

2019

Design Thinking as Heterogeneous Engineering: Emerging Design Methods in Meme Warfare

Travis Wall
University of Wollongong

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Recommended Citation

Wall, Travis, Design Thinking as Heterogeneous Engineering: Emerging Design Methods in Meme Warfare, Doctor of Philosophy thesis, School of the Arts, English and Media, University of Wollongong, 2019.
<https://ro.uow.edu.au/theses1/1066>



**Design Thinking as Heterogeneous Engineering:
Emerging Design Methods in Meme Warfare**

Travis Wall

Supervisors:

Dr Teodor Mitew

Gregor Cullen

This thesis is presented as part of the requirement for the conferral of the degree:

Doctor of Philosophy

This research has been conducted with the support of the
Australian Government Research Training Program Scholarship

University of Wollongong
School of The Arts, English and Media

August 2019

Abstract

The shift of production of material artefacts to digital and online making has been greatly disruptive to material culture. Design has typically concerned itself with studying material cultures in order to develop a better understanding of the ways people go about shaping the world around them. This thesis contributes to this space by looking at an emerging form of artefact generation in digital and online making, namely, visual communication design in online information warfare. Developing understanding of participation in this space reveals possible trajectory of working with material culture as it increasingly becomes digital and online.

Marshall McLuhan wrote in 1970 that “World War 3 is a guerrilla information war with no division between military and civilian participation” (p. 66), anticipating ubiquitous symmetrical capacity of users as both producers and consumers of information through communication technology. This space has emerged as our digital and online environment, and prominent in this environment are images with characteristics of visual communication design. It appears that the trajectory of visual communication design from the late 19th century is moving toward ubiquitous making and exchanging of visual communication, as anyone with a smartphone can make an internet meme with worldwide reach and influence.

In developing a methodological perspective on participating in this space, established methods of design fail to capture the nature of production in the digital and online environment (Bruns 2007). These methods capture an era of material artefact production of the 20th century where there are sharp distinctions between producers and consumers, and designers and non-designers, and online image making contains production processes outside of this nature. In online image making, participation is open and copies of artefacts and ideas flow as resourceful users cobble together images from whatever they can find in the converging media landscape, making new parts only if necessary. Users across a spectrum of anonymity form ad-hoc collaborative structures, swarming around projects as required and cohering through memetic

consensus (Blackmore 1999). Understanding participation in this space requires turning to emerging media production processes where there are no distinctions between producers and consumers, or designers and non-designers. This transition provides insight into new material artefact production processes as material culture increasingly becomes digital and online.

To develop a methodological perspective on participation in online information warfare using images, this thesis uses visual research (Noble & Bestley 2005), practice-based research and ethnographic techniques (Muratovski 2015) to generate a set of methodological tools. The first of these tools is the *model of symmetrical media exchange* capturing the processual nature of the environment of ongoing exchange between participants emerging as central to the digital and online space. This modelling finds ongoing perception shifting as key driver of continual media exchange, and framing as the key process of both making and viewing artefacts (Entman 1993). Accompanying this modelling is an investigation of perception shifting in material culture, using actor-network theory (Law 1999) as a sensibility toward framing and frame shifting, finding frames of operation as useful methodological tools offering decision making sensibilities toward operation without outlining rigid specifics.

Following this finding, the *frame of visual media exchange* is developed through case studies of found artefacts alongside practice-based research to capture the sensibilities of making and exchanging visual communication in this environment. The sensibilities of working demonstrate disregard for authorship, consideration of artefacts as always incomplete, liberal duplication of artefacts at zero marginal cost, rapid and public feedback loops, non-linearity of artefact formation and production timescales, organisation around memes, and working on personal interest topics. This mode of operation produces the *memetic warfare campaign frame*, a new kind of visual communication design activity native to online information warfare.

Through a case study of the #DraftOurDaughters memetic warfare campaign conducted during the 2016 US election campaigns (Wall & Mitew 2018), this activity is found to emerge from a sensibility of development in public, widespread use of open source

protocols, anonymous participation, and decision making through memetics. Finally, the *frame of online material culture* is proposed, a working anticipatory frame of operation illustrating possible emerging sensibilities toward material culture as it increasingly becomes digital and online. Under this frame, material culture operates under mass customisation, non-linearity, finding frame-alignments, battling of agencies, and a general landscape of information warfare.

Acknowledgments

Many thanks to my supervisor Ted Mitew. The last few years has been quite a wild ride, and navigating it has only been possible with the perspective I've been able to form under the freedom you have given me, your recommendations, your feedback, a vast set of things to watch and read I will never get through, and your ongoing analysis of the happenings. Also thanks to my teaching and research colleague Doug Simkin for your ongoing insights on these matters as well.

Thanks to my co-supervisor Gregor Cullen for reminding me where I started, and pointing me back there when I need it.

Thanks to everyone at TAEM for your always useful conversations, assistance, tips and tricks. That awkward moment where you ask how my writing is going can finally be answered a bit differently.

Thanks to every student who has ever been in any of my classes. You may recognise a lot of what you find in this thesis... much of it was tested and refined through conversations with you.

Thanks to my family and friends for your patience. I should be better at returning your messages and phone calls now.

Finally, many thanks to Jackie for your love, support and patience.

Certification

I, Travis Wall, declare that this thesis submitted in fulfilment of the requirements for the conferral of the degree Doctor of Philosophy, from the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

Travis Wall

August 2019

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Glossary

Design thinking	Design thinking is a catch all term to describe the kind of thinking that designers do. It encapsulates the set of strategies and tactics toward making things that have been studied and documented by researchers studying the processes people use to make things (Cross 1982). This research has identified that fundamental to designers making things is an ongoing loop of analysis, synthesis and evaluation (Lawson 2005). The term contrasts tangible artefact and intangible thinking to demonstrate the reflexive doing and thinking nature of designing.
Heterogeneous engineering	Coming from the field of research known as actor-network theory, heterogeneous engineering is an analytical and action taking sensibility denying strict sociological determinism or technological determinism in any scenario. Instead, any kind of sociological or technological outcome is viewed as an outcome of a heterogeneous set of actors where both sociological and technological workings are at play (Latour & Woolgar 1979, Law 2009, Callon 1987).
Information warfare	Use of information with the specific aim of gaining advantage over a target (Berkowitz 1995). This can operate at the level of information infrastructure to gain advantage via enhanced coordination through information, or penetration of opposition communication for theft or disabling communications. It can also involve targeted use of information within communications systems for psychological impact. The rapid advancement of communications technologies over the

	<p>course of the second half of the twentieth century has seen information warfare quickly advance, with new ways of conducting information warfare continually emerging (Libicki 1995).</p>
Visual communication design	<p>Visual communication design is the use of visual based communication with an objective of modifying the behaviour of people (Frascara 2006, Tyler 2006). This is performed through the use of information and/or data combined with visual language (shape, colour, image) to produce communication leading to the audience performing a particular behaviour.</p>
Frames	<p>Frames are used for information bounding in order to overcome the overwhelming interconnectedness of information. Frames are used to organise and limit incoming information from a complex and chaotic environment through selection and salience of particular information elements (Entman 1993). Frames can exist as a cognitive filter in people's minds to help them handle and process incoming information, and frames are also used to devise conception and production of an artefact.</p>
Meme	<p>A meme is a unit of culture that spreads throughout a population of people. Memes spread via replication through imitation, and with slight variation in the copies, leading to cultural evolution (Dawkins 1976, Dennett 1995). Memes can manifest as combinations of artefacts, behaviours and ideas, leading to the occurrence of multiples of people cohering under shared socio-material practices. Memes are used generally to explain human cultures, but can also explain things like fashion trends,</p>

	<p>subcultures and religions (Blackmore 1999). The general idea of cultural memes are not to be confused with internet memes, a kind of image that spreads across the internet that has been called a meme because it acts with the same properties of replication and variation as cultural memes.</p>
Memetic warfare	<p>Memetic warfare is an emerging field of information warfare that uses online images to achieve objectives of psychological impact to damage an opponent and shift the perspective of an audience on a particular issue (Giese 2015). It uses online internet memes to impact the cultural memes to generate wider cultural change.</p>

Chapter 1

Introduction

The shift in production of material artefacts to both digital and online making has been extremely disruptive to material culture. This opens up an opportunity to understand the dynamics of these new production processes. Design has typically concerned itself with studying the making of artefacts in order to develop a better understanding of the ways people go about shaping the world around them. The present thesis aims to contribute to this lineage of research by studying the production and dissemination of images in an online information environment to shed light on emerging practices and themes of making in the digital and online environment.

Focusing on the problem and opportunity, the first part of the present chapter will define the online information environment as a kind of information battlefield that has appeared through the development of our ubiquitous digital and online communication technologies landscape. It will also look at the use of images in this space. The second part will position the study of making images in this environment as a design issue connected to the lineage of practicing visual communication design. Methods of design, a research area within the field of design research that studies and generates processual documentation around artefact generation, will be overviewed for concepts relevant to the construction of a processual perspective on doing digital and online image making. Then, visual communication design will be examined specifically to get a hold of the mechanics of the discipline and the role methods of design play in this practice. Putting these findings together, we will reveal a need for generating methods of design in the production and dissemination of images in the online information environment. As we will see, this is because the key characteristics of rapid production, continuous development and open collaborative structures differ to the conventional processes of design related to visual communication design. The third part details the contents of three chapters that will construct these new methods. Through this construction, we will also see how these characteristics are central to ideation, refining and propagating influential content. The content of the concluding chapter will reflect on how these

findings yield insight into wider themes of making in the digital and online environment.

Part I: The Problem and Opportunity:

Ubiquitous Information Warfare

Marshall McLuhan wrote in 1970 that, “World War 3 is a guerrilla information war with no division between military and civilian participation” (p. 66). This statement is typical of McLuhan in its sweeping and enigmatic nature, much like his most famous statement “the medium is the message”. However, much like many of McLuhan’s statements, pulling apart the statement can generate insight about ways of understanding ourselves individually and as a society as well as the relationship we have with the technologies we use. Once we have done this, we will see how McLuhan is pointing to where we find ourselves today and what this might mean for identifying new methods of design. To unravel McLuhan’s statement, first we will sketch out what information warfare is before moving onto what McLuhan is trying to tell us about the ubiquitous participation in the environment of information warfare he anticipates.

Conventionally and broadly, information warfare refers to the “use of information systems—computers, communications networks, databases—for military advantage” which can be used as infrastructure to enable operations, or locations of attack on an opposition (Berkowitz 1995). This describes the location where information warfare takes place. However, what it actually looks like in practice is impossible to define as activities of information warfare defy stable categorisation or typologies. Furthermore, in practice information warfare is not strictly a military activity, but as Megan Burns (1999) suggests, it can apply in “any competitive situation, public or private, civilian or military”.

Martin Libicki’s book, *What Is Information Warfare* (1995) offers a thorough charting of the landscape of information warfare from which we can get a sense of the breadth of information warfare. A starting point is to think of information warfare in two categories: firstly, in information infrastructure; secondly, in information content.

Information infrastructure is the communications technology networks that facilitate the flow of informational content. Information warfare in an infrastructure sense is the less complicated of the two, and might look like attacking physical information infrastructure in order to disable enemy communication (p. 9). Information warfare in the content sense is highly complex and deals with manipulating the actions of others through argumentation in conjunction with dynamics of information possession, acquisition and suppression. In practice this might be any combination of psychological warfare through strategic use of information for persuasive or rhetorical purposes (p. 35), espionage or information theft (p. 49), or even economic warfare (p. 67). A combination of both infrastructure and content information warfare might look like flooding an information system with more information than it can process, leading to it ceasing to operate (Mirkovic & Reiher, 2004). Many of these activities now take place in the digital and online space using ubiquitous digital communications technologies. As more objects and information systems become digital and come online, the digital and online environment becomes populated with the internet of things (Al-Fuqaha et al. 2015). Therefore, there is capacity for many of these activities to operate with global reach, to exist in tandem, and to rapidly evolve or converge (Robinson, Jones & Janicke 2015).

While this definition is still broad, we have a sketch of the landscape we are operating in. It is a globally expanding ecosystem of communications technologies and information content. Our most commonly used communications technologies such as televisions, phones and even home appliances, which are connected and form part of the landscape, contribute to its expansion. Information warfare is the operation within this ecosystem to try to gain advantage. It is at this point that we can return to McLuhan's statement and turn our attention to the role people play in this environment, and to how they might be operating as guerilla participants where there is no distinction between military and civilian participation.

Much of McLuhan's work is at its core anticipating growing ubiquity of information and communication technology where people can communicate with each other in real time across vast distances, and the consequent idea of the global village (1962).

McLuhan's writing, however, is never as simple as it appears on the surface. To get a sense of where McLuhan is fitting ubiquitous information warfare into the trajectory he proposes, one can turn to his perspective of technologies as extenders of man (1964). Through this conceptualisation of technologies, McLuhan does not exactly predict the internet or what we might think of as communications networks, but does point to a landscape of ubiquitous access to technologies where people have capacity to extend themselves at a global scale. Our ubiquitous landscape of internet connected devices, such as smartphones, tablets, watches, and desktop computers, resulted in these extensions. We can see these technologies extending ourselves and their advantages such as chatting to friends on the other side of the world, or visiting a bank from our dining table. However, McLuhan's statement indicates that he is not just anticipating a global village of these benign communications. He was always concerned with human potentiality to misuse these communication technologies.

With our sketch of the landscape of information warfare in place, and McLuhan's concept of technologies as extensions of human nature, the final part of McLuhan's statement referring to lack of distinction between military and civilian participation in information warfare becomes clear. Information warfare is no longer exclusive to military operations, but can be used by any individual or group to gain advantage. This generates conditions resembling fourth generation warfare, where lines between combatants and civilians are blurred in warfare conducted across a comprehensive front combining political, economic, social and physical combat (Lind & Thiele 2015). While capabilities may vary, any military, political, commercial group or individual can conduct information warfare to gain advantage of any kind, including a state actor conducting mass coordinated systemic economic warfare, a lone hacker accessing credit card information using the public internet and a desktop computer, or as we will see, a graphic designer using a smartphone to wage psychological warfare through strategically composed internet memes deployed onto social media.

Evidence that we have indeed entered in this space of ubiquitous information warfare is mounting. Digital and social media is increasingly becoming a space of conflict (Zeitsoff 2017), transforming from simply sharing messages and media with friends and

family to an algorithmically mediated battlefield of public opinion through strategic use of information shared by all kinds of states and non-state actors trying to shape public opinion through use of information (Prier 2017, p. 51). From among many examples and studies several key studies are discussed here to help develop a sense of the key issues.

US military strategists David Ronfeldt and John Arquilla propose that we live in an era where soft power has become a successor to hard power (2020). Writing from the perspective of US military strategy advisors, they build on the idea of the *noosphere*, a concept with developmental lineage through the 20th century proposing that there is an emerging third sphere of the earth alongside the existing geosphere and biosphere titled the noosphere, which is a global informational and collective intelligence ecosystem that anybody connected to the internet is participating in (2020, p. 7). Ronfeldt and Arquilla demonstrate that with the presence of a noosphere comes a new kind of warfare that they call a *noopolitik*, which is a warfare taking place primarily in the noosphere. *Noopolitik* differs from the *realpolitik*, where warfare took place primarily in our geosphere and biosphere. They advise that state-based US adversaries have embraced noopolitik, which is a patchwork of informational and narrative forms of warfare with murkier and more unstable categorising than the warfare of *realpolitik*, albeit not without lineage to existing concepts associated with warfare:

They go by many names: information warfare, information operations, cognitive warfare, political warfare, memetic warfare, epistemic warfare, neocortical warfare, perception management, and strategic deception, along with such older terms as the war of ideas and the battle for hearts and minds and newer terms about weaponized social networks and weaponized narratives. (pp. 42-43).

Ronfeldt and Arquilla point to McLuhan directly, mapping the noosphere to McLuhan's concept of the "global village" (p. 19), and it would seem that the concept of noopolitik would also derive from McLuhan's conceptualising of information warfare.

Examples of this warfare at a state based level exist, although it can be at times difficult to point to due to the deliberately murky nature of these operations. A 2015 analysis of Russian warfare (Thornton 2015) points out that the Russian state's approach to geopolitical conflict follows a "contactless war" (p. 44) doctrine, where information warfare is the primary military operation "to be fought in the mind" with physical conflict as support (pp. 41-42). This analysis suggests that Russia uses systemic information warfare across all media to set up civilian perception and narratives that result in Russian geopolitical maneuvering to go unnoticed or even supported while also sowing discord in opponents of these moves, with the Russia-Ukraine conflict used as an example. Social media then generates fourth generation warfare conditions where lines between civilians and military are blurred, as people are persuaded by state based messaging, they themselves become propagators of the state based messaging on social media through their own commenting, sharing of content or media production. In a similar example of state-led information warfare targeting civilian populations, a US military document published in 2020 titled 'Chinese Communist Party Information Warfare US-China Competition during the COVID-19 Pandemic' (Chan & Loftus, 2020) details how the Chinese state is "waging an aggressive information warfare campaign to obfuscate its role in propagating the COVID-19 pandemic and to portray its response as a triumph of its authoritarian model of governance" (p. 1). This document details themes of Chinese government messaging on global social media platforms such as Twitter as well as the ways they are designed to shape narrative and public opinion favourable to China.

Non-state actors also play a significant role in this conflict space, functioning as anything from direct opposition to states and other non-state actors to working in tandem. An example is Wikileaks, which acquired and released the emails of former Hillary Clinton campaign manager John Podesta during the 2016 US election campaign (Proferes and Summers, 2019). It is unclear exactly how Wikileaks obtained the emails or what the motives were of releasing them, but in any event the release and distribution of key emails over social media platforms damaged the Clinton election campaign (Enten, 2016). Another example of information warfare blending state and non-state actors is the use of information networks by the Islamic State of Iraq and Sham (ISIS) in

recruitment, propaganda, and subsequent information conflict between ISIS and a coalition of state and non-state ISIS opposition. ISIS famously made violent propaganda and recruitment materials widely accessible on popular content platforms such as Twitter and YouTube, which was countered by the owners of social media platforms through content bannings, independent hackers attacking ISIS information networks and the US government producing counter narrative propaganda. To counter this, ISIS then developed alternative content distribution through adopting new platforms, anonymous digital portals and encrypted communications channels (Shehabat and Mitew, 2017). The QAnon phenomena is another example that defies all conventional categories of state and non-state actors, information leaks, narrative and counter narrative control. QAnon is a name to ongoing information and narrative phenomena that first appeared in 2017 as an anonymous user going by the name Q claiming to be a high level insider of one side of a war within the global elite, leaving cryptic messages and clues as to the progress of a plot where “Donald Trump is secretly working in league with Robert Mueller to arrest Hillary Clinton, Barack Obama, and other members of the Deep State who are working to destroy our nation” (Zuckerman, 2019). It is unclear whether Q is an individual, a group, a state actor, a non-state actor, completely false or completely true, but nonetheless Q has developed a strong online following and developed into a movement, with groups of people propagating the messages across social media and performing detailed investigations into clues in Q’s messages.

In all cases, we have all facets of McLuhan’s statement appearing in our digital and online environment. We have a variety of information conflicts appearing across the media landscape where there are no distinctions between military, civilian, state and non-state actors; and entry points or guerrilla participation is open to anyone with ubiquitous communications technology. This kind of information warfare is operating beyond use of just simple rhetoric, instead using rhetoric alongside strategic information deployment. Just through the examples above, we can see how state and non-state actors are using information, whether stolen, or leaked, alongside carefully constructed narratives. It is more than just argumentation; it is, in fact, strategic control of the information pool that argumentation is built on.

One can get a sense of just how murky this space is. While we have established that information warfare operations tend to defy stabilised categories, there are more layers to add to the perplexing nature of information dissemination in the digital and online environment. The evidence that these information warfare operations are even conducted is arguable, as the use of proxy actors by combatants (Chivvis 2017, p. 3) and subtlety of operation makes pointing to information warfare often plausibly deniable. One can also see how individuals can knowingly enter these conflicts with little barrier to entry. Examples include people individually trawling through thousands of John Podesta's emails and circulating what they find interesting, or individuals investigating messages by Q and developing their own theories on what has been communicated. The participatory nature of social media adds to this; the people whose opinion has been successfully shaped through this information become spreaders of that message as they participate in discussion on social media. In short, any person using social media might be a combatant in an information war *without even knowing it*.

Images in Ubiquitous Information Warfare

Whether the information used in information warfare is data, factual, narrative, stolen, fictional, instructional or anything else, there are many forms that this information can take for spreading across the digital and online media environment. Here we will focus on images, which play a prominent role in our current digital and online media environment.

The screen based devices connected to this space such as computers (laptop or desktop), phones and tablets, have become ubiquitous and are ideal for both producing and consuming images. The images online are not just photographic images, but images combining photography, text, graphic objects etc, which are typical of the material artefacts of graphic design. The landscape of artefacts of graphic design in this digital and online space of many-to-many production and consumption is wildly varied. We would expect typical professional communications with the artefacts of graphic design. We will also encounter anything from internet memes, where many variations of images are used to communicate ideas such as the 'distracted boyfriend' meme as shown in Figure 1, to collages, which can be used to convey complex commentary and messaging

such as Figure 2 depicting Donald Trump and Chinese electronics brand Huawei on the “Huawei To Hell” (in reference to rock band AC/DC).



Figure 1: The distracted boyfriend meme popular on social media in 2017-2018.¹



Figure 2: Image collage of US President Donald Trump circulated online following news of banning the sale of products by Chinese electronics manufacturer Huawei in the US.²

¹ More information on the distracted boyfriend meme including history, analysis and many variations can be found at <https://knowyourmeme.com/memes/distracted-boyfriend>.

² Throughout this thesis, many of the images presented are found on social media, exist in multiple locations and circulated often from an unknown point of origin and authorship. Unless the point of origin is particularly relevant (such as in Chapter 4 Distributed Design in a case study of image board 4chan as a location of coordinated image making), the images will be presented without a specific point of origin or author.

Ubiquitous communication devices are capable of creating all the components of graphic design through built in cameras, software applications capable of creating graphics and text, and the simple function that images viewed on the device can be saved to the device and modified through combining with other images, graphics or texts.³

Artefacts of graphic design are described by graphic design writer Jorge Frascara as use of visual communication for the purpose of changing minds, with the aim of “modification of people’s attitudes or abilities in one way or another” (2006, p. 31). Focusing on behaviour, another graphic design writer, Ann C. Tyler defines artefacts of graphic design in more detail as “to induce the audience to take some action; to educate the audience (persuade them to accept information or data); or to provide the audience with an experience of the display or exhibition of a value for approval or disapproval, with which an audience may wish to identify or reject” (2006, p. 36). These descriptions share concerns with the objectives of information warfare and, in particular, psychological warfare, where information is disseminated targeting the minds of audiences for the purpose of changing their behaviour that would lead to advantage (Robinson, Jones & Janicke 2015, p. 7).

Information warfare uses any kind of image, from entirely original compositions to collages created using entirely found pieces. This environment of ubiquitous graphic design production and distribution capacity is ripe for guerrilla operation. Much like any forms of information warfare, the reach of these images operates in tandem with other technologies or information systems. For example, images created are stored in

³ Adobe’s well-known industry grade image editing application *Photoshop* is highly accessible and will comfortably run on consumer desktop and laptop computers, as do many variations and clone applications (Alternativeto.net, 2019). Applications for photo editing on mobile devices are also widely available, with Adobe developing mobile versions of image editing software for tablets (Adobe 2019), as well as a wide variety of independently developed applications available for tablets and phones, which are easily found on Apple’s iOS App Store (Apple 2019) or Google Play (Google 2019). In addition, learning to use this software is considerably open, as a simple search on YouTube for instructional videos will present endless high quality demonstrations. We will further explore the culture with which users operate in this ecosystem of applications and digital and online making in Chapter 3: Swarms and sensibilities.

databases, and are delivered to users by algorithms on content delivery platforms. It is this combination of image content and information distribution systems that are then leveraged by any individual or group to whatever outcome they may be aiming toward. The ubiquitous image production capacity of these globally networked devices means the extension of influence using images is worldwide.

The study of internet memes is an emerging research space that traces and analyses the spread of image content using these networks, both in terms of the production and spread of media objects often existing in many slight variations (Gal, Shifman & Kampf 2015). It also studies how creation is driven by remixing and recontextualising recognisable images to create novel ways of carrying and distributing messages within cultures (Milner, 2013a). This content, as a kind of graphic design that is used in information warfare, is emerging as a practice known as *meme warfare*, albeit not explicitly recognised as a kind of graphic design despite a shared objective. Chris Rodley (2016) documents meme warfare as component of the 2014 Israel-Gaza conflict where user-generated images distributed on social media were a feature of the propaganda component of the conflict, with many images circulating using a wide range of messaging techniques from emotional targeting featuring well-known popular culture figures to infographics displaying data about the conflict, as illustrated in Figures 3 and 4 below. A similar example by Bradley Wiggins (2016) documents the use of images created as part of the Ukraine-Russia conflict, as illustrated in Figure 5 below. In the present thesis, we will see more examples of using images in a misinformation campaign as part of the 2016 US election campaign.⁴

⁴ An early version of this study was published as: Wall, T, and Mitew, T 2018, 'Swarm networks and the design process of a distributed meme warfare campaign', *First Monday*, vol. 23, no. 5-7, <https://firstmonday.org/ojs/index.php/fm/article/view/8290/7202#app>.



Figure 3: Example of image content distributed on social media during the 2014 Israel-Gaza conflict (Rodley 2016).



Figure 4: Example of image content distributed on social media during the 2014 Israel-Gaza conflict (Rodley 2016).



Figure 5: Example of image content distributed on social media during the 2016 Russia-Ukraine conflict (Wiggins 2016).

Image making and operating images in this information environment is a form of material culture worthy of investigation for the reason of learning more about material culture in a digital and online space. Considering this use of images in a targeted manner, could we consider memetic warfare a kind of *graphic design*? If we were to consider these images as a kind of graphic design, could we understand participation in image making in ubiquitous information warfare by using established principles of graphic design and methodological knowledge built up around the practice of graphic design to guide participation in image making in ubiquitous information warfare? In turn, what might this investigation into an emerging digital and online context show us about the nature of design and design activity?

Part II: Situating the Problem and Opportunity in Design Research

Where Do We Sit in Design Research?

By considering images in information warfare as a kind of design, we can use findings from design methodology research as a groundwork to develop an understanding of how to participate in image making in online information warfare. In our questions concerning image making in information warfare, we are looking to build a broad base

of understanding that builds a conceptual framework and a guide for participating in this space.

This kind of approach is known as a grounded theory, which is a form of research that typically appears in design research (Muratovski 2016, p. 98). Broadly, grounded theories are a kind of qualitative research where researchers collect empirical data from multiple sources about an identified situation, and then form a theory about the situation from interpretation of the data (Leedy and Ormrod 2015, p. 102). Continual collection of the data can then refine the theory or generate new questions. Jaccard and Jacoby (2010) point out that the grounded theory approach stands in contrast with typical scientific studies where data is collected to confirm or disconfirm a hypothesis, giving grounded theory an alternative name of emergent theory (p. 256). Grounded theory as a defined practice has origins in early 20th century American pragmatism and was applied in sociology in the 1960s (Locke 2001, p. 34). It is now widely used across many disciplines, particularly those involving messy data collection, including systems of human and non-human entities, such as social work or education (Leedy and Ormrod 2015, p. 274). The complexity of the situations and subsequent data collection that grounded theories arise from leads to the practice of developing grounded theories that require care around problem framing, literature review as well as general knowledge of qualitative data collection methods, analytical techniques and even rhetoric in presenting findings (Jaccard and Jacoby, 2010 p. 256-281). While this may seem like it leads to cloudy outcomes, this combination of techniques has been demonstrated to be effective in generating theory about given situations when existing theories cannot account for an observed occurrence (Leedy and Ormrod 2015, p. 39).

In design research, in particular, grounded theories aim to develop a new theory of material artefact production by studying artefacts and the processes people use to generate them, as well as the context of their application (Muratovski 2016 p. 98). In a design theory context, grounded theory is particularly relevant for describing an emergent technological space and the practices of artefact generation within. Our aim here is then to generate a theory of the production of images in online information warfare constructing our theory from studying images and the processes of their

generation in online spaces. To start, we can look at design literature generally to get an idea of the systemic nature of design literature so that we can position the grounded theory developed in the present thesis.

The Systemic Nature of Design Literature

Bruce Archer, an early and influential writer in design methods, writes in ‘Design as Discipline’ (1979) that the design space is not quite art and not quite science, but a third area of some combination of both that makes up “material culture” (p. 18). Given the breath of the material culture we will need to structure the literature so we can isolate the spaces we will focus on in investigation of construction of a processual perspective on participation in image making in ubiquitous information warfare. This is illustrated in Figure 6:

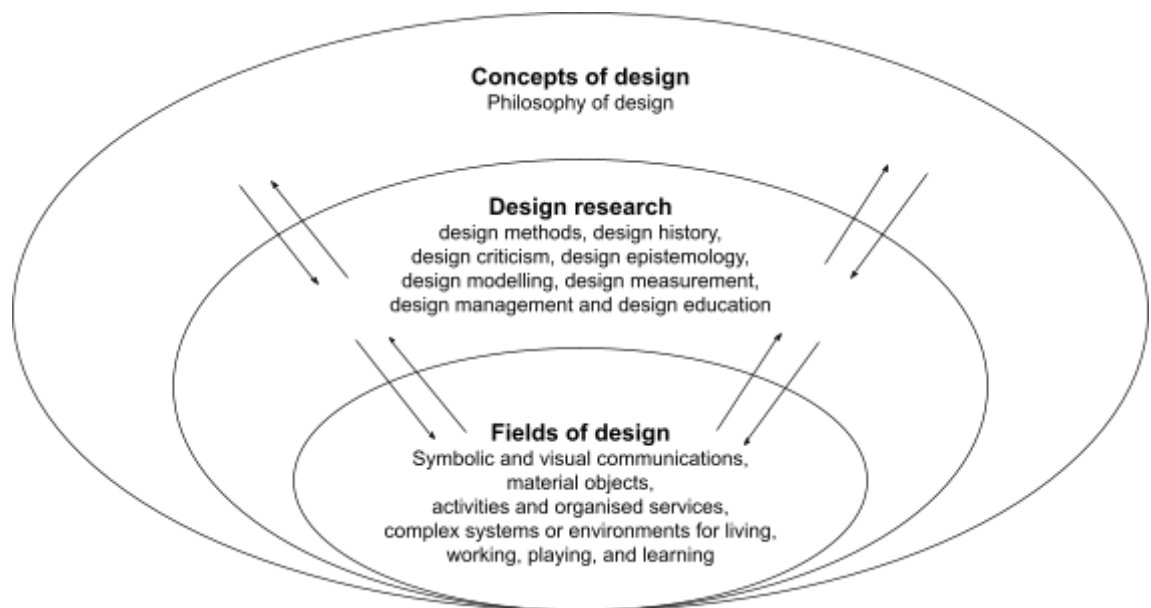


Figure 6: Systemic structure of design research based on Archer (1979) and Buchanan (1992).⁵

Richard Buchanan lays out four areas of this material culture where design appears, which we will call *fields of design*, identifying symbolic and visual communications, material objects, activities and organised services, complex systems or environments for

⁵ All graphs and illustrations are by the author, unless otherwise stated.

living, working, playing, and learning (1992, pp. 9-10). We can place these at the practical foundation of our structure, based on which graphic design could be considered symbolic and visual communications. Bruce Archer notes that the research extracted from design practice belongs to the same family of research themes, as do design methods, “design history, design philosophy, design criticism, design epistemology, design modelling, design measurement, design management and design education” as examples of particular strands (p. 18). As we are aiming to build a grounded theory of the processes of making images in information warfare, *methods of design* is of particular interest to us. In *methods of design*, researchers study designers in a generally ethnographic style as designers go about their design work in specific *fields of design* and document their processes of designing. *Methods of design*, which is a suitable starting point in the present study, will be derived from the field of graphic design.

Above the level of extractions from practice is the *concepts of design*, which is more philosophical in nature and contains hazy but graspable core general themes resonating throughout all the different parts of design literature. It is important to note that while Bruce Archer had listed design philosophy alongside other family members of design, it tends to be different in nature and even further abstracted from practice. This level of literature encapsulates the nature of design from commonly associated ideas of problem solving, creativity, invention and intervention. These broad concepts will help further characterise the nature of image making in a space of ubiquitous information warfare.

The systemic nature of this structure is important because these layers help evolve each other. For example, a process of artefact generation might be observed in a particular field of design that can then be picked up and experimented with in another field. The result is a resonance system where *fields of design*, *methods of design* and *concepts of design* shape each other. This is important to note in the present study of online visual communication design because the methods of design that are observed in this field generate perspectives on design at the concept level.

How we will use this structure is illustrated below in Figure 7, which is a modification of Figure 6 above. This clarifies three distinct spaces we can examine to construct our grounded theory of making images in ubiquitous information warfare. We can work through each of these three layers to determine some of the key concepts and what might be of value to us during the construction of our grounded theory. The systemic nature of design research is important to keep in mind, as findings will resonate through all these levels of design as we are building our grounded theory.

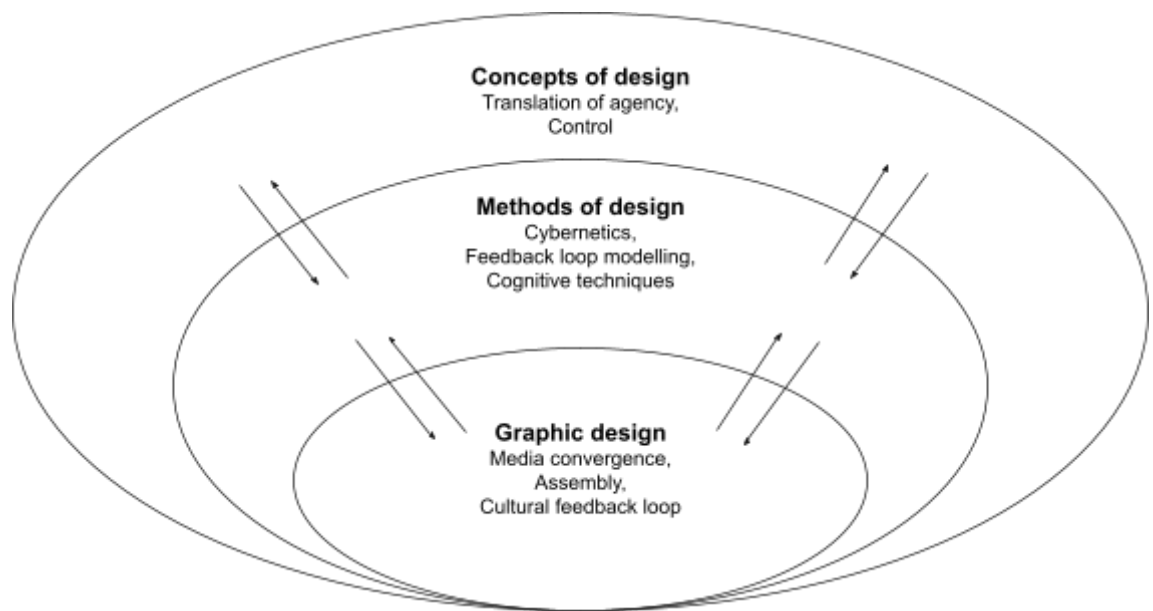


Figure 7: Modified systemic structure of design research demonstrating research areas of the present thesis.

Our first point of examination will be methods of design, as a processual perspective is the main aim of our grounded theory development. Starting with a methodological approach can help shape our investigation of subsequent levels. We can use this examination of methods of design to understand what we might be making as a guide applicable to participation in the space of online information warfare, which uses images. Following that, we can look to the general concept of design we can use as a more general characterisation of the nature of operation in the space of online information warfare. Finally, we can look into graphic design in detail to see what we can use to build specific material artefacts of graphic design processes for our guide to understanding and operating in the space of online information warfare using images.

Following these investigations, we will have a snapshot of what is available to us in constructing a perspective on participation in online information warfare using images. In examining these spaces we will be able to identify further areas of interest useful in developing this perspective.

Methods of Design

Methods of design examine and codify the processes of designers in action. We can examine the nature of these methods for what we can use as groundwork for building our own method of participating in online information warfare using images. As part of the family of research around material culture, methods of design is a peculiar space as documentation tends to not critique or analyse artefacts, but instead looks particularly at the process of creating the artefact, and in many cases the final artefact is not even presented in the research. Documented instead is the development of artefacts and the processes of individual people or teams of people as they move through the project, including the stages of generating initial ideas, prototyping test artefacts, and implementing in a real scenario, which we will examine below. As we will see, the outcome of the documentation generated is a design method, which could be any repeatable process, creative strategy (with varying specificity to steps that can be used) or general philosophical approach observed. The present research is then particularly useful for individual designers looking for processes to implement in their own practices, managers of teams developing material artefacts, and developers of computational systems generating artefacts, or in our case, understanding how to make images in online information warfare. Each field of design will have different methods according to various factors and material affordances. First we will look at the specific aims of design methods, then we will look at what is produced in design methods.

Design Methods: An Historical Background

The historical themes and developmental trajectory of design methods research illustrate the initial problems the field emerged from, and what we can find useful in the field. Avoiding a detailed recount of the historical overview in these texts, we will discuss some points from the timeline and trajectory of the field that reveal fundamental concerns of it as a research topic, and how the findings of it might be useful in

understanding online information warfare. For literature starting points, detailed accounts of the developmental lineage of design methods research by Nigel Cross (1993, 2007) and Nigal Bayazit (2004) reflect on and analyse the development of design methods research from its beginnings in the 1950s.

First, the industrial origins of design methods research are particularly notable for understanding the problem the field of design methods is attempting to deal with. Nigel Cross notes that the appearance of design methods research in the 1950s came about from growth in complexity in professional life created by the expanding breadth of scientisation. Design methods research appeared in an attempt to understand *how to use and string together emerging scientific fields*, which were rapidly appearing from sciences of material engineering to sciences of human behaviour (Cross 1993, pp. 19-20). The origins of this thinking can be traced back to the concerns of the early 20th century European modernists such as the De Stijl and Bauhaus groups in the 1920s and 1930s. Such thinkers generated much foundational philosophical work on devising artefacts in an age of industrialised global mass production, with particular focus on optimisation of energy and material requirements in creation of artefacts optimised for human use in the emerging industrial culture (Bayazit 2004, p. 17). As we will find in Chapter 3: Swarms and Sensibilities, this is important to note that production of artefacts of visual communication design is at odds with industrial production paradigms.

Second, the post WWII emergence of design research is important to note as technological developments during WWII created opportunities and problems that resulted in the emergence of design research in the 1950s. The creativity methods that were at play in invention of wartime equipment became of interest in the US during the post WWII space race period, with more resources allocated to research into reliable creative methods that could help drive technology invention (Bayazit 2004, p. 17-18; Cross 1993, p. 16). In addition, the information systems and operations management processes developed during WWII generated the field of cybernetics, which is described by design writers Paul Pangaro and Hugh Dubberly (2015) as “the world in terms of systems and their goals” (2015, p. 1):

Cybernetics came into existence at the dawn of the information age, in predigital communications and media, by bridging the way humans interact with machines, systems, and each other. Cybernetics focuses on the use of feedback to correct errors and attain goals. It has roots in neurobiology and found practical application during World War II in the development of automatic controls for piloting ships, airplanes, and artillery shells.

Design methods emerged as an exploration of the possibility of ‘scientising’ material artefact generation through using themes of signal control systems and feedback loops, with this early space of design methods threaded with research in computation and science of decision making that were informing early explorers of artificial intelligence (Bayazit 2004, p. 27). Herbert Simon’s book *The Sciences of the Artificial* (1969) is still considered a major work in the field. This lineage of thinking also goes back to the modern design movement of pre WWII, with Cross pointing to prominent figures in this era Theo van Doesburg and Le Corbusier calling for objectivity and efficient systematisation of material artefact creation (1993, p. 20).

The third and final point to note at this stage is the style and location of this research in terms of profession and industrial application. Design methods research is based in an ethnographic style of observation and documentation of people working in material artefact creation (Cross 1984). Early studies in the field came from studies by engineers and architects documenting their problem solving process as they solved problems of material artefact creation (Bayazit 2004, p. 18). By the 1980s it has extended beyond creation of material objects into general studies of how people go about any kind of problem of planning and invention, such as organisation management or policy making. This expansion was driven by study into problem types by Horst Rittel and Melvin Webber (1973) who argued any kind of problem of planning and invention shared similar characteristics. Of particular relevance to this study is this focus on industrialised settings, as many focus on formalised settings of material artefact creation

within a professional setting, which generally voices concerns over modern workplace culture.

Design Methods Outcomes

The outcomes of research on methods of design typically follow a cybernetic paradigm as a feedback loop of error detection and goal attaining by the designer (or design team) working with a problem and generating a material artefact in response. Methods of design capture the nuances of how designers move through this feedback loop of making something and observing the results of this making. However, observation of action and response may generate insight that changes the original goal, leading to a loop of co-evolution of problem and solution. Paul Pangaro and Hugh Dubberly (2015, p. 9) capture this in discussion of cybernetics, pointing out that “design is not just steering towards a goal ... ; design is also a process of discovering goals, a process of learning what matters ... ”.

The outcomes of methods of design research then tend to fit into two general categories that fit into cybernetic concepts. We will investigate them here to get an idea of what we can use in developing our grounded theory around making images in information warfare. The first kind of methods of design place emphasis on sequence, creating models of feedback loops as generalised methods of designing by capturing the steps of the designer or design team as they analyse problems, generate ideas and test the ideas in context to evolve both the problem and solution. However, as design researcher Bryan Lawson writes, sequential or specific steps are not necessarily the best way to capture the reality of making in this space because these actions are more often than not non-linear in occurrence (2005, p. 48). With this in mind, we will look to capture at an overview level the nature of the process rather than drilling down into specific steps, which we can do at a later stage in this Introduction when looking at particular methods of visual communication design, and through case studies in Chapter 3: Swarms and Sensibilities, and Chapter 4; Distributed Design. The second kind of methods of design positions the designer (or design team) as the signal reading and computing information processor, looking at cognitive techniques used by designers or design teams to generate new ways of thinking about problem scenarios to create ideas.

Action Modelling

A typically cited piece of modelling the design process is Robert McKim's *express, test, cycle* concept where the feedback loop of an illustrator is mapped to demonstrate how the illustrator is involved in a constant process of drawing and evaluating the drawing to decide what to do next, as shown below in Figure 8 (1973, p. 124). This simple model is foundational because it captures the essence of iterative making of design process modelling.

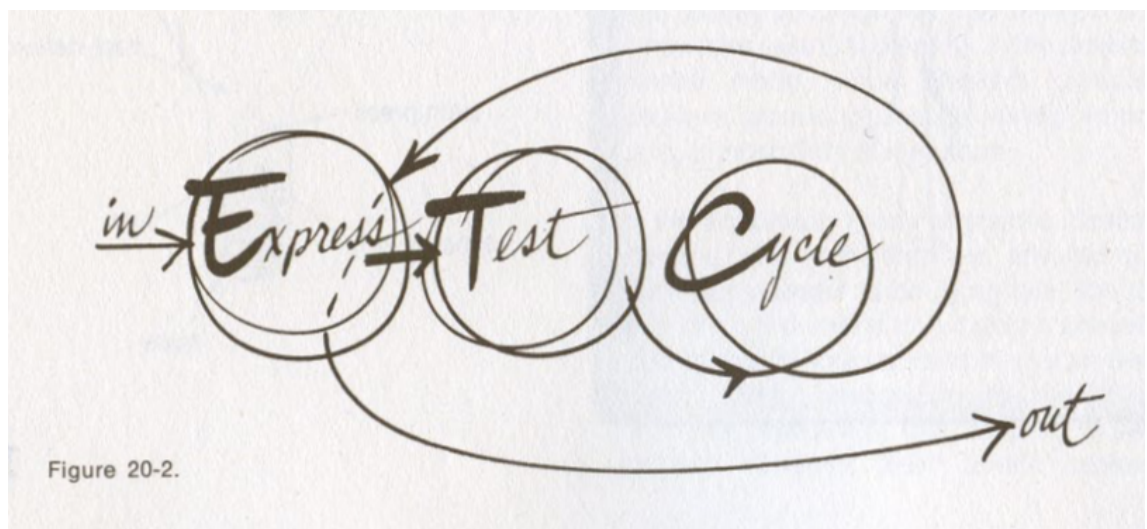


Figure 8: Robert McKim's model of express, test, cycle (1973, p. 124).

Bryan Lawson's book *How Designers Think* (2005) is a foundational overview work on design methods orientated research on design, and in particular the chapter 'Route Maps of the Design Process' charts the models created throughout the lineage of research into methods of design. Lawson presents a very generalised map of the design process capturing the essence of many models of design process, as illustrated in Figure 9 below.

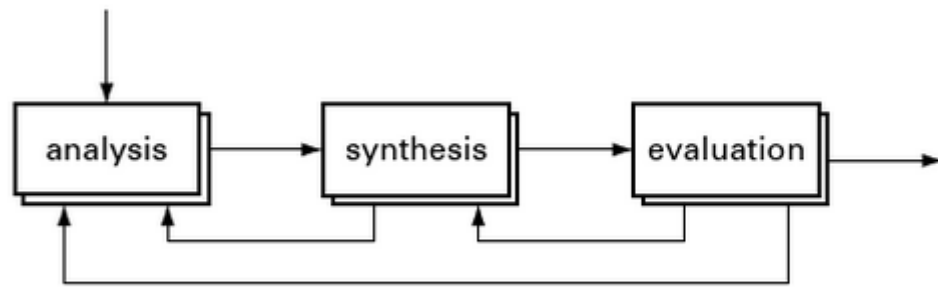


Figure 9: Bryan Lawson's generalised map of the design process (2005, p. 38).

This is clearly a cybernetic process where analysis, synthesis and evaluation are computational like responses to informational inputs in an iterative process. As Lawson points out, this is the heart of the design process however there are many slight variations on this process that play out in accordance to the problem and the materials being worked with. Hugh Dubberly's compendium of models *How Do You Design?* (2005) collects over one hundred modellings of design process, which as a collection illustrates this point made by Lawson. Many of the models collected feature the same fundamental process of iterative exploratory analysis, synthesis, and evaluation until a resolution to the problem becomes stable. The differences in these models arise from the context of the feedback loop. One needs to take into consideration whether the designer is working individually or as part of a team. This ranges from engineering problems within the development of machine components to working with more complex problems involving a broad set of contextual parameters of both social and material requirements.

Notably, models that emerge from work with broader contextual parameters tend to involve more emphasis on ethnographic practice. A typical example is the process model of d.school's empathise, define, ideate, prototype, test as illustrated in Figure 10 below from Stanford University's d.school *Design Thinking Bootleg* (2018). This approach goes by the term "human centred design" (p. i), where observation and analysis of the interactions between people, objects and services, and material artefacts

of the circumstance, and testing ideas is through low cost prototype implemented for intended change. These procedures gather signals from the scenario and aim to produce prototypes of material artefacts to test the signals and to make the process faster through increasing the speed of feedback loops (p. 19).

The process modelling is more inclined toward designing in the complex wicked problem scenarios, identified by Horst Rittel and Melvin Webber (1973), that involve many factors and require an interdisciplinary response. Wicked problem scenarios, which involve tangled human and material factors, are continually evolving. The results of intervention are highly unpredictable and could cause more problems. Because of this complexity, intervention requires integration of various fields, and changing fields that are used in the intervention as the feedback loop iterates.

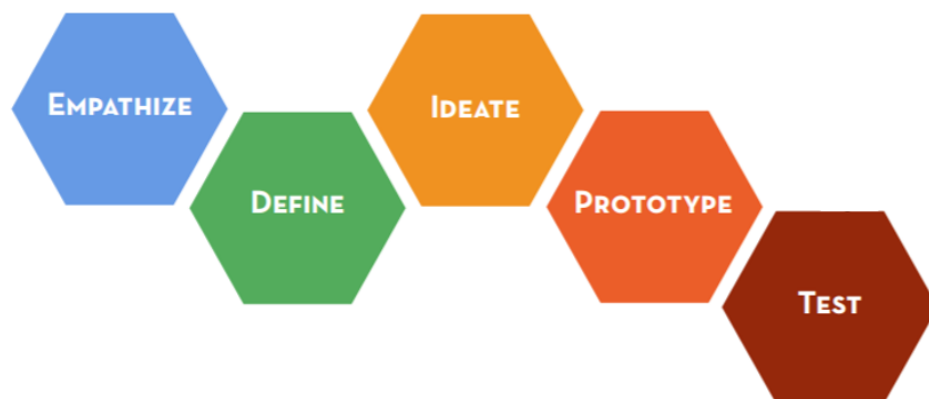


Figure 10: Stanford University d.school model (*Design Thinking Bootleg* 2018).

