Online Profiles
Cyber Forces
Witness(es)
Fact Checking
memes
connecting with fam/friends
sharing personal images/videos
clickbait titles
sharing digital content
creation of funny stories
hashtags
@ mentions
viral spread
trending on social media
fake profiles
creates profile to represent life
anonymous web forums
chooses other profiles to follow
newsfeed tailored to interests
conspiracy theories on reddit
social bubbles
development of personal brand
influencer funding
influencer's
conversion to active shopper
fake engagement
like/follow farms
content farms
funding to trend posts/influencer's
disinformation attacks
weaponizing information
flow from business and government
reaction posts
interpreted by many
collected/ interpreted by journalists
citizen journalism
story breaks on tv
story breaks online
story breaks in newspapers
interpreted by bloggers
visualized data
story posted on blog
shares on social media
debated in blog comments
read by subscribers
shares on social media
shared by others
edited video posted
video removed
forwarded email
email
phone call
word of mouth
interviewed
interpreted by journalist
edited video or photo posted
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story breaks on TV
story breaks in online pub
interpreted radio DJ