Materials of artefacts in play dominate the performance of feedback loops in methods of design, as the materials afford the speed of prototyping and feedback signals gathered. For example, software development as a digital and online medium has produced methods of designing with a feedback loop and experimental process to improve the product or service from those possible in practices such as industrial design. It is worth noting the operation of this kind of digitally native feedback loop in the context of our question around processual methods of image making in a digital and online space, as the material foundation of digital and online enabling this accelerated feedback loop is shared.

Common in software development are iterative processes of frequently released software updates, as the medium of computer code and the internet allow for quick updates to be made and sent to users for observation (Savor et al. 2016). There are little boundaries between product conception and product release, a good illustration of which comes from the processual concept of *continuous deployment* that has become common in the 2010s (Chen 2017, p. 72). Continuous deployment is where small software updates are developed and deployed to the platform automatically and continuously, becoming common practice with the proliferation of cloud based software products and services. Netflix documents their frequent updates to the platform on their technical blog, illustrating multiple ongoing branches of development of internal testing, daily updates and weekly updates pushed out across delivery on over 1000 device types, which is driven by the logic of “the faster these features can be delivered ... the faster they can get in front of customers and improve the user experience” (Schmaus 2013). The frequency of updating has also accelerated over this period. For example, in 2009 Flickr was publicly releasing 10 software updates a day, while in 2011 Etsy had released over 11,000 updates within the year (Saver et al. 2016, p21).

Interestingly, digitally native design processes handle problem definition and user feedback gathering through rapid cycles of release and observation. In these fields, the software is released to users and users are observed as they interact with the product. These observations of users drive iteration of the software product, rather than decisions made based on feedback via questionnaire or interview with users that are typical of the above social intervention processes. For example, a common approach within continuous development is testing ideas by running real time experiments on users, where different versions of the software are randomly and unknowingly delivered to users and their use is monitored, and the version delivering the most optimal result is adopted. This process is known as A/B testing, split tests, Control/Treatment tests, MultiVariable Tests (MVT) or parallel flights and has become typical practice in developing software products and services, particularly in user interface development as any element of the interface from visual composition to wording can be tested and best optimal designs is revealed through observing use (Kohavi et al. 2009). This creates a

scenario where designers do not need to make final selections for elements of the artefact outcome, instead they only define variations that will be tested in real time by users and they use metrics revealing the optimal solution out of the variations.

Interestingly, the use of documented methods of design can also be used experimentally and illustrates how the different layers of design function together. Any methods of design documented can be drawn upon by any other field where material artefacts are generated, for example the use of a digitally native process of continual delivery in the context of social intervention, as illustrated in Figure 11 below of experimentation with ‘agile’ methodology in government policy. Agile methodology is the foundation of the continuous delivery methodology described above, emerging in the 1990s in software development where software developers found the affordances of the medium of digital and online allowed frequent and rapid updates to software to fix problems with the software even after it had been released to users, and adjusting the software almost on the fly as they observed user response and discovered user needs that they did not realise before (Dingsøyr et al. 2012). We can think of agile as a methodology sitting in this pool of methods of design for experimentation by other disciplines outside of software design. A transfer of agile methodology seeing increasing is to design of government policy making, as seen in a recent white paper by the World Economic Forum (2018) proposing the use of agile methodology in government policy making models. However, because policymaking and software are very different spaces, with the materials of the field having different affordances and the ramifications of error in a prototype, the methodology of agile needs modification when it is applied to policy making (Bisen 2018). While improving government service through faster feedback cycles seems attractive in principle, releasing daily updates to a policy is obviously not practical. Therefore, adjustments to the method need to be made (in turn spawning new methods).

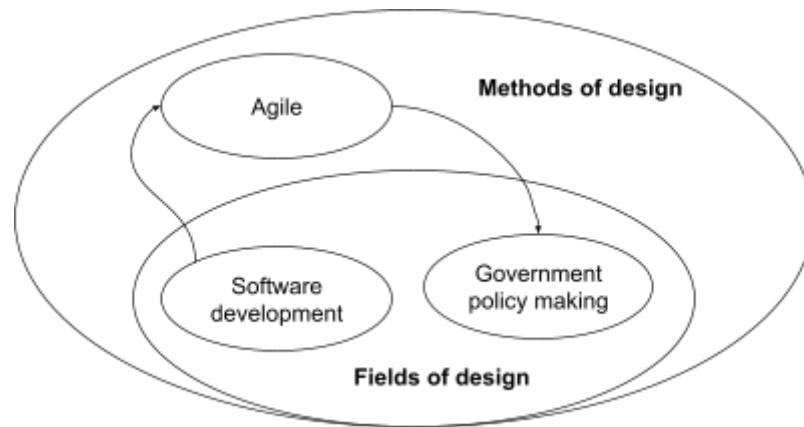


Figure 11: Drawing upon the methods of design from software development of agile, and applying to government policy making, illustrating how the different layers of design function together.

With this snapshot, we can see through examining these models of designing. It appears constructing a processual perspective on image making in information warfare requires a cybernetic looping model as foundation, and the characteristics of digitally native feedback loops should form a guide to how the affordances of the materials will shape the operation of this loop. Next we will look at human cognition in the design process.

Cognitive Techniques

Because analysis and synthesis are the heart of the design process in this cybernetic loop, cognitive process and techniques are also important to design. We will again take the approach of taking a quick snapshot of the main concepts with the idea that we can return to these concepts as required within our contextual circumstances throughout the present thesis. In his cybernetic perspective, Norbert Wiener considers the brain and computational machines as analogous in terms of the fundamental concept of information input and output systems, and both playing the role of units performing information processing, spending a whole chapter of *Cybernetics: or control and communication in the animal and the machine* (1948) to this concept.

Research in design methods has taken this perspective of sorts, taking a position of humans as the computational processors at the middle of the cybernetic system of design, investigating how it is that designers go about their computational processes in

attempting to solve given problems. As Willemien Visser writes “In cognitive psychology, ‘problem’ is a technical term with a precise definition: It qualifies people’s mental representation of their task” (p. 16). This mental representation is foundational to methods of design in two fundamental ways: firstly, studying how it shifts during the iterative course of problem solving; and secondly, studying how to manipulate it to generate innovative outcomes to the problem. This mental representation is known in design as problem framing, and is described by Donald Schon (1988, p. 182):

in order to formulate a design problem to be solved, the designer must frame a problematic design situation: set its boundaries, select particular things and relations for attention, and impose on the situation a coherence that guides subsequent moves.

This operates processually in the cybernetic foundation of methods of design, where framing is a constant process of making and evaluating, or framing and reframing. This resonates through Robert McKim’s express, test, loop cycle above, mapping the feedback loop of an illustrator where the illustrator makes and evaluates to instigate the next stage of making with the previous evaluation in mind. In Schon’s terms, this might be setting different boundaries, selecting different things and relations, and imposing a different coherence for evaluation.

Building on these foundations of strategies of creativity as core to the interests of methods of design, current research investigates use of linguistic approaches to defining and characterising the circumstance. It, in turn, manipulates perception of the problem, which can generate new ways of thinking while also attempting to handle the appearance of unknown variables that complex problems produce. An example is the work of Kees Dorst in *Frame Innovation* (2015), documenting methodological approaches to reframing through a variety of case studies, which involve collaboration with organisations to work with complex circumstances such as social housing (p. 7) and smart work hubs (p. 110) and nightclub districts (p. 31). For instance, Dorst provides an example of working with the Sydney Opera House illustrating perceptual change techniques, manipulating problem statements “If the problem situation of the

Opera House podium is approached *as if* it is a problem of providing contemplation or spiritual experience, *then* the podium should be ... “ (p. 84) or similarly in thinking about the problem of anti-social behaviour in Sydney’s King Cross Nightclub district, Dorst illustrates opening up new opportunity about the circumstance by thinking of the district as if it were a music festival, and the innovations this reframe could possibly bring in (p. 32-33). As we can see from these examples, this framing approach uses metaphor and analogy to describe the problem to open new ways to think about the problem (Pee, Dorst & van der Bijl-Brouwer 2015, Evcil & Usal-Yalcin 2017). This approach shifts the characterisation of the situation from low level descriptors to high level abstract concepts in order to reformulate the brief or problem (Kokotovich & Dorst, 2016). Bec Paton and Kees Dorst (2006) also illustrate how clients and designers find a frame alignment by working through an iterative process of briefing and debriefing, where “mutual understanding of what the project will be about” (p. 575) appears and stabilises through discussion, sharing of documents and prototyping.

We will return to framing later in detail in Chapter 2: Framing and Reframing, where we will find that constructing an approach of constructing frames of operating is more appropriate image making in online information warfare than a strict methodological approach. As we can see from the examples of framing above, a frame is a loose but flexible decision making tool capable of handling a wide variety of variables that appear in it. This flexibility makes frames useful for transfer from one context to another, and more robust than a methodological framework which may be prone to being overwhelmed and fail when transferred to a situation outside of where it was conceived. For example, transferring agile methodology as a method of producing government policy requires the methodology be modified because software code and software development teams have different properties to policy documents and bureaucrats. But, transferring a *mindset* of improvement through faster feedback cycles transfers robustly as an operational approach, with decision making and practicalities of the unique circumstance flowing from the frame. This is especially important given the wide variety of content formats that might appear as image making in online information warfare, and the continually evolving and converging nature of information warfare.

Throughout this snapshot of methods of design, we have seen that the way feedback loops run and are facilitated by designers varies significantly across contexts. We have also seen that the use of framing in both individuals and groups are key issues of the process of designing. We will return to and expand on both of these points as required within our contextual circumstances throughout the present thesis as we develop our understanding of participation in online information warfare. Next, we discuss a more general concept of design to continue developing groundwork of a design perspective on understanding image making in online information warfare.

Concepts of Design

Considering our structure of design research illustrated in Figure 7, we noted that concepts of design are the outer layer of the structure and are extracted from methods of design and other aspects of the field of design research. The word design can be traced etymologically to sign, and can be traced from Latin *de + signare* (Krippendorff, 2006). With respect to this lineage, we are looking in particular at the use of design in the post WWII industrial production context, which as we previously noted, is where design research as a body of documentation has appeared from. *Design* is a cloudy term used in many ways, which can appear as either a noun associated with objects of fashion and style, or a verb describing strategic creating of things to achieve some kind of goal (Lawson 2005, p. 3).⁶ To illustrate this confusion, common job titles might be graphic *designer*, industrial *designer*, fashion *designer*, interior *designer*, interaction *designer*, and these job titles also go along with all the people who generate *designs*, such as mechanical engineers, civil engineers, computer engineers, architects, urban planners, policy makers and so on, as we have seen in the scope of the fields of design. Recently large companies such as Johnson & Johnson, PepsiCo and Philips Electronics Nv have created positions of Chief Design Officers (CDO) (Stuhl 2014). This initially seems like semantic questioning, but the term designer can generate confusion as issues around expectations of what people in this field do arise. Do people called *designers* make things look beautiful, or create strategies and things to meet the needs of people? Is making something beautiful *part* of making something work? Henry Dreyfuss, writing

⁶ Vilem Flusser discusses this linguistic trait further in 'About the Word Design' (2008, p38).

about industrial designers, in particular, in *Designing for People* (2003, pp. 14-15), captures how designers incorporate many fields of work into their activity:

Within the last twenty-five years that the profession has come of age, partially because a successful performer in this new field is a man of many hats. He does more than merely design things. He is a businessman as well as a person who makes drawings and models. He is a keen observer of public taste, and he has painstakingly cultivated his own taste. He has an understanding of merchandising, how things are made, packed, and distributed, and displayed. He accepts the responsibility of his position as liaison linking management, engineering, and the consumer and cooperates with all three.

This is a good example of the theme of industrial origins of design and the timeline of expansion of the field from the 1930s to 1950s, and particularly what we have seen from the more interdisciplinary components of methods of design, where the designer plays the role of both ethnographer and engineer.

The Collection of Definitions

To further investigate the concept of design, many attempts at defining design as a field have been made. Vilem Flusser writes in 'About the word design', an analysis of the background of the word design, tracing the origins of the word to Greek and Latin (p. 38):

The words *design*, *machine*, *technology*, *ars* and *art* are closely related to one another, one term being unthinkable without the others, and they all derive from the same existential view of the world. However, this internal connection has been denied for centuries (at least since the Renaissance). Modern bourgeois culture made a sharp division between the world of the arts and that of technology and machines; hence culture was split into two mutually exclusive branches: one scientific, quantifiable and 'hard', the other aesthetic, evaluative and 'soft'. This

unfortunate split started to become irreversible towards the end of the nineteenth century. In the gap, the work *design* formed a bridge between the two. It could do this since it is an expression of the internal connection between art and technology. Hence in contemporary life, *design* more or less indicates the site where art and technology (along with their respective evaluative and scientific ways of thinking) come together as equals, making a new form of culture possible.

Flusser's account is less based on professional concerns than on the liberal art of material culture as described by Richard Buchanan (1992). Herbert Simon in *The Sciences of the Artificial* writes "Everyone designs who devises courses of action aimed at changing existing situations into preferred ones" (1969, p. 111). Indeed, any distinction between designers and non-designers assumes that people using material artefacts in their daily lives are operating without any intent. In a similar manner of talking of design as both a professional and non-professional activity, Tim Brown, CEO of design firm IDEO, in a discussion hosted by Google for Startups on design methods (2014), defined design as:

At it's most abstract level design is about crafting the world around us to meet the needs of us as people ... Through an understanding of people, we can then craft the technology and materials we have at our disposal to create things, they might be products, they might be services, they might be systems, that most meet the needs of those people.

This future orientation has been typical of many definitions of design since design methods research in the 1950s. John Chris Jones (1992) in *Design Methods* (pp. 3-5) writes:

All one can say with certainty is that society, or the world, is not the same as it was before the new design appeared. The new design has, if successful, changed the situation in just the way that the sponsor hoped it would. If the design is unsuccessful (which in many cases is more

likely) the final effect may be far from the sponsor's hopes and the designer's predictions but it is still a change of one kind or another. In either case we can conclude that the effect of designing is to initiate change in man-made things.

Similarly, Koskinen et al. (2012), taking a much more stripped down approach, describe designers as “people who are paid to produce visions of better futures and make those futures happen” (p. 42).

A common line of positioning the concept of design has been making the distinction commonly found in modern education of the two classification areas of education in the sciences and education in the arts, or humanities, and positioning design as a third classification, as we had found in Bruce Archer's above description of design.

Christopher Alexander writes that “scientists try to identify the components of existing structures, designers try to shape the components of new structures” (1964, p. 130).

Developing this further, Sydney A Gregory writes in 1966 (p. 6):

The scientific method is a pattern of problem-solving behaviour employed in finding out the nature of what exists, whereas the design method is a pattern of behaviour employed in inventing things of value which do not yet exist. Science is analytic; design is constructive.

Nigel Cross takes the most developed of such approaches in ‘Designerly Ways of Knowing’ (1982, p. 221):

The 'third culture' is not so easily recognised, simply because it has been neglected, and has not been adequately named or articulated. In their report (Royal College of Art, 1979), Bruce Archer and his colleagues were prepared to call it "Design with a capital D' and to articulate it as 'the collected experience of the material culture, and the collected body of experience, skill and understanding embodied in the arts of planning, inventing, making and doing'.

To distill these broad concepts of design, design seems to be fundamentally *inventive*; it is about *generating change*, it is instigated in an attempt to *solve problems*, and it is generally *future oriented*. When people are considering their actions in these terms, the kind of thinking they are using might be considered *design thinking*.

The term design thinking does highlight important qualities of the process of designing and the term should be used with caution. Since the mid 2000s, use of the term design thinking has seen a proliferation in popular use. Postgraduate courses under the label design thinking, which teach design related concepts to students of business and management backgrounds, have grown in popularity since the opening of the Hasso Plattner Institute of Design (better known as d.school) in 2005 at Stanford University. Books by Tim Brown and Barry Katz (2009) and Roger Martin (2009) advocating the use of design strategies in business management have also drawn significant attention, which have led to the term design thinking and related language elevating to popular buzzword status (Stewart, 2011). Terminology of design has also entered social, health and environmental initiative circles through this popular design thinking trend (Stewart, 2011). The topic was even explored in the documentary film *Design & Thinking* (Mu-Ming, 2012), which featured interviews with significant industry proponents, but suffered from the lack of significant input from the research community where the topic was born. This focus on design process through this popular design thinking term has been met with unease from the design studies community (Dorst, 2011, p. 531; Stewart, 2011, p. 515) who have been reluctant to package design concepts into the neat definition and prescriptive method that attention on the topic has demanded (Dorst, 2011).

The term design thinking does however highlight the processual nature of thinking and doing at the heart of designing. Through the definitions we have just explored, we can conclude with certainty that designing is fundamentally concerned with making things. The term design thinking takes the tangible in “design” as relating to the tangible making of things, juxtaposed with “thinking”, which is a much more intangible exercise, but the two concepts are intertwined. This is captured well by technologist and

cybernetics writer Paul Pangaro in the documentary film *Design & Thinking* (Mu-Ming, 2012) who ponders over the issue by stating “if you’re only thinking, you’re not doing. And you have to do in order to know. And you have to know in order to think better.” In this sense, the term design thinking is useful for considering designing as making things by a process of validated learning. The term design thinking therefore highlights the processual nature of making and doing in order to learn, which then informs further making and doing. The use of the term design thinking is useful in our context of online visual communication design because, as we will see shortly, the online medium facilitates a process of tightly bound thinking and doing by naturally affording rapid prototyping and short feedback loops in the creation of artefacts and evaluation of their functionality.

Design as Control

The key issue of control, which resonates through design, is often ignored. The issue of control lies in the direction of the change; as we can see from the above definitions by John Chris Jones (1980) and Herbert Simon (1969), the aim is to steer the change in a *particular direction*. The example of Apple can illustrate this. Apple’s consumer products are well known for their *design* in the noun sense of objects of fashion and style. Determined to enhance the user interactions with its products, Apple is also known for control over its products, compared to other manufacturers in the marketplace. As pointed by Jonathan Zittrain in *The Future of the Internet and How to Stop It* (2008), key to the logic of Apple’s approach to design is in the following passage by Steve Jobs at the launch of the iPhone in 2007 (p. 7):

We define everything that is on the phone. . . . You don’t want your phone to be like a PC. The last thing you want is to have loaded three apps on your phone and then you go to make a call and it doesn’t work anymore. These are more like iPods than they are like computers

Considering the above conceptualisation of design by Tim Brown, we might consider the Apple approach to design as making decisions about the functionality of the object for the user and the subsequent crafting of the object for only that specific functionality.

This specificity eliminates the possibility of the user using the object for a purpose other than intended by the designer. Zittrain calls this the approach of design making appliances that stands in contrast with the way that Apple developed the Apple II personal computer thirty years earlier, which Zittrain calls *generative* (2008, p. 2):

The Apple II was quintessentially generative technology. It was a platform. It invited people to tinker with it. Hobbyists wrote programs. Businesses began to plan on selling software. Jobs (and Apple) had no clue how the machine would be used. They had their hunches, but, fortunately for them, nothing constrained the PC to the hunches of the founders. Apple did not even know that VisiCalc was on the market when it noticed sales of the Apple II skyrocketing. The Apple II was

designed for surprises—some very good (VisiCalc), and some not so good (the inevitable and frequent computer crashes).⁷

This contrast between *application* and *generative* technology implies that design is fundamentally concerned with the imposition of agency over a scenario. This issue of agency, which seems to resonate through the concept of design as the way of asserting control, makes it fundamental for characterising image making in online information warfare. In this approach the agency of the user is limited by the agency of the designer and the determinations made about what is best, while in generative technology the user assumes greater agency over the technology and can decide what is best. Even if we reflect back to concepts of social design, the complex design method of the *Design Thinking Bootleg* (2018) process and myriad of options for understanding the problem and developing a solution is based in a similar approach; the designer investigates agencies at play as well as what material artefacts could be introduced into the scenario

⁷ In a popular post on Reddit's *Showerthoughts* subreddit, user Jedorawr wrote "Apple treats you like a user, Android treats you like an admin", capturing the idea of the element of control in design nicely. Discussion available at: https://www.reddit.com/r/Showerthoughts/comments/ad6g7r/apple_treats_you_like_a_user_android_treats_you/.

to shift agencies. In any case, the designer (or design team) is fundamentally working with agencies to control the situation. It may be human-centred design, but to *which* humans? Design seems to be about imposing or shifting agencies so that some situation plays out differently, or in a particular way as determined by the designer. This puts the designer, who designs to shift the agency of particular humans and objects of their choosing, at the centre of the process of design. We will explore this further by going outside of design literature, looking to concepts around agency by Marshall McLuhan and Bruno Latour. These concepts tell us more about the extent of translation of agency into material artefacts to give a detailed perspective on how agency is at the heart of working in the space of online information warfare and material culture more broadly.

Agency, or Extensions of Man

Marshall McLuhan's concept, extensions of man captures the way control exists through material culture. In typical McLuhan sense, the extensions of man statement when unpacked contains valuable insights along with numerous connected implications. Considering McLuhan's statement, media is an extension of *human agency*, where agency has been translated into a material artefact. With this expansion, McLuhan's definition of media essentially reads as media is any object extending human agency. We could also work backwards by taking the object and tracing the agency in the object.

We can also move beyond McLuhan to find more arguments that all media contains human agency. One example of this comes from Bruno Latour (1991) who shows us how hotel keys can be extensions of man, and in particular the hotel owners. Latour recounts how European hotel owners successfully directed behavioural change in hotel guests, instructing them to return their room keys to the front desk before going out to prevent them from losing their room key. The answer to this was to attaching a large metal weight to the hotel keys. Hotel owners had tried verbal instruction and signage, but neither were reliable for directing the behaviour of the hotel guests because there were many languages to contend with, and the behavioural change relied on people remembering the instruction and moral obligation of the guests to follow the instruction. However, the hotel owners translated their agency into a heavy metal weight and attached it to the keys, putting their instruction into the weight. Hotel guests then started

doing what the hotel owners wanted them to do, and were happy to do it because it meant dispensing an inconvenient heavy key on their way out of the hotel (pp. 104-105).

This example illustrates how all material artefacts are media, as material artefacts hold translation of agencies that impact other agencies. The implication of McLuhan's statement is that all media contain agency because all human encountering media is interaction with agency. With this in mind, an important question of design research is the logistics of how people extend their agency by translating it into artefacts that are durable across time and space (Law 1999). Holding onto this implication, we will now move into visual communication design specifically, examining it as a field of design where translation of agency occurs in a visual based communication.

Visual Communication Design

To start examination of graphic design and laying out what we can learn from graphic design in understanding ubiquitous information warfare using images. A useful starting position is looking to design researcher Jorge Frascara, who in *Communication Design: Principles, Methods and Practice* (2004) lays out the case for the use of the term *visual communication design* as more appropriate as it captures the key components of a design activity based in visual media (p. 4):

Although the most widely accepted term is indeed “graphic designer,” it is more descriptive and appropriate to say “visual communication designer,” because this definition includes three essential elements of the profession: a method (design); an objective (communication); and a medium (vision).

This terminology also corresponds with our three layers of the structure of design research: the objective of communication with the outer *concept of design* layer; the medium mapping with the *field of design* layer; and the method with the core as a particular activity where the concepts of design play out in a particular field. With this in mind, we will adopt the term *visual communication design* to describe graphic design. We can then use these three components to structure our examination of visual

communication design, starting with the objective and connecting it to the issue of agency as already discussed. When looking at the objective, we will see that the flow of agency in a digital and online environment is becoming more symmetrical between the designer as a producer and the audience as a consumer. We will then look at the medium to see the nature of the medium as a component of material culture and the trajectory of this medium in a digital and online environment. With this grounding in place, we can look at particular methods in visual communication design that use the ideas around objective and the nature of the medium in tandem. Here we will assess what we can find from methods of visual communication design that will help us learn how to participate in this digital and online space.

Objective

In *Graphic Design: Fine Art or Social Science* Jorge Frascara writes that “graphic design is the activity that organizes visual communication in society” (2006, p. 28). Frascara refers to design being commonly called a problem solving activity, but follows with, “the solution to a client’s needs is not the production of the visual communication; it is the modification of people’s attitudes or abilities in one way or another” (p. 31). Echoing this, Ann C. Tyler writes in ‘Shaping Belief: The Role of Audience in Visual Communication’ (2006, p. 36):

the designer attempts to persuade the audience to adopt a belief demonstrated or suggested through the two-dimensional object. The purpose of this persuasion is to accomplish one of the following goals: to induce the audience to take some action; to educate the audience (persuade them to accept information or data); or to provide the audience with an experience of the display or exhibition of a value for approval or disapproval, with which an audience may wish to identify or reject.

The key design concept of control is evident here, as the designer is looking to generate adoption of a particular viewpoint or to modify behaviour by using visual communication. Resonating through this intent is the *extension of man*, where viewpoint or behavioural modification is performed by translation into a material artefact, in this

case an artefact of visual communication design. Richard Hollis' definition of visual communication design holds a foundational concern with translation of agency into an object (2001, p. 10):

The primary role of graphic design is to identify: to say what something is, or where it came from (inn signs, banners and shields, mason's marks, publishers' and printers' symbols, company logos, labels on packaging). Its second function, known in the profession as Information Design, is to inform and instruct, indicating the relationship of one thing to another in direction, position and scale (maps, diagrams, directional signs). Its third role, very different from the other two, is to present and promote (posters, advertisements), where it aims to catch the eye and make its message memorable.

We can see how all three functions of identifying, instructing, and selling are translation of an agency into an artefact, where no longer a person needs to perform the communication, but instead the communication is translated into an object. We can also see how the third role also uses translation of the communication into a material form as an opportunity to be more recognisable and memorable through the form of the elements in the composition.

In a similar vein Jorge Frascara in 'Graphic Design Fine Art or Social Science?' continues this concern with behaviour and the extent of using media to control behaviour. As we see, he argues that it is not just about advertising, but control of any behaviour of people (p. 28):

The behavioral concern has to do with the way graphic communications affect the attitudes and behavior of their audiences. Advertising design is expected to make people buy products or services; political or ideological propaganda is expected to affect people's beliefs and actions; regulatory signs on highways are intended to organize the flow of traffic; teaching aids are supposed to improve learning performance; bank notes

are designed to make forgery difficult and identification of one denomination from another easy. This is the real measure of the performance of any and every piece of graphic design and the proof that graphic design cannot be understood in isolation but only within a communication context.

To illustrate this visual communication design as an instrument of agency, we can take an example of traffic signage, as depicted in Figure 12 below. In this sign there are multiple examples of agency. First, a decision is made by a person or a group of people, that people are to behave a certain way which is driving their cars on that section of road at 80km/h. The traffic sign deals with a problem of how to direct the behaviour of the people to what has been decided as appropriate. To make this agency more complex, the signage may come through a procedural regulation, as the speed limit of 80 might be a standard procedure when there is roadwork. This was the decision some people made at some time in some other location, but is having agency on this particular piece of road, compounding many agencies into the road sign. The decision makers could stand next to the road and tell each car that drives past that they should be driving 80km/h, but this is not very practical, so instead their agency is translated into a sign. This sign makes durable agency across space, as the people do not have to be there, and across time as the sign is there all the time so they do not personally need to be there. The same applies to the sign indicating roadwork ahead, informing each motorist there is roadwork ahead without requiring a person.



Figure 12: Traffic signage (Australia).⁸

Also notable is the symmetry of interaction of agencies in the road sign. We noted that under Marshall McLuhan's concept of extensions of man, all contact with media is interaction because agencies are coming into contact. However as we see, motorists driving along the road cannot talk to the decision makers of the speed limit sign and negotiate a speed limit at the time. The media types listed by Jorge Frascara above are also characterised by asymmetric agency, where communication flow is in a one-way direction. This one-way direction produces an artefact where the producer extends their agency through the artefact, and the consumer has no ability to communicate back to the producer via the same artefact. To illustrate this asymmetry we can look to the image in Figure 13 below. Similar to the example above of extension of agency through the road signs, authors and the related networks of publishers and editors extend their agency by translation into the newspaper medium. Their agency is translated into a medium extending their influence across time and space, however the asymmetry is in the agency of the medium as agency of readers is comparatively limited. The readers of these newspapers cannot talk back to the writer of the article and present a differing

⁸ Image source: <https://www.abc.net.au/news/2013-04-17/cars-drive-past-a-roadworks-sign/4635282>.

viewpoint. Readers also have limited relative agency in offering a differing viewpoint, able to voice their differing position to others only immediately around them (who may not listen because they are busy reading newspapers). Similar to how the rule of the road sign is a result of hidden decision making of planners, production of the newspaper involves an array of people making decisions about content although much of this process of how the content eventuates is hidden to the readers. This creation of artefacts and their one-way direction of communication characterises mediums of the 20th century. Along with newspapers, television, film and radio are broadcast mediums characterised by asymmetric agency much like a road sign.



Figure 13: Commuters on a train reading newspapers.⁹

However, with the appearance of digital and online media, asymmetry and one-way agency through the artefact is no longer a given. Digital and online media facilitates a symmetrical communication environment where consumers can extend their own agency through the artefact made by the producer. For example, users can respond to the newspaper article in real time for the author to see and the other readers too can see that response. Readers can also write their own articles and distribute them with the

⁹ Image source: <http://edc15.education.ed.ac.uk/kfirth/2015/01/12/miller-2011/>.

same capacity as newspaper authors. This shift of agency is captured by Jay Rosen in 2006, who writes:

The people formerly known as the audience wish to inform media people of our existence, and of a shift in power that goes with the platform shift you've all heard about. Think of passengers on your ship who got a boat of their own. The writing readers. The viewers who picked up a camera. The formerly atomized listeners who with modest effort can connect with each other and gain the means to speak— to the world, as it were.

We can see that visual communication design artefacts are clearly vessels of agency, however digital and online technologies tend toward symmetrical communication. As visual communication design becomes increasingly digital and online, the trajectory of these vessels of agency is moving from asymmetrical interaction to symmetrical interaction through participatory media. Even though most people do not have the ability to produce images of a high production quality (because of access to tools or not having practiced the craft), a culture of increased involvement in visual communication design would appear on the trajectory of visual communication design as it becomes increasingly digital and online.

As addressed by Alan Rusbridger, the editor of *The Guardian* (2010), journalism has already transformed from an environment where only a select few have access to a place of mass involvement. Rusbridger points out that, journalism had to consider the fact that a considerable number of people want to have this access, indicating the necessity of journalism addressing this:

Here the tension is between a world in which journalists considered themselves – and were perhaps considered by others – special figures of authority. We had the information and the access; you didn't. You trusted us to filter news and information and to prioritise it – and to pass it on accurately, fairly, readably and quickly. That state of affairs is now in tension with a world in which many (but

not all) readers want to have the ability to make their own judgments; express their own priorities; create their own content; articulate their own views; learn from peers as much as from traditional sources of authority. Journalists may remain one source of authority, but people may also be less interested to receive journalism in an inert context – i.e. which can't be responded to, challenged, or knitted in with other sources.

As it moves through this transition, journalism is still finding its role in the quality of the practice (Porlezza, 2019) as well as finding new business models where professional and user generated content can coexist (Carpes da Silva and Sanseverino 2020). As visual communication design moves begin this transition, it may face some of the same issues, with journalism acting as a useful signpost for what may be ahead. Next we will look into the nature of constructing artefacts of visual communication design to get a sense of where this transition may play out in the processual methods of their construction.

How Visual Communication Design Works: Image Making with Objective

Paul Rand, a leading design practitioner and writer of the second half of the 20th century, writes of the visual communication designer in a short essay, 'The Designer's Problem' (2014, p. 12), focusing on the process:

The designer does not, as a rule, begin with some preconceived idea. Rather, the idea is (or should be) the result of careful study and observation, and the design a product of that idea. In order, therefore, to achieve an effective solution to his problem, the designer must necessarily go through some sort of mental process. Conscious or not, he analyzes, interprets, formulates. He is aware of the scientific and technological developments in his own and kindred fields. He improvises, invents, or discovers new techniques and combinations. He coordinates and integrates his material so that he may restate his problem in terms of ideas, signs, symbols, pictures. He unifies, simplifies, and eliminates superfluities. He symbolizes — abstracts from

his material by association and analogy. He intensifies and reinforces his symbol with appropriate accessories to achieve clarity and interest. He draws upon instinct and intuition. He considers the spectator, his feelings and predilections.

As with all materials of technological culture, visual communication design is continually reshaped by technology in both the tools of making of the artefact and the form of the artefact itself. Jorge Frascara (2006) expresses concern over medium as a fundamental component of visual communication design, not unlike the one noted by Paul Rand in the passage above. To explore this, we will take a similar approach to our overview of design methods and look at the core characteristics of visual communication design. Here we will find three characteristics to identify and explore. The first is a strong cultural feedback loop; the second is how artefacts are constructed by assembly of visual components; and the third is how media convergence has driven the availability of parts for assemblage.

As we are moving through these three spaces we can begin to identify how the production of these components is being impacted by the emergence of the digital and online environment and ubiquitous communication devices capable of producing visual communication design. Through this we can begin to flag concepts of participatory media that are useful for processual perspectives on doing visual communication design in a digital and online environment. We can then use these flagged perspectives as building blocks for our processual perspective on participation in image making in online information warfare.

How Visual Communication Design Works: An Historical Background

Visual communication design has a less developed historical documentation than other fields of design such as fashion or industrial design, with the first formal conference on visual communication design history appearing at the Rochester Institute of Technology in 1983 (Triggs 2011, p. 3). Looking at artefacts of visual communication design historically, one can find a patchwork of materials that can be used to string together a narrative of the development of the field and to reveal the foundational concepts

concerning how it is performed processually. While visual communication design, as a study of signs and symbols, could be traced back as far as people have been drawing and communicating, visual communication design as a professional activity is generally traced along a timeline that matches design methods as emerging in the 19th and 20th centuries as part of industrial culture as we will see next.

Richard Hollis presents signs and symbols on objects of Medieval Europe as a kind of graphic design prehistory, with the origins of graphic design laying in advertising posters of the late 19th century (2001, pp. 11-17)¹⁰. In a similar vein, Amy Arntson links visual communication design to industrial culture, writing that through the 19th century (p. 19):

“a spirit of innovation and progress gave rise to a new interest in providing information to an entire culture rather than only an affluent elite. The growth of population centers, industry, and a money-based economy all increased the need for the dissemination of information”

Similarly, Steven Heller maps graphic design specifically as commercial art appearing out of culture of industrialisation and commercialisation (2001, p. x), for instance the art poster as shown in Figure 14 below, a poster for Mazawattee, Tea Ceylon Empire in the UK (1890). This style of images features an entirely illustrated composition. Image based technology developments in the early 20th century helped graphic design develop as a discipline of assembling components. Helen Armstrong links the “modern foundation from which the graphic design industry emerged” to European avant-garde movements such as Dadaism, De Stijl, constructivism and New Typography (2009, p. 20), particularly appearing in Soviet imagery and political and cultural movements

¹⁰ Visual communication design has foundation in a range of disciplinary areas including semiotics, linguistics and anthropology. While these are critical to a broad conception of the field and the nature of visual communication artefacts, the tracing of visual communication design followed here is framed for relevancy to the generation of processual methods of the designer practicing visual communication design. Focus on the designer and how the processes they use to create artefacts is the primary concern of this thesis, as is the field of design methodology research which is the area of design research this thesis contributes to.

around industrialisation.¹¹ The artefacts appearing here started to incorporate components using technology becoming available and experimented with through these movements, such as photography as illustrated in Alexander Rodchenko's well-known poster for Leningrad Publishing House (1924), illustrated below in Figure 15. It is important to note here that these artefacts feature the same dynamics of agency, as the examples of the road sign and the newspaper above of an agency translated into a more durable artefact across time and space, as well as the asymmetry of agency between the embedded agency and the viewer.

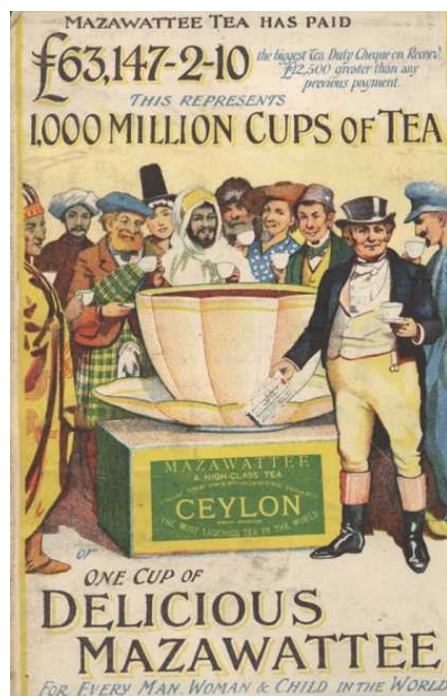


Figure 14: Poster for Mazawattee, Tea Ceylon Empire, UK (1890).¹²

¹¹ This shift toward the dominance of images in modern Western civilisation is explored by David Levin's collection of essays *Modernity and the Hegemony of Vision* (1993). This interestingly takes a similar tone to the way Marshall McLuhan traces the way audiences interact with media in *The Gutenberg Galaxy: The Making of Typographic Man* (1962), observing that the 20th century is seeing a shift away from visual dominated culture toward audio dominated culture through electronic media.

¹² Image source: <http://www.vintageadbrowser.com/drinks-ads-1890s>.



Figure 15: Poster for Leningrad Publishing House by Alexander Rodchenko (1924).¹³

How Visual Communication Design Works I: Cultural Feedback Loop

Writing in the context of visual communication design, Mike Press and Rachel Cooper describe a designer generally as “a combination of craft maker, cultural intermediary, and opportunistic entrepreneur” (2003, p. 7). A vibrant patchwork of writing around visual communication design reflects this. This body of writing, typically focusing on the artefact and tends to be characterised by examining artefacts as *cultural artefacts*, examines the relationship between artefacts and the culture. In a well known short essay ‘Why Designers Can’t Think’ (2007, p. 14), Michael Bierut captures the importance of *generalist cultural knowledge* to visual communication design:

Graphic designers are lucky. As the people who structure much of the world’s communications, we get to vicariously partake of as many fields of interest as we have clients. In a single day, a designer can talk about real estate with one client, cancer cures with another, and forklift trucks with a third. Imagine how tedious it must be for a dentist who has nothing to do all day but worry about teeth.

The concern of the essay is that a cultural feedback loop is important to visual communication design, and Bierut is arguing for cultural literacy as key importance to visual communication designers.¹⁴ Ann C Tyler connects this interest in culture to the

¹³ Image source: <http://www.museum.ru/alb/image.asp?79782>.

¹⁴ Visual communication designers typically refer to themselves simply as just designers. It is typical in

concern of visual communication design with persuasion, pointing out that visual communication designers use this cultural knowledge to map attributes to subjects in the minds of the audience (2006, p. 38):

Designers persuade an audience by referencing established or accepted values and attributing those values to the new subject. The specific audience's experiences within society and its understanding of social attitudes are an essential aspect of argument and necessary to the communication goal.

With this relationship between visual communication design and cultural knowledge, plenty of writing around visual communication design reflects this cultural feedback loop. For example Steven Heller's collected volume, *Design Literacy: Understanding Graphic Design* illustrates this cultural concern, containing examples and analysis of hundreds of pieces of visual communication design artefacts from the eclectic to the mundane, examining anything from Swiss corporate advertising (p. 227) to Japanese movie tickets (p. 364), parody in Mad Magazine (p. 115), and the Swastika (p. 329).¹⁵

The shift of visual communication design to an environment of the writing readers has implications for the cultural feedback loop in terms of both online cultures to observe as

publications about visual communication design. For example, *79 Short Essays on Design* (2007) by leading practitioner Michael Bierut, or *How to Think Like a Great Graphic Designer* (2007), a series of interviews with leading design practitioners by practitioner, educator and interviewer Debbie Millman, the terms graphic designer (or visual communication designer), and simply *designer* are used interchangeably. Often visual communication designers come from backgrounds in visual art and, interestingly, this may be because of this background in visual art this interchangeable use comes with a sense of designer *as opposed to* visual artist, and might be telling about the nature of writing about visual communication design having this cultural focus.

¹⁵ The *Looking Closer* series in particular captures this stream of writing through collections of essays examining artefacts as well as operating in the sense of trade journals discussing issues in visual communication design generally. The landscape of this content generation is ever expanding, with the contemporary landscape operating as an ongoing conversation about design and culture through websites such as *Design Observer* through content such as blogs and podcasts from a wide variety of practitioners, commentators, and historians on visual communication design. Many major writers on visual communication design are also leading commercial practitioners, and a common practice of visual communication designers is to maintain web presence through blogs and social media accounts.

well as the culture to participate in and contribute visual communication to. This idea is not new to visual communication design and new media theory in general. Works on the topic of participatory culture is useful to turn to here as our focus is on a space of symmetrical media exchange. Visual communication designers are not just mining these spaces for visual sources to apply in a separate development of artefacts in professional practice, but their practice *is operating* in this symmetrical space. Below we will explore its implications for the material artefact production. But, in terms of the cultural feedback loop, participatory culture presents new perspectives to consider. A strong starting point for exploring participatory culture is the work of Henry Jenkins, who has extensively traced concepts and the workings of participatory culture. Jenkins' work broadly looks at the intersection of how global online communities of people form by making media around shared interests, where communities flourish around niche interests producing original content, and how media industries handle this shift as fan communities form and make their own media around media products under ownership (2006). We will further explore this idea of participatory culture in Chapter 3: Swarms and Sensibilities.

How Visual Communication Design Works II: Assembly

Artefacts of visual communication design are constructed by assembly of components. Visual communication designers make assemblages of any combination of components, such as text, colour, shape, illustrations, photographs, graphic elements, etc. into compositions.¹⁶ This process extends into systemic composition of components through such concepts as identity systems and the concept of a *style guide*, which considers uniformity of components, used in a system of visual communication artefacts such as illustrated in Figure 16 below, in visual identity guidelines for the Microsoft brand.

¹⁶ The use of the term assemblage in this context is used to capture the basic process generating works of visual communication. This concept of assemblage can be significantly extended by looking at the works of Gilles Deleuze and Felix Guattari (1980) who present a theory of assemblage as a wider ontological theory for examining social-material complexity, or Dick Hebdige who examines the assembly of objects in construction of sub-cultures (1979). However, for the purposes of this section laying foundational actions to doing graphic design, we do not need to go further than characterising the nature of graphic design as assemblage of parts.

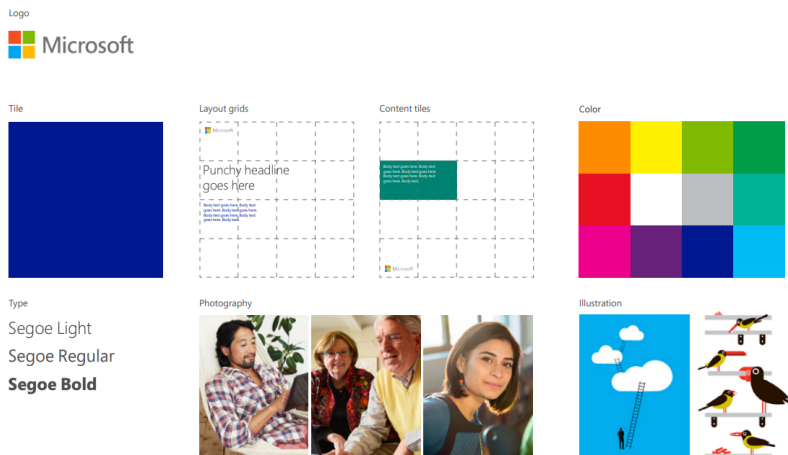


Figure 16: A brand style guide for Microsoft from 2013 (July).¹⁷

The construction of these components are disciplines themselves. Publications such as *Education of an Illustrator* (2000), *Education of a Typographer* (2004), and *Education of a Photographer* (2006) hone in on each of these disciplines from a general visual communication design perspective, implying that visual communication designers are aware of these practices, and themselves may also practice in these spaces to create their own components.

In tracing the role of assemblage in visual communication design in an online environment it is useful to refer to the image of Donald Trump and the Huawei to Hell in Figure 2. We can see the same principles of assemblage of components occurring. This assemblage is made from entirely found pieces; in the digital and online environment assembling is as simple as picking up found pieces of images, text, etc. online and collaging together into something new. Nowadays, the writing readers do not just have the capacity to write a comment on the newspaper article for everyone else to see, but they can also respond with an image assembled entirely out of pieces they find online.

¹⁷ Document source: <https://docslide.net/documents/microsoft-brandguide-july2013.html>.

At this stage, an important distinction must be made between differing kinds of visual communication design. The distinction has an impact on the content we are dealing with around image making in a digital and online landscape, which has processual implications relevant to developing methods of generating this content. There has emerged two kinds of assembling elements in visual communication design. The first kind of visual communication design is the assembly of graphic elements in content, which is the development of visual communication design we have traced through examples above. The second, a more recent form of visual communication design, is visual communication design in content delivery systems, such as user interface design, where users interact with visual objects to navigate content. To illustrate this, we can take the example of the Facebook interface as shown in Figure 17 below. The Facebook interface is a content delivery system, where users use graphic objects to navigate content. The content is an image appearing on the newsfeed or as a profile display picture. Both of these kinds of visual communication design work under assemblage premise of control.

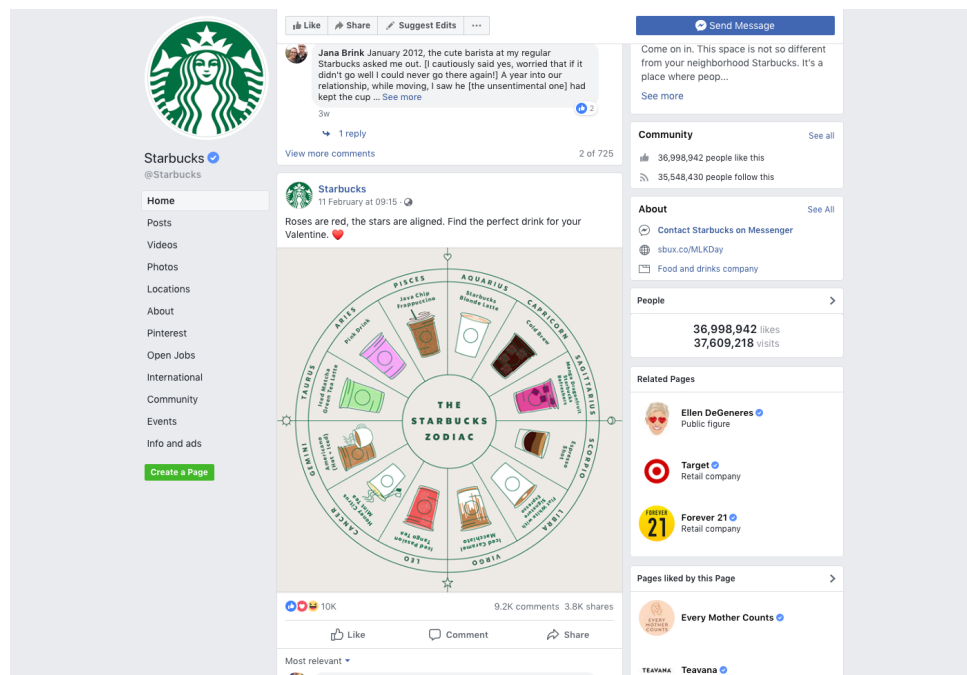


Figure 17: Visual communication design in a content delivery system, in this case the design of Facebook user interface, which is concerned with assembling graphics to create navigation and organise information on screen. This example shows the Facebook interface of the Starbucks page in February 2019.

How Visual Communication Design Works III: Media Convergence

The examples shown in Figures 14, 15, and 18 indicate a trajectory of *convergence*. This links to the nature of visual communication design as assemblage; media that was once separate tends to follow a trajectory of merging together. The most notable merger of tools of assemblage was digitalisation in the 1980s. It entirely disrupted the tools of making artefacts of visual communication design (Licko & Vanderlands 1989) and gradually saw all components of assemblage merge. For instance, all components of visual communication design were made available within one tool (the Macintosh). These new combinations also tend to produce new aesthetics. As we see below in Figure 18 in posters for UCLA Summer Sessions by April Greiman (1991), digital technology produces aesthetics of assembling many components including photography and typography, as well as computer generated graphics such as false shadows. In addition, elements of the components such as the typography reference pixelation, an aesthetic native to digital. Also important is convergence appearing across tools of making of the artefact and the medium delivery (Cooper 1989). Here, the key example is the personal computer, which functions as a device of both media production and media consumption.



Figure 18: Posters of UCLA Summer Sessions by April Greiman (1991).¹⁸

The concepts above present useful foundational frameworks for understanding visual communication design at a fundamental level that we can use to build a processual

¹⁸ Image source: <https://www.are.na/block/924310>.

understanding of image making in the context of ubiquitous information warfare. We get a sense that at the conceptual level, visual communication design has a core concern with behavioural modification, whether that be perception or action modification, which links to the issue of control resonating through the more generalised concepts of design explored. Visual communication design attempts modification by translating agency of the modifier into a visual object. We have seen that these objects are driven by basic fundamentals of assembling visual components, the variety of which is continually expanding due to media convergence. We have also seen how this composition is driven by a feedback loop with the general culture, where artefacts both reflect and influence the culture they are operating in. From here, we will investigate the documented methods of visual communication design to see the process of pulling all these components together.

Processual Methods of Designing in Visual Communication

As already mentioned, much has been written about artefacts of visual communication design driven particularly by the field of the cultural feedback loop. It is worth mentioning that the artefact is not particularly a matter of concern in design methods. If we think in terms of our family of design, most of these writings fit better as design criticism or design history. In visual communication design, the matter of process is not as thoroughly documented as other fields of design, such as industrial design or software development. Visual communication design can be vague or even obscurantist regarding process, as Jorge Frascara asserts in 'Hiding Lack of Knowledge: Bad Words in Design Education' (2007) that the field tends toward "promotion of the designer as an illuminated magician" (p. 62). In the same vein, Paul Rand famously wrote intuition is a key part of visual communication design, pointing at the mysterious nature of designing (2017, p. 45):

Intuition cannot be willed or taught. It works in mysterious ways and has something in common with improvisation. It has nothing to do with intentions, or with programming. It simply happens - an idea out of the blue - characterised sometimes by surprise, elation, and a release of tension. Intuition is conditioned by experience, habit, native ability,

religion, culture, imagination and education and, at some point, is no stranger to reason

Intuition is a point of discussion within visual communication design theory, and a culture within visual communication design of black boxing the method as intuition exists in the field (Wragg & Barnes 2016).

There are a handful of documented methods around visual communication design we can use as a groundwork for building a methods approach to understanding making images in ubiquitous information warfare. As previously mentioned, there are slightly differing spaces of objects of visual communication design, such as assembly of graphic elements in content and assembly of graphic elements of content delivery systems. There are studies of assembly of graphic elements of content delivery systems such as user interface design or user experience design looking at methods of design in these spaces. Typical of particular fields of design driven processually by the affordances of the materials of the field, processes here tend to be influenced by software design and development processes, as people in these fields tend to work closely with software developers. We are looking for processual documentation more closely related to assemblages appearing in online content within content delivery systems, such as examples documented above in Figures 2, 14, 15, and 18. We will document these pieces of content thoroughly in Chapter 3: Swarms and Sensibilities, and look at a coordinated deployment of mass content in Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign.

One such example of design method in visual communication design is by Gavin Ambrose and Paul Harris in their book *Design Thinking for Visual Communication* (2015). Ambrose and Harris document a combination of action modelling and technique, illustrating a broad process of working through visual communication design projects through various case studies into a generalised action model. The action modelling resembles the process models detailed above, with a looping model of shifting between phases of “define, research, ideate, prototype, selection, implement and learn” (p. 10). The techniques of each stage of this model are specific to visual

communication design and working with visual language. For example, the research phase is driven by identification of a target audience (p. 33), from which idea generation is performed through activities such as organising visual references (p. 59) and sketching out initial early prototypes of ideas (p. 70).

Another similar documentation of design methods in visual communication design is Matt Cooke's 'Design Methodologies: Toward a Systematic Approach to Design' (2006). This documentation, also presented by Ian Noble and Russell Bestley (2005) as a key example of an outcome of research into transferrable visual communication design methodology (pp. 30-41), is more specific and gives good insight into the development of a particular campaign from a methodological perspective. Cooke is writing about his own professional practice in a design team with the World Cancer Research Fund developing a promotional leaflet for doctors' waiting rooms. Resonating through the documentation are typical action modelling concepts. It offers a detailed tracking of the design process through the following phases: "definition", where the communication goal and target audience are defined (p. 132); "divergence", where background research of data gathering and analysis, visual research and distribution channels is performed (p. 134); "transformation" by translating the communication into a form aligned with the research performed and testing small prototypes (p. 137); and "convergence", where the final version is put into print and distributed (p. 141).

This process is depicted in a more complex mapping form illustrated below in Figure 19. In this map we can see the cybernetic concepts of looping, but presenting it visually as looping through spaces of located action. Various locations of working charted are typical to design models, including placing problem definition, ideation and prototyping, along with techniques specific to the discipline similar to Ambrose and Harris' modelling, including working with a target audience (p. 139), organising visual references (p. 135), etc.

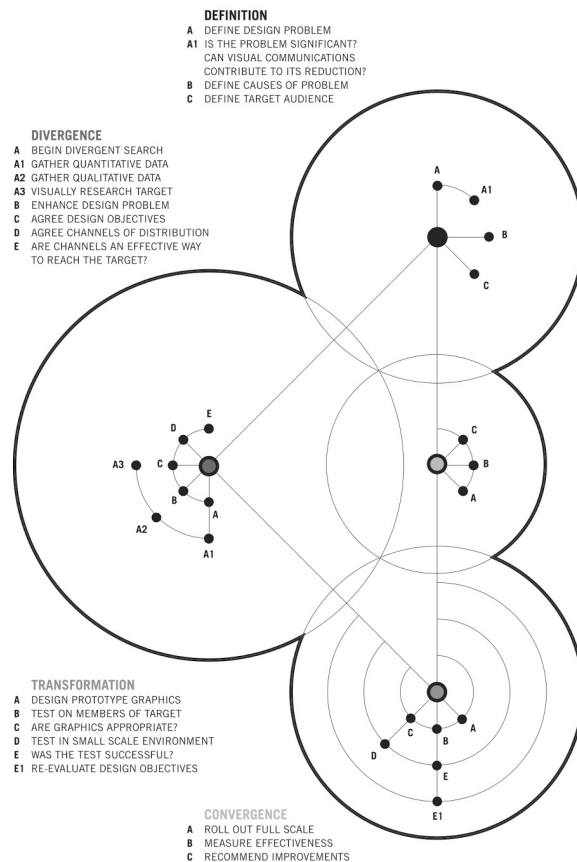


Figure 19: Process map by Matt Cooke (2006).

Another slightly different process model was produced by Clement Mok and Keith Yamashita for the American Institute of Graphic Arts (AIGA). The “Process of designing solutions” model was produced for an AIGA handbook to clarify the process of visual communication designers (Dubberly 2005, p. 47), which is illustrated below in Figure 20. This model contains similar steps to Matt Cooke’s model, however is more generalised and does not map specific matters of visual communication design such as visual reference building in the process by Gavin Ambrose and Paul Harris. However the stage of “Generating value” is particularly interesting as it highlights a stage of convincing the client. An important aspect of the entire final phase, persuasion indicates that in visual communication design the activity of persuasion and behavioural modification is deeply embedded in the practice even to the point of persuading the client of a proposed direction.

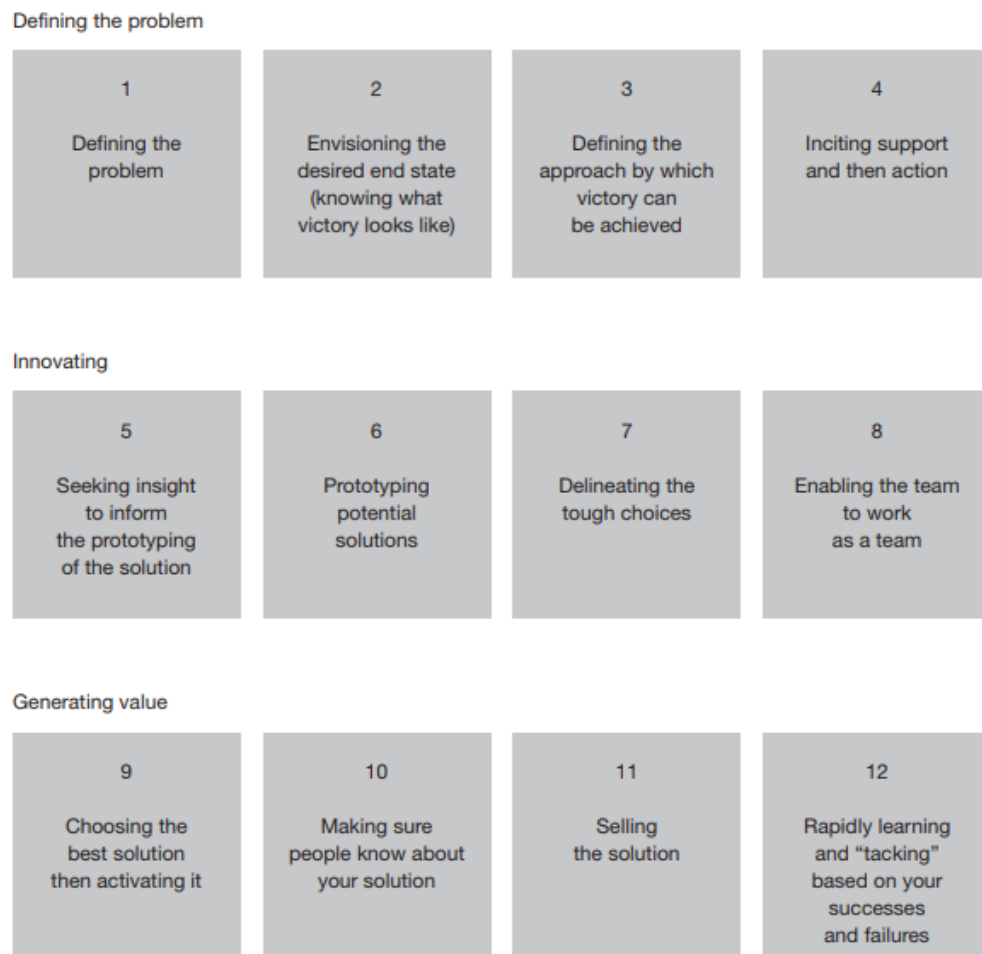


Figure 20: Process of designing solutions by Clement Mok and Keith Yamashita for the American Institute of Graphic Arts (Dubberly 2005, p. 48).

A particularly interesting adaptation of the AIGA model also exists in a mapping of this process to the development of narrative around the Iraq war (Dubberly 2005, p. 48). This process shows how the frame of the story was developed through these phases and how control of Iraq was reframed into a story of weapons of mass destruction and liberating the people of Iraq. We will further explore this documentation as a kind of frame development in Chapter 2: Framing and Reframing to look at how media constructs stories using central organising frames.

We have noted, however, that visual communication design is moving into participatory media. Participatory media also has processual models to take into account. This reveals a very different paradigm compared to those of visual communication design illustrated above. Axel Bruns (2008) notes the core feature of online media is that things are always *unfinished*; nothing online can ever reach the state of delivery and project completion. Bruns writes:

Open to the input of users as producers of content, content artefacts in produsage projects are continually under development, and therefore always unfinished; their development does not follow the discrete versioning and revisioning processes of traditional content production, but instead proceeds along evolutionary, iterative paths (often also involving trial and error processes where new iterations are made available – as alpha or beta versions – for community testing and feedback, and are further revised or even revert back to previous iterations if such testing produces unfavourable results).

While the produsage model was first identified by Bruns looking at the production of community projects such as Wikipedia, all online media is subject to the same state of being unfinished because of the nature of the technology. As Kevin Kelly writes in ‘Better Than Free’ (2008), “the internet as a copy machine” and anything online can be copied by other users at zero cost and remixed infinitely:

At its most foundational level, it copies every action, every character, every thought we make while we ride upon it. In order to send a message from one corner of the internet to another, the protocols of communication demand that the whole message be copied along the way several times. IT companies make a lot of money selling equipment that facilitates this ceaseless copying. Every bit of data ever produced on any computer is copied somewhere. The digital economy is thus run on a

river of copies. Unlike the mass-produced reproductions of the machine age, these copies are not just cheap, they are free.

This means that to view any media on a device in this digital and online environment, the media is actually copied to that device. This point is fundamental to the nature of the digital and online space, so much so that we will use it as the pillar of the development of our frame of online visual communication in Chapter 3: Swarms and Sensibilities.

The produsage approach to production of material artefacts is in stark contrast with the models proposed by both Gavin Ambrose and Paul Harris, and Matt Cooke. Cooke's model is an outcome of the affordances of the medium of working in print. Ambrose and Harris are presenting a generalised model of visual communication design, but clearly defining a stage of the process in implementation (2015, p. 149). Therefore, the Ambrose and Harris documentation is primarily suited to producing print media. In these models there are essentially two loops in operation. One is the cycling of iteratively producing *designs* to a point deemed as project finalisation which is then delivered and distributed. From this the larger loop of reflecting on the project runs into the next project, where experience from the prior project is brought into the next. In the digital and online environment of produsage, these two phases dissolve into a way of operating where artefacts are produced and released always *in beta* because of the copy machine environment. We can also see how the term design thinking is appropriate here, as the doing and the thinking around artefact construction are tightly bound in the online environment. This is not to say that thinking and doing is not present in the print environment, but the online environment facilitates a mode of operation where the feedback loop between production and consumption becomes so rapid that the doing and thinking merge together in the same way production and consumption do.

Axel Bruns (2008) also models produsage, contrasting it with an industrial production chain as illustrated in Figures 21 and 22 below. It is worth mentioning that the industrial production chain has clear distinction between points of producer and consumer, which also generates an asymmetry in agency and resembles the processes of visual communication design documented above. This is in contrast with the model

of *produsage* where there is no distinction between producer and consumer, which is a model showing more symmetrical agency between participants.

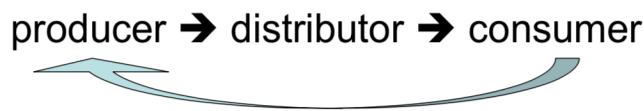


Figure 1. Industrial Production Value Chain

Figure 21: The model of industrial production illustrated by Axel Bruns (2008).

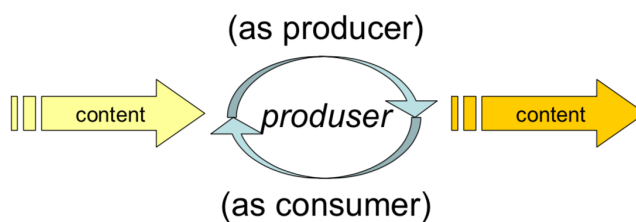


Figure 22: The model of participatory media production illustrated by Axel Bruns (2008).

Symmetrical communication in the sense of access and agency between users functions in produsage. In terms of access, the artefact is symmetrically accessible to both the producer and consumer, and the producer and consumer can switch between roles constantly and without permission. This leads to agency, as reflective of McLuhan's idea of media as extensions of the agency of people, and ANT's idea of objects as translations of agency. The producer and consumer are constantly switching roles and in the process translating their agency into the artefact through modification. Other documentations capture this idea of symmetry, including James Grunig and Todd Hunt's two-way symmetrical model (1984), Yochai Benkler's peer production model (2016), and the work of Henry Jenkins (2006) that looks at participatory culture. Produsage broadly captures the symmetry of access to media production. However, at this stage, agency is a sufficient conceptual overview grounding and it can be further explored through the present thesis, particularly using Jenkins in more depth in Chapter 3: Swarms and Sensibilities.

It is interesting to note that produsage is thematically similar to digitally native methods of design from software design and development of continuous delivery, where there is no clear point of project completion. However, in the examples of continuous delivery noted above, there was clear project ownership and protection of code and the project owners could declare the project finished. In contrast, under produsage driven by the technology of digital and online, ownership of content, such as an image, in public cannot be protected, and a project can always continue even if the first image maker stops working on it. In Chapter 3: Swarms and Sensibilities, we will explore in particular how collaborative organisation functions under these dynamics through open source projects.

Based on examining these models of visual communication design one can argue that a model of digital and online visual communication design in an environment of media exchange needs to include the element of produsage, where things are never finished because that is the nature of the medium. The produsage model also demonstrates how the both models by Gavin Ambrose and Paul Harris, and Matt Cooke are based on the industrial production paradigm of project progression and a point of delivery, and the model of operating in a digital and online space is a non-industrial paradigm of continual *in beta*. Produsage is also showing us that the industrial paradigm of producers and consumers is disappearing as a matter of shifting symmetry of agency, as previously noted. In fact, as we will see in Chapters 2, 3, and 4, foundational to this space is a lack of distinction between producers and consumers, or in our case, designers and non-designers. In Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign, we will see how these non-industrial ways of working greatly outmaneuver entities of an industrial paradigm in periods of information warfare.

Conclusion: Moving Forward

The trajectory of visual communication design, as a field of design that translates agency into visually based communication, developed from the art poster of late 19th century, through the modernist movement of the 20th century, into the digital realm of the late 20th century. However, within the digital, online environment of the 21st

century, changes are appearing in both the nature of artefact construction and the agency with which they operate. The principles of constructing visual communication design artefacts in this space remain the same although the process appears to be very different. If we consider Figure 2, illustrating Donald Trump and Huawei to Hell, it is difficult to imagine that the image was created following a process of conducting visual research and target market analysis, which generated mood boards and brainstorming possible solutions to choose from. To understand how that image was produced, new digitally native models of artefact construction in produsage show us a new direction to build on.

Part III: Thesis Research Approach and Structure

Research Method and Outcomes

Having found that the process of image making in the digital and online environment is different from the process of image making captured by typical methods of design in visual communication design, the present thesis aims to contribute to design methodology research by constructing a guide to participation in image making in the environment of online information warfare anticipated by Marshall McLuhan (1970). This thesis first asks what are these new processes of designing in online image making? Then, with this question signalling a transition in the design process as artefacts become digital and online, this thesis asks what the trajectory of methods of design might be as material culture joins increasingly the information environment? This question will be investigated through four components across three chapters and the conclusion. The first looks at a general modeling of participation in an environment of media exchange. The second looks specifically at making images in this environment of media exchange. The third looks at a particular kind of collaborative making project that is native to online information warfare. Finally, the fourth looks at transfer of these ways of working with images to material culture more broadly as it becomes increasingly digital and online. Each outcome will be developed with a distinct approach and logic, which will unfold as follows:

Beginning with Chapter 2: Framing and Reframing, we will develop a *model of symmetrical media exchange* and an accompanying understanding of issues of shifting

perception. The model captures visually and processually the environment of ongoing media exchange between participants, which has emerged as central to the digital and online space. It also captures how exchange of information, agency, and influence flow as participants interact through exchange of media. Given that this digital and online environment has produced an environment of global guerrilla information war with no division between military and civilian participation, as anticipated by Marshall McLuhan (1970), this model and accompanying understanding on shifting perceptions form the foundation for participation in online information warfare.

To construct the *model of symmetrical media exchange*, based on grounded theory (Muratovski 2015, p. 99), is conducted through a process of reconfiguring existing modelling of media construction, then adding processual depth to the model by placing topics of shifting perception across the performance of the model. To further understand mechanics of this environment a deep investigation of concepts relating to perception and perception shifting will follow.

We will begin to construct this model by building on cybernetic issues of feedback loop as a typical cybernetic approach of modelling methods of design. We will find through the frame problem (Dennett 1984) that perception is the key driver of exchange of media between participants. We will subsequently investigate how perception works through examination of mental schema as a concept of human cognition (Piaget 1952a, 1952b) and find how perception is malleable, making it a target of design in both internal and external senses through the design concept of change as participants exchange media. Then to continue building out our model, we will perform a reconfiguring of existing modelling of media construction from professional journalistic practice. We will see that central to the construction of media in professional journalistic practice is the activity of framing (Entman 1993; Scheufele 1999). We will transfer processual workings of framing from professional journalism practice to the environment of media exchange, where there are no distinctions between producers and consumers, or designers and non-designers. To further develop an understanding of how perception shifts occur, we will evaluate topics of perceptual change, which appeared at stages across the processual model of symmetrical media exchange between

participants. We will look at how people perceive media through the frame effect and positioning; how mental models flow memetically between participants (Dawkins 1976; Blackmore 1999); how these changes feed into media making through the use of central organising frames (Entman 1993); and how schema changes operate across time with the Overton window (Mackinac Center for Public Policy).

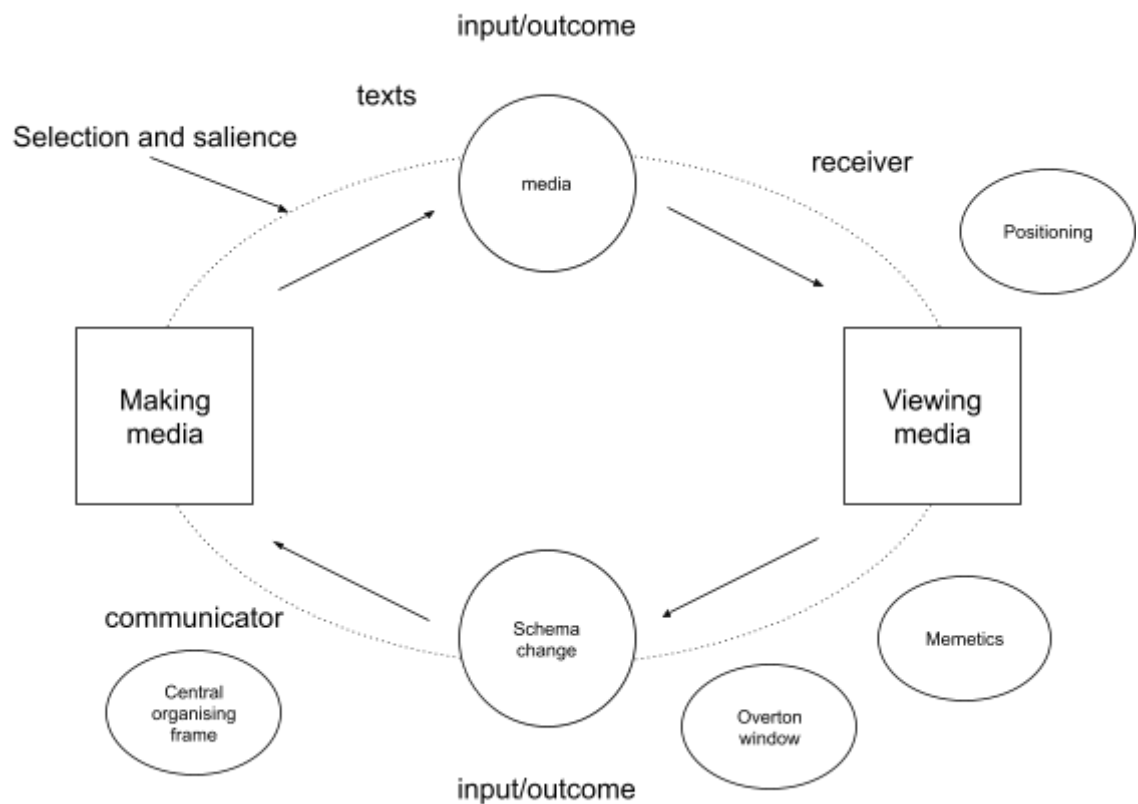


Figure 23: The model of symmetrical media exchange developed in Chapter 2: Framing and Reframing.

Then, to further investigate the shift in this environment of media exchange, we will introduce and investigate the sensibility of actor-network theory (ANT) toward framing and what it shows us about the necessary practice of framing, and the nature of frames and the possibilities of framing shifting. We will see how ANT provides us with a sensibility on complexity that illustrates the opportunity of frame shifting within the bounds of our human cognition to find new ways of viewing circumstances, and we will

perform frame shifting using this sensibility. We will then look at different kinds of performing frame shifting through case studies: first, at Henry Beck's London Underground map as a kind of *pragmatic framing* illustrating performance of a frame shift particular to a circumstance; then at the work of Stuart Walker to illustrate *speculative framing*, a complete frame shift in reimagining any artefact of material culture.

We will then move into Chapter 3: Swarms and Sensibilities to look at visual communication design more specifically in this environment of media exchange. Using the *model of symmetrical media exchange* constructed in Chapter 2: Framing and Reframing as the environmental foundation, the major contribution of this chapter is a *frame of visual media exchange*, a mode of operation in making artefacts of visual communication design in this environment. The *frame of visual media exchange* is presented as a sensibility towards artefacts and decision making in this space. It is influenced by the *speculative framing* frame shift approach illustrated by the work of Stuart Walker in Chapter 2: Framing and Reframing, which develops a guide to working in the environment without rigid specifics in operational doctrine. Given the *frame of visual media exchange* outlines operation in the digital and online space from which Marshall McLuhan's anticipated environment of global guerrilla information warfare has emerged, this sensibility also serves as the sensibility toward image making in online information warfare. This mode of operation demonstrates sensibilities of image making in the media exchange environment. Authorship and treatment of all found artefacts are always incomplete and available for reconfiguration, rapid and public feedback loops, non-linearity, ad-hoc collaborative structures around interests and memes, skillset convergence and participation in projects based on personal interests.

Construction of the *frame of visual media exchange* will be performed by conducting a blend of visual research of artefacts of online visual communication design found in the environment of media exchange (Noble & Bestley 2005). Practice-based research of operating in this space (Muratovski 2015, p. 192) will be performed through construction of artefacts similar to those found in the space, and reflection on their construction used to fortify the grounded theory being developed through the chapter.

Both the visual and practice-based research will pay continual attention to the characteristics of visual communication design identified as *assemblage*, *media convergence* and a *cultural feedback loop*.

To perform the visual research through case studies, we will first build a conceptual apparatus for examining these artefacts by establishing the nature of the artefacts in this space, and how participants organise in this space. In constructing our conceptual apparatus we will first focus on the nature of production of artefacts in this space, getting a sense of the processual nature of the frame of operating in this space. We will lay the foundation of the technological nature of the internet as a copy machine (Kelly 2008) and see the nature of the internet, as an environment where any media artefact essentially functions as an open source project (Weber 2004). We will see how the concept of produsage (Bruns 2008) contains important processual perspective for making images in this copy machine environment, which functions as a paradigm for operation in this space. We will see how media convergence and citizen journalism (Rosen 2005), where ubiquitous devices generating media operating in the copy machine produce artefacts, are characterised by assemblage; how assemblage uses any combination of found and self generated components that are freely and opening flowing across platforms and media formats; and how memetics drive an evolution of these artefacts as many variations of artefacts appear and ideas spread (Blackmore 1999).

We will develop an understanding of the way organisation occurs within the *frame of visual media exchange* in the environment, through taking a topological perspective on organisational dynamics. We will see how distributed network topology (Baran 1962) is the core paradigm for collaborative operation in this space. We will examine distributed organisation structures, finding open source projects as a key example of collaboration in these projects, which occur under a distributed network topology (Raymond 1999). We will examine the sensibilities of collaboration in distributed organisation structures toward openness of participation and absence of formally structured roles and hierarchies. We will then look at the functioning of distributed collaborative structures as coherence emerges from initial chaotic operation as these structures form shared

directionality. These dynamics are examined as swarming (Arquilla & Ronfeldt 2000). We will see how this, as an organisation form, generates innovation through distributed feedback loops, where trial and error by participants without a central organising hub and operating with network wide visibility, produce coherence emerging from chaos, as swarms focus around a vector of impact when discovered by a participant. We will then see how the distributed network topology facilitates scaling of the swarm, which is able to grow and dissipate while it maintains the network structure without incurring additional organisational costs.

Using the processual and topological framework, we will conduct visual research to examine a thread of case studies of media of online visual communication design occurring in interactions by exchanges of media, from which the ways of operating become visible. We will start with static images, including the *Absolutely* meme and *Steven Crowder's "Change My Mind" Campus Sign* meme, to find an aesthetic of cobbling as participants construct and reconfigure assemblages using found and self generated components in a rapid feedback loop of exchange with other participants to express reaction and comment on unfolding events (Douglas, 2014). We will see how these images flow across platforms, with static images difficult to point to an original author or location, and watch images flowing offline to objects like t-shirts available through print on demand services such as RedBubble. We will see how brands can use image filters on image sharing platforms such as Snapchat to provide users with assemblage pieces to document activities in consumer experience settings, while these can be used by participants to create damaging perceptions around the brand.

We will then move to moving image, seeing how this media convergence and assembling of all manner of found pieces occurs in a similar flow across platforms, and how videos can be constructed and reconfigured into new assemblages with other images or video, producing an aesthetic of hyper collage. We will see how this hyper collage appears in edited videos through experiments such as *Unrealities Journeys* and the appearance of the vaporwave genre. Then, we will watch it happen in real time video composition on streaming platforms, such as Twitch, where people are live streaming activities and conversing in real time with viewers who are sending images

and messages, all of which is visible to all viewers. In generation of these artefacts, we will see how skillsets converge as image making combines with code to automate image production in projects like the *Shitpostbot 5000*, and how this flow of content and media making produces localised cultures of visual language in fan communities such as professional wrestling fans.

The supporting practice-based research to further develop the *frame of visual media exchange* will be performed by my own experimenting with media production as we move through the case studies to test and validate the observed and proposed construction processes of found artefacts. This testing will experiment with rapid cobbling together of internet memes, making methods of design diagrams available on t-shirts, digitising the physical card game *Design Fiction Design Brief Creation Playing Cards*, including generating additional versions and flowing it across platforms and configurations, copying video from Japanese broadcaster *NHK World* to YouTube to generate additional value, and making Twitter bots that automatically tweet curated professional wrestling content.

Following this, in Chapter 4, we will examine memetic warfare, a new kind of visual communication design campaign activity native to Marshall McLuhan's anticipated environment of global guerrilla information war with no division between military and civilian participation (1970). It appears as a surge of artefact production and distribution when a swarm of users appear around a vector of impact discovered by a participant tinkering in the environmental landscape. Using the *frame of visual media exchange* constructed in Chapter 3: Swarms and Sensibilities as the operational frame foundation, the major contribution of Chapter 4 is a *memetic warfare campaign frame*, which illustrates sensibilities around development of visual communication design campaign material in public, widespread use of open source protocol, anonymous participation, and decision making through memetics. We will also look at how this *memetic warfare campaign frame* applies to other appearances of the use of internet memes as part of a larger period of conflict.

Importantly, we will see that this memetic warfare campaign frame illustrates the emergence of a new kind of designer who can participate in a design process to generate work aiming to destabilise work of professional designers. For these new kinds of designers, it is not required to be a professional to participate in their community design projects. These projects can be highly effective in destabilising the aims of professional designers. This will open up the possibility of reframing the figure of the visual communication designer to somebody operating in an environment of media exchange with intent to generate perceptual shifting within a target audience through ad-hoc construction of information items. The *memetic warfare campaign frame* illustrates this reframing transition in action.

To construct the *memetic warfare campaign frame* will be performed by examining the #DraftOurDaughters memetic warfare campaign, as part of the 2016 US election campaigning, using ethnographic research (Muratovski 2015, p. 56), which documents the observed public conversations of the users as they ideate, rapidly prototype, coordinate, produce and spread content. As part of this documentation, visual research of artefacts will be produced (Noble & Bestley 2005) to examine the processual and topological dynamics of their production.

Before examining the #DraftOurDaughters case study, we will first develop an understanding of using internet memes in information warfare (Rodley 2016, Wiggins 2016, Giese 2015). We will then investigate how memetic warfare functions as a design activity by looking at the organisation mechanism of the open source insurgency (Robb, 2007). We will see how the swarming users appeared as an ad-hoc project with a shared incentive to destabilise the Presidential campaign of Hillary Clinton. We will then move into the #DraftOurDaughters memetic warfare campaign case study, taking place on 4chan's politically incorrect themed forum /pol/ in late October 2016 in the lead up to the US election on Nov 8 where 4chan users leveraged growing concern over Hillary Clinton's complex relationship with Russia (Hains 2016) to create a political media campaign to highlight these issues. We will see how a small amount of images resembling official Hillary Clinton campaign material appeared on Twitter, and featured typical Hillary Clinton supporters enthusiastic about the possibility of being drafted into

combat with Russia. We will see how these images were posted on 4chan's politically incorrect themed forum /pol/ as possible semantic vectors of impact, which became prototypes for a large scale memetic warfare campaign of content convincingly produced and disseminated across social media appearing as Hillary Clinton campaign material. They undermined subtly the campaign through exploitation of core messaging themes, an example of which is illustrated in Figure 25 below. We will see how a swarm of users producing content for the project appeared and scaled, documented in detail in conversations of the users through the ideation, rapidly prototyping, coordinating, producing, and spreading of content.



Figure 25: Content produced as part of the 'Draft Our Daughters' campaign conducted online as part of the 2016 US Presidential campaigns.

Finally, the conclusion chapter will review the outcomes of the investigations above to illustrate the new space of online visual communication outlined by the findings. It will present further potential direction as this environment continues to unfold. Then it will lay out the final frame of operation, the *frame of online material culture*, a working anticipatory frame that illustrates the new sensibilities toward mass customisation, non-linearity, finding frame-alignments, battling of agencies and a general landscape of information warfare as material culture increasingly becomes digital and online.

Chapter 2

Framing and Reframing

Introduction: Making Sense of Things

Design is concerned with modification of scenarios through intervention, where a material artefact of some kind is devised and deployed into the scenario in an attempt to alter that scenario in a particular way. As we have seen through reviewing concepts around design, the central concern of modification in a design context and, in particular, visual communication design is *human cognition*. This concern plays out in multiple locations throughout the process of designing. The first location is in the minds of the audience, as shifting of these cognitive structures are the primary aim of visual communication design, as we have seen described by Jorge Frascara (2006) and Ann C Tyler (2006) in their description of visual communication design as concerned with behaviour and perception in an audience. In this operation of agency, the designer aims to influence those who encounter the artefact in a particular way. In visual communication design specifically, this influence is created through translating agency into material artefacts of symbolic and visual communication, as we have examined through examples of road signs and newspapers. The second location is in the minds of the designer themselves, aiming to change the way the designer thinks about the problem at hand in an attempt to generate novel ways of considering the problem to generate novel solutions. As we have noted, this has been developed in design literature through Donald Schon (1988) and Kees Dorst (2015). However, in Marshall McLuhan's anticipated space of ubiquitous information warfare (1970) the symmetrical nature of material artefact generation capacity of all participants, which we have seen developing in the concept of participatory media, removes distinction between a producer and a consumer, impacting processual considerations by blending these two spaces. Here, there are no isolated and objective designers making something from the outside and deploying into a situation aiming to influence an audience, but only somebody who has been influenced making something and aiming to influence someone else.

In this space of information warfare, where the consumer is also a producer, the concept of *framing* from cognitive sciences handles this well. The term framing, much like design, is also both a noun and a verb. It is fundamentally about *making sense of things*, and like design is a concept existing in different forms. Framing exists as a noun in the sense that it is a thing, the cognitive structure, that people have in their mind that helps them handle incoming information, as well as a verb in the sense that it helps them process that incoming information. It is also a verb in the sense that it is a thing that people do when they are generating a material artefact, and a noun in the sense that it is a thing people have when making a material artefact. Framing is fundamentally about *making sense of things* in both making and viewing media, which we will explore in detail in the present chapter.

Chapter Method and Outcomes

The major contribution of the present chapter is a *model of symmetrical media exchange*. The model processually captures the environment of media exchange between participants that has emerged in the digital and online space, and models exchange of information, agency, and influence as participants exchange media. In turn, this model demonstrates the process of interaction and influence in the environment of global guerrilla information warfare anticipated by Marshall McLuhan.

To construct the *model of symmetrical media exchange* is based on grounded theory (Muratovski 2015, p. 99). It is conducted through a process of reconfiguring the existing modelling of media construction, placing topics onto this modelling, and performing deep investigation of concepts to further understand mechanics of this environment. Our foundational concepts come from study of journalism which offers a set of literature thoroughly examining the construction of media that applies to all media production. We will examine and reconfigure these concepts and models for an environment of symmetrical media exchange where there are no distinctions between producers and consumers. With this reconfiguration we will examine topics of interest that emerge and place them into the model environment processually as interaction and influence occurs. Throughout this process we perform deep investigations of concepts appearing across the model, adding further depth to the model and its functioning.

The model forms the foundation for Chapter 3: Swarms and Sensibilities, where we will focus on exchange of artefacts of visual communication, in particular in this environment. As we will see, the major research outcome of Chapter 3: Swarms and Sensibilities is the *frame of visual media exchange*, which will be a methodological outcome discovered through the present chapter and its investigation into framing.

Chapter Concepts and Logic

In Section I we lay the processual foundation for constructing this model using a feedback loop of an information processing paradigm, typical of methods of design modelling. We establish how dealing with media, whether viewing or making media, is founded on perception due to the frame problem, a discovery about the nature of human cognition during attempts to build machines with cognitive problem solving capacity (Dennett 1984). We will see that researchers trying to build problem solving machines found that any media, human or nonhuman, needs a limit on information inputs and on consideration of all possible implications of actions in response to information inputs (Dennett 1984). The nature of this bounding of complexity into a workable information input is the core concern of framing as a concept, which the present chapter will be built around. To understand framing we look at the work of psychologist Jean Piaget. Piaget found that people see the world by perceiving, a cognitive process of building mental schema and association chains in minds for quick reference when necessary (Wadsworth 2004, pp. 16-17) rather than seeing complexity. Particularly interesting about the functioning of mental schema to design is their malleability, allowing them to be rewritten through exposure to information (Wadsworth 2004, pp. 15-16). If the way humans see the world is malleable, given the concern of design with manipulating change, modification of the way people perceive the world is a design issue. In an environment of symmetrical media exchange of information warfare, this modification of the way people perceive things is a key driver of interactions.

The professional practice of journalism has been destabilised by the shift to symmetrical participatory culture. However, as we will find in Section II, the existing research in framing journalism can be reworked to build the *model of symmetrical media exchange*

that models practices of the fractured paradigm of framing into a model of media exchange between entities. In the journalistic context of constructing media for information dissemination, Robert Entman conceptualises framing as a “fractured paradigm” (1993). Here, “fractured” means “made up of different parts” rather than “broken” or “problematic”. We will further develop the *model of symmetrical media exchange* established in Section I by looking at the different pieces of this fractured paradigm and placing them together with a processual cybernetic perspective based on a loop of continual interaction by exchange of media between entities. Building on foundations set in Section I, we can focus on the malleability of mental schema as it exists processually. It is in a constant state of reshaping as it encounters information (Wadsworth 2004, pp. 16-17). In environments of interaction via symmetrical exchange of media where these exchanges result in schematic change, distinctions between designers and non-designers also dissolve. We will then organise topics around human cognition and perceptual change into this model. While not exhausting topics that could be placed onto the model, we will illustrate how the model can be used to place topics around perceptual change processually. As part of this placement of topics into the model, we will look at research around human cognition and information processing in the frame effect (Tversky & Kahneman 1981), and associated techniques of redrawing schema through positioning (Ries & Trout 2001). We will then look at memetics (Blackmore 1999) for a processual perspective on how perceptions spread through participants as a result of interaction and exchange. Then, we will see how these spreading perceptions become the central organising mechanism of constructing media that will be perceived by others. Finally, we will look at the concept of the overton window in order to manage shifting perception across time.

In Section III, we further explore issues around framing and frame shifting in Sections I and II in three parts following a chain of investigation. The first part looks at the use of actor-network theory (ANT) in framing. ANT is a socio-technical sensibility taking a position of neither sociological determinism or technological determinism in any scenario, instead treating any kind of sociological or technological outcomes as occurrences of combined simultaneous sociological and technological workings roughly referred to as heterogeneous engineering. We will look to this conceptual apparatus to draw connections to how it is useful to understanding framing. ANT has seen wide use

in socio-technical analysis through writers such as Bruno Latour, John Law and Michel Callon, and we will look at these writings to understand more about the nature of frames, finding that there are only frames around heterogeneous complexities, and we can shift frames to see circumstances in terms of infinite makeup. We will also explore what ANT means by heterogeneous complexities by looking at the diversity of actors ANT asks us to trace in a scenario, and the continual performance of these agencies in continual generating and evolving the scenario. Adopting the ANT perspective of frames and frame shifting, the second part of this section takes a processual perspective on revealing hidden heterogeneous complexities in problems scenarios. Using Buchanan's concept of the indeterminate problem (1992), we map the evolution of the problem using the framework of Michel Callon's heating and cooling, illustrating how frame shifting produces an effect of heating and cooling new components in the heterogeneous network. The third part of this section looks at two distinct kinds of frame shifting and explores case studies. The first case study looks at Henry Beck's London Underground map to reveal a kind of *pragmatic framing*, a frame shift particular to the circumstance. The second case study looks at the work of Stuart Walker identifying *speculative framing*, a complete frame shift for reimagining any artefact of material culture.

Section I: The Importance of Framing

Introduction

To position framing, consider these questions from the context of branding: When people see the Nike swoosh, why do they recognise this as a symbol of a global corporation? Why is it not a banana or associated with viking ships? When people see the silhouette of an Apple, why do they recognise this as a symbol of a global technology corporation? Why not a piece of fruit or associated with Adam and Eve?

We will begin our investigation of these questions from the processual concerns of cybernetics first introduced in the Introduction chapter of this thesis. Of particular interest is a concept considered by Norbert Wiener in *Cybernetics: or control and communication in the animal and the machine* (1948) as the topic of the chapter

‘Cybernetics and psychopathy’. Weiner considers the brain and computational machines analogous in terms of the fundamental concept of information input and output systems, and both playing the role of units performing *information processing*.

Working from this position, we can operate at two levels to help explore key concepts of framing. First, we can look at how people operate as processing units, handling incoming information as an input, processing it and generating an output. This is illustrated in Figure 26 below. It is important because we can focus attention on processing in particular. It is also reflective of the base process of design process (Dubberly 2005, p. 13).

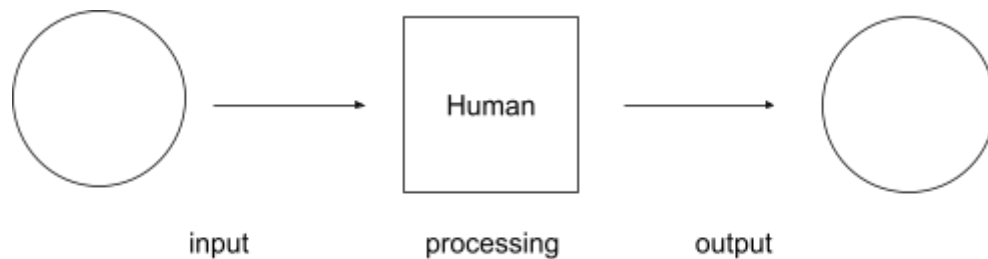


Figure 26: Humans as an information receiver, processor and output generator.

Second, we can bind this process to the other information processes where an information output from one entity becomes an information input for another entity. This is illustrated in Figure 27 below. This is important because we can consider how entities exchange information and we can consider this in a looping process, which will inform the processual loop of framing developed in the next part of the present chapter.

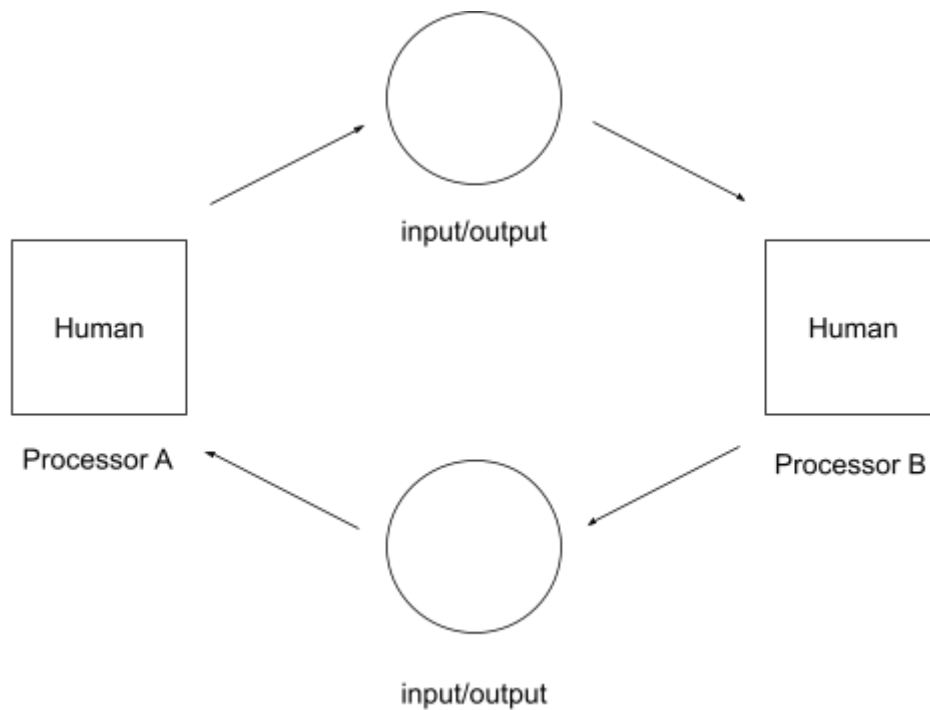


Figure 27: Humans in a loop information receiver, processor and output generator.

The study of the way humans process information is important because it reveals a particular way of dealing with information processing. It makes functioning possible for humans in the world, and presents an opportunity for design to target the nature of this processing unit¹⁹.

The Frame Problem

As artificial intelligence researchers were building on cybernetics concepts in an attempt to build computers with information processing resembling the one done by humans,²⁰ they ran into problems of information flow and information processing at a fundamental level. This problem has to do with overwhelming information inputs and

¹⁹ While the term processing unit may appear to have dehumanising connotations, in the context of cybernetics, the intention of seeing humans as a processing unit is to map all entities in the landscape strictly in terms of information in, information processing and information output. Then building on top of this primary mechanic, we can look at how all entities have unique ways of processing information, including humans broadly and individual humans.

²⁰ It is important to note that artificial intelligence and cybernetics are related although not necessarily concerned with the same thing, a point made by Paul Pangaro (2006).

processing and began to be documented in both a technical and philosophical sense as the frame problem (McCarthy & Hayes, 1969).

In ‘Cognitive Wheels: The Frame Problem in Artificial Intelligence’ (1984), Daniel C. Dennett describes the frame problem with a story of a robot unable to decide on a course of action when faced with a simple problem of bomb defusal. The robot quickly becomes unable to come to a decision on an action due to becoming stuck continually tracing information inputs and the possible implications of decisions made in response to information inputs:

‘Do something!’ they yelled at it. ‘I am,’ it retorted. ‘I’m busily ignoring some thousands of implications I have determined to be irrelevant. Just as soon as I find an irrelevant implication, I put it on the list of those I must ignore, and...’ the bomb went off.

Illustrated in this story is the two step problem of the framing. The first problem being how to draw bounds around the connectedness of complex information inputs, and the second problem being how to limit consideration of all possible implications of actions in response to information inputs. This frame problem is a general information processing system problem, and is where Norbert Wiener was pointing in ‘Cybernetics and psychopathy’. All information processing systems, human or nonhuman, must employ some kind of limiting on information inputs and some kind of limiting on consideration of all possible implications of actions in response to information inputs.

Humans and the Frame Problem: Information Processing to *Perceiving*

Human information processing is characterised by first drawing bounds around incoming information, and then limiting considerations of the implications of decisions made in response to information inputs. This is captured by Richards Heuer in the *Psychology of Information Analysis* (1999, p. 10):

People have no conceivable way of coping with the volume of stimuli that impinge upon their senses, or with the volume and complexity of the data they

have to analyze, without some kind of simplifying preconceptions about what to expect, what is important, and what is related to what.

To further understand this we can shift from matters of building machines replicating human intelligence to the human activity of dealing with the frame problem.

Association Chains

Media theorists generally acknowledge the importance of framing to the viewer as the viewer encounters and processes the media object. Robert Entman talks about this generally as how viewers of media use “mentally stored clusters of ideas that guide individuals' processing of information” (1993, p. 53). This is a good initial positioning describing the existence of the concept. We can further explore the details of how it works by looking at cognitive psychology, which will form the foundation of our model of symmetrical media making. These concepts will also be illustrated through a set of diagrams.

Mental clusters is a well established concept in cognitive psychology. Cognitive psychology is a subset of psychology focusing on how people “think, perceive, remember, and learn” (Blake & Pope 2008, p. 59), and contains answers to how humans deal with the frame problem. Mental clusters is a fundamental concept to cognitive psychology, described as “basic, interconnected psychological systems that enable people to process information by connecting it with prior knowledge and experience, finding patterns and relationships, identifying rules, and generating abstract principles that are relevant in different applications” and most importantly, “each individual has to internally develop his or her own cognitive structures” (Garner 2008, p. 32).

This concept was developed by Jean Piaget, an influential psychologist focusing on early childhood learning (Voyat 1981). Piaget describes cognitive structures as “cohesive, repeatable action sequence possessing component actions that are tightly interconnected and governed by a core meaning” (1952a, p. 240), and conceptualised learning as the building of these structures, which he typically described as schema (1952b, p. 7). To illustrate how these schema function, Barry Wadsworth captures Piaget’s concepts via a story of a child looking into a field to see a cow and mapping it

as a dog (2004, pp. 15-16):

The father looks into a field nearby and sees what adults call a cow, an animal John has never seen before. He says to his son, "John, look at that animal. What is it?" John looks into the field and sees the cow. One can almost see the wheels going around in John's head while he is thinking. After a moment of thought, John says, "It's a dog." Assuming John made an honest response, we could infer something like this: John looked out into the field and saw a cow. Presented with this "new" stimulus, he tried to place or classify the stimulus in reference to a card in his card file. In terms of categories in John's "file," the stimulus (cow) most closely approximated John's dog schema, so he identified the object as a dog.

According to Piaget, people build sets of schema in their minds by building chains of associations between things as they experience the world. Richards Heuer illustrates this in *The Psychology of Intelligence Analysis*, p. 22:

A schema is any pattern of relationships among data stored in memory. It is any set of nodes and links between them in the spider web of memory that hang together so strongly that they can be retrieved and used more or less as a single unit.

These association chains are written in the mind and stored like a set of index cards (Wadsworth 2004, p. 14). These schemas are entirely heterogeneous, and can be made from collecting and chaining together objects with actions or concepts. People map all incoming information to the index cards they have available, interpreting incoming information by *perceiving*. In the case above illustrated by Wadsworth, John had never seen a cow before, so to interpret what he was seeing he went to the closest approximate mapping in his index cards, which was a dog. Figure 27 broadly illustrates the concept of chains of associations, mapped together and stored as a simple index card in the mind for retrieval to perceive objects.

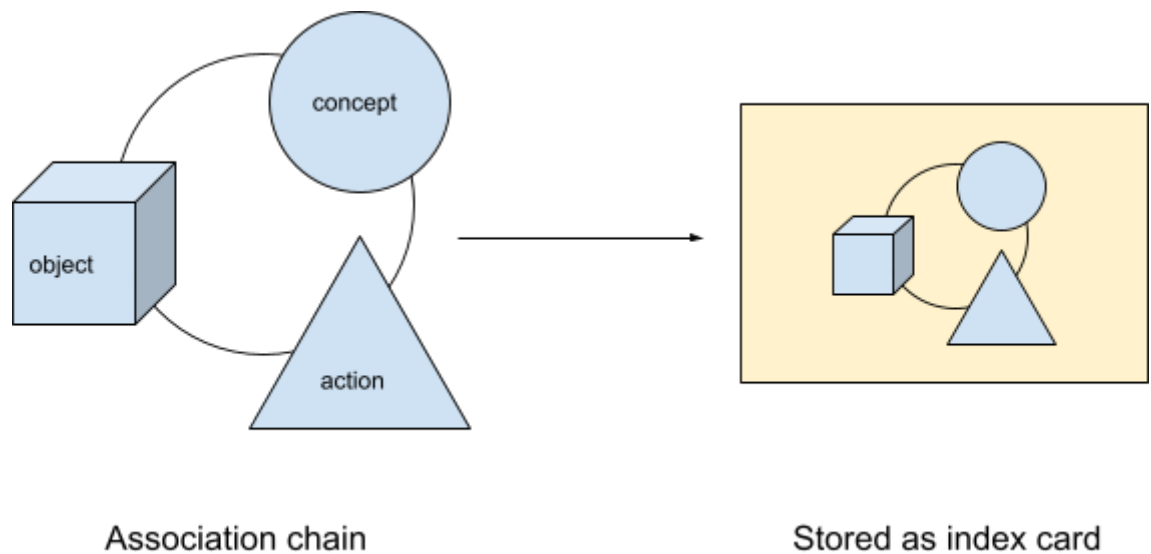


Figure 27: Chains of associations are mapped together and stored as a simple index card in the mind for retrieval.

Piaget worked with schemas as something carried into adulthood, which continue to work the same way (Wadsworth 2004, p. 14). Children begin with simple sets of schema, and the approximations between schema and the object can be very loose. As they get older through encountering more things and collecting more categories and associations, the set of schema become more refined and complex, and then approximations become more honed. To Piaget, “intellectual development is a constant process of construction and reconstruction” of these schemas (Wadsworth 2004, p. 16).

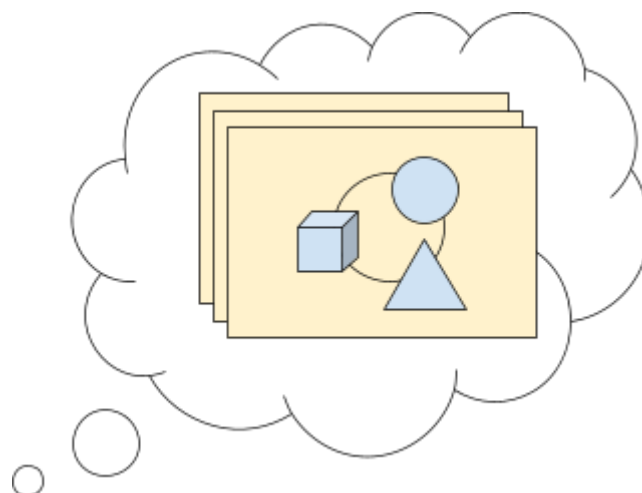


Figure 28: Schema stored as index cards in the mind.

This process maps to cybernetic concepts of information input, and is illustrated below in Figure 29. The general cybernetic concept we are building on is that humans receive an information input, and as a processing unit they perceive the input through the cognitive process of mapping the information to available schema as described by Piaget. This approximate mapping is how humans avoid infinite complexity of information input and find a workable way of dealing with the frame problem. This comes with great opportunity and also problems. As we have seen in the example of John mistaking the cow for a dog, it can be a problem because the approximations are inexact. As we can see in our question of how a Nike swoosh is a Nike swoosh, it means humans can attach meaning to a simple shape.

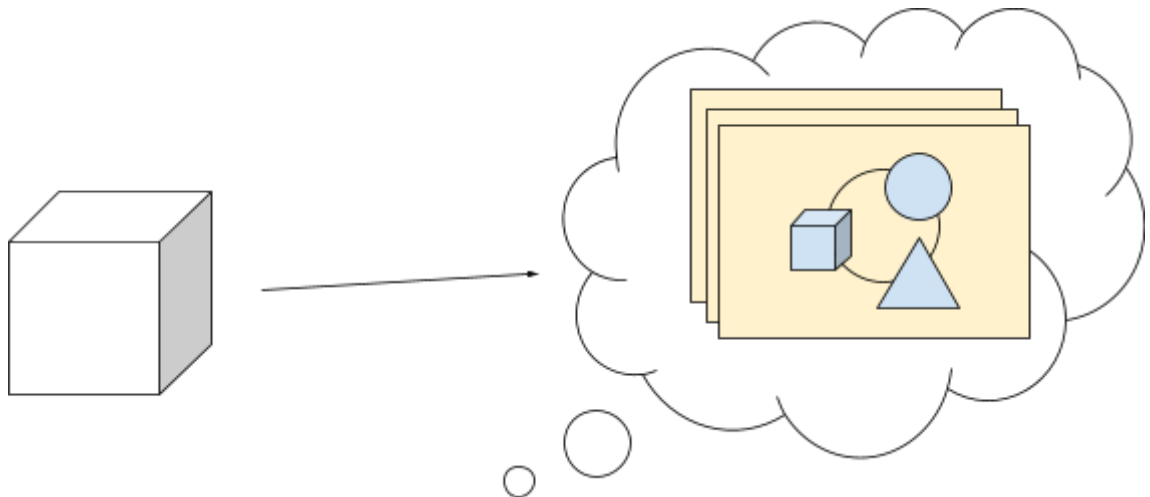


Figure 29: Perception occurring through mapping of objects to schema.

Here we can begin to answer the question of *how do people see an abstract shape like a Nike swoosh and process it as a global corporation?* The Nike swoosh is a Nike swoosh because association chains have been constructed in the mind. A relationship between the shape and a heterogeneous set of objects, concepts, and actions have been built through exposure to the Nike swoosh in association with other media objects. The result is an assemblage stored in the mind as an index card, and when the Nike swoosh is encountered, the index card stored is drawn upon and the assemblage is active.

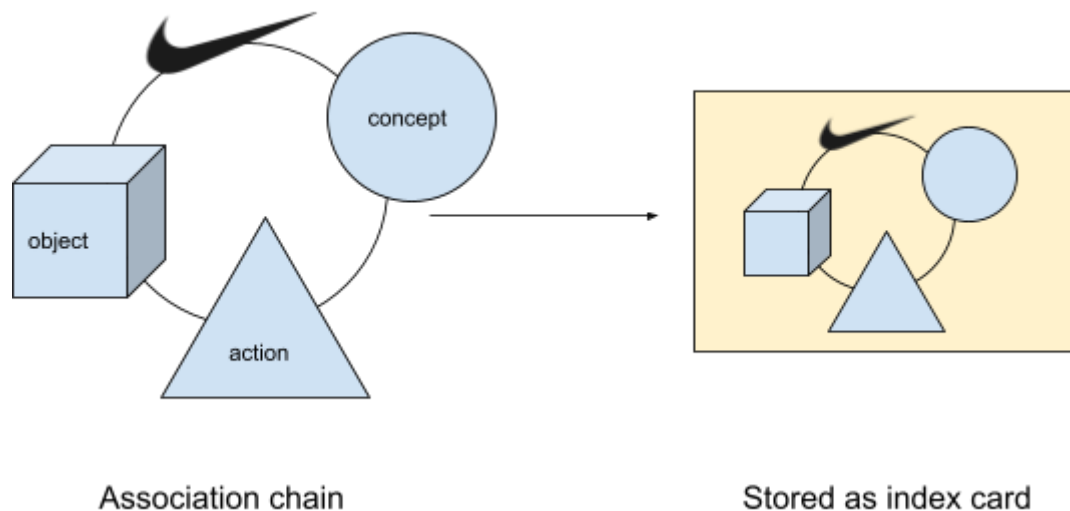


Figure 30: Association chains in the mind as schema.

To take another example illustrating how framing works, we can look at the case of the conquistadors appearing in Mexico, and the response of the Aztecs. A typical story is that the Aztecs thought the conquistadors were gods because of their advanced and alien technology in the form of guns and riding horses. We can consider this in terms of framing. In framing terms, the Aztecs mapped the conquistadors to gods because the Aztecs had no index cards to map guns and riding horses to, so they jumped to mapping them as gods for a lack of any other available interpretation. Historians have debated that the Aztecs thought the conquistadors actually were gods, although accepted differing accounts offer a useful illustration of framing that points to the Aztecs and their sensibility for perception. Michael Smith writes in *The Aztecs* (p. 284):

The Mexica king had been following their progress, and he sent Cortes gifts of precious feathers and gold. This offering was made in part to ascertain who these strange foreigners were. Some wondered whether the Spaniards could be gods, and their reactions to the gifts would help to clarify their nature.

This account would suggest that the Aztecs were testing the frames of the conquistadors. By offering them both precious feathers and gold, they were testing the conquistadors to see what association chains the conquistadors hold with those objects.

People can consider feathers precious because of framing.

Malleable Schema

Piaget writes that “intellectual development is a constant process of construction and reconstruction”. Each piece of information exposure validates or rewrites an association chain. When does a Nike swoosh not become a Nike swoosh?

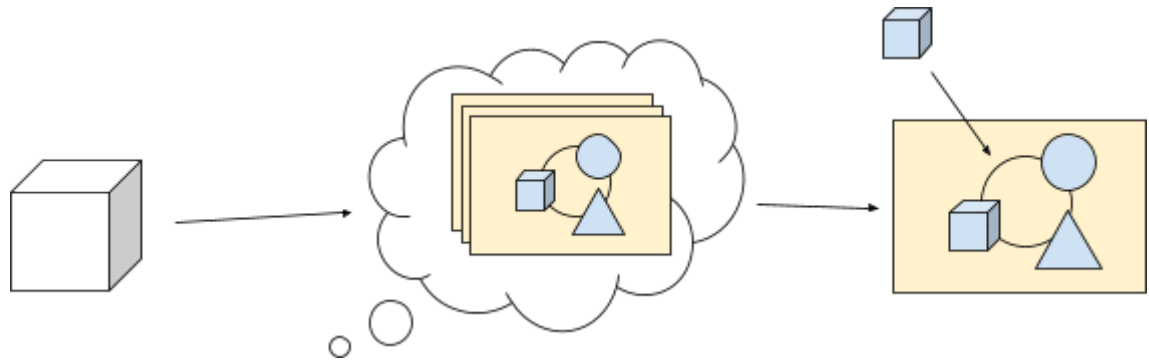


Figure 31: Redrawing of index cards in the mind.

Fundamental to schema as a learning concept is the operation of the schema, which is also mapped out by Piaget (Wadsworth 2004, p. 17-18). This operation is processual, and important to note because the nature of change in the process makes the concept of interest to designers. The first operation is *assimilation*, where an existing schema is deployed to handle perception of something as we saw in the story of John seeing a dog when he was looking at a cow (Wadsworth 2004, p. 17-18). The operation of assimilation is the base of perception as a human activity of dealing with the frame problem. However, a problem occurs when something appears that is unable to fit. Here, the second operation of *accommodation* occurs (Wadsworth 2004, p. 17-18). In accommodation, there are two options both relating to malleability of the cognitive structures of the mind. The first option is to write an *entirely new index card*, and the second option is to *modify an existing index card*. Wadsworth completes the logic of accommodation and assimilation, describing the process as “once accommodation has taken place, a child can try again to assimilate the stimulus. Because the structure has changed, the stimulus is readily assimilated. Assimilation is always the end product” (2004 pp. 17-18).

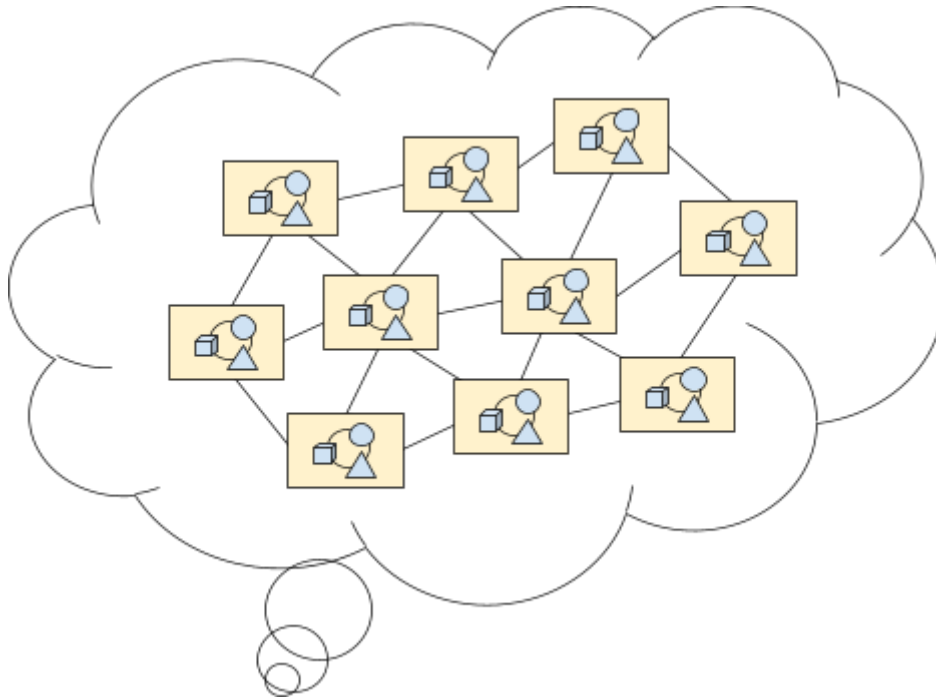


Figure 32: Networked schema in the mind.

Piaget notes that the entire schema must contain "a cohesive, repeatable action sequence possessing component actions that are tightly interconnected and governed by a core meaning" (1952, p. 7). This core meaning is particularly interesting as it points to this schemata as networked, and each of these association chains as smaller schema making up the entire schema of the mind, or what we might call the complete perceptual frame. The entire set of association chains must have a coherency, meaning the process of assimilation and accommodation is not isolated to a single card but instead must be cross checked across all index cards.

Conclusion

At this stage, we have mapped out issues fundamental to framing that set a foundation for constructing a processual model of framing where perception is the key driver of the loop. Using basic cybernetics concepts of all entities, human or non-human, as information processing units (Weiner 1948), we have found that the fundamental principle to any information processing unit is bounding of information inputs as important. We have laid out how humans operate as information processing units by looking at basic principles of cognitive psychology, and in particular the fundamental concepts developed by Jean Piaget of the existence of mental schema, and the operation

of this mental schema in the concepts of assimilation and accommodation (1952a; 1952b; Wadsworth 2004).

Particularly important here is the malleability of the schema. Given that the schema is malleable, it means it can be a target of design because design is concerned with instigating change. In the next section, we will fully develop our *model of symmetrical media exchange* and place the concepts around changing perception onto the model.

Section II: The Media-Framing Processual Model

Introduction

To begin developing our media-framing processual model, we look at some key concepts of modelling framing from the perspective of journalistic practice, and we will reconfigure these models for an environment of symmetrical media exchange. We will use the work of Robert Entman (1993) and a foundation for how framing operates in journalism, and further develop through reconfiguration of existing processual modelling of media-framing by Dietram Scheufele (1999). Once this reconfiguration has been performed, we will investigate topics of interest around perceptual alteration to *place* on the model in a processual manner.

The Fractured Paradigm

We started Section I of the present chapter with Robert Entman's note of people using mental clustering to view and interpret media, and we explored this further by moving into cognitive psychology with some depth. In this section, we return to Entman's paper 'Framing: Toward Clarification of a Fractured Paradigm' (1993), and work with the larger concept of the paper. Entman conceptualises framing as a "fractured paradigm" occurring in four locations in the communication process: the communicator, the text, the receiver, and the culture (pp. 52-53):

Communicators make conscious or unconscious framing judgments in deciding what to say, guided by frames (often called schemata) that organize their belief systems. The *text* contains frames, which are

manifested by the presence or absence of certain keywords, stock phrases, stereotyped images, sources of information, and sentences that provide thematically reinforcing clusters of facts or judgments. The frames that guide the *receiver's* thinking and conclusion may or may not reflect the frames in the text and the framing intention of the communicator. The *culture* is the stock of commonly invoked frames; in fact, culture might be defined as the empirically demonstrable set of common frames exhibited in the discourse and thinking of most people in a social grouping. Framing in all four locations includes similar functions: selection and highlighting, and use of the highlighted elements to construct an argument about problems and their causation, evaluation, and/or solution.

However, caution and clarification is required here in what Entman means by 'broken'. In the introduction to this chapter, it was noted that framing is both a noun and a verb, and Entman's description of broken is touching on this, conceptualising framing as a concept not broken in the sense of not functioning, but fractured in the sense of splintered into different interacting pieces functioning as a whole. Entman's fracturing of framing into these pieces is reasoned by positioning framing as a "master discipline that synthesizes related theories and concepts and exposes them to the most rigorous, comprehensive statement and exploration" (p. 51). Michael Cacciatore, Dietram Scheufele & Shanto Iyengar have expressed similar concerns around this multiplicity of what framing means (2016). Here we deal with this problem by recognising each piece outlined as requiring and warranting exploration at depth, while keeping in mind each as a component of the system making up the master discipline of framing. Through Section I of the present chapter, we have already explored at depth a piece of this system, which is human perception. We will build on this approach in the construction of our loop.

In Section I, we found that all entities, human or non-human, act as information processing units (Weiner 1948). We also found that the fundamental principle to any information processing unit is bounding of information inputs as important. We can say

that framing is inevitable as both a media producer and a media audience. Robert Entman deals with this. A key concept of framing thread pulling these pieces together as the *system of framing* is what Entman terms *selection* and *salience* (p. 52):

Framing essentially involves *selection* and *salience*. To frame is to *select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation* for the item described.

This is useful because we have a core concept we can apply across all locations, making it the driver for our process across the loop.

Developing a Processual Modelling

A processual model of framing has been developed by Dietram Scheufele in “Framing as a theory of media effects” (1999). Scheufele picks up this nature and organises framing concepts into an operational “process model” of frame research (p. 115):

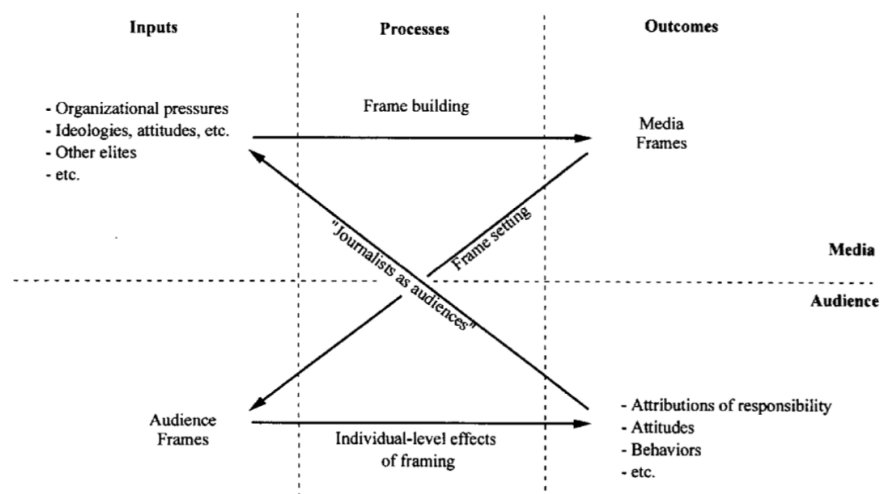


Figure 1. A process model of framing research.

Figure 33: Dietram Scheufele’s processual modelling of framing in journalism (1999, p. 115).

For our analysis of this model and to work out how it might be useful for us, we can look at this model first in terms of placements, and then in terms of process. First, looking in terms of placements, this model contains two stages of the *media frame*, and the *audience frame*. This works toward Entman's modelling of framing as distinct spaces warranting its own conceptualisation and sub-issues, while keeping in mind its operating as a function of a larger system of framing. First, it maps to Entman's pieces *communicator* and *text* (p. 52) through the stage on the model of the media frame. The media frame is concerned with the process of constructing stories using available information and media objects, for example how have journalists organised information and presented coherent narrative of events? or using Entman's terminology, how does a media maker perform *selection* and *salience* to generate a story? Second, it maps to Entman's piece of *audience* through the stage on the model of the audience frame. The audience frame looks at concepts of cognitive psychology we have explored in Section I of the present chapter. This organisation of placement is something we can look to use in building our processual model. However Entman's fourth piece of framing, *culture*, is not explicitly placed on the model although somewhat resonates through "attributions of responsibility, attitudes, behaviours etc" of the audience, and "Organisational pressures, ideologies, attitudes etc, other elites, etc" of the media. This is something we can look to account for more in our modelling in terms of placement. Then, we look at the arrangement of pieces processually. First thing to note is the looping nature of the model, indicating a cybernetic feedback loop at play. Particularly interesting to note here is Scheufele's use of *outcomes* instead of *outputs*, pointing to each space having a processual component themselves. This works to Robert Entman's fractured paradigm concept, indicating each stage worthy of exploration at depth.

Using these concepts, we can take the cybernetic processual model in Figure 27 and modify it by adding Robert Entman's concepts of framing to develop a sense of their threading together processually. First, *selection and salience* as a concept runs through the entire loop because it is necessary to making media, as Entman points out above. It is important to view media as we see through human perception, as explored in Section I of the present chapter. Second, taking Entman's spaces of framing, the *receiver* as a space sits around viewing media because it deals with the input/outcome of making

media, while *communicator* sits after the schema change as an outcome of viewing media. *Texts* then sits as an outcome of making media and input for the receiver. Each one of these spaces is a sequential building process, with *texts* being an outcome of *making media*, which is an outcome of a *communicator* having a *schema change*, which is an outcome of *viewing media* as a *receiver*, and so on.

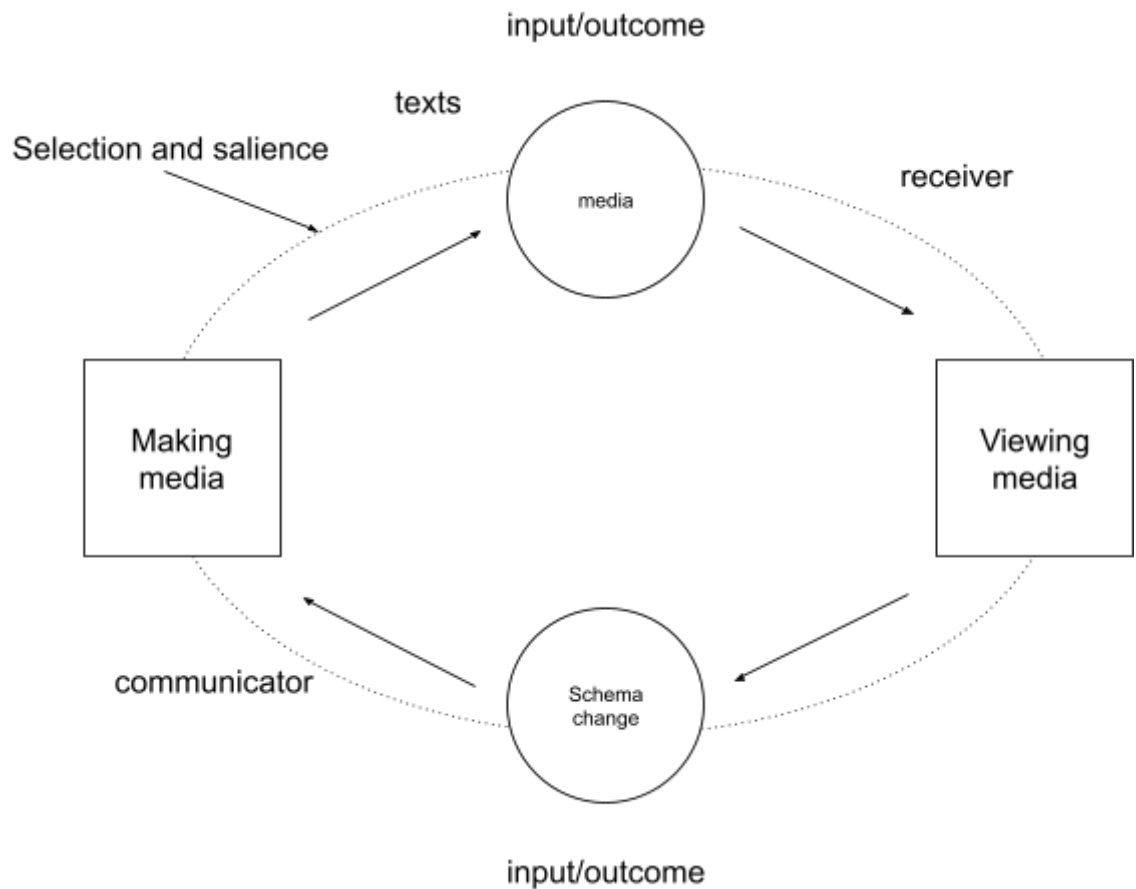


Figure 34: The foundation of the model of symmetrical agency (without placements).

Placements of Perception

Following Robert Entman's concept of framing as a fractured paradigm built on a systemic function of pieces each with their own conceptual depth, we will look to build in topics around the placements of *communicators*, *texts*, *receivers*, and *culture*. We can build on the foundation of concepts of human cognition covered in Section I of the present chapter, in particular the fundamental concepts of the existence of mental schema, developed by Jean Piaget, and malleability of these schema (1952a, 1952b, Wadsworth 2004). Then, we make the addition of elements of human cognition and

perception change onto this model to build a processual sense of the performance of selection, salience, and schema change by looking into research on the frame effect and the associated technique of positioning; the concept of the overton window as gradual shifting of schema over time; memetics in looking at how schematic associations spread and; how schema forms the bounding mechanism on construction of media by creating a media frame. While these topics are not exhaustive of possible processual components of selection, salience, and schema change, this demonstrates how the looping model is a strong foundation for modelling interaction via symmetrical exchange of media. Keeping in mind McLuhan's concept of media as extensions of man, which can be applied to anything where agency has been translated, we will further explore its logistics in Section III.

Placement I: The Frame Effect and Positioning

The framing effect is concerned with the use of language and perception of information. It has its origin in cognitive psychology and observing situations where humans encounter written information leading to an action (a judgement or decision). It is a well validated approach in research studies and commercial application, as the most applicable and widely deployed in advertising. However, the techniques of framing effects discovered can be used to manipulate perception of any written information, which we will examine here.

The framing effect was first documented and published by Amos Tversky and Daniel Kahneman in 1981 in a study well known in framing effect research lineage as the Asian Disease problem (Winskel et al. 2016). Tversky and Kahneman asked two groups of participants "imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people" (1981). Both groups were presented with the same two program options to deal with the situation, but the *described expected outcome* of the programs offered to each group were phrased differently (p. 453):

Group A:

Program options	Described expected outcome	Preferred by respondents
If program A is adopted	200 people will be saved	72% of respondents preferred
If program B is adopted	there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved	28% of respondents preferred

Group B:

Program options	Described expected outcome	Preferred by respondents
If program C is adopted	400 people will die	22% of respondents preferred
If program D is adopted	there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die	78% of respondents preferred

Programs A and C are identical, as are programs B and D. The difference is in the positive and negative phrasing of programs – a positively phrased outcome is preferred over a negatively phrased outcome, despite being logically equivalent.

In another example of the framing effect, Irwin Levin and Gary Gaeth (1988) replicate results of the Asian disease problem in a study looking at differences of perception of a consumer product in positive and negative framing. Participants were given identical samples of ground beef, but with different descriptions - either 75% *lean* (positive) or 25% *fat* (negative). Levin and Gaeth found that participants rated the beef described 75% *lean* as better tasting and less greasy, despite being identical and logically similar

to the samples with the alternative description of 25% *fat* (p. 377). This study is notable because it differs from the Asian disease problem in the framing; it is grounded in *attribute* of the options rather than *risk* of the options (Levin, Schneider & Gaeth 1999, p. 159). This led to Levin, Schneider and Gaeth mapping a set of studies on framing effects into a typology of three categories (1999), observing that the Asian disease problem is a *risk choice framing*, the beef study an example of *attribute framing*, and drawing a third category of *goal framing*.

Levin, Schneider and Gaeth (1999) generally observe goal framing as occurring in communication attempting to persuade to take an action, framing in terms of potential to “provide a benefit or gain (positive frame) or prevent or avoid a loss (negative frame)” (p. 167). Interestingly, negative framing is found to have greater impact than is positive framing across framing effect literature looking at goal framing (pp. 169-171). In Ganzach and Karsaki’s study of credit card offers (1995), the promotional tactic of emphasising possible losses from not using a card was more powerful than messaging highlighting possible gains from using it. The general disposition of people seems to be loss aversion, which is favoured across both risk framing and goal framing.

Type of framing	Participants favour
Risk framing	Positively framed – “200/600 people survive” rather than “400/600 people die”.
Attribute framing	Positively framed – “75% lean” rather than “25% fat”
Goal framing	Avoiding loss – “Use this credit card to avoid this loss” is better than “Use this credit card to possibly receive this gain”.

As expected, this framing effect is very useful in marketing, advertising and public relations, and considered a cornerstone of marketing and advertising (Ganzach & Karsahi 1995). Adam Ferrier, an advertiser and consumer psychologist, points out exploitation of the loss aversion framing in particular as an established tactic in

advertising, citing often used terms such as “Don’t miss out”, “Only two left”, “Hurry before they’re all sold” (2014, p. 67).

The framing effect shows how logically equivalent outcomes can be perceived differently through changes in language or phrasing. *Positioning* is a related technique commonly used in marketing and advertising (Urde and Koch 2014 p478) of changing the perception of things through construction of media aiming to modify association chains in a particular direction. Al Ries and Jack Trout in their book *Positioning: The Battle for Your Mind* (2001), although not directly pointing to Jean Piaget, point at the concept of association chains by defining the approach of positioning as “not to create something new and different, but to manipulate what’s already up there in the mind, to retie the connections that already exist” (p. 5). In the same vein Robert Entman writes that in building a text, “the text contains frames, which are manifested by the presence or absence of certain keywords, stock phrases, stereotyped images, sources of information, and sentences that provide thematically reinforcing clusters of facts or judgments”. Positioning is about being aware of association chains in the minds of a receiver, and constructing media that builds something into an existing association chain.

To see how this works in practice, we can look at Edward Bernays. Bernays was the nephew of psychoanalyst Sigmund Freud and a successful propagandist for the United States during World War I. Following World War I, Bernays deployed his propaganda techniques in consumer advertising. Bernays coined the term “public relations”, following negative connotation around the term propaganda. He described propaganda as “a consistent, enduring effort to create or shape events to influence the relations of the public to an enterprise, idea or group” (1928, p25).

An example of Edward Bernays use of positioning is how he constructed a campaign persuading women to smoke in the late 1920s by associating cigarettes with the suffragette movement. While this case study has been examined from angles of feminism and consumption (Leal, Freire Filho & Rocha, 2016), and issues of propaganda in the everyday media environment (Kirsch 2016), it is strongly depicted in

terms of the psychological technique of positioning in the documentary *The Century of the Self - Part 1: Happiness Machines* by Adam Curtis (2002). At the time, there was a cultural taboo around women smoking in public, and Bernays was commissioned by the American Tobacco Corporation to break this taboo. In 1929, Bernays staged an event at a popular parade in New York, giving a group of young women in the parade cigarettes, instructing them to first hide, and then on his signal, to reveal dramatically and light the cigarettes, and begin smoking them. Bernays then told the press that he had heard a group of suffragettes would be staging a protest by lighting “torches of freedom”, a term he had come up with. This event was widely covered by the media using this term Bernays had planted, with images of young women smoking cigarettes in an expression of freedom. Bernays had successfully repositioned cigarettes: taking the ideas of the suffragette movement that was established in the minds of people, and building new association chains between women and cigarettes by showing cigarettes attached to these ideas, which led to a significant increase in cigarette sales to women.

Placement II: Memetics

The topic of memetics is particularly relevant to our loop of symmetrical media making, and is a concept describing the process of something spreading through minds as media is exchanged and perceptual schemas are modified. The term *meme* has become popular due to the internet memes and their prominence in internet culture. However, the concept of a meme extends well beyond pictures on the internet, although the way internet memes operate as many copies of an image in slight variations gives a little insight into the foundation of the larger concept.

We will further explore this in the following chapters, but here we focus first on the larger concept of the meme that was first proposed by Richard Dawkins, as it directly relates exchange between entities and cognition. Richard Dawkins in *The Selfish Gene* (1976) writes culture spreads via people imitating cultural units, taking the concept of a gene as biological replicator, and using the meme to describe cultural replication (p. 192):

Examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches. Just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation.

The grounding of this concept in possible outcomes of interacting and information exchange places it onto our model as a process of interest. Through an encountering or exchange there is potential of memetic replication, where one entity might imitate what they have interacted with.

The meme concept has been further explored by Susan Blackmore (1999) and Dan Dennett (1995) from the perspective of evolutionary biology as a concept for understanding cultural evolution. Anything that can be replicated can do so memetically, and the evolutionary interest is in the process where something is imitated, producing a copy of that thing that is slightly varied from the previous providing optionality and survival of strongest options for the given environment (Blackmore pp. 53-56). Anything can become a meme if it can be replicated, such as clothing styles, patterns of speech etc. Blackmore even develops the concept of a memeplex, where groups of objects are replicated together, for instance in religious practices. Importantly, ideas can also be memes as they spread via imitation from person to person. Through positioning and association chains between objects, ideas spread from person to person with slight variation in each person.

While critique of memetics has been based on argumentation around semiotics and the notion of the sign as offering a more robust framework for what memetics is attempting to describe (Deacon 2004), the idea of memetics is applicable to examples of idea replication and framing that is of concern in the present chapter. The example of Edward Bernays' 'torches of freedom' cigarette campaign demonstrates this memetic replication in practice and is fitting to the looping environment of symmetrical media making. Bernays' campaign displayed the use of dynamics of memetics from viewing

media to media making, aware of the suffragette movement as meme spreading gathering momentum throughout the population and inserting the cigarette into the assemblage to become part of the memeplex. People viewed the media of suffragettes and the cigarettes together, and imitated what they had seen, thus replicating the meme.

Placement III: The Media Frame

The media frame is the framing mechanism of making media, performing a similar function to perception in encountering media. However, it is the simplification mechanism in making media and determines what components are used. For example, Robert Entman illustrates the use of the cold war frame of the 90s, where a central organising frame emerged that reduced complexity of the situation and brought particular things into focus while leaving others out, highlighting “certain foreign events-say, civil wars-as problems, identified their source (communist rebels), offered moral judgments (atheistic aggression), and commended particular solutions (U.S. support for the other side)” (1993, p. 52). Gamson and Modigliani (1987) conceptually defined a media frame as "a central organizing idea or story line that provides meaning to an unfolding strip of events ... The frame suggests what the controversy is about, the essence of the issue" (p. 143). The central organising frames can also be used “to turn meaningless and nonrecognizable happenings into a discernible event” (Scheufele 1999, p. 106). This is illustrated in Figure 35 below.

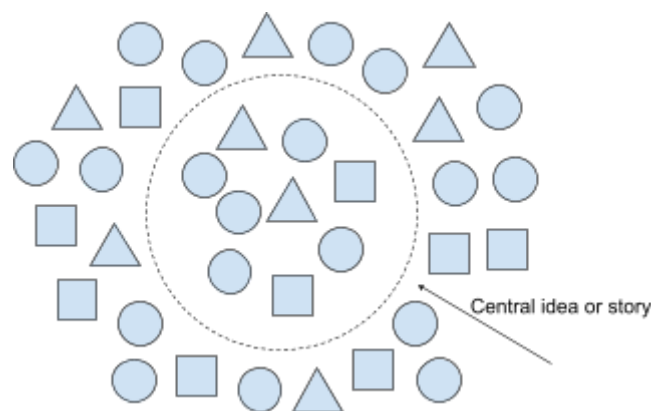


Figure 35: How the central organising frame selects some things and leaves others out.

Just as mental schema are not static across time, central organising frames also shift across time. To see the formation of a frame in a detailed processual form as a design

problem we will refer to the visual communication design modelling of AIGA, in the “Process of designing solutions” (Dubberly 2005, p. 47), as well as an adaptation of the AIGA model mapping of this process to develop the narrative around the Iraq war (Dubberly 2005, p. 48). Figure 36 below illustrates this process as mapped by Nathan Felde (Dubberly 2005, p. 48) analysing how the frame of the story developed through an iterative process of framing and reframing. As we can see in the illustration, the story of “Liberating the people of Iraq” is the frame of the story that eventually emerged, but through a process of selection, salience, and iteration of the frame. The design problem initially starts as how to frame gaining control of Iraq and getting access to oil, from which the “axis of evil” and climate of fear frame emerged. With this frame, a story of building evidence to support war could be constructed with new selection and salient components, bringing “Grenada, Panama, Kuwait, Afghanistan...” into the frame and the issue of weapons inspections, leading to war with Iraq as the best solution. “Weapons of mass destruction” is documented as a failed frame, which the iteration to reframing liberation comes about.

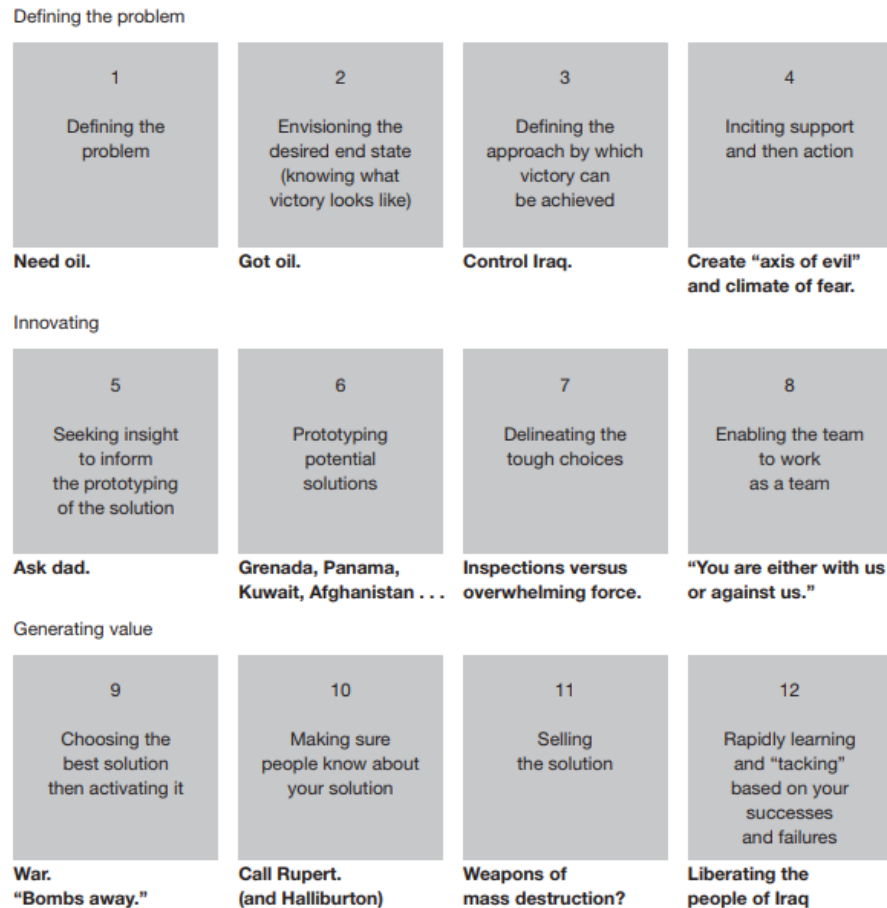


Figure 36: Modification of the process of designing solutions by Clement Mok and Keith Yamashita by Nathan Felde to show development of the Iraq war narrative (Dubberly 2005, p. 48).

The central organising frame comes about through the mental schema of the media maker. For example, Meng Shi and Matthew Nisbet write in ‘How Media Frames Structure Our Political Perceptions’:

As Wolfgang Donsbach (2005) relates in analyzing the psychology of journalists, many will approach a story with a pre-existing expectation or hypothesis and this frame of reference will then serve to organize information. This likely was the case in coverage of the Korean and Iranian airline

shootdowns, with journalists' pre-existing schema specific to Iran and the Soviet Union shaping their coverage.

This fits the processual modelling of our loop, as the flow of the loop indicates that perceiving media through mental schematic is an input to making media, and a relationship between central organising frames and memes exists because memes precede frames. The central organising frame can come about as a meme that has been picked up by the media maker, and is what Robert Entman is pointing to above in the “common” use by journalists of the cold war frame. Within the frame there can be differing positions and ways of telling the story (for example pro-war or anti-war), the frame still remains the same.

Placement IV: Overton Window

In the above example of development and iteration of the Iraq war frame by Nathan Felde, we can see how frame shifting over time can take place where an idea at one point in time would be rejected by an audience but eventually becomes accepted by framing and reframing across time. This captures the concept called the Overton Window, named after Joseph Overton, who proposed that social groups tend to have a window of accepted ideas common throughout the population that is continually shifting over time, and that politicians “will only espouse policies that they believe do not hurt their electoral chances” (Mackinac Center for Public Policy n.d.). Overton developed this concept at the Mackinac Center for Public Policy in the context of public policy, and although it has not been extensively tested in formal research, it resonates throughout. For example, Robert Entman points to something like an Overton Window as an “empirically demonstrable set of common frames exhibited in the discourse and thinking of most people in a social grouping” (1993, p. 53). Common frames can also be thought of as memes that have spread throughout a population.

The Overton Window concept is illustrated below in Figure 37, and is based on Mackinac Center for Public Policy’s guide to the concept (n.d.), showing how in policy discussion, there is a window of ideas in play, with policy at the centre of the window and unthinkable ideas outside of the window. This window shifts over time, where

unthinkable ideas become considered, and policies are questioned. Importantly, unthinkable ideas only come into the window gradually, as proposal of an unthinkable idea would surely be rejected. Mackinac Center uses the example of the Prohibition Era, once policy and now an unthinkable idea. However, we can trace this dynamic through the perceptual shifts documented above and see how it is performed *by design*. Edward Bernays made the unthinkable idea of women smoking common by attaching it to the suffragette movement, and the Iraq war frame shifting was designed to make entering Iraq an acceptable idea by framing it as a war against the weapons of mass destruction.

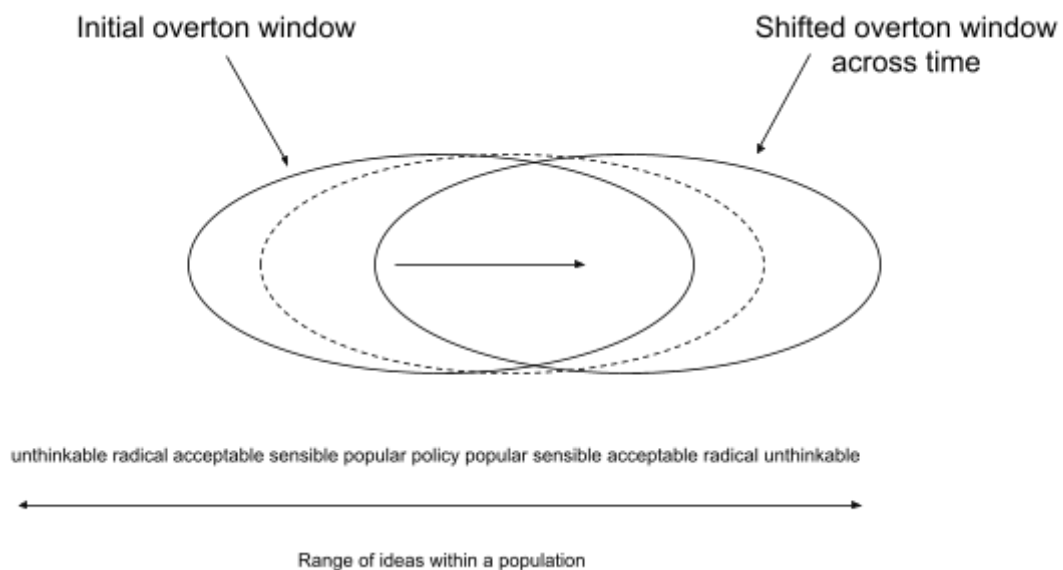


Figure 37: Demonstration of Overton Window shifting using a modification of Mackinac Center for Public Policy (n.d.).

Conclusion

Journalism has already been entirely disrupted and destabilised by this shift to digital and online that has generated participatory culture. However, as we have found in this section, the existing research in framing in journalism can be reworked to build a model of media making in a symmetrical media making environment of participatory culture. We have seen how concepts around perceptual change such as the framing effect and positioning, memetics, the overton window and the central media frame operate in a processual loop, with the concepts of perceiving media feeding into the construction of media in an ongoing cycle. While this model is not representative of every possible

concept of perception that may exist and can be mapped onto this model, it represents Entman's fractured paradigm concept and how various concepts of schema changes operate processual in a symmetrical media making environment. Also important to note is, as mentioned in the introduction to construction of this loop, the account of concepts of schema changes placed on the model are not intended to be exhaustive examinations of the concepts because the aim is to illustrate how the fundamental aspects of the concepts fit together processually. This feedback loop of cognition captures exchange of media where there are reduced distinctions between media makers and media consumers. In the next section we will focus on how to use frame shifting to generate new perceptions of circumstances and material artefacts.

Section III: Heterogeneous Engineering and Framing

Introduction

Through Sections I and II of this present chapter, we have found that frames are inevitable in media production and consumption, and can also shift through exposure. Framing is foundational not just to journalistic media practices, but to all material culture. The framing of any material artefact can find new ways of using it, new ways of thinking about it and generate new opportunities. This is also not particular to journalistic framing, and William Gibson shows us in his essay 'Rocket Radio' (1989):

The Street finds its own uses for things - uses the manufacturers never imagined. The microcassette recorder, originally intended for on-the-jump executive dictation, becomes the revolutionary medium of magnizdat, allowing the covert spread of suppressed political speeches in Poland and China. The beeper and the cellular telephone become tools in an increasingly competitive market in illicit drugs. Other technological artifacts unexpectedly become means of communication, either through opportunity or necessity. The aerosol can give birth to the urban graffiti matrix. Soviet rockers press homemade flexi-discs out of used chest X-rays.

The streets find their own use for things by framing objects differently to the way manufacturers never imagined. As we noted in the Introduction, the concern of framing in methods of design research looks to build a methodological perspective on finding its own use for things: using the inevitability of framing we have found and using purposeful shifting of frames to find new ways of looking at scenarios to generate opportunities for material artefact use or construction. In this section, we will build on this concept as a processual approach by going outside design literature. Importantly, this section generates the importance of a frame of operation as a key methodological outcome, which will form the foundation of the methodological outcomes of Chapter 3: Swarms and Sensibilities, and Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign.

This section has three parts. Much like Section II, is not intended to be an exhaustive account of the concepts introduced, but sketches out their usefulness to understanding frame shifting from a position of an overall snapshot, along with providing some examples. The first part unfolds the issues of material culture as extensions of man and the embedded issue of translation of agency that first emerged in the Introduction chapter. We will further explore this in the context of framing, looking at actor-network theory (ANT) as a sensibility toward complexity of the makeup of objects and their embedded agencies and heterogeneities. We will show that there are only frames selecting and making salient agencies and heterogeneities to illustrate how frames are performed and how tracing heterogeneous complexity generates opportunity for frame shifting. Following this, the second part of this section looks at how frame shifting generates a dynamic of heating and cooling of components visible inside the frame. The final part of this section develops two approaches to frame shifting through two case studies. The first is Henry Beck's London Underground map as a kind of pragmatic framing, demonstrating a kind of frame shifting particular to the circumstance. Second, we look at the work of Stuart Walker as speculative framing, demonstrating a complete frame shift for reimagining any artefact of material culture. Here the concept of the frame of operation appears as a high level frame shift generating different modes of operation in working with material culture.

The ANT Sensibility

As we noted in the Introduction, embedded in material culture is extension of agency. We saw how design is fundamentally concerned with matters of agency, and looks to create new material artefacts that alters operation of agencies in scenarios. However, we generated a sense of immense complexity to this issue of agency through examination of things such as hotel keys, road signs, and newspapers, and traced how agencies are translated, compounded, and operating within material artefacts. Here, we will aim to better understand ways of seeing agency by looking at the body of work known as actor-network theory (ANT). Although not explicitly connected to Marshall McLuhan, ANT offers a vibrant way of considering scenarios involving humans and technology that helps us better understand McLuhan's statement of media as extensions of man. Through this we will see that the visibility of agency is a framing problem. ANT will offer us a perceptual shift in itself, making visible the operation and interaction of translated agencies as heterogeneous networks of agency. It will also indicate a sensibility toward complexity demonstrating what could possibly be part of the frame, and asks how some components become the salient part of the frame.

We can first position ANT as a perceptual device itself. John Law describes ANT as a "sensibility to materiality, relationality and process" (2004, p. 157) rather than a theory, confirming this to a degree in 'Actor Network Theory and Material Semiotics' (2009, p. 141):

Theories usually try to explain why something happens, but actor network theory is descriptive rather than foundational in explanatory terms, which means that it is a disappointment for those seeking strong accounts. Instead it tells stories about "how" relations assemble or don't. As a form, one of several, of material semiotics, it is better understood as a toolkit for telling interesting stories about, and interfering in, those relations. More profoundly, it is a sensibility to the messy practices of relationality and materiality of the world.

From this account of ANT, we can see the sensibility places heavy emphasis on materials and their relations in a performative manner. In fact, ANT does not make

much sense of the distinction between social and technical, viewing everything as heterogeneous. In other words, the premise of the ANT approach is that construction or analysis of either the social or material artefacts must be heterogeneous, always enacting both the social and material.

The ANT Premise

ANT emerged in the late 1970s and the early 1980s within Science and Technology studies as a way of analysing the emergence of scientific outcomes and material artefacts. Bruno Latour and Steve Woolgar's breakthrough study of how scientific laboratories generated facts is a foundation text demonstrating this perspective. Latour and Steve Woolgar argued that even the most seemingly trivial scientific activities become intensely complicated and layered outcomes of social and technological factors. ANT sensibility, even the very instruments used in science become entanglements and embodiments of a performative set of heterogeneous actors (Latour & Woolgar 1979). Following Latour and Woolgar's initial breakthrough analytical approach in *Laboratory Life*, ANT developed through case studies each with their own peculiarities.

The ANT frame looks at everything locally because it maps out complexities of a scenario, with each case study tracing details highly peculiar to that scenario. An overview of the important contributions to ANT from John Law, Bruno Latour and Michel Callon illustrates the importance of this. It is worth presenting this overview in detail as it illustrates the core of the sensibility that will become more apparent as we explore ANT. For example in John Law's examination of the Portuguese expansion (1986, p. 235):

My argument is that the Portuguese effort involved the mobilisation and combination of elements from each of these categories. Of course kings and merchants appear in the story. But so too do sailors and astronomers, navigators and soldiers of fortune, astrolabes and astronomical tables, vessels and ports of call, and last but not least, the winds and currents that lay between Lisbon and Calicut.

Similarly, Bruno Latour's study of Pasteur, described by John Law (2009, p. 145):

To show this he charts how a network of domesticated farms, technicians, laboratories, veterinarians, statistics, and bacilli was generated. He describes how they were shaped (in some cases created) in this network. And he shows how the result was generative. Farms were turned into laboratories, vaccines made from attenuated bacteria, cattle stopped dying of anthrax, and Pasteur became a great man (Latour 1988b). All of which were the effects of a set of materially heterogeneous relations.

Michel Callon's study of the development of electric cars in France also shows this heterogeneous framing of scenarios (1987, p. 84):

it is often believed that at the beginning of the process of innovation the problems to be solved are basically technical and that economic, social, political, or indeed cultural considerations come into play only at a later stage. However, more and more studies are showing that this distinction is never as clear-cut. This is particularly true in the case of radical innovations. Right from the start, technical, scientific, social, economic, or political considerations have been inextricably bound up into an organic whole. Such heterogeneity and complexity, which everyone agrees is present at the end of the process, are not progressively introduced along the way.

It must be noted that attempting to see with such complexity seems to work against our natural cognitive process of framing. As we know from the frame problem, adding complexity results in making situations unworkable because of the limited bandwidth of input and decision making. However, the purpose of ANT is not to add complexity to the framing of a scenario, but instead ANT makes important points about framing. First, ANT determines what could become part of the frame, where a frame shift could see the scenario or entity with any of these components as the salient. For example, in John

Law's examination of the Portuguese expansion, he is pointing out that kings and merchants represent a way of framing the success. However, another framing could be astronomical tables as the most salient, as they also played a role just as significant. Second, ANT asks why some components become more salient in the framing, even though all components are just as necessary. For example, Bruno Latour is capturing this point in the case of Pasteur, where Pasteur became the salient component of the network where all these other entities were also in play as well. The question of using ANT then is a frame of seeing, how to see the frames, and how to shift frames.

The usefulness of this analytical approach within Science and Technology studies became apparent to social sciences more broadly as it develops into an analytical approach to any situation involving human and material artefact relations. Design historian Kjetil Fallan has explored the possible usefulness of actor-network theory as a tool to design historians, describing it as a "fascinating approach" (2009, p. 46) to issues of human-artefact relations. According to Fallan, it is "a sort of mental corrective and conceptual backdrop" (2010, p. 69) and broad "theoretical framework facilitating new and dynamic ways of thinking about design" (2010, p. 71). Mental corrective indeed captures the point, as the ANT sensibility generates possibilities of new framings.

How ANT Reframes

Indeed, in articulating ANT John Law captures it into a set of "ingredients" (2009 p. 146), pushing away from methodology or formula and presenting it as a general perceptual sensibility when viewing a situation. Bruno Latour has noted "four things that do not work with actor-network theory: the word actor, the word network, the word theory and the hyphen!" (1999, p. 15). Following this, Latour asks us to put aside the terms actor and network, and asks us to consider ANT in terms of framing instead. (1999, p. 16). Illustrating what ANT is in the abstract can be done (Law 2009), but it is best illustrated as a sensibility of generating new frames of any given scenario through examples of empirical assessment of scenarios and artefacts. Assemblage and agency roughly map to the network (assemblage) and actor (agency) suggested in the ANT label, and theory points to a method of tracing these agencies through assemblages in a situation as "a way to access sites" (Latour 1999, p. 20). These new sites are the frame

shift to change what is selected and what is salient. Here we will look at examples of how the ANT perspective aids this frame shifting.

In the Introduction we discussed tracing of agencies in material artefacts through examples of the hotel keys (Latour 1991), looking at how road signs (Figure 12) are translation of agency of decision makers into durable objects enacting their agency over time, and the asymmetrical agency of broadcast media where writers can talk to newspaper readers, but the readers cannot talk back (Figure 13). In the Introduction we also discussed looking at artefacts of visual communication design as translation of the communication into a material, visual form, extending an agency intending to modify the perception or behaviour of people it is interacting with. This way of looking at artefacts illustrates the ANT approach to agency, and in fact is also captured by the Marshall McLuhan perspective of media as extensions of man. Here, we will further investigate the ANT approach and unravel the implications of taking this perspective, and how this perspective highlights how there are only frames, and how these frames occur.

Writers of the ANT approach often take the mundane as the object of their study and frame objects in terms of agency that has been translated into the object. We have already seen how Bruno Latour traced the agency of the hotel owner in the hotel key, seeing how the hotel owner translated their agency into an inconvenient object to change the behaviour of the hotel guests. In another example from Latour, translation of agency is traced through examination of a cat flap on a door, where the human, tired of being a doorman for the cat, but not wanting to leave the door permanently open, translates his action of opening the door into freely swinging flap allowing the door to be both open and shut and keeping both the human and the cat happy. We could really take any object we see around us and frame it in terms of translation of agency and the interactions of agency in the object and other agencies the object comes into contact with, human or non-human. This generates a framing that is the outcome of seeing everything as negotiations between agencies.

Interestingly, with this perspective we see “*power* as an effect” (Law 2009) rather than

as given through a landscape of *semiotic relationality* where, as John Law describes, any situation or entity, human or non-human, is a “network whose elements define and shape one another” (2009, p. 146). This illustrates a sense to ANT of framing situations or entities as assemblages of components where the interactions between components are key. We frame in terms of interactions of translated agencies within objects rather than objects themselves.

Edward Woodhouse and Jason W. Patton (2004) have explored this relational materiality as “design by society”, arguing that the process of designing is not as simple as a lone designer single-handedly creating an artefact, but is a series of negotiations between the “proximate designer” and a complex myriad of networks of society, such as the organisation they work within or society they are serving, that results in a design outcome (p. 1-3). They assert that “no simple boundary adequately delineates what counts as design, or who engages in it” (p. 3), rather the design process is a complex push and pull arrangement where the role of the proximate designer is to reshape the networks of society. Their conclusion is that for something to appear, it must reinforce or establish existing values of social for the society to allow it to exist, and the agency it operates with is performed by the network and not in the object. Through negotiations, the social accepts, modifies, or rejects material artefacts based on how they are perceived to shape the social.

In turn, this perspective argues that innovation created by designers will inevitably be reshaped by the society that interacts with the design outcome, requiring the design process to be an open dialogue between designers and the social. The interactions define things instead of the objects and there is a volatility of agencies as things are in continual renegotiation. Bruno Latour writes that “designers do not make facts, they make things - things can be disputed or overcome” (2009, p. 6), and something appears as a given only when the assembly is stable, there are no contradictory issues, and negotiations have been settled (2009, p. 4). To Latour, any outcome, including artefacts, systems, and organisations, is viewed as an outcome of what he calls “matters of concern” (2009, p. 4). He approaches outcomes as “conceivable as complex assemblies of contradictory issues” (2009, p. 4) pointing at how these things appear out of a

wrestling between agencies, rather than a single point of power. Kjetil Fallan describes this in the context of design history, defining entities as “something which is made to act by many others... An “actor” is not the source of an action but the moving target of a vast array of entities” (2010, p. 75).

By framing entities relationally, we can also trace networks of objects to see how agencies operate together, and how agencies enrol other objects to perform their agency. For example, in a road sign, the communication of the road sign and the behavioural modification is enforced by a network of objects. The intended behavioural modification is difficult to enforce, as the translation of the people into a durable object where they are not present has created a feedback problem. The decision makers can communicate the instructed behavioural change, but have no mechanism for enforcing or checking if it is being followed. However, the decision makers can employ another extension of man, the camera, translating the function of seeing across time and distance. In effect, the decision makers have extended themselves in multiple ways, translating their communication into a road sign, and their vision into a camera. However, this still does not solve the problem of enforcing the behavioural change, as now they can see if they are not following the communication but still no way to slow them down. So, money is used as an enforcement mechanism where if the car is seen by the camera disobeying the communication, a monetary cost is applied. We could keep tracing this situation through more policy documents, car registration and license plates, drivers licenses, license points, accelerator pedals, camera components, steel manufacturers and all sorts of things. We can see how with the ANT approach, entities become massive compounding assemblies of entities where agencies depend on each other. This is where the ANT perspective of tracing agency generates immense complexities and reveals how it can be used to find new objects to frame around in the assemblage. We could trace the road sign infinitely, which is actually how to operate with the ANT frame.

With this, we can see how the *heterogeneity of components* emerges in occurrence of the material artefact or situation (Law 2009, p. 146). This is how John Law on the Portuguese expansion (1986), Bruno Latour on Pasteur (Law 2009), and Michel Callon

(1987) on electric cars, see the wide reaching extent of heterogeneity. This tracing works at a huge scale and in ANT there are no differences in scale. Edwin Sayes illustrates just how wide reaching ANT can be in consideration of scale and nonhuman actors. He cites various pieces of ANT work by the above writers, who study various situations and make salient the agency of things such as microbes, scallops, rocks, and ships, reefs, spectrometers, sewerage networks, planes, texts and commodities, in a few examples (2014, p. 136).

In the ANT perspective, micro and macro are poor distinctions because the framing at any level produces the same results. The network is topologically flat, with frames just acting as black boxing of components that are actually making up the performance. The Portuguese expansion can be used as a point of salience, but it is framing a network into black box that when opened, we see that it falls apart without astronomical tables. Astronomical tables themselves might seem micro in context of the framing of portuguese expansion, but operate with the same idea. We can shift up and down what might be perceived as micro and macro, but these shifts are just different framings.

The heterogeneity and complexity is not a problem, but an opportunity. It is not a matter of increasing complexity, but it is actually an opportunity to use complexity to our advantage to find new locations to use as the point of salience in the frame. The tracing of agency allows us to trace through heterogeneous components and find new things to make salient in framing how the activity comes about. John Law points at *materiality* and the role of materiality in social matters. This component illustrates how ANT looks for the way frames operate, for example looking at how the perception of a human is shaped by a network of non-human entities. To demonstrate this, Yaneva (2009) uses an example of lecture theatres to see how the environment of the lecturer theatre frames the authority of the lecturer. Starting with media in the room, she highlights how a circular theatre with the lecturer in the centre is structured to provide an environment of equality and communication between all participants, but a semi-circular theatre is intended to place primary focus on the lecturer, giving them enhanced authority and influence in the environment (pp. 278-280). This echoes McLuhan's position of agency where the medium (the room) is configured to extend the agency of the lecturer to the maximum

level. Placement and status of participants in the room is not controlled just by the layout, but is determined by a heterogeneous set of components. Yaneva highlights issues such as poor acoustics in a circular layout, podiums, or positions of screens in a semi-circular layout as objects specifically influencing the delivery style, manner, or authority of the lecturer in a particular way, which in turn alters their framing in the environment (p. 279). This is only the architecture of the room though, as the perceived authority of the lecturer is an outcome of heterogeneous components, which might also include even the clothes they are wearing.

Continuing Edward Woodhouse and Jason W. Patton's (2004) concept of design by society, proximate designers are also shaped by constraints and procedures such as corporate policies, building codes, safety standards, or environmental regulations that are part of networks of society (p. 2). Similarly, Dietram Scheufele's mapping of the construction of a news story in Figure 33 mapped non-human entities such as organisational pressures, ideologies, etc. With an ANT perceptive, a news story is built by all these things, and also all other things involved, such as cameras, microphones, keyboards, newsrooms, etc., which may not be salient in the news story. However, the news story is only possible because of all of these working together.

The ANT sensibility is viewing any outcome as a temporary network effect. As John Law writes, "There is an insistence on process and its precariousness" where "all elements need to play their part moment by moment or it all comes unstuck" (2009, p. 146). This point is where the opportunity lies. This indicates that every situation is always already performing, and the aim of design is to change the performance of the situation. To elaborate on this, we will move into our next part of this section illustrating the performance of a frame shift.

So far, using ANT as a frame we can trace complexities of scenarios, recognising that there are only frames and knowing that we can shift frames to make different components more salient. Digging into ANT further provides many fascinating case studies on tracing heterogeneous assemblages, including more concepts of the logistics of translations and performance such as immutable mobiles (Law 2009, p. 146),

scripting (and describing, inscribing, transcribing) programs (and anti-programs) (Akrich and Latour 1992), which have been explored in a design context (Woodhouse & Patton 2004, Yaneva 2009). Here, in our context of framing, we have illustrated the use of ANT as pointing to the optionality of framings. This is a useful perspective we can use to frame objects, particularly in our case studies of artefacts of online visual communication in Chapter 3: Swarms and Sensibilities, and our case study of memetic warfare in Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign. Next, we will perform a frame shift to see how frame shifting can be used to enact infinite framings, and how it helps reveal more about the performance and precariousness of networks.

Problems as Frames: From Wicked Problems to Heating and Cooling

In the observational mode of ANT we will perform a frame shift to create a new scenario to illustrate how we can use complexity to create opportunity rather than seeing it as a problem. Note here that the following illustrated frame shift is not intended to be indicative of how to go about solving a problem. In fact, through this frame shift we will see that problem solving as a notion is actually *problematic* in itself. We will see that problems are just a matter of the frame of problematisation, and what is problematised can easily change through frame shifting.

We will again take our road sign example of Figure 12 we have been tracing throughout and shift the frame to explore what possibilities we can discover in frame shifting through complexities. We have noted that a set of problems made decision makers to come up with the policy that in periods of road work a speed limit of 80km/h must be observed. This in itself is a kind of problem solving, but we will leave this aside as the first part of our framing, and will focus our framing around the behavioural modification, and the communication of the instructed behavioural change and monitoring of behaviour. We have investigated how a compounding of policy makers have translated their decision making about appropriate behaviour and enforcement of their decision making into a network apparatus, translating their communication into a sign on the side of the road and their vision into a camera, and then an identification system of license plates and enforcement of decisions on identified vehicles using

money and drivers license points. Now we will shift frames to heat and cool the scenario. Having traced the complexity of the scenario, we have identified that cars have accelerators. So, for the sake of the exercise we will make this salient in our frame of the situation. We could choose any of the heterogeneous components we find in the scenario, such as the minds of the drivers or the roads that they drive on, but in this frame shift we will be shifting to the car. As we shift to the car, we begin to heat up new components as we look inside the black box. Cars have accelerators and brakes, speedometers, fuel in their engines, fuel gauges. To limit the speed of the cars in order to satisfy the policy makers we could just limit the speed a car can travel. This is our first frame shift.

We have heated up the components of the car in our frame of the problem. Importantly, we have not added complexity to the scenario, instead cooled other components. We are still operating within the limits of the frame problem, but shifting to what is available in our frame. If cars were modified to not be able to break speed limits, other parts of the enrolled network cool down and become less visible. We need neither money nor licenses to enforce the speed limit. But, by doing this, we heat up other things to make the network function.

First coming to mind is car manufacturers. Whole new sets of regulations would need to be drawn up to make sure that cars in the jurisdiction were made with the required modifications to not go faster than deemed appropriate. This would require significant alignment and agreement from car manufacturers. For example, given the globalised nature of car distribution would this be too difficult to implement such changes to cars for a particular jurisdiction (particularly if such changes were to be required for only a relatively small market such as Australia)? How would car manufacturers prevent motorists from modifying cars themselves to get around the imposed restrictions? We can see how shifting the frame of the problem to the cars heats up a new set of components. The next point is locality as speed limits are not the same everywhere. So, cars would need location awareness such as GPS, which would be connected to a system of the regulations. The limitation of the speed the car can travel would then be

controlled by the GPS and changed per location. This heats another set of components such as computer systems and satellites.

If everything fell into place, motorists would be driving around in cars that cannot break the speed limits. But now we must think how motorists would feel about driving around under these authoritarian measures. Would they feel like the government is too imposing? This heats up new parts of the network, and perhaps a program of government communication would need to run to convince motorists that limiting their freedoms is good for them. We also think that if motorists cannot break the speed limits, what would be the impact to monetary income to the government as now motorists cannot break the rules? Would governments implement a driving tax to make up the shortfall? As a creative exercise, we could continue tracing these questions infinitely, heating and cooling new components within the possibility of the frame until we find a balance that works within the existing networks. And importantly as an analytical exercise, this reveals more about the functionality of the existing network of enrolments around road signs.

The system of road signs, cameras, license plates, and license points is a network holding together in its performance in alignment with others. Networks of car manufacturers who make cars that can travel at whatever speed the drivers likes, and populations that would deem enforcement measures too authoritarian, possibly generating civil unrest (and risking an entire anti-government frame shift within the population). It appears that governments provide the optionality of speeding so that *some people do break their rules*, providing a source of income. This freedom that the government allows then comes with the risk of danger, as drivers making their own decisions may make decisions that endanger themselves and others, from which messaging campaigns appear persuading the people that should follow the rules. It holds together because other entities make it function in this way, and importantly it appears cool because it appears as a given, even though we have just illustrated it is not. A simple Overton Window shift in the mindset of the motorists that would be accepting of an authoritarian system would heat up the whole network, allowing the implementation of a system of speed restricted via GPS cars.

We can see how shifting around and performing heating and cooling reveals the performativity of the network. We could attempt this as an exercise with any scenario. Next, we will examine the established principles of problems within design through the concept of wicked problems, and then map this to a conceptual processual framework of heating and cooling to construct a conceptual framework around the process of heating and cooling we have just performed.

The Wicked Problems Approach

The formulation of problems perspective used in design to formulate the problem of problems has origins primarily in the wicked problems concept formulated by Horst Rittel and Melvin Webber. The background of wicked problems links explicitly to the development of artificial intelligence and the frame problem. Horst Rittel was a German based researcher and teacher in cybernetics who became associated with the Design Methods Group through particular research output in cybernetics dealing with understanding the structure of problems (Rith & Dubberly 2006). In 1963, Rittel moved to University of Berkeley, the central hub of the Design Methods Group, to apply these cybernetic concepts and problems of structuring problems to research and teaching in design and architecture. Rittel recognised that the unstructured nature of some problems was actually a problem itself. There are many scenarios and problems that could not be structured (to be conclusively dealt with computationally) because the information inputs were unclear, there are multiple stakeholders with conflicting aims and values, and ramifications of the implemented action are mostly unpredictable (Churchman 1967).

Horst Rittel and Melvin Webber's 1973 paper 'Dilemmas in a General Theory of Planning' became the key documentation of this problem, and a key text in the nature of problems. Design research literature has used this text as a cornerstone of the field.²¹ Rittel and Webber are positioning themselves in social policy and planning issues, conceptualising problems in this space as a special kind of complex problem different

²¹ As "design thinking" has reached buzzword status in management circles, seemingly so has the term "wicked problems".

from the kinds of problems dealt with in scientific disciplines. They argue that scientists have a clearly marked problem space, inside which they work aiming for a particular achievement or uncover an existing unknown. However, the type of problems in social policy are different because they are about creating something in response to a complicated set of circumstances:

The problems that scientists and [some classes of] engineers have usually focused upon are mostly “tame” or “benign” ones. As an example, consider a problem of mathematics, such as solving an equation; or the task of an organic chemist in analysing the structure of some unknown compound; or that of the chess player attempting to accomplish checkmate in five moves. For each the mission is clear. It is clear, in turn, whether or not the problems have been solved.

Wicked problems, in contrast, have neither of these clarifying traits and the invalid nearly all public policy issues - whether the question concerns the location of a freeway, the adjustment of a tax rate, the modification of school curricula, or the confrontation of crime (p. 160).

The structure, or to put things a better way, lack of structure, makes these problems “wicked”, a term Rittel and Webber are using to describe the frustratingly ungraspable nature of the problem (p. 160). In a wicked problem, there are too many things to consider to conclusively define a problem space to work in or conclusively solve the problem.²²

²² These problems are only really “wicked”, or especially problematic, when considered within a scientific paradigm. As a quick exercise, consider the concept of a wicked problem as a wicked problem - where does the wickedness lie? Is it in the structure of the problems, or is it in the rigid structure we are accustomed to in scientific enquiry? This is the fundamental point Rittel and Webber are trying to communicate - application of a rigid scientific process is not appropriate for these kinds of problems (p161). The problem is not the problem, the problem is trying to grasp the problem in a scientific way. Rittel and Webber also amusingly play with this in the sense of the use of the term wicked, suggesting it might be “morally objectionable for the planner to treat a wicked problem as though it were a tame one” (p161).

Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the indisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about “optimal solutions” to social problems unless severe qualifications are imposed first. Even worse, there are no “solutions in the sense of definitive and objective answers.

Indeed, this is why the problem of policy making is a design problem, as a policy is a very durable way of extending agency of decision makers over space and scale. However, with more space and scale introduced, the policy interacts with more agencies and generates the wickedness of the wicked problem as the variety of interactions the agency of the policy is dealing with becomes immense. Attempting to impose agency at a framing at an apparent macro level generates problems because of the scale and complexity of agencies that must be overcome operating in the complexities.

This conception of wicked problems is more analytical than the synthetic kind of wickedness experienced by makers of material culture. The wickedness here is in determining the actors enrolled in a particular performance that is viewed as problematic. Entities as the heterogeneous alignment of actors generating a trajectory of existence is a given, but what exactly makes up this heterogeneous alignment and where are centres of influence driving this performance to? As we noted in the Introduction, models of design have appeared where ethnographic approaches from social sciences dominate the process through interviews and working directly with people impacted by the problem and intervention to help determine the frame of the problem.

The wickedness Horst Rittel and Melvin Webber were referring to in their seminal paper are policy and management problems like “the location of a freeway, the adjustment of a tax rate, the modification of school curricula, or the confrontation of crime” (p. 160). Common across all these situations is a difficulty in placing performing actors and centres of influence. These things have broadly enrolled actors and threads of seemingly invisible intermediaries, making difficult the task of gripping locations of

enrolment. These situations are not static; the performance of things creates a dynamic existence where alignments are in constant negotiation, requiring the strategies deployed to tangle with these kinds of situations to have their own performance. Wicked problems place us outside the typical paradigm of a scientific problem and into a space of endless options: there are no longer truths or solutions, only offerings of resolutions which are one of many potential options that are guided by self imposed measurements of achievement, and the main activity is always swirling around defining a space to work (p. 161).

With this, Rittel and Webber have set up a clear categorisation of problems: scientific “tame” problems (p. 160) and the unstructured “wicked” problems:

	Tame	Wicked
<i>Problem space</i> Where are we working?	Chess (p. 161) – set rules, set playing space. Chemistry (p. 161) - specified compound composed of a fixed but unknown structure.	Poverty (p. 161) - How to define poverty? Is there a problem of skills in labour force? Is there an issue in physical and mental health? Geographic disadvantage? Is it a combination of all these factors?
In tame problems, we have fixed boundaries and options. Wicked problems, we could look anywhere and have multiple options.		
<i>Conclusion</i> We work until we get where?	Chess (p. 161) – checkmate achieved within a set of rules. Chemistry (p. 161) – unknown structure is defined.	Poverty (p. 161) - when is poverty declared over? If the labour force has been educated with a skill set, what happens if change occurs and new skills for new industries are required? If the health system is changed and prosperity occurs, what kind of new health problems are generated by prosperity? If geography is a hindrance, can people move, or generate technology to make transport easier? If people move and gain new skill sets, do they replace people in the new location and

	cause new poverty there?
<p>Checkmate is true or false, and when it is true it cannot become false. A chemical compound cannot be unfound. But poverty could be solved and then become unsolved, or moved, and the goalposts for measuring poverty are self erected and can be moved any time.</p>	

To characterise the seemingly impossible nature of wicked problems, Rittel and Webber list “at least ten distinguishing” characteristics of a “wicked problem” throughout the paper:

1. There is no definitive formulation of a wicked problem.
2. Wicked problems have no stopping rule.
3. Solutions to wicked problems are not true-or-false, but good-or-bad.
4. There is no immediate and no ultimate test of a solution to a wicked problem.
5. Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial-and-error, every attempt counts significantly.
6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
7. Every wicked problem is essentially unique.
8. Every wicked problem can be considered to be a symptom of another problem.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem’s resolution.
10. The planner has no right to be wrong.

Horst and Webber are seemingly pointing to the same landscape visible with the ANT sensibility, and seem to be accepting the defeat of the possibility of scientisation of

solving wicked problems at the hands of complexity. Richard Buchanan (1992) notes that Rittel was initially influenced by the neo-positivist approach popular in the 1960s, which sought to develop a scientific process of creating. However, his wicked problems idea was actually a change in his conceptualisation of these problems to a more pluralist position (p. 16). Applying the ANT sensibility to the wicked problems, John Law puts Horst and Webbers paper and wicked problems at the centre of the ANT sensibility in his paper 'Working Well with Wickedness' (2014), arguing that with the heterogeneity and complexity of every situation, everything is actually wicked, and conversely nothing is benign (p. 10):

The first is that the problems of the world are always wicked. The implication is that anything we put together is profoundly fragile. This, I suggest, is true at every level of scale from the individual on the one hand to the largest form of collectivity on the other. We are all and irreducibly in the business of handling wicked problems.

This implies that wicked problems are frames rather than problems that problematise a particular performance of complex heterogeneity from a particular perspective, and the wickedness of the problem lies in the perception. The problem circumstance is a performance occurring because it is permitted in accordance with the network and is produced as an outcome of agencies negotiating. John Law in his assessment of wicked problems concludes that the only way of working with a wicked problem is to impose a frame (p. 10) while recognising that we have optionality in the frame. This is in accordance with our use of the ANT sensibility above in the previous part of the present section where we illustrated infinite heterogeneity and complexity is not actually a problem, but an opportunity because frames can be shifted. Infinite heterogeneity and complexity is infinite possible frames. We are not increasing complexity, but shifting frames to different locations of salience. Next, we will work through a way of framing this shift in ANT as heating and cooling.

Wicked Problems to Indeterminate Problems

Richard Buchanan's 'Wicked problems in Design Thinking' (1992) is a landmark text in design practice research for a number of reasons. Along with providing structure for organising design practice research, as noted in the Introduction, Buchanan imports Rittel and Webber's wicked problems concept into material culture. As we have seen, Rittel and Webber's concept comes from policy making. Buchanan argues that technological culture has evolved to a point of complexity and ubiquity in human existence, and problems of creating material objects are structurally similar to Rittel and Webber's wicked problems.

Buchanan makes an ANT like observation, arguing that disciplines like visual communication design or industrial design are not isolated in their own problems and processes, but have realised they create objects within a complex system of things, both material and non-material. Just as we illustrated in the example of Albena Yaneva's framing of the lecture theatre (2009), Buchanan makes the point that visual communication designers are creating objects of visual communication where agency is translated into an artefact, but that translation needs to consider that the object will work in the context of a material and social system of "signs, things, actions and thoughts" (p. 10).

Buchanan demonstrates this complexity through an example of a retail store finding that customers were having trouble navigating stores to find products and visual communication design was used to create navigational signage. However, easy navigation requires the designer to consider and place the problem in the surrounding system of other material items, such as the building architecture, positioning of shelving, lighting etc. Buchanan traces this in topological terms as a problem of placements (pp. 8-14), making problems matters of framing points of salience. He observes that further investigation of the problem made salient the behavioural habits of the customers, resulting in adjusting placement of the problem to include material and human factors (p. 12). Buchanan sets up indeterminate problems as a problem of

placements (pp. 8-14): a problem can exist in multiple places of technological culture simultaneously and grappling with the scenario requires looking in multiple places at once and trying to figure out the places where the problem exists, and where the best places to attack might be.

Although the problem of store signage location is much more trivial than poverty in the wicked problems concept, Richard Buchanan's point is that the problems are structurally similar: the wicked problem of poverty is difficult to place, and can possibly reside in any combination of locations, such as education, health, geography or otherwise, and in the same way, the problem of efficient store navigation is difficult to place and can possibly reside in any combination of visual signage, store layout, human behaviour, or otherwise. The trick is shifting placements to find a new point of salience that offers opportunity for manipulation to generate new effects. This problem is also difficult to conclude for the same reasons as poverty: when is poverty declared over? When do we declare maximum store navigation ease achieved? This is a problem of interactions, as the continuing interactions of agencies always reshape the performance of the network.

Buchanan iterates Rittel and Webber's tame and wicked categorisation, evolving them into a model of determinate (tame) and indeterminate (wicked) problems. This is useful for considering problems as placement problems, which opens the opportunity for using the heterogeneous complexity to our advantage to find new possible points of salience. Tame problems are determinate, from the space the problem exists in to the point of conclusion (p. 15). A wicked problem on the other hand, is indeterminate in its location and end point (pp. 15-16). However, along with this comes the opportunity of reframing to different locations of salience. Following the idea of mixing Buchanan's model into conceptualising problems, the wicked problems table can be modified like so:

	Tame/Determinate	Wicked/Indeterminate
<i>Problem space</i> Where are we working?	Chess (p. 161) – set rules, set playing space.	Poverty (p. 161) - How to define poverty? Is there a problem of lack of skills in the labour force? Is there an

	Chemistry (p. 161) - specified compound composed of a fixed but unknown structure.	issue in physical and mental health? Geographic disadvantage? Is it a combination of all these factors? Retail store navigation ease – Add visual signage? Change store layout? Misunderstanding of human behavior? Is it a combination of all these factors?
Tame problems have determinate fixed boundaries and options. Wicked problems have indeterminate boundaries and multiple options for placement.		
<i>Conclusion</i> We work until we get where?	Chess (p. 161) – checkmate achieved within a set of rules. Chemistry (p. 161) – unknown structure is defined.	Poverty (p. 161) - when is poverty declared over? What do we change in the education system and how long will that change stay relevant? If the health system is changed and prosperity occurs, what kind of new health problems are generated by prosperity? If geography is a hindrance, can people move, or generate technology to make transport easier? If people move and gain new skill sets, do they replace people in the new location and cause new poverty there? And so on...Retail store navigation ease – When is maximum store navigation ease achieved? If we add bigger signs, how will that change the store aesthetic? If we change product layout, how will that effect product sales? And so on...
The end of a tame problem is determinate. Checkmate is true or false, and when it is true it cannot become false. A chemical compound cannot be unfound. Wicked problems have indeterminate end points. Poverty or retail store navigation ease could be solved and then become unsolved as factors change, or are moved, and the goalposts for measuring poverty or store navigation efficiency are self erected and can be moved any time.		

Indeterminate Problems to Hot Problems

With problems positioned in terms of framing of points of salience, Michel Callon's 'An essay in framing and overflowing' (1998) becomes particularly useful. It illustrates how tracing the complexity of the situation to find new points of salience *heats* and *cools* the viewing of points of possible network manipulation. Callon is speaking in the context of economics, and the particular difficulty of figuring out how to definitively frame economic transactions and generate conclusive contracts between parties involved in

economic exchange. He echoes Buchanan's observations of technological culture, attributing the difficulty of framing these scenarios to the way that technological culture has embedded itself into human existence and created a dense web of complexity of human and non-human in all societal situations:

The first relates to the growing complexity of industrialised societies, a level of sophistication due in large part to the movements of the technosciences, which are causing connections and interdependencies to proliferate ... The current situation is the result of the intertwining of a whole series of decisions and interrelated actions, initially autonomous but gradually weaving a web over time that is proving very difficult to pick apart in retrospect. so numerous and heterogeneous are the elements bound up within it (p. 261).

Callon reaches for a problem categorisation model in the same way as Buchanan, but instead of using determinate and indeterminate, he uses temperature. In this model, a situation is considered hot when the frame is difficult to set, and cold if the frame and components are certain (p. 260). The interesting part of Callon's approach in terms of conceptualising wicked problems is how he moves consideration of these situations beyond a binary classification of tame/determinate-wicked/indeterminate into a scale of cold to hot. This is a significant change in the way of dealing with things. Rittel and Webber, and Buchanan both hint at possibilities of degrees of "wickedness" or "determinacy", but Callon's approach fundamentally abandons definite categorisation and provides only a world of gradients.²³ Given this, we can evolve our graph to be a scale of tame/determinate/cold to wicked/determinate/hot, with problems sitting anywhere along the spectrum:

²³ As noted above, neo-positivism has been a trap for design theorists since the earliest publications of Herbert Simon and his contemporaries. Buchanan particularly notes how design theory has often lent towards a neo-positivist approach, in tension with the pluralist and pragmatic reality of design practice (p. 6). Even 25 years on from Buchanan's text, attempts at building frameworks and models are common (almost always awkwardly attempting to retain an element of pluralism as part of the framework). This again highlights the usefulness of an actor-network kind of approach to thinking about design. It is a theoretical way of dealing with things that are in alignment with the reality of plurality in design practice.

	Tame/Determinate/Cool	Wicked/Indeterminate/Hot
<i>Problem space</i> Where are we working?	Chess (p. 161) – set rules, set playing space. Chemistry (p. 161) - specified compound composed of a fixed but unknown structure. Poverty (p. 161) - How to define poverty? Is there a problem of lack of skills in the labour force? Is there an issue in physical and mental health? Geographic disadvantage? Is it a combination of all these factors? Retail store navigation ease – Add visual signage? Change store layout? Misunderstanding of human behavior? Is it a combination of all these factors?	
As boundaries become determinate, problems cool. Indeterminate problems have bleeding externalities and multiple options for placement, causing them to heat.		
<i>Problem space</i> Where are we working?	Chess (p. 161) – checkmate achieved within set of rules. Chemistry (p. 161) – unknown structure is defined. Poverty (p. 161) - when is poverty declared over? What do we change in the education system and how long will that change stay relevant? If the health system is changed and prosperity occurs, what kind of new health problems are generated by prosperity? If geography is a hindrance, can people move, or generate technology to make transport easier? If people move and gain new skill sets, do they replace people in the new location and cause new poverty there? And so on...Retail store navigation ease – When is maximum store navigation ease achieved? If we add bigger signs, how will that change the store aesthetic? If we change product layout, how will that affect product sales? And so on...	
Determinate boundaries mean a problem can become and stay completely cool. Addressing a wicked problem tends to create new externalities, so they have indeterminate end points because they can never completely cool. The goalposts for measuring poverty or store navigation efficiency are self imposed and can be moved any time.		

This deals with the messy reality of problems. Most problems will be evolving tangles of tame and wicked problems. For example, poverty is placed in geography, because it has been discovered that harsh conditions make agriculture difficult. New technology to generate successful agriculture is then proposed to meet a measurement that will declare a definition of poverty solved, and then the solving of poverty becomes a much more tame technological engineering problem. It might then be discovered that the tame engineering problem contains properties that will be extremely difficult and expensive to overcome, making it unviable and eliminating it from the options of placement

(unless funding can be sourced, which then becomes its own problem to place). Then the problem heats up again, because a new set of placements has to be figured out.

Pragmatic and Speculative Framing

We noted in the Introduction that design studies concerned itself with methodologies of frame shifting. This frame shifting can be performed by using linguistic tools. One example is finding the highest abstracted way of thinking about the scenario to generate new ways of thinking about it (Dorst 2015), with abstraction of thinking about problems recognised as a core component of expert designers (Kokotovich & Dorst 2016).

Another is use of analogy and metaphor by designers in analysis and description of problems to find new abstractions to generate frame shifts (Pee, Dorst & van der Bijl-Brouwer 2015). These frame shifts are aimed at framing of the problem scenario, looking for new abstract ways to characterise the situations as operating on a high plane allows for shifting along the plane (Kokotovich & Dorst 2016). In this part, we will look at abstraction and frame shifting to generate new assemblages, and how high level frame changes can generate exciting new ways of approaching operation in material culture.

Here we will find two kinds of framing. The first is pragmatic reframing. It is illustrated in the case study of Henry Becks map, where the problem of navigating the London underground is addressed by a frame shift by use of a different central organising frame of circumstance, allowing for a new assemblage with different components to be placed together. The second is speculative reframing, that involves changing frames entirely, which will be examined through the case study of the work of Stuart Walker and his identification of the *frame of modernity* and an offering of an alternative *frame of humanity*.

Pragmatic Framing: Henry Beck's Map

In the early 1930s London Transport was losing money on the Underground system, attributing this problem to passengers not understanding how to navigate the series of lines connected by interchange stations. Central to the problem was a map of the Underground system that was a geographically mapped birds-eye view illustration of the network, illustrated in Figure 38 below. This approach to visualisation created a

dense clustering of the central city area stations in the middle of the map, making the map a messy tangle of lines and station interchanges. In response, Henry Beck, an English technical draftsman not trained or experienced in graphic design, devised a conceptual approach to visualising the London Underground system through a self initiated and uncommissioned project (Garland, 1994).

Henry Beck performed a simple frame shift, deciding that passenger understanding of the railway system could be improved by shifting the map's central organising frame from the geography of the system to plotting the sequence of stations and line intersections. This is a simple frame shift of the central organising story from thinking of the map in terms of *where* to thinking in terms of *sequence*. As a result, Beck constructed a diagram of the train-lines drawn on straight, at 90 degree or 135 degree lines, and plotting the stations and crossover points evenly (Degani 2013, p. 8), much like an electrical schematic. The result was a clean and logical map, which solved the navigation problems of passengers after it was accepted by London Transport in 1933 for official use (Figure 39). Beck was eventually hired by London Transport to continue iterations of the map as the network expanded, and Beck's concept has become standard

across transit diagrams across the world (See Figure 40), eventually used by the New York Subway system, Tokyo and Paris Metro, among others (Garland 1994).

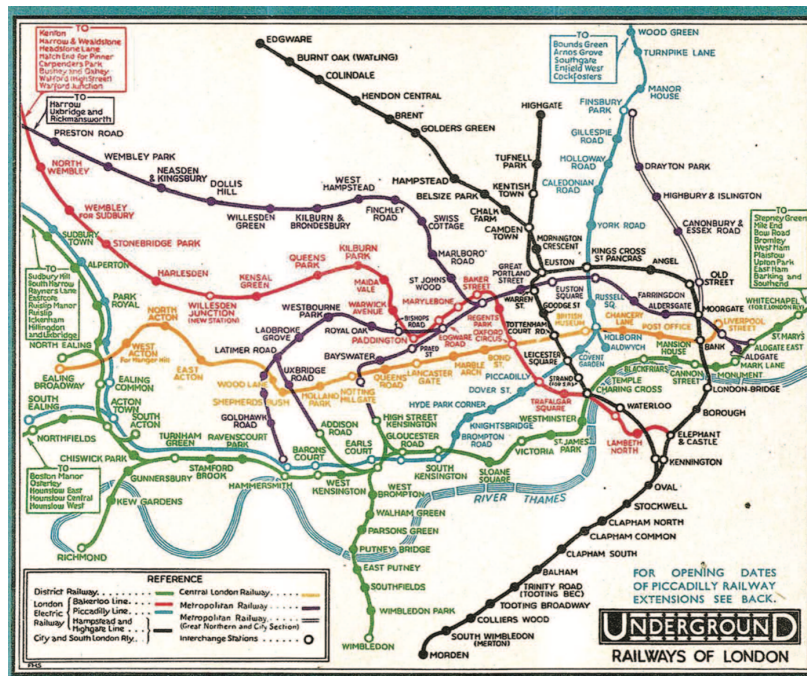


Figure 38: Example of the first form of the London Underground map plotted by geographic positioning (Garland 1994).



Figure 39: Henry Becks' London Underground map reframed around sequence, bringing in visualisation similar to electrical schematics (Garland 1994).

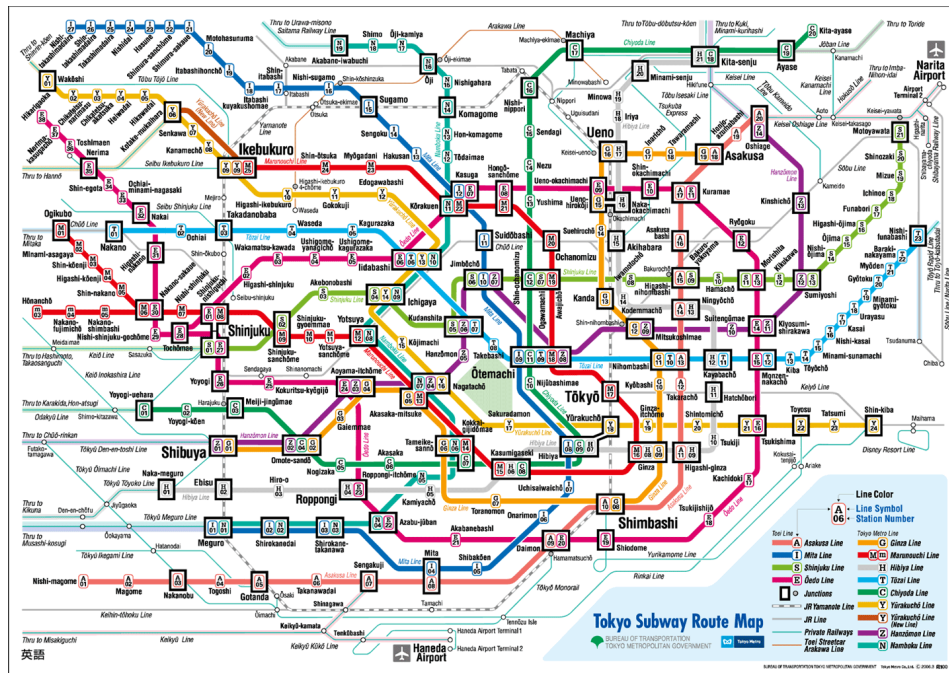


Figure 40: Contemporary Tokyo Subway map using the visualisation of technique of Henry Beck's London Underground map.

We can see that Henry Beck is operating at a kind of abstraction within the circumstance, changing the central organising frame of the circumstance to make a new assemblage appear. By changing the central organising frame, electric schematic as a way of visually organising information becomes more visible in the frame as an option. This puts the moment of creative synthesis into a particular perspective where Beck's decision to synthesise the electrical schema might seem like a point of bringing things into the frame, but instead we might think of it as changing the central organising frame populates the frame with new assemblage items, making new things visible in the frame that were previously externalities. The fundamental thing here is that the abstraction, that is the central organising frame, is specific to the artefact. We are starting with the artefact and shifting up to the frame. This is the core of the pragmatic framing approach.

Speculative Framing: Stuart Walker's *Design for Life*

The work of Stuart Walker presents a fascinating illustration of frame shifting that differs from the kind of pragmatic framing in the above example by Henry Beck. Stuart Walker has a design background in industrial design, and is grounding his work in a very broad problematisation of the modern condition. In his book *Design for Life: Creating Meaning in a Distracted World* (2017), he points to the problem he traced

throughout his works in papers, books and designing artefacts. He does not outline a specific social problem, or a way of going about material culture or environmental issues of modernity, rather takes a wide reaching position on the position of humanity in the current age. Evident in the outset of *Design for Life*, Stuart Walker is setting up the design problem as problematising the very *frame of modernity* at the highest level that captures every facet of it, from globalised manufacturing practices to epistemological approaches to education. He argues that it has led to a condition for humanity and the environment that is both entirely unsustainable in operation and spiritually unfulfilling for humans.

To deal with this problem, throughout *Design for Life* Stuart Walker presents an equally wide reaching approach, not suggesting a policy approach or specific actions to be taken, but an *entire frame shift*. In fact in this frame policy suggestions and specific directives may be viewed very differently. The dynamics of this frame shift are illustrated in the context of our media exchange environment below in Figure 41. Stuart Walker is proposing that the problem of the frame of modernity should be dealt with by a frame shift covering every facet of human existence, including the way we go about material culture in a more resourcement and meaningful way, our approaches to social and community life, connection to ancestral heritage and a way of being grounded in spirituality and wisdom lost under modernity. For the purposes of our argument here, we will call this the *frame of humanity*.

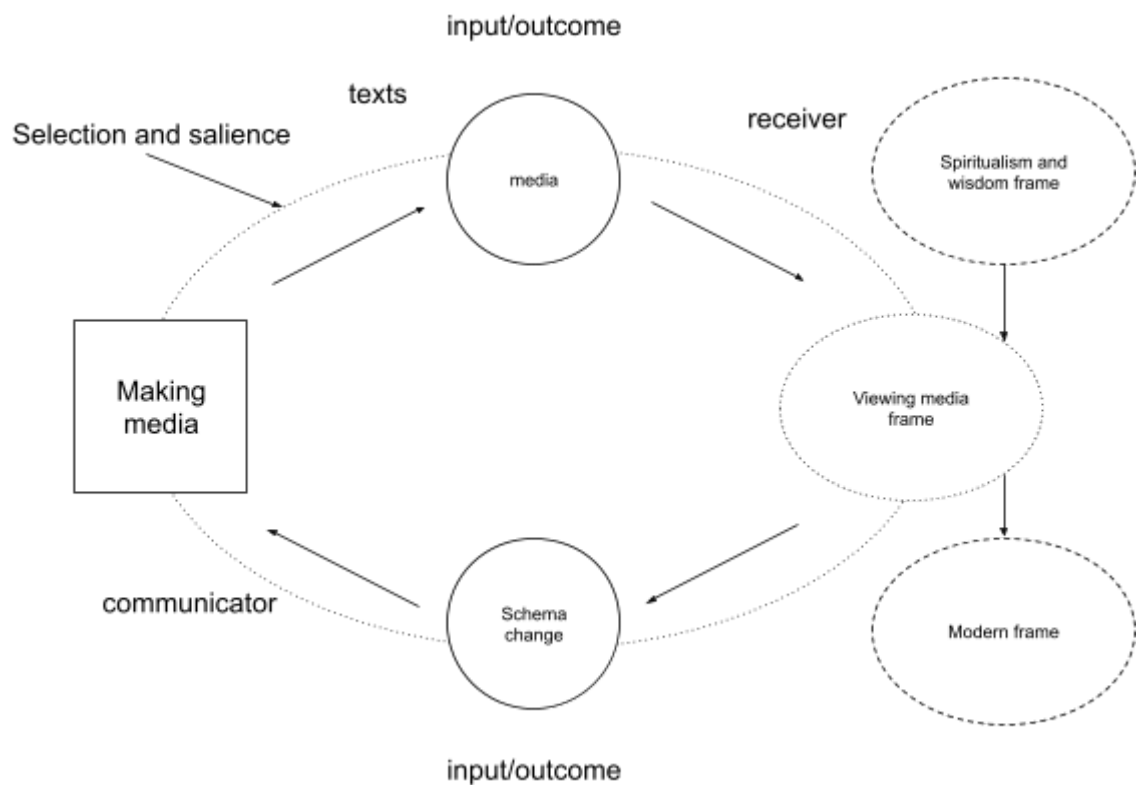


Figure 41: A high level frame shift generating a new mode of operation.

As an industrial designer, Stuart Walker presents a series of works speculating what material artefacts might look like under the *frame of humanity*. A selection of these works are depicted below in Figures 42-45, with more pieces of information available on his website and in his book *The Spirit of Design: Objects, Environment and Meaning* (2011). On the surface, these material artefacts may be read aesthetically as low-fidelity through their use of materials and a cobbled together kind of construction, making statements about environmentalism through reusable parts, and containing a sense of nostalgia and looking to return to the past. However, the construction of these objects is performed under the *frame of humanity*, where all of these themes may exist, but are operating and entwined as part of the frame, which goes about social and community life in a particular way. It has a certain kind of relationship with locality and ancestral heritage, and a way of being grounded in spirituality and collected wisdom of the human experience. These objects are speculations of what objects would look like under the *frame of humanity*, showing furniture using local materials and readily available parts complete with their imperfections as illustrated in Figures 42 and 43, as well as

making objects of contemporary digital technology as illustrated in Figures 44 and 45, but doing so with a very different assembly and sense of materials to typical objects of digital technology. Stuart Walker is operating as a designer, looking to the future and looking to solve a problem by changing the mode of operation entirely, calling for something that used to be done but has been lost.



Figure 42: Low Chair by Stuart Walker.²⁴



Figure 43: Bamboo Stone by Stuart Walker.²⁵

²⁴ Image source: <https://stuartwalker.org.uk/furniture-lighting/7-furniture-and-lighting>.

²⁵ Image source: <https://stuartwalker.org.uk/furniture-lighting/7-furniture-and-lighting>.



Figure 44: iKon by Stuart Walker.²⁶



Figure 45: Memoria Porto by Stuart Walker.²⁷

²⁶ Image source: <https://stuartwalker.org.uk/designs-2/8-beyond-function>.

²⁷ Image source: <https://stuartwalker.org.uk/designs-2/8-beyond-function>.

Proposing a frame shift at the highest level possible from the *frame of modernity* to the *frame of humanity* is a change that within the context of Walker's argument is fitting. Shifting operation at the highest possible level shifts all decision making, as frame of operation holds logic, removing the need for specificity at the tactical or strategic levels (also a chronic problem of modernity). As we saw above in examples of the detail of finding by John Law (1986), Bruno Latour (Law 2009), and Michel Callon (1987), along with our tracing of road signs, the ANT approach shows us that every scenario involving material artefact generation is socio-technical, and each framing highly unique.

In this case, Stuart Walker is exploring the generation of material artefacts somewhat related to industrial design. He illustrates how this new mode of operation facilitates decision making use of materials in construction of artefacts. The decision making of this frame is biased toward using local materials, traditional cultural practices and looks to build on ancestral wisdom of localities. Under this frame, the problem of material culture and production practices of modernity and globalisation is dealt with because it simply becomes disused by the frame of operation.

This shows that operating with a high level frame containing decision making is a robust approach, as it outlines a way of operating transferable to a local situation and material artefacts. Walker mentions in the very introduction of *Design for Life* that this frame shifting is not regression as a strict return to previous practices, it rather takes a future oriented design approach through speculative imagining of use of existing and emerging technology with the frame of traditionalism (p. 2). Under this frame, existing technologies might become disused, but not non-existent, only reframed as unwanted or used very differently. Artefacts may also resemble previous artefacts, but integrate new technologies useful under the frame. For example, a speculative exercise might be applying this frame shift to the field of visual communication design. What would artefacts look like? Another example might be imagining what the internet looks like under the *frame of humanity*, a technology Walker points to as a driver of the problem at points throughout *Design for Life*. Any field of design could be reimagined under this frame and in fact, so can the other levels of design in the spaces of design research, and

the very concept of design itself. The frame shift proposed by Stuart Walker actually occurs above the concept of design, and is reimagining what the very practice of design looks like under this frame. We will further investigate this in the Conclusion chapter where we understand the implications for the concept of design that have appeared through our case studies in Chapters 3: Swarms and Sensibilities and Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign, that point to a shift in concepts of design as more material culture becomes digital and online.

Memetics can also play a role here in dealing with the problem by spreading the mode of operation through the landscape of participants. An artefact encountered constructed with the *frame of humanity* may begin to memetically spread to the frame of other participants. In their own media making, the central organising frame of the media making is biased by the meme toward the sensibility of the *frame of humanity* as somebody encounters the work and applies the frame to a different field of design. This memetic approach helps create a frame transition that does not need top down policy making and enforcement of change of behaviour that is, interestingly a modern, *unsustainable* approach. Behavioural change occurs through a memetic injection, and the frame disappears as the behaviour becomes disused by the new frame of operation. This illustrates an interesting sense of agency, as agency translating into a memetic frame appears to be an effective and low cost way of directing behavioural change.

In tracing these two case studies, we have found two kinds of framing with significant distinctions. They involve shifting frames through a sense of vertical movement. However, they exist at different kinds of vertical shifting. The first kind of framing is *pragmatic framing*, such as the framing produced by Henry Beck to deal with the London Underground map problem, which works with a specific circumstance and reframes it by changing the central organising frame the circumstance is viewed with. The second kind of framing is *speculative framing*, which we saw through the example of the work of Stuart Walker. It involves shifting an entire frame of operation to find a new mode of operation and drive decision making. Walker proposes a frame shift at the highest level, shifting from the contemporary *frame of modernity* to the *frame of humanity*, and is speculating what particular existing objects may look like under that

frame. Speculative framing is a frame change where anything can be passed through the frame and reimagined. This kind of frame shifting is particularly interesting as a concept for methodology of designing, because the frame shift is an entire operational shift that produces a mode of operation, with embedded decision making logic without having to outline specificity of procedural change.

Conclusion

We have found resonating through this Section a sense of precariousness and indefiniteness to the nature of material culture. Bruno Latour echoes this, writing “there is always something ‘precautionary’ about design (2009, p. 4)” and “design is that it is never a process that starts from scratch: to design is always to redesign” (2009, p. 5). By examining the logistics of agency translation through ANT, we have seen how ANT shows us a mental corrective for sensing and seeing precariousness and indefiniteness, showing that *there are only frames* that select and make salient agencies and heterogeneities, and that we can shift the frames to see different kinds of complexities while operating within the bounds of our human cognition. To demonstrate this, we illustrated a frame shifting, and in doing so saw that these shifts have an effect of heating and cooling components of circumstances as saliences and visibilities shift, demonstrating that the wickedness of problems is in the perception. Finally, we looked at different kinds of frame shifts in pragmatic and speculative framing, showing two distinct ways of frame shifting with differences in applicability of locality. Importantly, we have highlighted the importance of the shift in *frame of operation*, which we will hold on to as we move into subsequent chapters 3. Swarms and Sensibilities and 4. Distributed Design, using the frame of operation as a foundational concept for methodological outcomes of the chapters.

Conclusion: Media Exchange under Frames of Operation

Throughout the present chapter we have mapped out issues fundamental to framing, setting a foundation for constructing a processual model of framing where perception is the key driver of the cybernetic model. Research from professional journalistic practice has provided foundation for illustrating the importance of framing to media making, and modelling into this loop shows how framing is a key driver of media making in an

environment of symmetrical media making of participatory culture. The model of framing here captures the core concepts exchanging of media, not specific to journalism or visual communication design, but relevant to material culture generally as all informational inputs are perceived by framing, and all material artefact generation is produced by frames.

The conditions of human cognition illustrating this framing is constructed from foundations of human cognition, developed by Jean Piaget. The key property of this mental schema is that it is malleable, and changes through media exchange. Therefore, we have captured framing from a processual perspective of how this change occurs. We have organised onto our model of exchanging media concepts of points of perceptual change such as the framing effect and positioning, memetics, the overton window and the central organising frame operate in a processual loop. The organisation of these mechanisms of change, however, illustrates how the concepts around perceiving media feed into the construction of media, where central organising ideas used to frame and position flow memetically to other media makers, who in turn make media using those memetic frames. The placement of concepts on top of this model is not exhaustive, illustrating how concepts could be placed onto this model. Possible further concepts will be discussed in the Conclusion chapter looking at framing as a tool of analysis, as well as further dynamics of spread of frames.

The heterogeneous complexity of the construction of media are hidden by perception. However, as we have seen this framing is necessary for humans to cognitively function, just like all information processing entities. We have seen how this presents opportunity for framing and reframing of scenarios by using ANT as a mental corrective for shifting frames through the heterogeneous complexity of the makeup of scenarios that has been bounded out by human cognition, and tracing complexity to heat and cool different components of our frame. We can see how this presents a different perspective of wicked problems as a matter of locality of problematisation. Finally, we looked at ways of performing this frame shift through case studies of Stuart Walker and Henry Beck, identifying *speculative framing* and *pragmatic framing* as two distinct ways of frame shifting for generating new opportunities of material artefact construction.

Most importantly, through investigating framing and frame shifting we have discovered that the making of artefacts is driven by a frame of operation. This sets the approach to the methodological outcome of Chapters 3 and 4, where we can develop *frames of operation* in online visual communication in making images, and in online visual communication design through our case study of conducting memetic warfare. Developing a methodological approach at a frame of operation is a robust outcome as it outlines a way of operating that is transferable to any given local situation. In other words, it creates a guideline, rather than rigid methods, for working that can be used to understand the frame of working with this space. This interestingly deals with the frame problem and computational problems of attempting to construct a comprehensive and stabilised processual method of image making in digital and online space by removing the need for specificity on tactical or strategic levels.

As we will see in Chapters 3: Swarms and Sensibilities and Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign, the digital and online environment is a space where the flow of content across platforms, continually changing and rapidly emerging forms, and facilitation of general nonlinearity quickly balloons the pool of possible specific actions. By outlining a frame of operation to work in this environment, we generate a guide for participation in this space broad enough to handle this nature. This is a more robust contribution to the issue of how to participate in image making in the participatory media environment, dealing with our question of how to participate in McLuhan's space of global guerrilla information warfare using images.

Chapter 3

Swarms and Sensibilities

Introduction: Visual Communication Design and Participatory Media

Tactical media, then, would be a kind of filth — an organic process — as compared with the ideological cleanliness of strategic media (the “author”). (...) To preserve its autonomy the tactical medium wants to remain dirty — it can never let itself be surrounded and cleared by strategy, by ideology. It must stay out ahead, drifting before all possible waves, uncertain even of its own trajectory. (...) By another paradox, this uncertainty itself becomes a “principle.” It comes to occupy the space of a strategy — and thus to define a strategic space. No “authors” need to be implicated. A messy organic process — involving both reason and unreason — not imposed or categorical — emergent. Shape-shifting. Dangerous and plagued by failures. But not aimless or undirected. In effect — strategic. (Wilson 1997)

The material affordances of the digital and online space are producing a new kind of visual communication design. The ubiquity of devices such as smartphones as kind of communication means visual communication design is embedding itself into everyday communication practice. In this environment, people across a spectrum of image making expertise tangle in exchanges of visual communication artefacts, translating their agency into images by deploying cultural knowledge and visual language to assemble images using pieces from converging media sources. This is the space of Marshall McLuhan’s global guerrilla information warfare (1970), where visual communication design is produced and deployed in real time and at global reach as people make and share their image based responses to media they are consuming, as well as generating from their own activities and experiences. This space is messy, untamed and operates to the ebb and flow of people building what they need to achieve

their goals at any given time. In this chapter, we will take a processual perspective on performing visual communication design in this space.

Chapter Outcomes and Method

This chapter builds on the *model of symmetrical media exchange*, constructed in Chapter 2: Framing and Reframing as the environmental foundation. The major contribution of this chapter is the *frame of visual media exchange*. This frame of operation outlines the sensibilities of constructing artefacts of visual communication design in this environment in regard to a sensibility toward authorship of artefacts, the treatment of all found artefacts as always incomplete and available for reconfiguration, the ongoing performance of rapid and public feedback loops, the non-linearity of artefact formation, artefact production intensity and skillset acquisition, and the ad-hoc nature of collaborative structures around interests and memes of participants.

The *frame of visual media exchange* is laid out as a sensibility towards artefacts and decision making in the environment of media exchange, which creates a guide to working in the environment without rigid specifics. Given this frame of operation outlines it in the digital and online space, from which Marshall McLuhan's anticipated environment of global guerrilla information warfare is emerging. The *frame of visual media exchange* also serves as the frame of operating in image making in online information warfare.

Construction of the *frame of visual media exchange*, a kind of grounded theory (Muratovski 2015, p. 99), will be performed by conducting a blend of visual research (Noble & Bestley 2005) and practice-based research (Muratovski 2015, p. 192). Case studies of artefacts found online in media exchange will be analysed from the perspective of their processual generation to examine the production of these artefacts in terms of the characteristics of visual communication design identified as *assemblage*, *media convergence* and a *cultural feedback loop*. In the present study on the nature of methods of design the emphasis is on the processual construction of the artefacts in order to gain insight into the frame of operation, rather than analysis and critique of the content. Throughout examination of these artefacts, I examine the dynamics of my

observations by making my own digital and online artefacts in this space to gather further insight into the frame. However, to examine these case studies effectively, first a conceptual apparatus will be constructed that layers themes of participatory media onto these characteristics of visual communication design.

This frame will form the foundation for the *memetic warfare campaign frame* in Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign, which is a specific application of this frame of operation to a surge of users gathering and performing targeted image making. It is a kind of community image making occurrence native to and exemplifying Marshall McLuhan's space of global guerrilla information war with no division between military and civilian participation (1970).

Chapter Concepts and Logic

This chapter begins by constructing a conceptual apparatus of artefact production in the environment of symmetrical media exchange, and looking towards how themes native to the digital and online environment, including *media convergence*, *assemblage* and the *cultural feedback loop*, play out in the characteristics of visual communication design as established in the Introduction chapter. We will organise the discussion around the questions of how people make artefacts of visual communication in the environment of symmetrical media exchange, and how people work together in the environment of symmetrical media exchange.

Starting with how artefacts of visual communication are made in the environment of symmetrical media exchange we will take a processual perspective, building on the technological foundation of the internet as a copy machine (Kelly 2008). As we established in the Introduction chapter, this conceptual foundation creates an environment of working in visual communication design distinctly different from those previously modelled in methods of design in visual communication design. We establish the overall nature of artefacts as following dynamics of open source projects, where they are always in beta and many forks of the projects appear (Weber, 2004). Focusing on assemblage and media convergence, we will see media convergence and citizen journalism producing artefacts compiled using a variety of found and self generated

components. We will see ways of working where users can generate remediations of existing activities at little additional cost, and reconfigurations of found objects to great effect. We will also see how the meme produces the evolution of this content as many variations of artefacts appear and ideas spread (Blackmore 1999). Through this part we will begin to introduce examples that we will further expand on during the case studies.

We will then move to how people work together in the environment of symmetrical media exchange, taking a processual perspective based in distributed network topology (Baran 1962) as a core paradigm for how organisation occurs between networks of professional and non-professional designers. Working per the definition of visual communication design, as established in the Introduction around making images with an objective (Frascara 2006, p. 4), we will see how non-professionals act in tandem with professional practitioners to create visual communication design. We will see how online space facilitates ways these people organise in an ad-hoc manner through the examples of collaboration in adhocracy organisation types (Bolman & Deal 2008) and open source projects (Raymond 1999) where participation is entirely open to anyone willing to contribute. In these organisation structures, formally structured roles, hierarchies and participation are non-existent, even between professional and non-professional designers. We will then look at swarming as a kind of dynamic that occurs as a collaborative network organised under distributed network topology form shared directionality (Arquilla and Ronfeldt, 2000). We will look at swarming in two main components; first, in terms of network scalability looking at how the topology facilitates scaling up of the group with little additional transactional cost or change in topology; and second, in terms of how the distributed topology facilitates distributed feedback loops, generating innovation through ongoing simultaneous experiments without central coordination and the results of trial and error are visible across the entire network.

Using this conceptual apparatus, we will move through our investigation of artefacts of visual communication in the digital and online environment, tracing an assortment of case studies examining typical artefacts of online visual communication design that populate the online space. These examples include internet memes (including

automation of internet memes), videos, printed t-shirts (with images of internet memes), branded image filters, videos (produced for virtual reality dance floors), screen overlays in video game chats, and location specific image reaction cultures. This selection of case studies is not intended to be exhaustive of examples of media produced by the processual and topological conceptual apparatus, but points to artefacts that have been observed emerging in the online space that indicate the presence of a method of production that sits outside of typical methods of production of visual communication design. Through these examples, we will see how the presence of non-professional visual communication designers generates particular aesthetics often in contrast with those generated by professional designers, although operating with the same intent and effectiveness in shaping of perception. Throughout this tour of artefacts of visual communication design found in the environment of media exchange, I examine and test the dynamics of the space by making my own digital artefacts existing in this space. This practice practice-based research (Muratovski 2015, p. 192), along with demonstrating the open participatory nature of the environment, is important to the testing and validation of the conceptual apparatus under development, as I can use the processes first hand and understand nuances that may be missed by strictly using observing found artefacts.

To conclude the chapter, we lay out the frame of visual communication in this space in a manner reflecting both Jean Piaget's concept of mental schema as a clustering of coherent objects hanging together, and the approach of *speculative framing* illustrated by the work of Stuart Walker, where a frame of operating capable of handling any object passing through the frame is outlined without rigid specifics in operational doctrine.

Digital Making: Remix and Swarming Media Makers

Conceptual Toolkit Overview

Our conceptual toolkit to examine visual communication participatory culture will be constructed in two components. The aim is twofold: first, building a toolkit to examine case studies of artefacts of visual communication; second, building this toolkit in order

to develop the frame of operating in this space. Therefore, we will cover the concepts of the toolkit to provide an overall snapshot of topics and illustrate through introductory examples in order to get an initial sense of the *frame of visual media exchange*. We will develop further sense of this frame of operation in the case studies where we see these play out in more detail. We will organise our toolkit around two aspects of building up this frame: the first concerned with how people make artefacts of visual communication in a digital and online environment; and the second concerned with how people work together in a digital and online environment.

To develop a sense of making artefacts of visual communication in the environment of symmetrical media exchange, we take a processual perspective using the nature of the technological environment as our foundation to create an open source landscape of artefacts. Then, we will look at ways people work together in this environment; we take a topological perspective concerned with the distributed network topology as our core paradigm, and the kind of ways of working this facilitates. These two toolkits, which make up the whole conceptual toolkit, are illustrated below in Figure 46, which shows the processual toolkit, and Figure 47, which shows the topological toolkit.

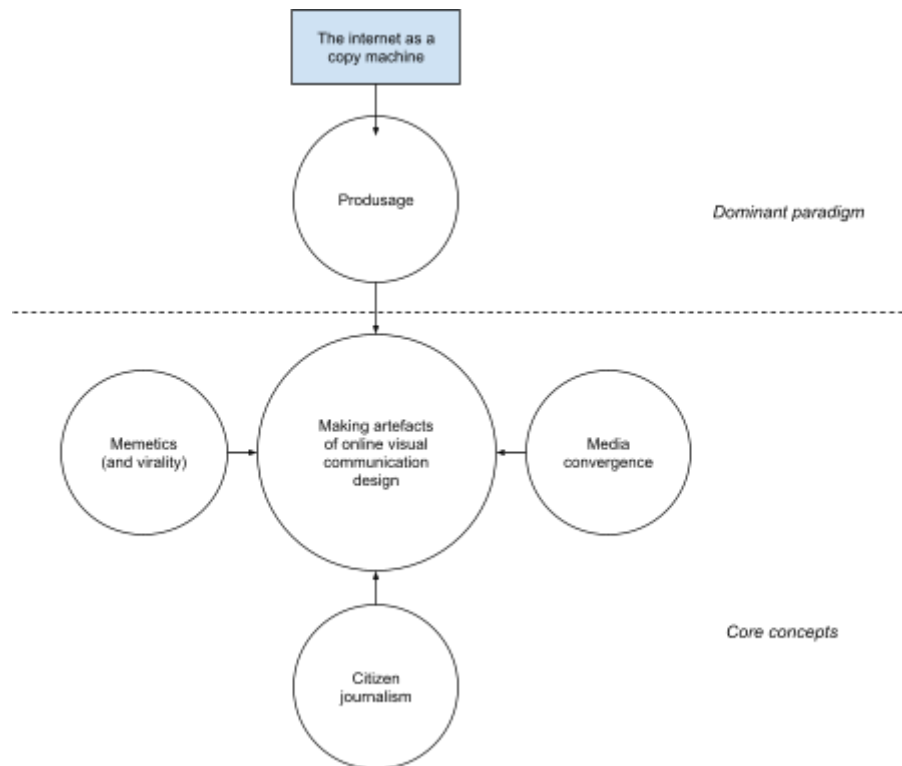


Figure 46: Toolkit of processual themes in online visual communication

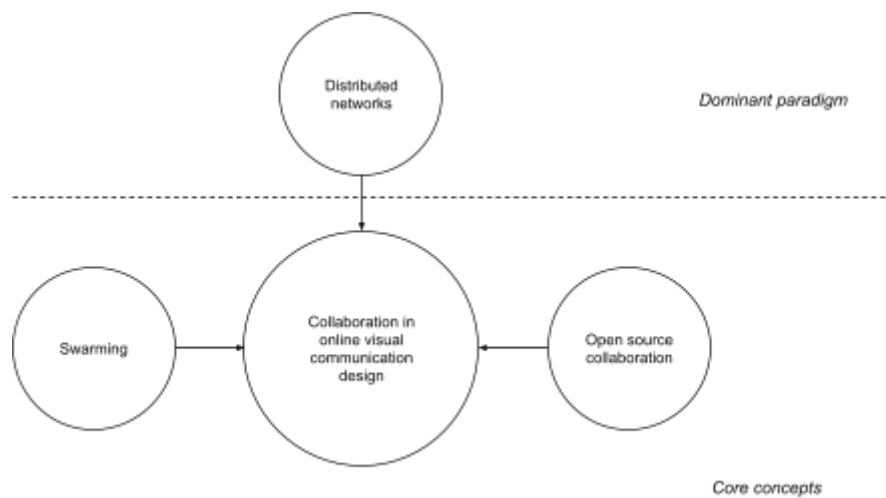


Figure 47: Toolkit of topological themes in online visual communication

It is worth mentioning that, as we start using examples of online artefacts of visual communication in this media exchange environment, the origins of the visual objects

are murky, even in some of the best cases. Therefore, citing original locations and authors of content is difficult and will only be done if there is certainty, and where possible URLs to online artefacts will be provided as footnotes to the text as we move through.

The Mechanics of Artefact Production

The Open Source Nature of Online

We noted in the Introduction chapter that the internet is a copy machine (Kelly 2008), and viewing any media on a device in this digital and online environment means that the media is actually copied to that device. This sets the pillar for our perspective of operating in this environment, as anything viewed online is a copy that can be remixed using the same device it is consumed on. It includes web browsers where page elements are temporarily downloaded to the computer and rendered by the web browser, and streaming video where video fragments are downloaded to the device, played and deleted on the go. We will see further examples of this dynamic in the case studies below.

In this environment, any digital media object is essentially subject to the dynamics of open source. Open source is a concept from software development originating in the 1980s. It is a general protocol, which functions in terms of the material, and the way that people work on projects. A movement started as a reaction to the spread of expensive proprietary software with locked and inaccessible source code displacing the previous default culture of freely distributed software with source code open for access and modification. Its aim was to build software, make the source code available to anybody to improve or modify for their own purposes, and to distribute it across the emerging Internet (Weber, 2004).

Open source is a fascinating culture of working on projects, many of which are the underlying technology of the internet itself. However, here we will focus on the material outcomes of open source to get a sense of how the dynamics apply to all artefacts online. We will return to ways of working together in our next part of the conceptual toolkit, which looks at topology. In open source projects, code bases are free for

anybody to access; users can make a local copy of the code and make their own modifications for their own purposes; or they can work on the publicly available repository of the code in collaboration with others (Weber 2004, p. 62). An open source project never finishes. Even if people stop working on it at some point, the code base can be picked up and the work continues at any time as any user sees fit (Weber 2004, p. 62). At any time code bases can be forked: a point in a project can branch off into multiple differing versions as different people adapt that point for their own use in tinkering and reframing (Weber 2004, p. 64). Major innovations in forks can be merged back into the main master branch of the project at any time. Returning to Horst Rittel and Melvin Webber's generalisation of working with a design problem, we will recall that the stopping point of working on a design problem is when the designer decides that that is enough (1973, p. 162). In open source projects, this stopping point does not exist. The project only *pauses* when nobody is working on it *at the time*. While artefacts of visual communication design viewed online may not seem completely open source because the working files are not always accessible, the visible artefact online is editable in this environment, creating a property that is always incomplete.

Produsage

The principle of open source protocol is embedded in the concept of produsage, illustrated by Axel Bruns' (2008), which we flagged in the Introduction chapter as the pillar of operating in the digital and online environment. We noted that it also stands in dramatic contrast with documented methods of visual communication design where projects are in a continual state of *in beta*, similar to the dynamics of open source above. Bruns points out that the course of artefacts in this unfinished state are "evolutionary, iterative, and palimpsestic" (2007), illustrating a particular sensibility toward artefacts foundational to the frame we are developing here. As we noted in the Introduction chapter, ubiquitous devices such as smartphones are used for both content production and consumption, with produsage occurring as users drifting between the two while using the same device. While people can use their phones to generate original content, the copy machine dynamics mean they can also use anything they find. Furthermore, even if users are seemingly passively consuming content, they are still continually producing in this environment through generating data of their consumption.

An interesting approach that fits digital image making well is *fast, inexpensive, simple, tiny (FIST)*, a way of approaching project development process articulated by US Air Force Lt. Col. Dan Ward as optimal for generating novel outcomes (2011). The FIST thinking is multifaceted, but deploys concepts of open source culture and process of remediation in searching for ways to generate large amounts of value through minimum work. The FIST way of working generates conditions of fast feedback loops, rapid iteration, and quick emergence of successful strategies and technical innovation (Ward 2011). It is a useful approach to think about in construction of the *frame of visual media exchange*. In this produsage environment of found media, which is always in an unfinished state, FIST presents a way of approaching projects seemingly native to the digital and online environment.

In terms of remix, the FIST approach to projects is trying to generate large amounts of new value through taking something available and making minimal modifications, a process driven by reframing. In open source programming, where the aim is to avoid reinventing the wheel, programmers search for codebases they can use to modify for their required purposes with as little extra work as possible (Weber, p. 75). This also applies in image making in online visual communication where the starting point could simply be a found image. Image making in this space is particularly powerful as images are media objects. It is important to find a balance between potency and cost of production, as images can be used for complex semantic messaging with potential for generating significant perceptual shifts. The technical barrier to image assemblage is low, and images are light to produce, remix, and distribute on ubiquitous devices, especially when using entirely found components. We have already seen an example of this in the Donald Trump and the Huawei to Hell image in the Introduction chapter, and we will see much more of this in our case studies below as we find people picking up images and components, and quickly cobbling things together into new configurations.

Media Convergence and Citizen Journalists

As we traced in the Introduction chapter, the medium of visual communication design has been characterised by media convergence, with the use of photography to the use of

digital computers. Online visual communication follows this pattern of technological convergence. It puts all things together into the same place and allows mashing different media together, as we have seen in the digital styles of Figure 18 in the Introduction chapter. It is worth mentioning that the digital can exist without being online, and the online adds connectedness, creating a landscape of interactions and flowing components.

This flowing operates in multiple sense: first, as assemblages created can spread very quickly allowing artefacts to be published and spread to huge audiences with very little cost to publication and massive distribution; and second, as components can spread of the assemblages themselves quickly, such as a photographic image, a video frame, a graphic shape and typography, also at very little cost and massive distribution.

The visibility of the extent of media convergence comes into full demonstration when investigated through the concept of citizen journalism. Citizen journalism is used to describe the open participation in the process of public journalism by citizens using tools of the internet that afford self publishing. While this is broadly afforded by the public having access to a range of software and hardware tools, media theorist Jay Rosen defines citizen journalism simply as “when the people formerly known as the audience employ the press tools they have in their possession to inform one another” (2008). Applying this to online visual communication design, we have noted that in the digital and online environment all users creating symmetrical agency have capability to produce pieces that can be used in an assemblage anywhere using ubiquitous content generation devices. This directly links to the disappearing distinction between designers and non-designers, and in visual communication design, this would be a kind of citizen design. Instead, we might say that citizen design is when the people formerly known as the audience employ the design tools they have in their possession to design for one another. This kind of design may bring about a wide variety of artefacts produced for a range of motivations and in varying quality, which will be examined in more detail through the case studies presented.

In any case, any component used in an assemblage of visual communication design can be created using a smartphone. Citizen journalism can be used as a catch all term where the public can become citizen producers of any kind, for example we can also have citizen illustrators, citizen photographers, and citizen visual communication designers. Some citizens might be better at making these components than others, but all have access to production. We will further explore the organisational logistics around expertise in the section on topology, and here remain focused on the way the materials function.

Citizen journalism allows for simple remediations of activities, converting already existing activities that can be remediated into many new forms with little additional costs and illustrating principles of FIST. A simple example of this is a video uploaded to YouTube by user Kyle Bodenham where he took a GoPro camera with him surfing, simply carrying the camera and attaching it to his surfboard as illustrated below in Figure 48. While we might think of citizen journalism as related to the news, citizen journalism can be used to describe this kind of activity. Kyle Bodenham does not have a significant status in the surfing industry, nor does he have a significant media presence, but he has a small YouTube channel and is able to create content that documents surfing activities at particular locations from a first person perspective. This demonstrates how even a leisure activity can be remediated to generate immense additional value through the simple action requiring little additional effort to an already existing activity. This remediation could also be reconfigured by other users, downloaded to their own device and remixed in any way, from changing soundtracks to editing to cutting into compilation videos.



Figure 48: Frame of surfing video recorded by YouTube user Kyle Bodenham²⁸

Another example demonstrating the possibilities of citizen journalism and visual assemblage through media convergence, illustrated below in Figure 49, is a video that appeared on social media during the Pakistan/India conflict of early 2019 showing tanks moving through civilian areas approaching the emerging conflict zone. This video is recorded using a smartphone, and overlaid onto the video is a graphic indicating location of Sialkot, Pakistan, a time stamp, messaging, and emojis. This assemblage disseminates useful emerging information about the conflict and in turn generates a new kind of visual aesthetic of conflict documentation.

²⁸ Video available: <https://www.youtube.com/watch?v=f7XX27bO1mw>.



Figure 49: Video that appeared on social media during the Pakistan/India conflict of early 2019 showing tanks moving through civilian areas approaching the emerging conflict zone captured by a citizen journalist²⁹

Virality and Memetics

It is also important to address the role of *virality and memetics* and distinguish these two concepts as separate processes of media spreading that have very different processual outcomes. We have already seen the concept of memes as introduced in Section II of Chapter 2: Framing and Reframing, where we saw that memetic spreading of duplication with variation. This illustrates the difference in viral and memetic content. While viral content spreads by replication through sharing an algorithmic functions of social media, memetic content spreads with slight variation through the dynamics above of produsage inside the copy machine environment.

²⁹ Video available on Twitter at <https://twitter.com/NabeelBDAP/status/1100505221409751042>.

Memes are the native image making process of the internet. Typical of open source material dynamics, users will make a copy of the image and adapt it for their own specific purpose or joke, which are illustrated in Figures 50 and 51 below. Memes can work in terms of the assemblage, as we see variations of the similar assemblages of objects (Gal, Shifman & Kampf 2015). The base image used for variation is known as a meme format, which is an established and accepted online culture of users copying content formats, while balancing this with constant tinkering and variation to find new vectors of resonance (Milner, 2013c). The central media frame can also become a meme, spreading through communities in slight variation (Knobel & Lankshear 2007).

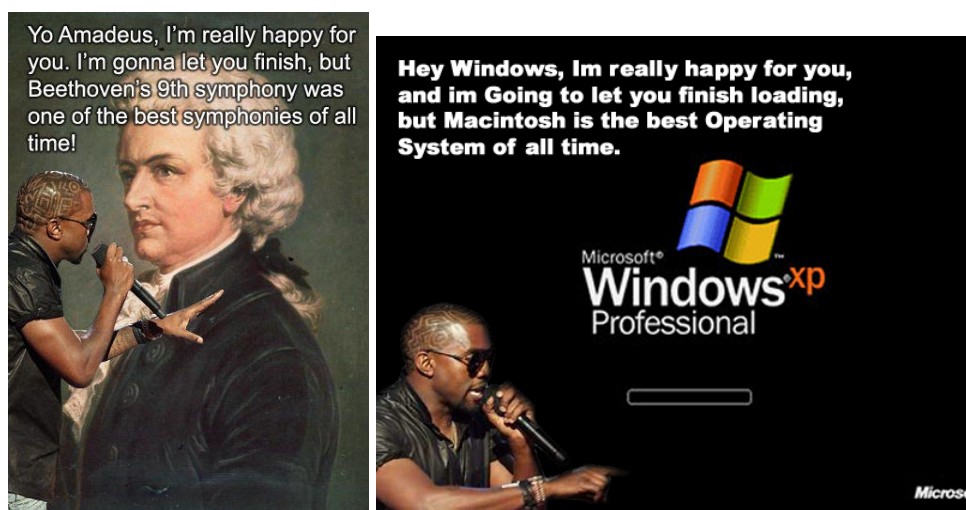


Figure 50: Some examples of the Kayne Interrupts Imma Let You Finish meme³⁰



Figure 51: Steven Crowder's "Change My Mind" Campus Sign³¹

³⁰ Further examples and details on the Kayne Interrupts Imma Let You Finish meme can be found at <https://knowyourmeme.com/memes/kanye-interrupts-imma-let-you-finish>.

³¹ Further examples and details on the Steven Crowder's "Change My Mind" Campus Sign meme can be

This point of media facilitating the spread of ideas is addressed by Susan Blackmore, who, as we noted in Chapter 2: Framing and Reframing, is a primary developer of the idea of memes following initial proposal by Richard Dawkins (1976):

While human language is a vast system for transmitting memes with high fidelity, it took the invention of writing to enable memes to be stored. Now telephones, fax machines, photocopiers, computers and the Internet all increase the speed and ease of meme-replication. We may think that we invented all these machines for our own convenience, but once memes got going, these devices—or something like them—were inevitable.

In any case, the natural state of the internet is generative, where generative artefacts and generative central organising frames appear. It creates a sense of generative evolution of artefacts and ideas in the environment, reflective of the evolutionary concept of memetics, first proposed by Richard Dawkins (1976). We will explore this in more detail in the following section tracing case studies.

The Mechanics of Online Collaboration

Distributed Networks

First, it is important to establish various digital communication network configurations and their different topological affordances. It will set the core idea to our topological perspective on how the copy machine environment of the internet set the foundation for our processual perspective above. Paul Baran's 1962 paper, "On Distributed Communications Networks", is useful. It establishes three general configuration settings: centralised, where all nodes are linked to a central point; decentralised, where a series of centralised networks are linked; and distributed, where all the nodes are linked without having any central point (Figure 1). In practice, most communications networks

found at <https://knowyourmeme.com/memes/steven-crowders-change-my-mind-campus-sign>.

are a combination of all three (p. 3-4) and the systems might be best thought of as a spectrum ranging from totally centralised to totally distributed.

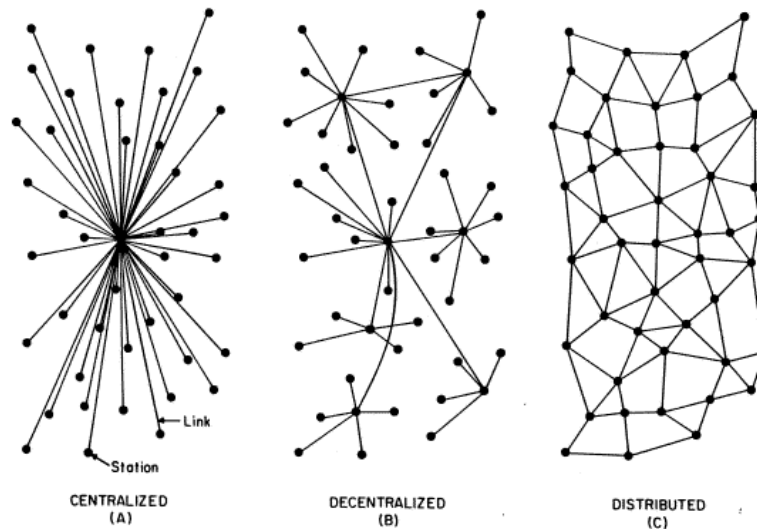


FIG. 1 — Centralized, Decentralized and Distributed Networks

Figure 52: Paul Baran’s three models of communication network topologies - centralised, decentralised and distributed (1962)

Arguably, Baran’s primary interest was in designing communications networks with balanced efficiency and survivability. In this case, efficiency refers to the logistics of information flow through the network. Centralised networks operate efficiently because information from the originating node is sent directly to the central hub and then swiftly distributed to the intended recipient. Distributed networks are much less efficient because information bounces throughout the network until it finds its intended recipient, potentially making many redundant moves. Survivability refers to the layout of the network. Centralised networks are significantly more fragile because removing a central node breaks the network of connected nodes (p. 3). Distributed communications networks are highly resilient, as nodes can be destroyed or removed from the network and it continues to function (p. 3).

The concept of distributed networks is not limited to technical communications networks. Henry Mintzberg’s seminal text on organisation structure, “The Structuring of Organisations” (1979), and in particular the chapter “The Organisation as a System of

Flows”, uses these concepts to illustrate ways groups organise. He identifies five typically occurring organisation types; simple structure, machine bureaucracy, professional bureaucracy, divisionalised form, and adhocracy. These structures can be used to describe many typical organisation types, from small technology start-up companies to multinational corporate organisations (Bolman & Deal, 2008).

This set of structures falls into a spectrum closely aligning to Baran’s model of network structures. Simple structures resemble a centralised network, where everything in the organisation goes through a very small amount of people. Divisionalised structures resemble a decentralised network, where organisations divide into smaller centralised networks. Adhocracy structures resemble a distributed network, where people organise and operate without clear hierarchy or mechanisms of centralisation (Bolman & Deal 2008, pp. 78-86).

Interestingly, description of the adhocracy structure has similarities to the description of the production model of produsage, which may indicate the topological nature of produsage. For example, Axel Bruns characterises produsage in a way that is reflective of adhocracy structures, pointing out that produsage features “fluid movement of producers between roles as leaders, participants, and users of content – such producers may have backgrounds ranging from professional to amateur” (2007). Given that adhocracy structures have decentralised topologies, the resonance between descriptions of produsage and adhocracy may indicate that where we have produsage taking place, a decentralised topology is occurring. In addition, it might also indicate that produsage produces adhocracy like structures, pointing to the nature of the online media environment having high capacity for facilitation of informal organisation of participants around media production.

Open Source Organisation

Open source projects follow distributed network topologies and offer further insight into how people work together in the environment of media exchange. The classic text on the mechanics of how people organise around open source projects is Eric Raymond’s *The Cathedral and the Bazaar* (1999), which draws from Raymond’s experience of

developing an open source email client and observations of the development of the open source Linux operating system. The cathedral and bazaar are metaphors of network topology contrasts. Raymond describes development of proprietary software as the building of a cathedral which is “carefully crafted by individual wizards or small bands of mages working in splendid isolation, with no beta to be released before its time” (p. 2). In contrast, open source projects operate in a chaotic style, where methods, materials and ideas are held in common, copied, traded and shared, and the state of things is in a functional but seemingly constant flux (p. 2). This reflects the dynamics of open source materials where the project is constantly in progress, even if it may be temporarily paused. Raymond’s observations of open source projects typically resemble an “adhocracy” organisational structure, particularly in the sense that adhocracies are “most often found in conditions of turbulence and rapid change” (Bolman & Deal, 2008, p. 86).

Open source is attractive because of the bazaar dynamics of openness and sharing of ideas and materials, but its biggest strength is the way anybody can join or leave the project at any time (Weber 2004, p. 64). This is the function of scalability we discussed above in the context of distributed network topologies. In an open source project, entry to the project is largely unlimited and therefore the project team can scale up or down at any stage as needed without any reconfiguration. Interestingly, maintaining distributed network topology is only possible as long as it uses an open-source coordination protocol. If that protocol were to change, the network would very quickly fragment or morph into a more centralised topology because the interface of access is closed off. In other words, distributed networks have to, axiomatically, adopt Raymond’s bazaar model if they want to be able to maintain operations in the same dynamics.

Online Swarms

The way that people function around open source projects can be considered as a kind of swarming. Swarming is a useful way to think about the way that online groups function, because it captures the nature of the distributed network topology central to the internet along with consideration to the timescales the internet allows. This will be especially important as we move into our case study in Chapter 4: Distributed Design

Sensibility of a Memetic Warfare Campaign. However, for now we can think of swarming as the basic dynamic of people gathering around and contributing to an event online as it is happening. In practice, this could be any event of higher intensity in activity, from working on an open source project to gathering around a trending event on social media.

To examine the dynamics of swarming as a concept, we can look to the work of John Arquilla and David Ronfeldt in their publication *Swarming and the Future of Conflict* (2000). Arquilla and Ronfeldt look at various insurgency movements across a spectrum of operations, from guerrilla armies engaging in physical combat to political activist groups. They present how these insurgencies “wreak havoc” on established and highly coordinated institutions, systems, and military operations seemingly vastly superior in terms of resources (p. 1-3), and they do so through swarming. Early application of this idea in the space of communications technologies has been explored by Howard Rheingold (2002), who pointed to Arquilla and Ronfeldt to describe how people swarm to exchange text based information via mobile phones to create social or political disruption (pp. 157-164). In terms of our distributed network topology, it is important to think of this dynamics in terms of coordination costs. The swarm pulses in whatever direction is needed, and with whatever intensity, without incurring any major costs to reconfigure its organisational topology. Arquilla and Ronfeldt articulate the design of a swarm as follows (pp. 45-46):

- Many small, dispersed, Internetted maneuver units
- All-service coordination for mixing and matching
- Both stand-off and close-in capabilities
- Integrated surveillance, sensors, C4I for “topsight”
- Aim: “sustainable pulsing” of force and/or fire
- Result: amorphous but coordinated way to strike from all directions—stealthy ubiquity, no “front”
- Tenet: centralized strategy, decentralized tactics, distributed formations and logistic

Arquilla and Ronfeldt describe swarming tactics as existing in great variation, and a broad insurgency might feature all possible combinations of these attacks. Hive-like structures typically nest and then deploy omnidirectional attacks to overwhelm a target (like guerrilla movements or activist groups); small mobile units may band together into packs (like soccer hooligans); or opportunistic mobbing where individuals take part for their own personal gain coincidentally aligning with others (like paparazzi) (p. 27). These variations can only work under a distributed network dynamic, which mirrors the open source protocol, as the lack of a centralised coordination mechanism affords wide variance in operation in a freely scalable network. These groups of collaborative networks organised under distributed network topology operate seemingly chaotically. The impact of swarming can be fully seen in the capacity to autonomous experiment under observation and rapidly scale when success is discovered. We will explore both these points in more detail.

Whatever a network's topology, the speed with which it processes external information inputs and reacts to them is a fundamental function of its coordination costs. This feedback loop is particularly interesting in swarms because their fully distributed topology allows them to process information inputs locally and react to them with much lower time-delay than more centralised networks. Feedback loops are fast in swarm networks because the speed of circulation of feedback allows for coordination and control to be performed both locally and at a distance, without altering the network's topology (Callon & Law, 2004). These feedback loops typically occur at both the individual and organisation levels, where individuals cycle through the loop at their own pace, while the organisation also cycles as a whole (Flaherty 2010, p. 5). At the level of the individual cycling through feedback loops, the lack of hierarchical centralisation and control allows free exploration of ideas, generating a flourishing of creativity and new directions (Bolman & Deal, 2008, p86). At the organisational level, the visibility of all performed trial and error on the network allows for participants to observe and shift direction when success is reached.

As successful directionality is discovered and the swarm begins to form shared directionality, the distributed network topology facilitates scaling of the swarm without

any change to its configuration. This is the significant advantage of the distributed network topology. In 1962 Baran was anticipating the need for a global network of information exchange. In the process he observed that at the cost of redundancy in a distributed communications network is highly scalable without any major reconfiguration (pp. 18-22). Nodes can be simply added or removed from the network without significant conceptual or technical reconfiguration. The key to this, not explicitly mentioned by Baran, is the rise of coordination costs associated with the scaling up of highly efficient networks such as centralised topologies. As more nodes join a network, it can scale up, which in turn increases the costs of coordinating the flow of information between nodes in the network. Crucially, these coordination costs are an inevitable emergent function of any network performing itself into existence against external resistance. In this context it has to be emphasised that all nodes of an information network are necessary for its performativity, “if a node is redundant the network drops it” (Castells 2004, p.3).

A hierarchical and vertically integrated network with a central hub will experience high coordination costs as it scales up simply because of the strain the new nodes will pose on the center of calculation in the network. Importantly, a highly centralised network will be highly efficient in the way in which it processes information - from peripheral nodes to the center - while also incurring prohibitive coordination costs as it scales up beyond a certain size. This, however, is not the case for a distributed network, which can both scale up easily and maintain low coordination costs as there is no pronounced center of calculation and coordination. This also means that in a distributed topology the entire surface of the network acts as a periphery as there is no designated centre.

These processual and topological themes have given us an initial sense for both how artefacts come about in this environment of media exchange and how participants organise and come into collaborative coherence. Next, we will explore a trace of case studies building on the examples of artefacts to further develop this.

An Exploration of Case Studies in Online Visual Communication Design

We will trace the above dynamics through sets of artefacts of online visual communication with the above concepts of participatory media as a conceptual apparatus. We will begin with static images, tracing internet memes such as the Absolutely meme through reconfigurations with no ending point, where users try many reconfigurations, and the rapid feedback loop of exchange, where little time to be spent perfecting assemblages (Douglas 2014) generates an aesthetic of online cobbling which is produced by crude bricolage at high speed. These images can also be reconfigured for political messaging. They can present problems for brands. Assemblage pieces provided through image filters platforms like Snapchat can present framing problems for brands as users easily use filters in documenting undesirable activities in consumer experience settings.

This practice of hyper collage where components are continually appearing, reassembling, and distributing also transfers to the moving image. In edited videos, YouTube accounts such as *Unreality Journeys* experiment with building virtual reality settings filled entirely with found image and video content. This practice generates new aesthetics of collage grounded in use of found objects, such as vaporwave and derivative genres such as Simponswave, where users edit episodes of *The Simpsons* into new stories as music videos. On live streaming platform Twitch, online cobbling aesthetic and hyper collage appears in real time video composition. There people live stream activities such as digital illustration and video gameplay; and media is live exchanged between live streamers and viewers as they converse through sending images and messages which appear within the live stream in a kind of making media within the media.

In making media in this environment, skillsets converge as image making combines with code in automatically-generated images through artefacts such as the *Shitpostbot 5000*. Artefacts flow across platforms, with static images impossible to fix to a location; videos transfer across platforms such as YouTube and Facebook; and images even flowing offline to merchandise are available through print on demand services such as RedBubble. The flow of content and media making produces localised cultures of visual

language, even outside of brands. Bootlegged streams of content appear such as within communities of professional wrestling fans who have their own customised features for image use during the stream as they watch and react to the product.

Through the present chapter we have been dealing with the nature of media production as produsage where participants drift between roles of producers and consumers, as well as the symmetrical capacity of all users given the production and consumption capacity of ubiquitous devices. The rest of the present chapter deals with my own testing of concepts through my own media making. As we will see, in this environment I can easily make my own memes in less than 30 seconds, cobbling together entirely found images to create something new. I can make Robert McKim's 'Express, test, cycle' diagram of Figure 8, as discussed in the Introduction chapter, available on t-shirts. I can take a physical card game *Design Fiction Design Brief Creation Playing Cards* and make a digital version of it, which allows me to remix and break the game. I can copy videos from a Japanese broadcaster website *NHK World* and upload them to YouTube, building a backup archive of the content and generating additional value from the process by exposing it to analytics and recommendation algorithms of the YouTube platform. I can sort and curate content of professional wrestling matches available on video streaming platforms and build a bot that automatically tweets out these matches as recommendations.

It is important to note a few things as we move into examples. First, this section too is constructed to illustrate the *frame of visual media exchange* in making artefacts of visual communication in the digital and online space. With this aim in mind, this tour is not intended to be an exhaustive cataloging and topology of genres of content. As we will see, artefacts ranging from simple image filters to custom emojis for video game streaming appear. To cover every kind of artefact online is impossible without going to incredible depths. It is always changing and this makes up an important part of the frame that is outlined in the conclusion below. Second, we are working under a methods of design perspective where analysis of artefacts is not typically performed. Reading and analysis of the messaging in content will not be of primary concern throughout examination of these case studies.

However, notes will be made on aesthetics of content to highlight how they are a function of the processual and topological themes.

The Artefacts of Online Visual Communication Design

To examine the generative production process of internet memes we can look in particular at the 'Absolutely' meme format, whose various versions are documented below in Figures 53 to Figure 58. This meme format is typically used as a reaction image, and uses as the base a still from a television news broadcast that seems to be captured by photographing the television screen, which is documented in Figure 53. From this format endless variations appear, typically pasting a new head onto the existing body, and replacing the word "disgusting" with a new word, which is generally done by cobbling together the new word using letters from the original graphic, although not always. Components of the meme can also become memetic items themselves, as can be seen in Figures 57 and 58 where just the text portion of the original meme format is used as a caption image.



Figure 53: The original frame of a television news broadcast that became the base of the Absolutely meme format



Figure 54: Version of the Absolutely meme featuring John Lennon as the Absolute Madman³²

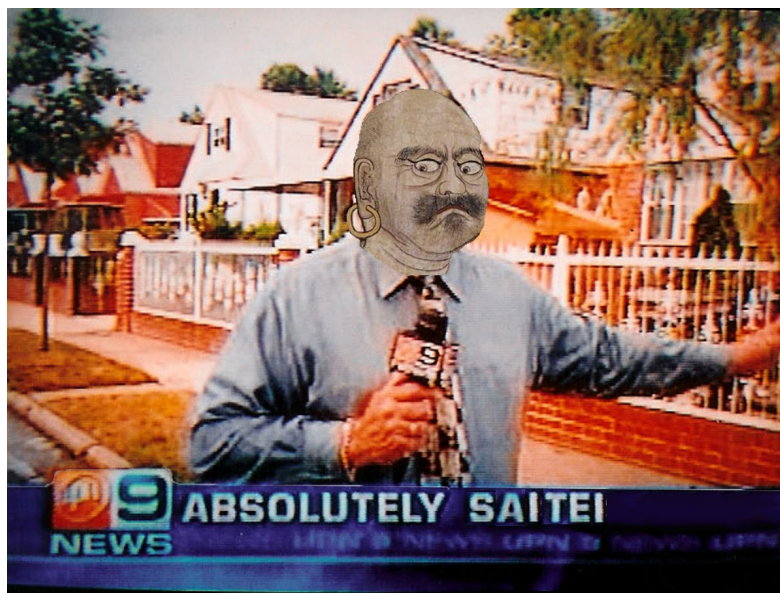


Figure 55: Further variation of the Absolutely meme

³² Further details on the John Lennon The Absolute Madman image can be found at <https://knowyourmeme.com/memes/john-lennon-the-absolute-madman>.



Figure 56: Further variation of the Absolutely meme



Figure 57: Further variation of the Absolutely meme

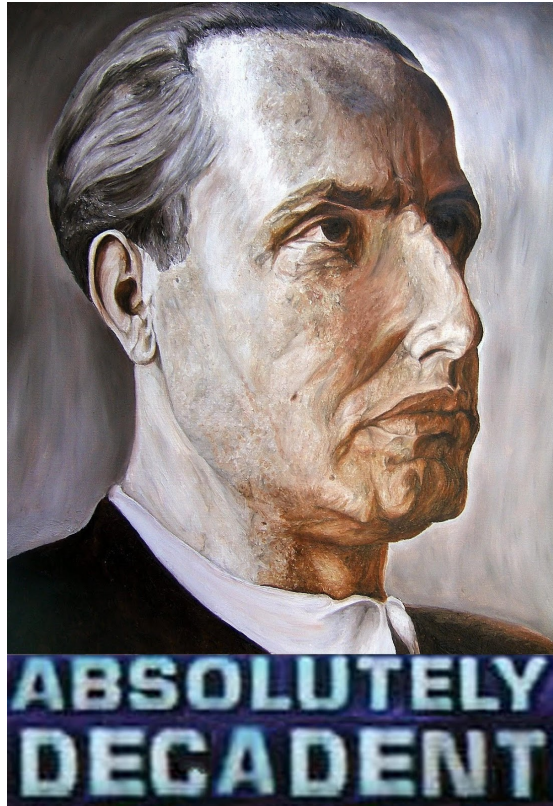


Figure 58: Further variation of the Absolutely meme

These examples of the absolutely meme are assembled using entirely found objects. They are seemingly made with little regard for any concept of who *owns* the found objects. The only originality to the image is the composition. This is a good example of objects becoming, for all practical purposes, open source even though there is no license specifically or it is not given. In turn, there is no author attached to these images, and seemingly no expectation that a user could protect their work from remix by somebody else. Also, as spreadable media there is no fixed location of these memes, with their point of origin difficult to determine. Furthermore, they exist across the internet and can really appear anywhere without tie to a particular social media platform. The production of these memes also operates to a swarm like timescale. When a successful meme format is discovered users swarm around it and tinker to find new variations and resonances, which is well illustrated on locations such as meme economy forum on Reddit.³³ As the initial variations are exhausted, the swarm subsides and moves onto a new popular meme format.

³³ Meme economy subreddit viewable at <https://www.reddit.com/r/memeeconomy>.

As artefacts of visual communication design, there is a notable visual language that is produced by the mechanics of their production. The images use distortion of components, visibility of cut and paste, mixes of resolutions and absence of colour correction for consistency to generate expression. Nick Douglas' 2014 paper 'It's Supposed to Look Like Shit: The Internet Ugly Aesthetic' deals with this online aesthetic, calling it *internet ugly* and describing it as a "an imposition of messy humanity upon an online world of smooth gradients, blemish-correcting Photoshop, and AutoCorrect". Writing in 2014 about an earlier iteration of internet meme culture focusing on crudely drawn images, Douglas captures the back and forward production of images describing how "users frequently make quick-and-dirty cut-and-paste photo manipulation as conversational volleys. But these images are rarely sophisticated – polish your reply in Photoshop for an hour and the thread might be done before you are" (p. 315). This captures processually rapid prototyping, where these images are grabbed, remixed, and posted quickly, which generates the crude aesthetic and allows for rapid exploration of ideas. A suitable description for this might be *online cobbling aesthetics*, which are visible in further examples below in Figures 59 and 60. They show a sense of bricolage where visual communication artefacts are compiled from available pieces often crudely, and feature visual language of heavy handed use of effects and distortion of components for emphasis. A suitable description for this kind of bricolage might be *online cobbling aesthetics*, which are visible in further examples below in Figures 59 and 60, where visual communication artefacts are rapidly and crudely compiled from available pieces, and featuring visual language of heavy handed use of effects and distortion of components for emphasis. This aesthetic also seems apt in an environment of production of images on smartphones, where the software available on the devices and means of device interaction may not afford nuance and refinement to editing that is possible on a desktop machine. This process is drastically different than the kinds of visual communication design steps we saw in documentation by Gavin Ambrose and Paul Harris (2015), and Matt Cooke (2006) as people are not spending time researching, brainstorming possible directions and building mood boards to select from. Ideas are quickly generated, things assembled and released. Only a small amount may appear

more than once online, and particularly in an anonymous environment, there is no social cost to posting an image if it is not received well.



Figure 59: The Forty Keks meme³⁴



Figure 60: Gordon Ramsay's Lamb Sauce meme³⁵

We can see how internet memes could be used to create media in order to rewrite association chains in minds (Wadsworth, 2004). Given that the images are created by assemblage, central organising ideas or stories are used in the assemblage, and new associations can be drawn between things very quickly. Figure 61 below shows a meme circulated on social media using the popular Steven Crowder's "Change My Mind" Campus Sign meme format where Malcolm Turnbull, Australian Prime Minister at the time is depicted as confidently entering negotiations with US President Donald Trump. The construction of this meme builds around the central organising story of Malcolm Turnbull not being afraid to stand up to Donald Trump's firm stance (Coorey, 2018),

³⁴ Further details on the 'Forty Keks' meme can be found at <https://knowyourmeme.com/memes/forty-keks>.

³⁵ Further details on the 'Gordon Ramsays Lamb Sauce' meme can be found at <https://knowyourmeme.com/memes/gordon-ramsays-lamb-sauce>.

attempting to position Malcolm Turnbull as a strong negotiator. This use of internet memes for political messaging will be the topic of Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign, and will be further explored there.



Figure 61: A version of Steven Crowder's "Change My Mind" Campus Sign meme format depicting Malcolm Turnbull, Australian Prime Minister at the time, confidently entering negotiations with US President Donald Trump

Figure 62 below shows a simple meme I have made illustrating this cobbling together found images. As can be seen from video recorded documenting my process,³⁶ making this meme took 30 seconds and is assembled from pieces entirely found online, including intellectual property from The Simpsons. Also note I have uploaded the video of making the image to two platforms, meaning that any media can spread across as many platforms as I like. Neither of the platforms have stopped me uploading the image even though it contains intellectual property from The Simpsons. I have uploaded the image to image sharing platform Imgur,³⁷ where nothing is clearly identifying me as a

³⁶ Available at <https://imgur.com/MJxPJ4> and <https://youtu.be/SW8kmORmJ5c>.

³⁷ Image available at <https://imgur.com/BD41k1o>.

producer. In addition, I cannot stop this image being saved from Imgur and adapted just as I have done.



Figure 62: A simple meme I constructed in 30 seconds

The spread of popular internet memes occurs memetically, with little explicit coordination between users. The only sign of a meme format being deemed useful is visibility of widespread adoption. Discussion and analysing meme formats is even openly mocked. For instance, on the meme economy forum on Reddit users discuss the potential of memes formats with a tone of irony, and frame their identification and assessment of new meme formats as an investment opportunity. Users have even constructed mock technical academic papers (authored by researchers at the University of Memechester and the Memeachusetts Institute of Dankology) documenting complex mathematical modelling around meme investment.³⁸

Another kind of component assemblage and media convergence that is more guided is the image filter. It is a ubiquitous feature on social media platforms where users posting images to social media are given the option to overlay various graphic objects over their images. Various brands have used this opportunity to work with social media platforms to provide visual assets of the brand that can be used by social media users, as seen below in Figure 63 of McDonalds providing overlays to McDonalds customers. The

³⁸ Mock technical academic papers around meme investment are available at <https://meme.market/resources/paper.pdf>.

filters are restricted for use in particular geographic locations, with these ones in particular restricted for use to when people are in McDonald's restaurant locations.



Figure 63: McDonald's branded Snapchat filter produced by McDonald's for customers to use in store

The purpose of these filters is for the brand to use citizen journalism to their advantage, where people can document their experiences at locations and report via social media and the brands of the locations provide visual assets for users to assemble into their documentation. This creates an opportunity for the brands to have advertising for their product or service circulated on social media by users, which bypasses the brand having to go through publishers, journalists or any other kind of public relations outlet. The goal is for people to document and report positive experiences at the location, generating association chains around the brand. However, this also opens the imagery to hijacking and off-brand use, and importantly for the brand this creates reframing issues. As seen in Figure 64 below, a late-night fight in a McDonald's is captured with a smartphone and circulated on Snapchat, making visible a frame of McDonald's as a place of late night and perhaps alcohol fuelled activity. The designer of the brand completely loses control of the association chains that can be built between the visual assets of the brand and the activities of users.



Figure 64: A fight inside a McDonald's store circulated on Snapchat with the McDonald's branded Snapchat filter

The cultural feedback loop of visual communication design is critical here, as cultural awareness drives the finding of new frames, and in particular the exploitation of frames. In our example of McDonald's above, the frame of McDonald's as a location for late night activities while intoxicated is a kind of cultural knowledge existing as easily found through news stories circulated.³⁹ However, this is framed out of their branded messaging where this culture is not made salient. The pieces such as the image and the image filter can be easily combined and distributed. Processually it is the ease at which this reframing can occur that is useful here.

The spread of images or image components is not restricted to screen based delivery, and can spread into offline appearance. Figure 65 below shows a variation of the absolutely meme available for purchase on a t-shirt on Redbubble, a merchandise website where users can set up their own stores, upload images and have the images

³⁹ An example of this can be found at <https://www.news.com.au/lifestyle/food/restaurants-bars/mcdonalds-comes-up-with-plan-to-stop-drunks-fighting-at-restaurant/news-story/59214d6fe70edee0de5eead823bc624b>.

available for purchase on a wide variety of merchandise such as t-shirts, mugs, phone cases, throw cushions, etc. Merchandise is printed on-demand and store owners receive royalties, so there are very little setup costs for store owners. Redbubble is intended for artists to set up stores that feature original work, but there is a proliferation of stores filled with internet memes available for purchase on all these pieces of merchandise. The copyright status of these memes is essentially public domain, meaning any user can upload any found images and sell them. In this case, the store ‘scotter1995’ run by a user only identified as “Tyler” from the United States sells internet memes found online.



Figure 65: The Absolutely meme available for purchase on a t-shirt⁴⁰

I tested this process by setting up a simple Redbubble store selling merchandise in a similar way. I have experimented with uploading various images to the platform. The images include tracings of an illustration on a sign I found while travelling in Japan; scans from a book of public domain illustrations; and Robert KcKim’s ‘express, test cycle’ diagram, as illustrated earlier in the Introduction chapter.⁴¹

⁴⁰ Absolute meme t-shirt:

<https://www.redbubble.com/people/scotter1995/works/20312240-absolutely-disgusting?p=t-shirt&style=mens&rbs=6d03c980-1ec9-4352-a3d3-e61e0cd45183>.

⁴¹ Robert KcKim ‘Express test cycle’ diagram available at RedBubble

<https://www.redbubble.com/people/traviswall/works/16655360-express-test-cycle-feedback-loop>.

In further examples of content flowing from offline to online, I experimented with doing this in the opposite, i.e., taking an analogue item and making it digital by converting a card game into a digital form. The *Design Fiction Design Brief Creation Playing Cards* is a card game by Near Future Laboratory, illustrated in Figure 66 below, for generating design fiction where players receive three cards of attribute, object, and design action, from which they can begin generating ideas. For example in the illustration of the game below in Figure 66, the hand is “make a virus proof speaker and add nostalgia/sentimentality”.



Figure 66: *Design Fiction Design Brief Creation Playing Cards* by Near Future Laboratory⁴²

I took it upon myself to digitise the game, making an easily accessible version by cloning the visual style of the cards and making it available online via web browser.⁴³ This clearly shows the ease at which something can be copied, but also with the possibility that I can now remix the game. I can make simple additions or subtractions

⁴² Design Fiction Product Design Work Kit 0-TBD-D012

<https://nearfuturelaboratory.myshopify.com/products/design-fiction-product-design-work-kit>.

⁴³ <http://traviswall.online/designfiction/>.

to the cards and I can also tinker with the mechanics of the game. The first experiment was adding an audience card, for example building on the above example of making a virus proof speaker and adding nostalgia/sentimentality *for cats*.⁴⁴ The second experiment was a version of the card with an image in addition to the word⁴⁵.

By remixing the game I could begin to understand the mechanics of the game. It demonstrates the usefulness of learning by dismantling and reconstructing. For example, I noticed how adding an audience card adds an interesting dimension and also highlights the trap of narrow thinking in the original version. If presented with the combination make a virus proof speaker and add nostalgia/sentimentality, there is nothing in that combination saying it cannot be for cats, or it must be for humans. In this sense, adding the audience card actually limits the game. Similarly, adding images to the game reveals that the game seems to work best when the words are abstracted, or as little is around the word as possible. For example, for the word key an image of a door key limits thinking to a door key, when a key could be interpreted as anything that unlocks, such as a cryptographic key. Also by converting the cards into a simple digital list of words, I could easily find new ways to use that list, for example the creation of a bot running on Twitter that regularly automatically tweets combinations of suggestions of the card game.⁴⁶ This presents an interesting skillset challenge. While playing with visual communication, I am also tangling with other skillsets such as learning code and deploying on websites and using programming interfaces with Twitter.

Tracing this thread of the remix and automation potential of online, the *Shitpostbot 5000* is an example of understanding and exploiting assemblage by automating assemblage through the use of software that creates internet memes and posts them to social media platforms Twitter, Facebook, Instagram and Tumblr every half an hour. The creator of the software is essentially anonymous, with no indication that it is a team, an individual or a location. The bot works by pulling images from two databases of images, one of

⁴⁴ <http://traviswall.online/designfiction/audience/>.

⁴⁵ <http://traviswall.online/designfiction/images/>.

⁴⁶ https://twitter.com/design_fiction_.

templates⁴⁷ that images will be inserted into, and one of images⁴⁸ that will be used in the template. Users can contribute images to the databases that the software pulls from, which includes a review process by the anonymous authors. The project also has a Patreon page where users can donate money to the anonymous authors, and a Discord channel facilitating chat among a community of active enthusiasts of the project and internet meme culture in general.

Because it is a piece of computer software automatically generating the images, the images are often crudely composed and for the most part nonsensical. However, within the context of internet ugly, this aesthetic of crude cobbling fits with the general aesthetic of online production and meme making in particular. This component of automatic assemblage leads to a kind of automated and crude association chain testing. For example, Figures 67 and 68 below show how the software contains templates including political figures, and how the software can potentially generate images pulling associations between these political figures and any other images stored in the database. This is also worth considering in the context of control, as this is a piece of computer software automatically generating images and distributing them across social media that could end up becoming problematic for any brand or organisation who ends up with their related visual assets added to the databases.

⁴⁷ <https://www.shitpostbot.com/gallery/templates>.

⁴⁸ <https://www.shitpostbot.com/gallery/sourceimages>.

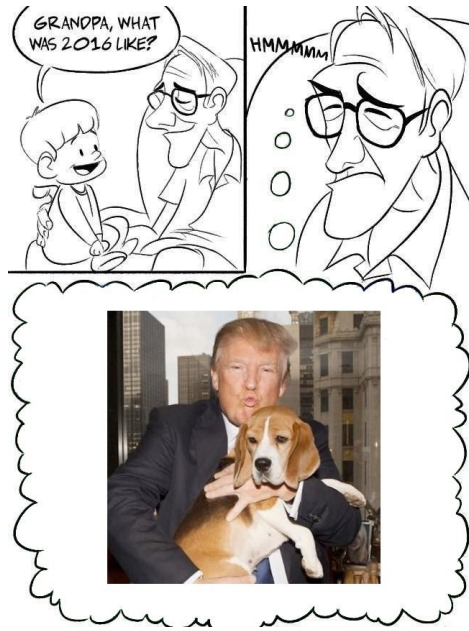


Figure 67: Image automatically created by the shitpostbot5000⁴⁹



Figure 68: Image automatically created by the shitpostbot5000⁵⁰

Online cobbling aesthetics is well captured in a processual sense in a video on YouTube titled “Every Facebook Video EVER”. This video is a satirical work of common video formats on Facebook, and a scene in the video at 0:20 illustrates the process of how things can come together rapidly in an online media making environment. While this

⁴⁹ <https://twitter.com/ShitpostBot5000/status/1098930470446862336>.

⁵⁰ <https://twitter.com/ShitpostBot5000/status/1098726625447944198>.

video is over exaggerated, it captures the essence of the process. First, we see a video taken from YouTube and posted to Facebook.⁵¹ We see an assemblage of visual components cobbled together in an internet ugly style. There is heavy compression artefacts referencing that this video has been through a loop of downloaded, remixed, and uploaded again many times. Various watermarkings appear over the video at stages of its generative development, including a username and Unregistered Hypercam 2 and DIVX, referencing free video composition and rendering software.

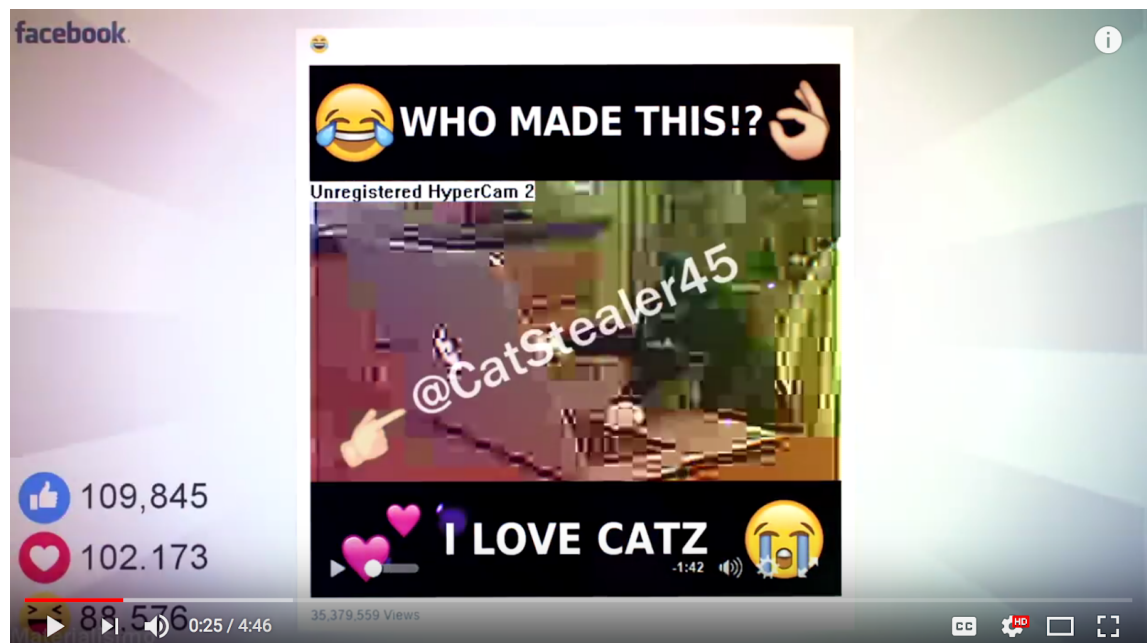


Figure 69: YouTube video Every Facebook Video EVER

The ease that videos can be spread across platforms is something I have explored through a project on a YouTube channel. In 2015, browsing YouTube I came across a popular show produced by NHK World Japan called Japanology Plus. It is a half hour English language documentary series with each episode revolving around very specific topics of Japanese culture. NHK World was not actually uploading these videos to YouTube themselves, but instead episodes were finding their way onto YouTube by users uploading their own recordings from airings on NHK World. I found reliability issues, as new episodes would only appear if somebody went to the trouble of recording the airing and uploading it. In trying to find missing episodes, I realised that I could

⁵¹ Video available at <https://www.youtube.com/watch?v=Xw-LPFFe9sU>.

download the episodes from various file sharing websites. In 2015 I decided I would make my own channel on YouTube to share these missing episodes I had found.⁵² I encountered no problems with video removal for copyright purposes, although occasionally audio tracks in the shows are edited by YouTube due to music in the show under copyright. The channel quickly grew in popularity and it now has over 8000 subscribers and 2.3 million views across all videos on the channels, with the most popular video an episode of Japanology Plus about sleep culture in Japan nearing 500000 views.

With this comes analytics of the viewers from which I can draw a detailed illustration of people interested in the show in terms of region, age, gender, etc. Interestingly, the most common viewer is from USA aged 24-34 and overall viewership leans slightly toward male. This provides an incentive for performing the project. My spreading of this content may benefit Japanese tourism, but I do not currently benefit from that result. However, the detailed analytics of the content that my work has made for me provides me with information that I could capitalise on.

In addition to Japanology Plus videos, I also experimented with other content from NHK World that might be of interest to the same audience such as Design Talks Plus, which have been mildly successful but nowhere near as successful as Japanology Plus. Recently NHK World started uploading episodes to their website,⁵³ but videos are generally only available there for a short period of time after the episode airs on NHK World. I copy the video from the website when it is available and then upload to YouTube when it is no longer available on the NHK World website. This process of copying the files from NHK World uses the copy machine dynamics of video streaming, involving digging into the ongoing requests within the browser to find the list of video segments, which I load into other video streaming software to save each file and stitch together into a complete video.⁵⁴

⁵² Japanology Plus YouTube https://www.youtube.com/channel/UC65ur_lQeJ0J83lhAoyrHzw.

⁵³ Japanology Plus on NHK <https://www3.nhk.or.jp/nhkworld/en/tv/japanologyplus/>.

⁵⁴ There are multiple ways to perform this, just like anything online, including browser extensions that find streaming videos in web pages and provide a link for download, however I find the manual process most reliable as browser extensions sometimes break due to new video streaming methods appearing.

The practice-based research examples above demonstrate that models of visual communication design such as those by Gavin Ambrose and Paul Harris (2015) and Matt Cooke (2006) do not transfer to this digital and online practice, despite the projects having the same aim as the process these models aim to capture. In running these small projects, I am doing every component of the project. As well as the visual communication design elements. I am also sourcing content, technical problem solving, developing the visual appearance of platform channels, assigning content with keywords for the content algorithm, examining the usage metrics, and making decisions on next steps. This is in stark contrast to Ambrose and Harris' model which is based on compartmentalisation of design and production where the graphic designer hands over the task of production and distribution of the designs to a printer or a web developer (p. 152). Similarly, Cooke's model documents design finalisation, effectiveness measurement, and improvement recommendations occurring as a distinct phase of evaluation following design rather than embedded in a process of continual rollout as illustrated through these practice-based research projects. These practice-based examples, similar to the other found artefacts, more closely reflect the produsage process of Bruns (2008), or even the digitally native continuous deployment methods (Chen, 2017) typical in software development.

In addition to the cobbling aesthetics explored above, a visual aesthetics of a kind of hyper collage has appeared out of the processual components of artefact construction online, which draws upon cobbling aesthetic, remix culture, and exploration of emerging digital and online technologies to generate new aesthetics. For example, Unreality Journeys was a Facebook and YouTube channel featuring demonstration videos of an experimental virtual reality game under development (Acute 2017). As illustrated in Figure 70 below, the video 'Toy_Story_5_Andy_Discovered_SoundCloud.mp4' shows gameplay of a virtual reality dancefloor where players avatars are 3D models of colour distorted well known animated television and movie characters, and the setting of this virtual reality dance floor is a footpath near a street in an urban area, creating a hyper collage of a virtual reality space entirely constructed from found media objects.



Figure 70: Toy_Story_5_Andy_Discovered_SoundClout.mp4' by Unreality Journeys (video)

Another video by Unreality Journeys titled 'S A D P 😞 S T I N G V I B E S - Feat. Music by FrankJavCee'⁵⁵ as illustrated below in Figure 71, is a 360 degree video of a flythrough of another level in the game.

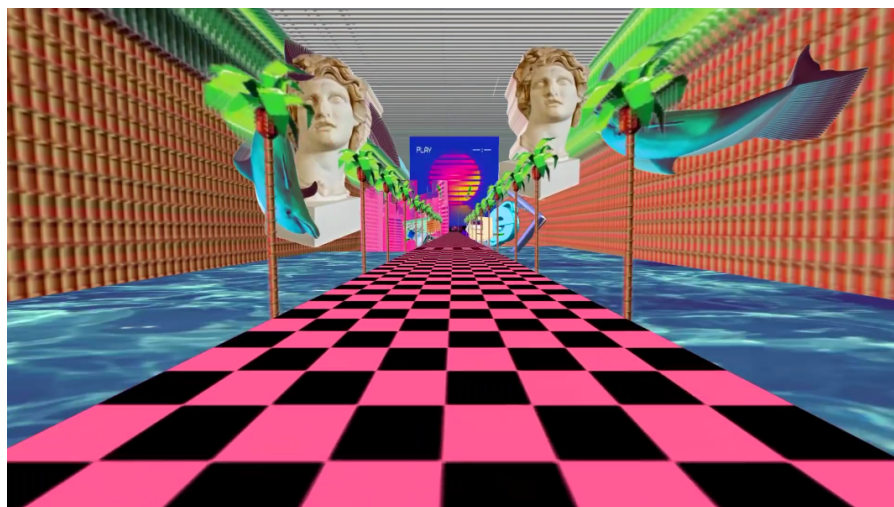


Figure 71: S A D P 😞 S T I N G V I B E S - Feat. Music by FrankJavCee by Unreality Journeys (video).

⁵⁵ Archived at <https://archive.org/details/youtube-ql2cLfDCCnM>.

This kind of hyper assemblage is typical of the genre of vaporwave. This processual way of working in an online space quickly generated an entire landscape of material artefacts created from mostly found objects, as Georgina Born and Christopher Haworth describe the development of the vaporwave as an audio/visual material world (2016, p. 79):

When the term came to more widespread attention, it was as an unexplained hashtag accompanying anonymously uploaded soundfiles, images, GIFs and other media. The media posted under this tag were distinctive in audiovisual style. Musically, they included samples of derided music sourced from the Internet and then re-uploaded with little in the way of modification: 1980s “muzak,” soul and funk, advertising soundtracks for consumer electronics, luxury hotels and other icons of consumer capitalism, computer game soundtracks and sonic idents. Visually, they featured anachronistic juxtapositions of images of Greek and Roman antiquity with 1990s computer graphics, isolated Japanese cityscapes, leisure advertisements, images of luxury apartments and other signifiers of global capitalism.

This assemblage has become a meme (Born & Haworth, 2016, p. 81) in multiple ways; first, through use of themes of nostalgia and global capitalism as a common central organising frame of making media. Many slight variations of the same images and use of the same pieces are used in these collages. The aesthetic even resonates through the video titles with the title including file formats and unicode text to distort the appearance of text even in content delivery systems.

Popular cultural figures are often added into this meme, demonstrating the way assemblage pieces flow online regardless of intellectual property ownership. For example, A genre of video called Simpsonswave appeared in 2016, as illustrated in Figure 72, showing a particularly popular video titled `SUNDAY SCHOOL`, as users began to cut scenes from episodes of The Simpsons (generally episodes from the

1990s) into music videos accompanying vaporwave audio tracks. These videos would be made using the vaporwave meme of the central organising frame to create new stories created by reconfiguring scenes of episodes, as well as the visual meme by using VHS style filtering effects on videos.



Figure 72: Simpsonswave SUNDAY SCHOOL (video)⁵⁶

Moving from edited videos of cobbling aesthetics, online we can also see the aesthetics appear in videos composed in real time through interactive components where users are exchanging media within media. An example of this is Twitch, a live streaming platform primarily for users to live stream their video game gameplay. However, live streaming of many kinds of activities can be found and often revolve around niche topics and interests. As an example, below in Figure 73 is a frame of the browser window from live stream ‘Artsy Fartsy’, featuring live streaming of illustration work. Twitch videos often feature multiple video sources fed into the one video feed. Streamers show their live activity as well as a camera and microphone on themselves as they commentate their own activity. However, streamers can overlay as many visual objects over their video feed as they like, including information panels and chat streams as seen in Figure 73.

⁵⁶ Video available at <https://www.youtube.com/watch?v=rTfa-9aCTYg&t=44s>.

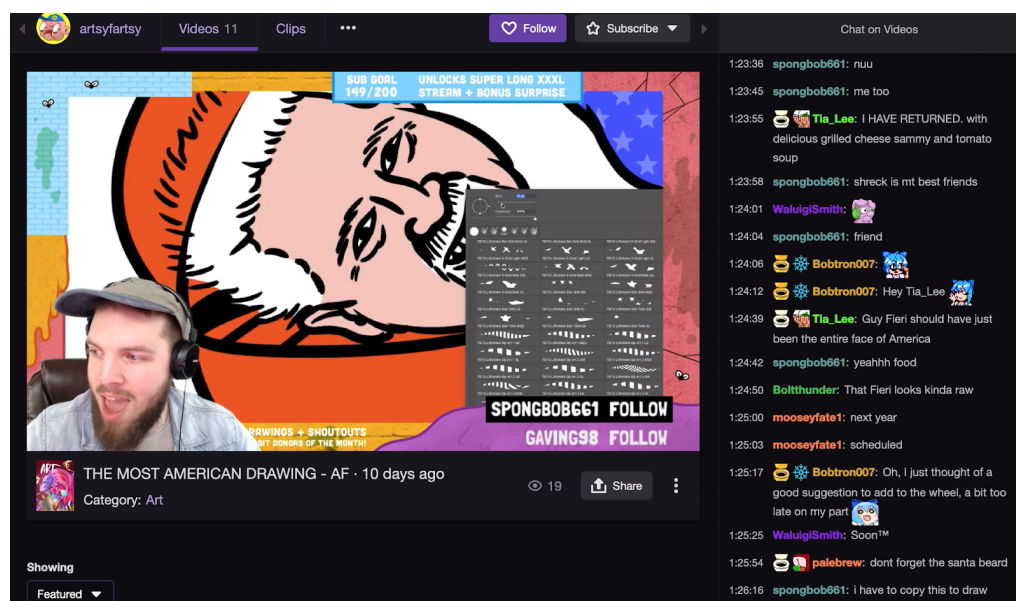


Figure 73: Illustration stream Artsy Fartsy live on Twitch (video)⁵⁷

This environment is also highly interactive between the streamer and viewers, with viewers able to comment on videos in real time, and streamers often following the comment stream and replying to comments as part of their activity. As one can see in Figure 73 above, the comment stream sits alongside the video window and in the comment stream viewers are commenting, making suggestions and conversing with the live streamer, which works as a dialogue where the illustrator can talk back to the suggestions via the video feed. This environment also facilitates swarm dynamics, as there is no limit to the number of people in the chat.

Twitch also has a feature called emotes, which are similar to emojis and allow viewers to react to the live stream using images. The functioning of emotes are reflective of the technological affordances of the digital and online medium, as each Twitch streamer can add customised emotes to their own stream for their viewers to use. Twitch streamers can make their own emotes, or find them on emote library websites such as Twitch Emotes⁵⁸, where any user can contribute them to the library. Emotes can be made from any image, from completely original contributions to images found online. As illustrated in Figure 74 below, these floated emotes are made from any found images

⁵⁷ Archive of clips of this live streaming session is available at <https://drive.google.com/drive/u/0/folders/1wZYguTqKy8YP7tULQH3gJmY99WHd2lRJ>.

⁵⁸ <https://twitchemotes.com>.

online, including popular internet memes, copyrighted characters, images of products, and cutouts of faces of other Twitch streamers who themselves have become memes on the platform. Twitch streamers can also opt to have users react to the live stream by floating small reaction images over the live video feed. Figure 74 shows Twitch streamer Alrex playing a video game with users reacting with floating reaction images over the screen. On Twitch these images are called emotes. This generates a kind of live generated online cobbling aesthetic, as we see visual mess through assets that are crudely overlayed on the fly.



Figure 74: Live streaming Twitch user Alrex featuring in video emotes⁵⁹

In addition to having this option, learning how to set these up as a Twitch streamer is relatively simple. Step by step demonstrations on how to create emotes can be found on YouTube.⁶⁰ In an example of digitally native feedback loops, developers of software for Twitch streamers to display emotes on their feeds have posted early versions of their software to a Reddit discussion forum about Twitch,⁶¹ where users directly reply to the developer and make suggestions, with the developer replying, making updates to the software, and releasing fixes immediately.

⁵⁹ Video available at <https://www.twitch.tv/videos/247624038>.

⁶⁰ Video available at https://www.youtube.com/watch?v=Zriq_svvQko.

⁶¹ https://www.reddit.com/r/Twitch/comments/4aldgz/kappagen_an_app_to_display_emotes_from_your_chat.

Another example of using images in reaction to video online, an unofficial live stream of a professional wrestling show on Taima.com shows how user generated visual objects used as reactions manifests a localised language of visual objects.⁶² Taima.com allows a chat window next to the video stream so users can chat during the show using text or images, both static and animated GIF. Users go by screen names, generally anonymous to other users and react to moments during the content as they occur. In Figure 75 and the related video below, there is a surprise event as a wrestler unexpectedly returns to the show after an absence and a new storyline begins with a main character of the program. As the surprise happens, users respond to the surprise with text and images, both static and animated. In the video there is a clear acceleration of the chat as the event happens. This is the kind of volatility in intensity present in the online environment, as when things happen media exchange greatly accelerates in speed and rises in volume.

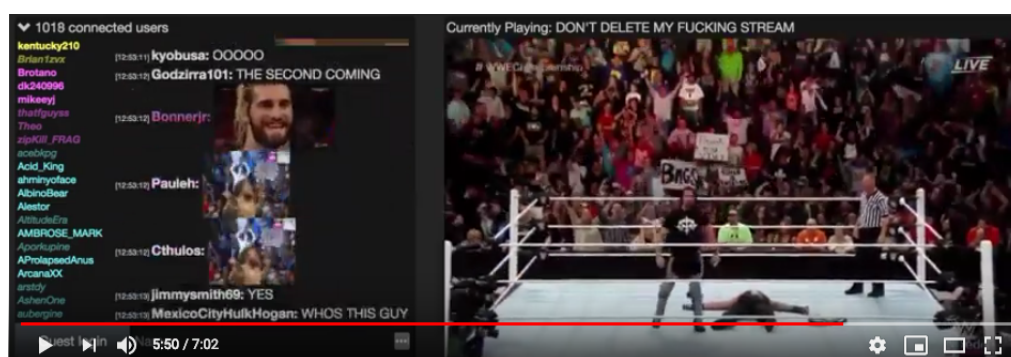


Figure 75: Moment of high intensity GIF reactions of an unofficial live stream of a professional wrestling show on Taima.com⁶³

The use of reaction GIFs is significant. Particularly notable about these reaction GIFs is that they are images specific to the localised culture within online wrestling fan communities. Many of the reaction GIFs entered to the chat by the users are specific to the wrestling fan audience and only really understood by them. It means that a local knowledge is required to understand the media generated in response to the event.

⁶² Link to original stream unavailable as streams are deleted after live broadcast.

⁶³ Archive of clip of this live streaming session available at <https://youtu.be/vQINQzIg0wY?t=335>

Further examples of localised memes are illustrated in Figure 76 below. Wrestling fan audience's specific versions of the absolutely meme (noted previously in this Section) that feature wrestlers AJ Styles and Chris Jericho exist. They carry particular meaning only within wrestling fan audiences. This is an example of the use of vernacular within internet subcultures such as localised meme culture (Nissembaum & Shifman 2017). This perspective is based primarily on how subcultures translate tropes within their communities into internet memes' visual objects. This is a key example of the distributed topological nature of production, as anyone can attempt to translate tropes from the community into a visual assemblage. They are able to make them because the media is essentially open sourced.



Figure 76: Professional wrestling specific versions of the Absolutely meme

In a further example of this kind of content generation as part of a fan community, I was able to generate a shirt design for RedBubble following a critically panned segment during a show, which is credited to the episode of the show receiving the lowest rating to date.⁶⁴ I was able to generate the t-shirt design and have it available on RedBubble as the conversation around the television rating and response to the segment, illustrating the feedback loop possible.

⁶⁴ <https://www.redbubble.com/people/traviswall/works/18728153-tater-tots-2-15-says-tv-ratings-are-tanking>.

This presents a design challenge for the content producer, as the content producer has no control over the conversation around the content they have produced. Users can openly respond to the content and it is entirely visible to all other users. Compounding this loss of control, the GIFs used by the users to express their reaction to the content are made from other content produced by the same content producer. The content created by the original media creator is essentially open sourced in multiple facets: first, as it is replicated on another channel and second, the creation of reaction GIFs by fans through copying and remixing found media into short loops. The content creator, in this case WWE, and their loss of control of the audience reaction directly relates to framing. The perception of the event is broadcast for everyone else to see. Users can see other users respond to the event in real time,; this potentially influences the response of other users.

In 2014 I made a Twitter bot⁶⁵ that automatically and regularly tweets random wrestling matches from user generated video sharing sites such as YouTube and Dailymotion. To build the database of matches the bot would tweet, I had to manually collect links to matches I could find on these platforms. Much of this content was fan uploaded, generally violating copyright and was of varying quality. The foundation code of the Twitter bot is shared with other bots I have made such as the Design Fiction bot noted above, as the engine of randomised selection and compilation is easily reconfigurable and transferable to other projects. This is an example of FIST in action, as minimal change to something already existing by recontextualisation can generate new value.

I posted the Twitter account to the wrestling fan community on Reddit (reddit.com/r/squaredcircle) and quickly gathered followers on the account. The account generally sits around 800 followers although has fallen into disrepair because monitoring and regularly updating dead links to content required too much attention. Also after this Twitter bot was made, WWE launched their own streaming service. WWE Network contains much of the archival footage available on user generated video platforms but it is with higher quality and much less likely to disappear, which makes much of the content on user generated video platforms redundant. Following this I made a second Twitter bot to tweet only wrestling matches from NJPW, a Japanese wrestling

⁶⁵ <https://twitter.com/WrestleBot>.

company with a growing following. I made my database from a publicly available spreadsheet of highly recommended NJPW matches created by another user.⁶⁶ These links are to content on NJPW's official streaming service, dealing with reliability and content quality problems. The same issue of incentive exists here; except for the social capital gained within the community and the personal satisfaction of working with the content, I do not financially benefit from the work of spreading this content, an issue detailed by Henry Jenkins in looking at the role of fan labour in construction of content (2006). However, the work generates analytical content of fan engagement with the content that I could capitalise on in some form. It also provides me with an opportunity to develop a skillset of value.

We have examined a thread of case studies of media of online visual communication design occurring in interactions by exchanges of media. We have seen memetic replication of variations of images, including automatic generation an online cobbling aesthetic, is generated through a rapid feedback loop where pieces are quickly and often crudely assembled and distributed online in media exchange. We have seen how these images can be used in exchange to express reaction, and how the languages of exchange develop within particular subcultures. We have also seen the potential potency of these images in distribution for political messaging and commentary, which we will expand further in the next chapter. This cobbling aesthetics appear not just on static images, but also transfer to other visual communication in an aesthetics of hyper collage, where visual formats and components converge in edited videos or videos composed in real time through interactive components. The users can exchange media within media through objects like screen overlays that contains viewer reactions on video streams. This content then flows across online platforms, and even offline to print on demand objects. Throughout tracing these threads, I have examined various dynamics by making my own digital artefacts to further examine the process, which includes rapidly producing images, spreading content both online and offline, and contributing objects to online subcultures.

⁶⁶ Spreadsheet available at <https://docs.google.com/spreadsheets/d/1ZsZCBTpKjHzdbCpKZ1No1KAdpmOd2OcgSMfC1-0a7pl/edit#gid=0>.

As illustrated through the case studies and my own activities in this environment, operating in this environment requires a particular frame of sensibility toward assembling material artefacts, exchanging artefacts with others in a loop of production and consumption, and working alongside and in coherence with others without explicitly coordinating with them. The conclusion of the present chapter lays out what makes up this frame.

Conclusion: The Frame of Visual Media Exchange

To conclude this chapter, we use the methods of design approach of constructing a processual guideline for participation to map out a frame of operating in this environment. Keeping in mind important concepts from Chapter 2: Framing and Reframing, we build the *frame of visual media exchange*. First, the laying out of this frame is constructed in the same way as a mental schema. As we noted through Piaget's concepts in Section I, a schema is a clustering of objects hanging together, with no particularly linear order and or central point of organisation. Also, according to the frame shift in the example of Stuart Walker's work in Section III of Chapter 2: Framing and Reframing, positioning a high level frame sets the space from which the mode of operation and decision making occurs. The frame shift proposed by Stuart Walker in material artefact production informed by localised and traditional production practices operates as a high level frame that guides a new kind of mode of operation and decision making that deals with the problem of the unsustainability of modern, globalised industrial production. In this regard, generating a frame of operation is an effective methodological contribution to how to participate in this space without requiring specificity at tactical or strategic specificity. As we will see through the resonance of non-linearity through this frame of operation, it is a task impossible to comprehensively achieve. In turn, this frame of operation also illustrates the foundation for the frame of using images in information warfare in this online environment. However, non-linearity means that comprehensively cataloguing stabilised tactical or strategic approaches to information warfare using images is also impossible. Nevertheless, a frame of conducting the particular approach of memetic warfare as a kind of online visual communication design can be achieved.

This is a frame of the writing readers, or perhaps the designing consumers who are simply exchanging visual communication with each other. These swarming users deal with authorship of artefacts and framing all artefacts as always incomplete and available for reframing. They work under operation of rapid and public feedback loops using memetics as indication of consensus decision making. To produce the media, they acquire technical literacies on a need to know basis, and this creation of media comes about through continual interaction with each other in symmetrical exchange of media driven by personal interests.

Authorship

- Anonymity exists in variation, including the cases where internet memes spread online with no author in any sense attached to accounts, the cases where there is a username but no clear indication of identity, and the cases with anonymous projects going by an avatar.
- Along this spectrum of anonymity, increasing absence of identity leads to the disappearance of the entire social capital risk-reward economy. The content can be created and tested with little risk of loss of social capital. New assemblages can be cobbled together and tested, including a variation on an internet meme, with little loss of social capital if the resonance of the artefact with communities is absent or off target.
- These varying levels of anonymity around the object have ramifications for how the object is framed by the audience. In an anonymous environment, the network is entirely flattened as each piece of content is valued *as is* because there is no attachment to an account, rather than framing being modified by authorship.
- In turn, no content is taken *as is*, or even granted immunity because of supposed expertise of authors.
- In anonymity, the only kind of capital demonstrated is cultural capital through the use of subculture-specific communication tropes known to the community (Nissenbaum & Shifman, 2017).
- As anonymity decreases, social capital can increase around non-human entities such as the account name. However, any additional information surrounding the

project and people attached to it, such as age, gender or location, that may impact perception of the artefact itself, is still non-existent.

- Permissionless culture of contributors: anyone can make these images and post them online with no gatekeepers. Because of ubiquitous devices, there is little cost of entry to making content.
- Consideration of authorship of the original composers, and using authorship as a boundary of what gets used in remixes is also not important. Any artefact is considered a found object regardless of author, available to be remixed by default.

Incompleteness

- Incompleteness of visual objects is a default state, with nothing ever really being considered finished as it can always be picked up by another user and reconfigured. Incompleteness of distribution of visual objects also operates. Objects can always be picked up and reposted on other platforms outside of the control or defined point of completion of the original maker.
- Cultural capital around something does not protect it from being picked up, reconfigured, and redistributed. Things with cultural capital may even become more attractive to use as the cultural capital can be exploited. This means visual identities with established associations and value generated around those associations are vulnerable to reframing attacks. We will explore this further in Chapter 4: Distributed Design Sensibility of a Memetic Warfare Campaign.
- Even with copyright in place, there is nothing technically protecting it from being copied and remixed, and copyright will be disregarded. Even a simple screenshot can be used to make copies to devices. Point of origin in many cases of the copy can be difficult to trace to a location because of the spreadability of media, or individuals. Anonymous operation makes even liability for this copyright violation difficult to enforce.
- Incompleteness of everything is fundamentally driven by a culture of reframing. Evaluation of content, state of quality of content, and measures of quality of control (Bruns 2007) are matters of framing, and objects can become useful to people under different frames. Crudely composed visual communication objects

or objects that contain errors can be framed for comedic effect.

- As the entire chain of versions of things are likely to exist somewhere through the copy machine dynamics, reversion to previous versions can be performed if an update is made to something framed as undesirable.
- As the content flows across all platforms open to variations, it is open to reframing as it lands in new niche communities.
- Expressing reaction using only the pre-defined set of reaction options on any given platform (like, favourite etc) is not a given. Users will find their own image to express their reaction from any location. To further hone their message they will quickly cobble together something to express just what they want.

Rapid and Public Feedback Loops

- Rapid feedback loops generate operation under cobbling aesthetics because of time scales. In an exchange of media here it is the timeliness rather than the perfection that matters. The artefact does not have to be perfect, it has to be at the right time, and there may not be time to make it perfect.
- Users observe what other users do and copy what is effective, taking ideas or even content through open source dynamics, and add their own iterations on top of them in these rapid exchanges.
- Distributed collaborative structures form around locations of rapid iterative development. They can rapidly scale because the content operates under open source protocols, and the feedback loops are extremely fast. It means that people can quickly join and start contributing because things can quickly be cobbled together under the principle of FIST.
- Furthermore, as the swarm is always already operating in public, its entire network is in effect a periphery. No central organising points of decision making form.
- Originality is not highly valued. This leads to producing visual styles where lack of originality is the actual central principle.

Zero Marginal Cost of Duplication

- Expressing reaction using only the pre-defined set of reaction options on any

given platform (like, favourite etc) is not a given. Users will find their own image to express their reaction from any location. To further hone their message they will quickly cobble together something to express just what they want.

- Any found object can be copied at little cost.
- Any already existing activity can be remediated at little additional cost and massively spread.
- Content is massively scalable, as there is little difference in cost to the content producer between a piece of content that generates little traction compared to a one that generates many. The cost of producing a video remains the same regardless of how many copies are made.

Non-Linearity

- Variations of memetic content have dramatically non-linear success rates. Immense long tails of content develop (Anderson 2006) where variations are tested, no resonance with audiences is found, and the image disappears from circulation. However, images that become successful can become wildly successful due to marginal costs of replication.
- In participatory culture users are continually framing and reframing, making connections between things which can be very unexpected. In terms of visual communication, new assemblages of things can appear unexpectedly. Openness of participation in communities around specific and obscure topics combined with the ability to rapidly assemble pieces into new assemblage generates possible intense hybridisation of obscure topics to create new, unexpected variations.
- The copy machine of the internet and low storage costs facilitates an environment where artefacts no matter how deep in the long tail of content can be retrieved at any time and reconfigured to find resonance.
- Zero marginal costs of replication mean the cost of producing content is the same regardless of how many times it is copied.
- Memetic swarming around vectors of semantic resonance produces non-linear time scales of production. Swarms can suddenly appear at any given time, and

rapidly scale and dissipate as the vector is stabilised and variation options subside.

Pulled Together by the Meme

- Content replicates not through explicit discussed consensus but through becoming a meme.

Skillsets

- There is an expansion of knowledge and skillset that operates through a kind of convergence.
- Technical skillsets are acquired on a need to know basis, and access to acquiring skills is achieved through ready availability to tutorial content.
- Operation occurs with basic awareness and literacy across a spectrum of things even if technical details of their workings are not known. For example, the spread of online content is dependent on platform algorithms, therefore content is produced with awareness of the presence of algorithms and prediction of how content might be handled by algorithms.
- Deployment of labour is highly uneven in division. There is a spectrum of possible contributions to projects, from doing every component of the project to making a tiny contribution to something in passing.

Personal Interests

- Participation in content making balances personal interests with available technical skill sets. Ongoing participation helps hone these skillsets, meaning visual communication design can hone the technical skills in image composition as well as expand digital skillsets through this participation.

This presents a foundation for the *frame of visual media exchange* in making artefacts of visual communication in this digital and online environment of media exchange. In the next chapter, we will look at how this frame translates into a memetic warfare campaign, a specific application of this frame of operation as a surge of users swarm around a vector of semantic resonance and perform targeted image making, a kind of community image making occurrence native to and exemplifying Marshall McLuhan's

space of global guerrilla information war with no division between military and civilian participation.

Chapter 4

Distributed Design Sensibility of a Memetic Warfare Campaign

Introduction: Design Team Swarms

The 2016 U.S. presidential election was surrounded by a vast social media campaign involving the phenomenon of political propaganda across social media on a scale unseen before. October, the final month of the elections, witnessed the #DraftOurDaughters campaign, organised and produced by anonymous members of the Internet board 4chan. Initially, ideas for the campaign began appearing on Twitter and 4chan's politically incorrect themed forum '/pol/'. From there, the campaign quickly gathered momentum across /pol/ and Reddit's 'The_Donald' subreddit. Over the following three days users swarmed to further ideate concepts, rapidly prototyping memetic media objects and deploying them to wider audiences on platforms, such as Reddit, Twitter and Facebook.

#DraftOurDaughters demonstrated memetic warfare, a kind of visual communication design campaign that appears as a surge of artefact production and distribution when a swarm of users appear around a discovered successful vector of semantic resonance and perform memetic targeted image making around this vector. In the present chapter we will explore the memetic warfare campaign frame to get a sense of participation in this new kind of visual communication design campaign activity native to Marshall McLuhan's anticipated environment of global guerrilla information war with no division between military and civilian participation (1970).

Chapter Outcomes and Method

Much like the major contribution of Chapter 3: Swarms and Sensibilities, which was a frame of operation of making artefacts of visual communication design in the environment of media exchange, the major contribution of the present chapter is the *memetic warfare campaign frame*. This frame of operation is an outcome of the *frame of visual media exchange* laid out in Chapter 3: Swarms and Sensibilities. It illustrates the

frame of conducting a memetic warfare campaign. As part of this frame, in addition to the properties for the *frame of visual media exchange*, laid out in Chapter 3: Swarms and Sensibilities, the *memetic warfare campaign frame* outlines sensibilities around campaign development in public, widespread use of open source protocol, anonymous participation, and decision making through memetics as fundamental to understanding how to participate in a memetic warfare campaign.

Constructing the *memetic warfare campaign frame* will be performed by conducting combined visual research (Noble & Bestley 2005) and ethnographic research (Muratovski 2015, p. 56). A major case study of the #DraftOurDaughters campaign, which was a part of the 2016 US election campaigning, will be conducted, to document the observed public conversations of the users as they ideate, rapidly prototype, coordinate, produce and spread content. As per the tracing of artefacts in Chapter 3: Swarms and Sensibilities, emphasis is on the processual construction of the artefacts in order to gain insight into the *memetic warfare campaign frame*, rather than analysis and critique of the content. Furthermore, the #DraftOurDaughters campaign will be examined following a conceptualisation of the way a design brief functions as a collaborative organisation mechanism. We will also look at how this frame of operation applies to other appearances of the use of internet memes as part of a larger period of conflict.

Chapter Concepts and Logic

Before entering our case study, we will first develop a sense of memetic warfare as use of internet memes in information warfare (Rodley 2016, Wiggins 2016, Giese 2015), and the memetic warfare campaign as a design activity by looking at the organisation mechanisms of the open source insurgency through which groups of people with shared incentives organise around a project. (Robb 2007). We will then examine the #DraftOurDaughters campaign, positioning ourselves in 4chan's politically incorrect themed forum /pol/ in late October 2016 in the lead up to the US election on Nov 8. We will see how 4chan users leveraged growing concern over Hillary Clinton's complex relationship with Russia (Hains 2016) to create a political media campaign to highlight these issues. A small amount of images resembling official Hillary Clinton campaign

material appeared on Twitter, and featured typical Hillary Clinton supporters enthusiastic about the possibility of being drafted into combat with Russia. These images were posted on /pol/ as prototypes of a possible memetic warfare campaign, instigating a swarm of users producing content for the project. Forum users rapidly prototyped media for the campaign, with the swarm massively scaling to produce an enormous amount of coordinated, semantically targeted content. This process is documented from inception to completion, capturing the swarm-like topology of 4chan's /pol/ forum, and the logistics of the swarm's rapid prototyping, coordination, production, and dissemination of content.

To conclude the chapter, we lay out the frame of visual communication in this space in a manner reflecting both Jean Piaget's concept of mental schema as a clustering of coherent objects hanging together, and the approach of *speculative framing* illustrated by the work of Stuart Walker, where a frame of operating capable of handling any object passing through the frame is outlined without rigid specifics in operational doctrine. This frame acts as a demonstration of the approach of the new kind of designer emerging where being a professional designer is not required for participation in making visual communication design artefacts effectively targeting the aims of the work of professional designers. We will see how this new kind of designer operates in the environment of media exchange with intent to generate perceptual shifting within a target audience through ad-hoc construction of information items. Furthermore, highlighting of this frame provides an insight into the kinds of platform affordances that facilitate a successful memetic warfare campaign.

Memetic Warfare and Distributed Design

Before going into our case study on memetic warfare, we first need to examine the relationship between memetic warfare and visual communication design. We build on the framework constructed in Chapter 3: Swarms and Sensibilities of processual and topological operation of making objects of visual communication design within the dynamics of participatory culture. Memetic warfare uses this image making in conjunction with visual communication design's objective of modification of perception and behaviour. A kind of image making in Marshall McLuhan's anticipated

environment of global guerrilla information warfare has emerged as memetic warfare where visual communication design is created and disseminated across online environments in a kind of combative communication. Memetic warfare exists as competition over narratives and ideas in an online environment (Giese 2015), and can pulse in intensification during political or military conflict in an online environment. Swarms of users appear, testing politically motivated content for semantic vectors of impact. Chris Rodley's documentation of content around the Israel-Gaza conflict (2016) and Bradley Wiggins' documentation of content around the Russia-Ukraine conflict (2016) provide examples of how users cobble together visual communication design from found objects to create images as a kind of psychological warfare (Giese 2015).

Meme Warfare

The appearance of Internet memes as a kind of information warfare in periods of political or military conflict is a growing area of research. It is grounded in media studies literature around ideas of participatory media we looked at in *Swarms and Sensibilities* around open participation (Jenkins 2006, Bruns 2010) and spreadable media objects (Jenkins, Ford & Green 2013). In this context, memetic warfare has been described as “competition over narrative, ideas, and social control in a social-media battlefield” by using social media content for semantically targeted messaging campaigns (Giese 2015, p. 70). As we have noted in the Introduction, recent case studies of the 2014 Israel-Gaza conflict by Chris Rodley (2016) and the 2014 Russia-Ukraine conflict by Bradley Wiggins (2016) document examples of memetic warfare, where Internet memes are deployed in battles of politically motivated and semantically targeted content across social media as part of a period of broader conflict. Chris Rodley's study observes political content as “single cultural units which are forwarded widely in their original form”, leading to the term “viral agitprop”, while Bradley Wiggins' study differentiates by documenting content following a unified message carried out through many variations.

These early scholarly treatments of Internet meme cultures provide the groundwork for exploring the space of memetic warfare. Accordingly, we are interested in a methods of design perspective of how this targeted and collaborative memetic content is produced.

In a 2015 paper for *Defense Strategic Communications*, Jeff Giese calls for a conceptual understanding of memetic warfare, and positioning it in a space of information warfare (p. 70):

One might think of it as a subset of ‘information operations’ tailored to social media. Information operations involve the collection and dissemination of information to establish a competitive advantage over an opponent. Memetic warfare could also be viewed as a ‘digital native’ version of psychological warfare, more commonly known as propaganda.

This space described by Giese is reflective of the examples of information warfare set out in the Introduction, and particularly the use of images as a subset of this space.

A memetic warfare campaign as a kind of visual communication design campaign occurs when a vector of informational impact, as part of this information operations process, is discovered by users on social media, and a visual communication design project appears around that vector of impact to generate a surge of material production and dissemination. In the examples by Rodley and Wiggins above, common central organising frames of content production occur and spread memetically, however the visual appearance of these artefacts is wildly varied. As we will see in the #DraftOurDaughters campaign, the vector of impact found becomes a wave of similar material reminiscent of an industrial scale coherent messaging campaign.

The Design Brief for Memetic Warfare

The design of a visual communication design campaign generally initialises with a design brief of some description (Ambrose & Harris 2015, Cooke 2006). This design brief acts as the organising mechanism for the designer (or design team) and the client into a shared objective, acting as a frame that aligns the design team and the client into operational unison (Paton & Dorst 2011). In distributed design, however, there is no explicit design brief, but a team manages to organise somehow into a very shared directionality. We will examine how in a memetic warfare campaign the project is

guided by a broad objective of a larger insurgency where users freely tinker with the use of visual communication design artefacts as part of the insurgency goals.

The Bubbling Chaos

To understand this process we can look at the concept of an open source insurgency. So far we have addressed open source mechanics in terms of the materials and in terms of open source dynamics in open source projects that usually revolve around the mechanics of people organising, accessing, and working on developing technology. Extending on this thinking, the concept of open source protocol has also been used to describe political projects. Open source insurgency is a term developed by US military and political analyst John Robb to describe how political movements operate with the mechanics of an open source project, complete with bazaar-like dynamics and distributed network features of scalability. John Robb's observations come from a background in military special operations, technology entrepreneurship, and his analysis of the dynamics of military operations in Iraq and the Middle East from 2002-2008. They are fully developed in his book *Brave New War: The Next Stage of Terrorism and the End of Globalization* (2008) and on his blog *Global Guerrillas*.

Participating in an AMA (ask me anything) session on Reddit (2016), John Robb argued that an open source insurgency revolves around the notion of a "plausible promise", which he describes as a "shared goal that is broad enough to interpret according to one's own needs." In *Brave New War*, Robb goes into detail describing how an open source insurgency revolves around a plausible promise, using examples of open source insurgencies in Iraq and the Middle East as made up of at least seventy groups from a variety of religious backgrounds and business cartels, all sharing the goal of resisting US occupation of Iraq for different reasons (p. 74). These groups operate across all fronts, from physical combat to online media (pp. 74-75). The concept of open source applies to the insurgency in the sense that the entire project of resisting the US occupation has a completely open operational protocol, meaning "the tactics, weapons, strategies, target selection, planning methods, and team dynamics are all open to community improvement" (p. 116) as long as it fits the plausible promise end goal. In Henry Mintzberg's terms, it operates as an adhocracy, as there is no fixed central

command and control of the movement. Here, as with Paul Baran's distributed network, nodes can join at any time and the network scales without any organisational reconfiguration or increased cost of configuration.

John Robb also stresses how open source insurgencies appear in many different locations to attack facets of the network making up the opposition, seemingly operating to create system disruption and cascades of failure rather than swift blows of single impact (pp. 94-110). Because of the absence of centralised command and the open nature of the project, actors can join the insurgency at will, and test any strategy, operation or tactic, therefore increasing the unpredictability of the insurgency at scale. The scalable and unpredictable nature of the insurgency can manifest itself in many forms across the entire periphery of the distributed network, from direct force engagements or attacks on important infrastructure to individuals performing terrorist acts in Western cities, as well as attacks across media under the same open source dynamics.

To illustrate how the open source insurgency uses this mechanics John Robb points to a specific example of the rapid proliferation and mutation of improvised explosive device (IED) technology across Iraq (2007, pp. 118-119). At the level of the organisation, many nodes operating autonomously means ideas and experiments within the organisation can be widely varied. This in turn generates a myriad of possible directions across the insurgency. This means that the network is less prone to stagnancy in its operations and can rapidly generate new ideas and technologies. This is the primary strength of an adhocracy (Bolman & Deal 2008, p. 86) and echoes Eric Raymond's idea that bugs in software "turn shallow pretty quickly when exposed to a thousand eager co-developers pounding on every single new release" (p. 9).

Open Source Design Team

The democratised nature of participatory media means anybody with Internet access and basic tools can create and distribute their own visual communication design around the plausible promise, essentially becoming a node of the network performing the plausible promise. The plausible promise then acts like a glue banding these media makers into a

messy leaderless swarm of autonomous or semi-autonomous units churning chaotically towards a unified goal. In network terms, an open source insurgency is a distributed network of nodes engaged in their own autonomous feedback loops as they tinker. This can happen at multiple levels, from longer term narrative arcs to rapid response to events. Digital images are powerful objects of memetic warfare because they are inexpensive to produce and remix, require little bandwidth to distribute, and are accessible on ubiquitous mobile media consumption platforms. In addition to these processual mechanics, the accepted aesthetic of online cobbling and a general reframing culture in online media making means autonomous media makers can rapidly prototype assemblages of media to test ways of using central organising ideas or stories to build association chains.

When a central organising frame of media making is found to be highly effective as working toward a plausible promise, a swarm appears around it making more media using that core centralising idea. In a sense, the design brief appears as a meme because there is no explicit coordination. John Arquilla and David Ronfeldt describe this as a kind of “sustainable pulsing” where the swarm is chaotic, attacking common targets from multiple central organising frames simultaneously, and scaling the attacks on aspects of the enemy network as required (p. 21-23). This is how the media making can become highly focused and evolve into a highly coherent campaign, which is what we will see in the #DraftOurDaughters campaign.

Trump as Open Source Insurgency

Commenting on the 2016 US presidential election, John Robb interestingly described the movement catalyzing around Donald Trump’s candidacy as an open source insurgency. The shared goal and plausible promise that the open source insurgency swarmed around was removal of the existing network of political establishment and media. There are many groups banding together around this goal, from business cartels, to alternative media organisations, to online activists interested in disrupting systems for their own entertainment. It has been argued that Donald Trump’s well documented lack of consistency and coherence on policy positions has effectively helped him operate as a

shell, open enough for many to swarm around, interpret or use, which then allows many groups to become part of the swarm (Robb 2016).

Following John Arquilla and David Ronfeldt's observations of swarms operating under sustainable pulsing, we can observe that the resulting open source insurgency creates sustainable pulse areas surrounding the nexus of political establishment, legacy media, and Democratic Party operations, creating cascades of failures. In effect, Donald Trump's campaign network has been able to disrupt the political system from the inside by benefitting from the swarming waves of memetic content attacks across social media.

This generates conditions resembling fourth generation warfare, where lines between combatants and civilians are blurred in warfare conducted across a comprehensive front combining political, economic, social, and physical combat (Lind & Thiele 2015). It exemplifies Marshall McLuhan's space of global guerrilla information war with no division between military and civilian participation (1970). Studies by Chris Rodley (2016) and Bradley Wiggins (2016) reflect this, as they point toward the propaganda component of a larger network taking part in combat across these fronts where divisions between state and non-state actors, and combatants and civilians blur in the production of image content.

Case study: #DraftOurDaughters

Equipped with the developed *frame of visual media exchange* laid out in Chapter 3: Swarms and Sensibilities along with the perspective of the appearance of online swarms as a design activity, we can trace the development of the #DraftOurDaughters campaign to construct the *memetic warfare campaign frame*. The campaign took place on 4chan's politically incorrect themed forum /pol/ in late October 2016 in the lead up to the US election on Nov 8. A small amount of images resembling official Hillary Clinton campaign material appeared on Twitter. Using the central organising frame of Hillary Clinton's complex relationship with Russia (Hains 2016), these images featured typical Hillary Clinton supporters enthusiastic about the possibility of being drafted into combat with Russia. These images were posted on /pol/ as prototypes of a possible

memetic warfare campaign instigating a swarm of users producing content for the project. Forum users rapidly prototyped media for the campaign. The swarm found coherence around the central organising frame, and massively scaled to produce an enormous amount of coordinated semantically targeted content.

4chan

4chan.org is an Internet forum in the format of an image board with a small but growing research interest. 4chan.org features 70 separate boards organised into a diverse set of topics from anime to fitness (Milner, 2013b). It has several key features distinguishing it from many other social media platforms (Knuttila 2011, Hine et al. 2017):

- Users can post in threads with a single image, just text or a combination of both. URLs can be posted.
- Users do not need a 4chan account to view 4chan content.
- There are no accounts, no post history and no direct messaging. Users can attach a name to their post, but rarely do (most users appear under the same screen name as “anonymous”). Users can also use an optional identifier known as a “tripcode” to identify themselves as the same author appearing across threads, but this is rare and often frowned upon on /pol/ as a breach of the protocol of anonymity.
- Each post has a unique ID code associated with the IP address of the user specific to each thread.
- Some boards, such as /pol/, feature country flags tied to the IP address of the user, and users have the option of overriding this flag with a selection of flags of non-state organisations and political positions.
- Users can reply directly to a post or multiple posts at a time, but there is no layered threaded conversation.
- There is no mechanism for structured feedback, no upvoting or downvoting, sharing posts, favoring posts, predefined reacts or any other methods of feedback commonly found on social media.
- Each board can hold a limited number of threads in the catalogue.

The last feature needs further detail as it contributes directly to the ephemerality of content posted on /pol/, which in turn leads to an ethos of rapid prototyping and an aesthetics of radical experimentation. As each 4chan board is limited in terms of the number of threads it can support at any one time, threads are moved to the top of the catalogue when they are created or receive new posts. This feature also serves to prevent power law distributions where a few popular threads would end up dominating the board. Instead, threads reach a post limit, slide off the catalogue and are closed, to be permanently deleted soon after. In other words, this feature generates a dynamic prioritizing new content (Hine et al. 2017). Threads on popular and active boards such as /pol/ may only survive for a few hours, given the large number of posters.

4chan has drawn the attention of researchers from a range of perspectives. It has been identified as a significant driver of Internet culture where many popular Internet memes and chunks of Internet culture originate (Hine et al. 2017). Attention to 4chan also comes from the perspective of online trolling, which is a significant part of the culture of 4chan (Phillips 2013, Milner 2013b, Massanari 2017). Milner and Massanari also trace this culture bleeding from 4chan to other social media platforms, specifically Reddit and Twitter. Most of this research looks at 4chan's /b/ board, which is a board for random posting (Phillips 2013, Nissenbaum & Shifman 2017), with research on other boards and particularly the /pol/ board still emerging (Hine et al. 2017).

4chan has been described as a "meme factory" (Herwig 2009), indicating its status as a highly creative space of content production. A 2017 study of 4chan's /pol/ board by Hine et al. found that over a two and a half month period leading up to the 2016 US election (June 30 to September 12), over 2 million images were posted. A significant amount of original content was observed, with a massive long tail distribution. Half of the images posted did not appear anywhere on 4chan outside of /pol/, 70% of these images were only posted once and 95% of images are posted no more than 5 times. The average size of images posted was 321 KB (p. 6-7).

From these general configurations, we can see the manifestation of a distributed network in the #DraftOurDaughters campaign. 4chan's simple mechanics facilitate this,

as the lack of accounts eliminates the need for an organisational structure around usernames or social capital build-up around accounts. Social capital build-up is also combated via thread deletion after a short period of inactivity. Even if a sequel thread is created, all users are assigned new user IDs in the new thread unless a tripcode is used, which is unusual (Hine et al. 2017, p.5). The mechanics of discussion on 4chan also resist centralisation of subject matter, because nesting or threading of comments is very difficult. 4chan also has a very low barrier to entry, with no account or approval needed to post. In other words, the 4chan board creates an environment of radical decentralisation, with the network of contributors distributed geographically as well as platform-wise.

The following images exemplify the sequence of events of the #DraftOurDaughters campaign. Documentation of users swarming around the project on 4chan and the bleeding of the campaign over to Reddit and Twitter evidences the topologic nature of memetic warfare. Documentation of conversations of the users captures the processual aspects of memetic warfare, through ideating, rapidly prototyping, coordinating, producing, and spreading of content by the users.

Background

The setting of the #DraftOurDaughters campaign is the 2016 US presidential election. The Draft America's Daughters Act of 2016 was passed, amending “the Military Selective Service Act to extend the registration and conscription requirements of the Selective Service System to all U.S. citizens and residents between the ages of 18 and 26. (Currently such provisions apply only to men)” (United States Congress, 2016). This would allow women to be conscripted to military service. There were also various media pieces published online developing a narrative around the concern over Hillary Clinton’s complex relationship with Russia, and speculation over the possibility of military conflict with Russia under a Hillary Clinton Presidency. These were most prominent in the campaign of the Greens candidate Jill Stein (Hains 2016).

The campaign

On 26-27 October 2016, a small amount of images of what appeared to be Hillary Clinton campaign material featuring people enthusiastic about being drafted for military service in a war with Russia appeared on Twitter. The images use typical Hillary Clinton campaign visual language, featuring the Hillary Clinton campaign branding and people from typical Hillary Clinton campaign images. The images appeared to gain a small amount of traction on Twitter.



Figure 77: Early campaign content distributed on Twitter⁶⁷

⁶⁷ Tweets archived at <http://archive.is/FWAE3>.

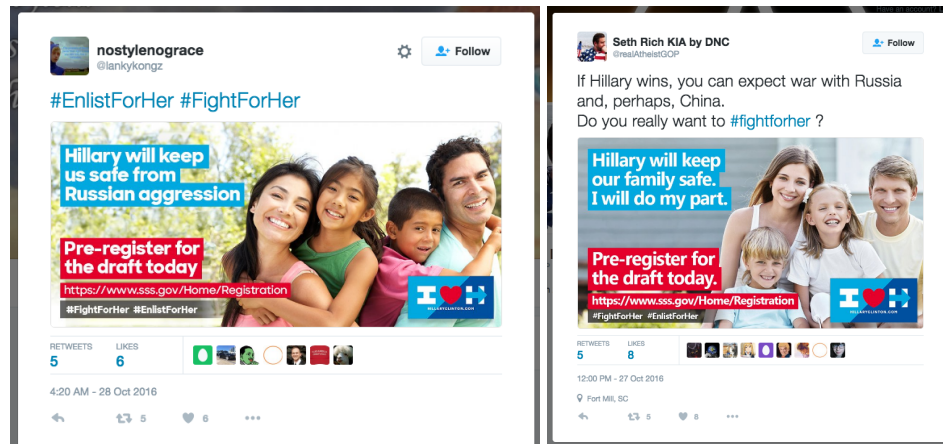


Figure 78: Further examples of early campaign content distributed on Twitter⁶⁸

4chan's /pol/ Community is Mobilized

The images were posted on 4chan's /pol/ board in two threads revealing the images were not official Hillary Clinton campaign material, but were created by people opposing Hillary Clinton who were using sockpuppet accounts. The campaign concept is reflective of the culture of trolling on 4chan. The characterisation of trolling by Ryan Milner as a mix of humour generated through antagonism and mockery (2013b) is fitting in describing the conceptual angle of the campaign that has been tested. In this case, this trolling is performed in an antagonistic relationship with the Hillary Clinton campaign, devised with the design intent of damaging the perception of the campaign through mocking its values, much to the apparent amusement of 4chan users. The traction gained by the images on Twitter was used by 4chan users as validation of the concept, identifying it as possibly useful for a memetic campaign against the Hillary Clinton campaign.

⁶⁸ Tweets archived at <http://archive.is/WNRV2> and <http://archive.is/Blbzs>.

Only Hillary is strong enough to tackle Russian aggression
Pre-register for the draft today
<https://www.sas.gov/Home/Registration>
Original Poster: Headhunter

IT'S STARTING Anonymous ID:q4LTaoWv Thu 27 Oct 21:03:59 2016 No.94816222 View Reply Original Report
Quoted By: >>94816336 >>94816409 >>94816667 >>94816819 >>94816953 >>94817118 >>94817217 >>94817782 >>94818097 >>94818298 >>94818320 >>94818414 >>94819716 >>94820126 >>94820191 >>94820332 >>94820335 >>94820697 >>94821736 >>94823098 >>94823609 >>94823873 >>94823945 >>94824048 >>94824222 >>94824370 >>94824778 >>94825243 >>94825740 >>94825782
The WW3/Draft meme is taking off boys!
These fucks will do a double take when they realize what Hillary has in store for them.
<https://twitter.com/RichCore9007/status/791717274478522368>

Anonymous ID:K6hap6OK Thu 27 Oct 2016 21:04:53 No.94816336 Report
Quoted By: >>94816827 >>94817049 >>94818215 >>94820553 >>94822041
>>94816222
Oh god these fucking idiots.
I'm ineligible for the draft and the actual mil, but holy shit that's actually really fucking bad.

Anonymous ID:oseNL2XZ Thu 27 Oct 2016 21:05:26 No.94816409 Report
Quoted By: >>94816610 >>94816688 >>94816792 >>94817217 >>94817883 >>94821056 >>94822115 >>94825328
>>94816222
This isn't a part of her campaign right? She's not literally saying vote for me I a warmonger....

Anonymous ID:nQkQuzdg Thu 27 Oct 2016 21:05:55 No.94816460 Report
Quoted By: >>94818064
it's happening

Anonymous ID:HmUT3AQ4 Thu 27 Oct 2016 21:07:06 No.94816610 Report
Quoted By: >>94818238
>>94816409
Oh britbong. You show that you are new here if you even have to ask that question.

Anonymous ID:S/4Bmauq Thu 27 Oct 2016 21:07:27 No.94816667 Report
Quoted By: >>94824079
>>94816222
some of those tags make it to obvious, you guys need to learn subtlety.

Anonymous ID:yZVDiqyQ Thu 27 Oct 2016 21:07:39 No.94816688 Report
Quoted By: >>94818365 >>94819968
>>94816409
>This isn't a part of her campaign right?
She do talk about no fly zones over Syria and standing up to Russian aggression

Figure 79: Example of an initial campaign thread on 4chan's /pol/ forum instigating the swarm around the campaign⁶⁹

⁶⁹ Full thread archived at <http://archive.is/EjgSF>.



Figure 80: Early campaign content distributed on Twitter⁷⁰

⁷⁰ Tweets archived at <http://archive.is/fpwRN>

#DraftOurDaughters Emerges

In these two threads on /pol/, the topologic nature of memetic warfare manifests itself as a clear swarm appears to explore the concept. The general campaign narrative was established, where users work to the general concept of exploiting the narrative of the Hillary Clinton campaign and the narrative and information available around concern of war with Russia under a Hillary Clinton presidency - “send your daughters to war, for equality!” (Figure 80). In both these threads, the processual dynamics of memetic warfare appear as members of the community make more images exploring the concept, openly experimenting with images, tag lines, hashtags, and general tone. The dynamics of digital and online visual communication design as laid out in Chapter 3 become visible as users swarm around the project, remixing found images to contribute to the campaign, and even remixing images produced within the campaign. Images were simultaneously deployed to Twitter as they were posted to /pol/, a pattern evident in Figure 81 and evident throughout further examples below.

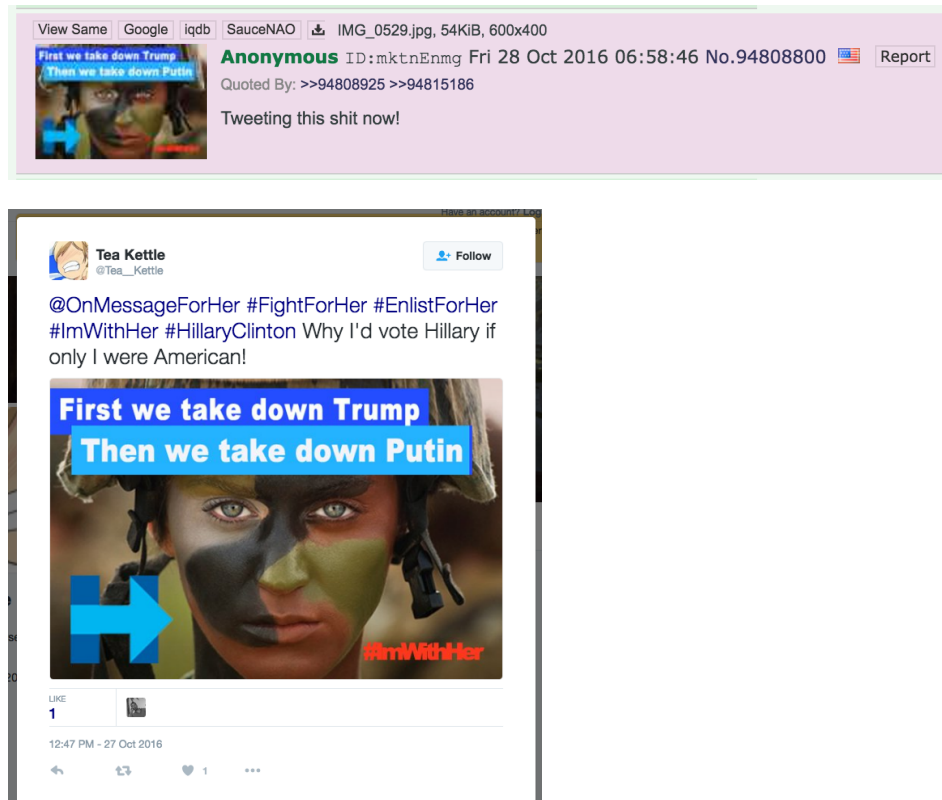


Figure 81: A /pol/ user prototyping content and deploying to Twitter⁷¹

⁷¹ Post archived at <http://archive.4plebs.org/pol/thread/94805438/#94808800>. Tweet archived at

Organising and Producing Memes

It is through these threads that the #DraftOurDaughters campaign emerged. All facets of the campaign were simultaneously developed in public, where users ideated, rapidly prototyped, and responded to content developed. A collection of screenshots capturing samples of this process is documented in the Figures below. In these early segments of the process, the intensity of the swarm's engagement with the attack vector can be seen to rise noticeably as indicated by the shortening time intervals between posts as the threads grow (See Figures 87–92). Crucially, the rising intensity of swarm engagement can be observed in terms of the shortening of the time intervals of feedback loops, where new targeted memetic content is posted, commented on, and reiterated.

The initial concept was refined to a consistent style guide of graphics and images where the Hillary Clinton campaign brand was effectively open sourced by users who extracted the graphic fonts from the Hillary Clinton campaign website (See Figure 85). The concept for the memetic warfare campaign was then further explored and refined (See Figure 86), with multiple slogans developed through a process of rapid prototyping and testing (See Figure 87). Notably, users experimented with image and slogan compositions through feedback loops, with the swarm acting as an early test ground closing the loop (See Figures 87–92). The same process was used to ideate multiple hashtags for the campaign, with #DraftOurDaughters emerging as the most popular (See Figure 93). The images were also posted to Reddit on /r/the_donald subreddit, where a similar distributed production process was instigated (Figures 95-97).

Following the swarming around these initial catalysing threads on /pol/, the swarm systematized its production process by creating discussion threads uniformly titled “/st/ stronger together”, where production of the targeted memetic objects continued (27 threads). Reminiscent of the swarm pulse attack mechanics described above, an image style guide and template could be observed to stabilise through replication in each new /st/ thread. A detailed set of instructions around fonts, colors, image style, and deployment technique developed and spread throughout the “/st/ stronger together”

<http://archive.is/q23f9>.

threads and /r/the_Donald. Interestingly, this mass production of content also mimicked industrial production of the campaign roll out in further replication of the frame of the opposition.



Figure 82: Iteration of Fig 7 image with altered slogans⁷²



Figure 83: A /pol/ user prototyping content and deploying to Twitter⁷³

⁷² Post archived at <http://archive.4plebs.org/pol/thread/94805438/#94808925>.

⁷³ Post archived at <http://archive.4plebs.org/pol/thread/94816222/#94818391>. Tweet archived at <http://archive.is/nr5SZ>.



Figure 84: A /pol/ user prototyping content and deploying to Twitter⁷⁴




Figure 85: The appearance of the Hillary Clinton campaign font posted for download⁷⁵

⁷⁴ Post archived at <http://archive.4plebs.org/pol/thread/94805438/#94815922>. Tweet archived at <http://archive.is/pxpUn>.

⁷⁵ Post archived at <http://archive.4plebs.org/pol/thread/94816222/#94817217>.



Figure 86: Various posts from the original threads ideating and developing concepts

Anonymous ID:mYrii8Rg Fri 28 Oct 2016 07:13:11 No.94810407  [Report](#)

Quoted By: >>94810496 >>94810510 >>94810806

>>94807163

Need a good slogan. Perhaps something along the lines of one of these.

- >Fight homophobia and sexism on the front lines.
- >Fight back in the war on women
- >Take the battle against sexism all the way to Putin's backyard

What do you guys think?

Anonymous ID:mYrii8Rg Fri 28 Oct 2016 07:13:11 No.94810407  [Report](#)

Quoted By: >>94810496 >>94810510 >>94810806

>>94807163

Need a good slogan. Perhaps

- >Fight homophobia and sexism
- >Fight back in the war on women
- >Take the battle against sexism

What do you guys think?


Anonymous ID:snQrFjnZ Fri 28 Oct 2016 07:16:49 No.94810806  [Report](#)

Quoted By: >>94811018 >>94811182

>>94810407

How about that

"ill fight for my country to defend my husband and children"

Anonymous ID:mYrii8Rg Fri 28 Oct 2016 07:20:20 No.94811182  [Report](#)


>>94810806

Nlce. Maybe.

I'll fight with Hillary to defend my country, husband and children against Russian sexism and homophobia.

I think it's important to include sexism and homophobia, as women actually only care about it when it indirectly benefits them.

Once they see the price, it'll be a huge red pill.

Anonymous ID:bgQxTtWx Fri 28 Oct 2016 08:19:28 No.94818136  [Report](#)


Quoted By: >>94818275 >>94818308

>>94816734

You guys should try and focus on bringing the women into the fight, rather than men

Women would rather vote trump than have to fight a war themselves. I guarantee it.

So something about equality blah blah female draft to fight a war against putin

Anonymous ID:AbWhX/1Y Fri 28 Oct 2016 08:19:47 No.94818187  [Report](#)

>>94818035

awesome, just reinforce the fact that war is IMMINENT with hillary

Figure 87: Various comments developing slogans



Figure 88: Content posted to /pol/, followed by critique and development⁷⁶

⁷⁶ Post archived at <http://archive.4plebs.org/pol/thread/94805438/#94808611>

[View Same](#)
[Google](#)
[iqdb](#)
[SauceNAO](#)
[Killary propaganda v2.png, 2MiB, 1998x990](#)



Anonymous ID: WHZjJ+re Fri 28 Oct 2016 08:21:27 No.94818391 [Report](#)
 Quoted By: >>94818554 >>94818946 >>94819074 >>94819219 >>94821870 >>94822672 >>94823414 >>94824144 >>94825740
 Tweaked version.
 Thoughts? Im not that good at coming up with slogans.

[View Same](#)
[Google](#)
[iqdb](#)
[SauceNAO](#)
[Killary propaganda v2.png, 2MiB, 1998x990](#)



Anonymous ID: WHZjJ+re Fri 28 Oct 2016 08:21:27 No.94818391 [Report](#)
 Quoted By: >>94818554 >>94818946 >>94819074 >>94819219 >>94821870 >>94822672 >>94823414 >>94824144
 Tweaked version.
 Thoughts? Im not that good at coming up with slogans.

Anonymous ID: AbWhX/1Y Fri 28 Oct 2016 08:22:46 No.94818554 [Report](#)
 Quoted By: >>94823948
 >>94818277
 WOMEN DONT KNOW THAT YOU FUCK

Anonymous ID: AbWhX/1Y Fri 28 Oct 2016 08:22:46 No.94818554 [Report](#)
 >>94818391
 it's more the engrish than the sentiment that is off
 maybe try
 "in our imminent war with russia"
 or "in the upcoming war with russia"

[View Same](#)
[Google](#)
[iqdb](#)
[SauceNAO](#)
[Killary propaganda v2.png, 2MiB, 1998x990](#)



Anonymous ID: WHZjJ+re Fri 28 Oct 2016 08:21:27 No.94818391 [Report](#)
 Quoted By: >>94818554 >>94818946 >>94819074 >>94819219 >>94821870 >>94822672 >>94823414 >>94824144 >>94825740
 Tweaked version.
 Thoughts? Im not that good at coming up with slogans.

Anonymous ID: AbWhX/1Y Fri 28 Oct 2016 08:22:46 No.94818554 [Report](#)
 Quoted By: >>94823948
 >>94818277
 WOMEN DONT KNOW THAT YOU FUCK

Anonymous ID: /JehYHqk Fri 28 Oct 2016 08:26:31 No.94818946 [Report](#)
 Quoted By: >>94822590
 >>94818391
 Try not to mention the war directly, make it seem more like the war IS coming, but whoever it was that made this image didn't want to explicitly say we were at war, yet.
 Something like "whatever the future holds, diversity is our greatest strength."

[View Same](#)
[Google](#)
[iqdb](#)
[SauceNAO](#)
[Killary propaganda v2.png, 2MiB, 1998x990](#)



Anonymous ID: WHZjJ+re Fri 28 Oct 2016 08:21:27 No.94818391 [Report](#)
 Quoted By: >>94818554 >>94818946 >>94819074 >>94819219 >>94821870 >>94822672 >>94823414 >>94824144 >>94825740
 Tweaked version.
 Thoughts? Im not that good at coming up with slogans.

Anonymous ID: AbWhX/1Y Fri 28 Oct 2016 08:22:46 No.94818554 [Report](#)
 Quoted By: >>94823948
 >>94818277
 WOMEN DONT KNOW THAT YOU FUCK

[View Same](#)
[Google](#)
[iqdb](#)
[SauceNAO](#)
[kekcap.gif, 4MiB, 700x298](#)



Anonymous ID: brlX+gJ0 Fri 28 Oct 2016 08:27:45 No.94819074 [Report](#)
 >>94818391
 >In our coming war against Russia, diversity is our greatest strength.
 Amazing

[View Same](#)
[Google](#)
[iqdb](#)
[SauceNAO](#)
[Killary propaganda v2.png, 2MiB, 1998x990](#)



Anonymous ID: WHZjJ+re Fri 28 Oct 2016 08:21:27 No.94818391 [Report](#)
 Quoted By: >>94818554 >>94818946 >>94819074 >>94819219 >>94821870 >>94822672 >>94823414 >>94824144 >>94825740
 Tweaked version.
 Thoughts? Im not that good at coming up with slogans.

Anonymous ID: bgQxTtWx Fri 28 Oct 2016 08:59:19 No.94822672 [Report](#)
 Quoted By: >>94822847 >>94823055
 >>94818391
 This is good
 This is perfect
 Don't listen to the faggot that said not to mention war directly, you should mention the war like it's a foregone conclusion with hillary.
 Don't listen to the faggot that says not to focus on women because they're not part of the draft; under hillary they WILL be part of the draft.
 Hillary means: Women are drafted for a war with russia.
 This will get liberal women going, "wait wtf hillary wants war with russia and I'LL be drafted!?!?"

Figure 89: Content is posted to /pol/, followed by a string of critique and development⁷⁷

⁷⁷ Original posts and feedback archived at <http://archive.4plebs.org/pol/thread/94816222/#94818391>.



Figure 90: A piece of content is posted to /pol/, followed by a string of critique and development⁷⁸

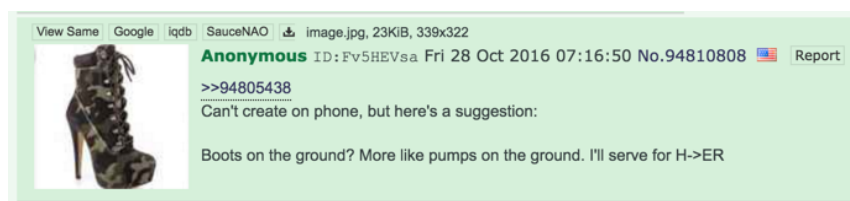


Figure 91: Ideas are proposed but are not copied or followed through⁷⁹

⁷⁸ Original posts and feedback archived at <http://archive.4plebs.org/pol/thread/94816222/#94816734>.

⁷⁹ Post archived at <http://archive.4plebs.org/pol/thread/94805438/#94810808>.

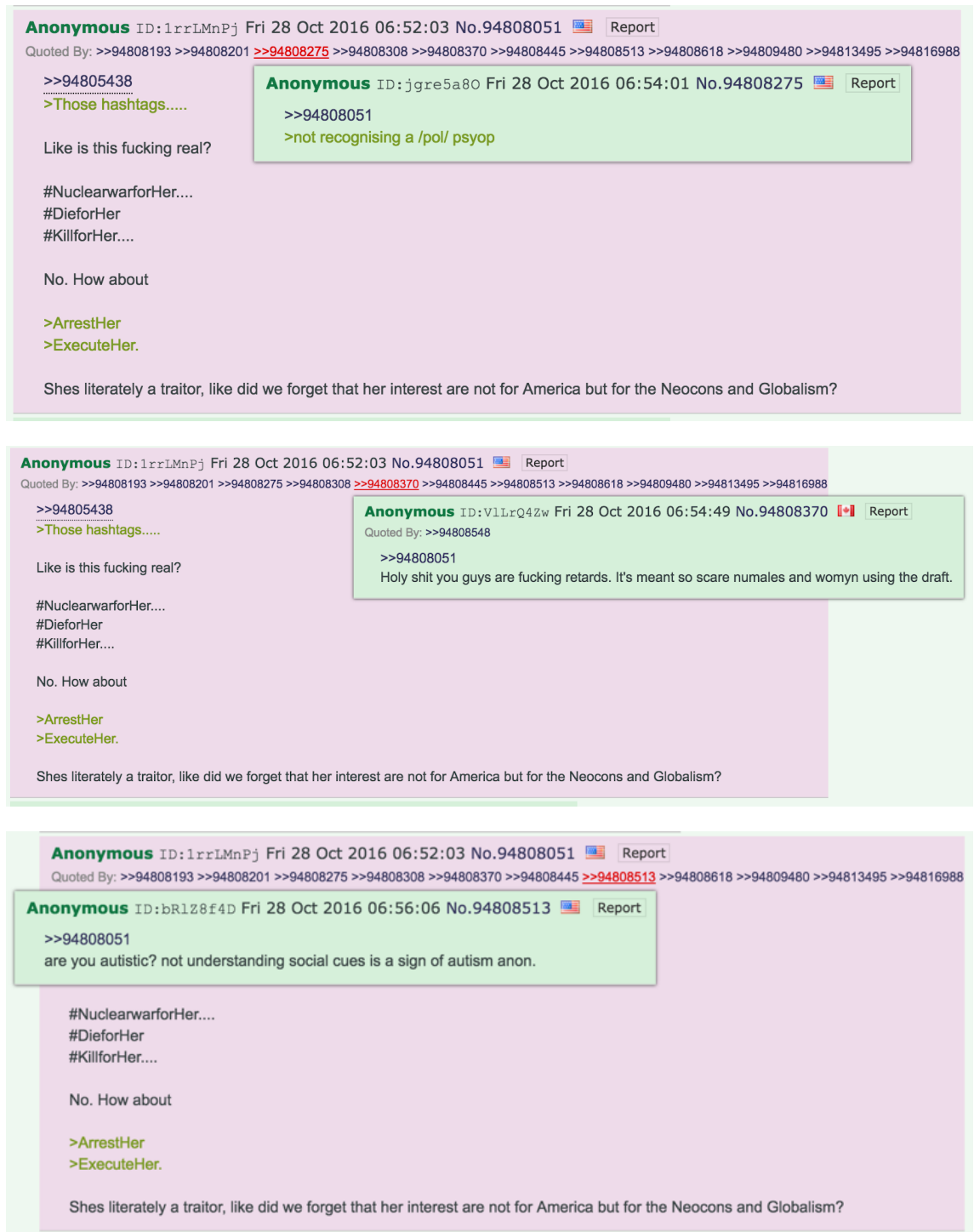


Figure 92: Negative feedback in the thread⁸⁰

⁸⁰ Post archived at <http://archive.4plebs.org/pol/thread/94805438/#94808051>.

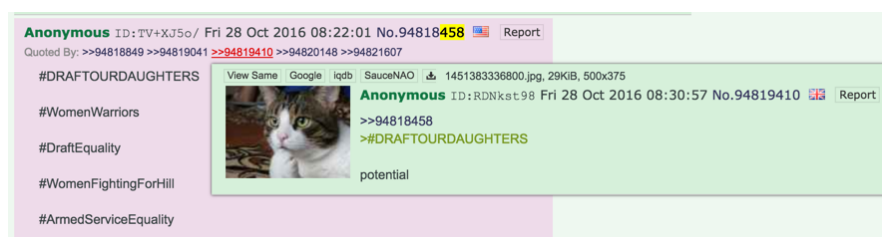


Figure 93: The initial posting of the #DraftOurDaughters hashtag followed by comments⁸¹

⁸¹ Post archived at <http://archive.4plebs.org/pol/thread/94816222/#94818458>.



Figure 94: First appearance of the #DraftOurDaughters hashtag on an image
Post archived at <http://archive.4plebs.org/pol/thread/94816222/#94819027>

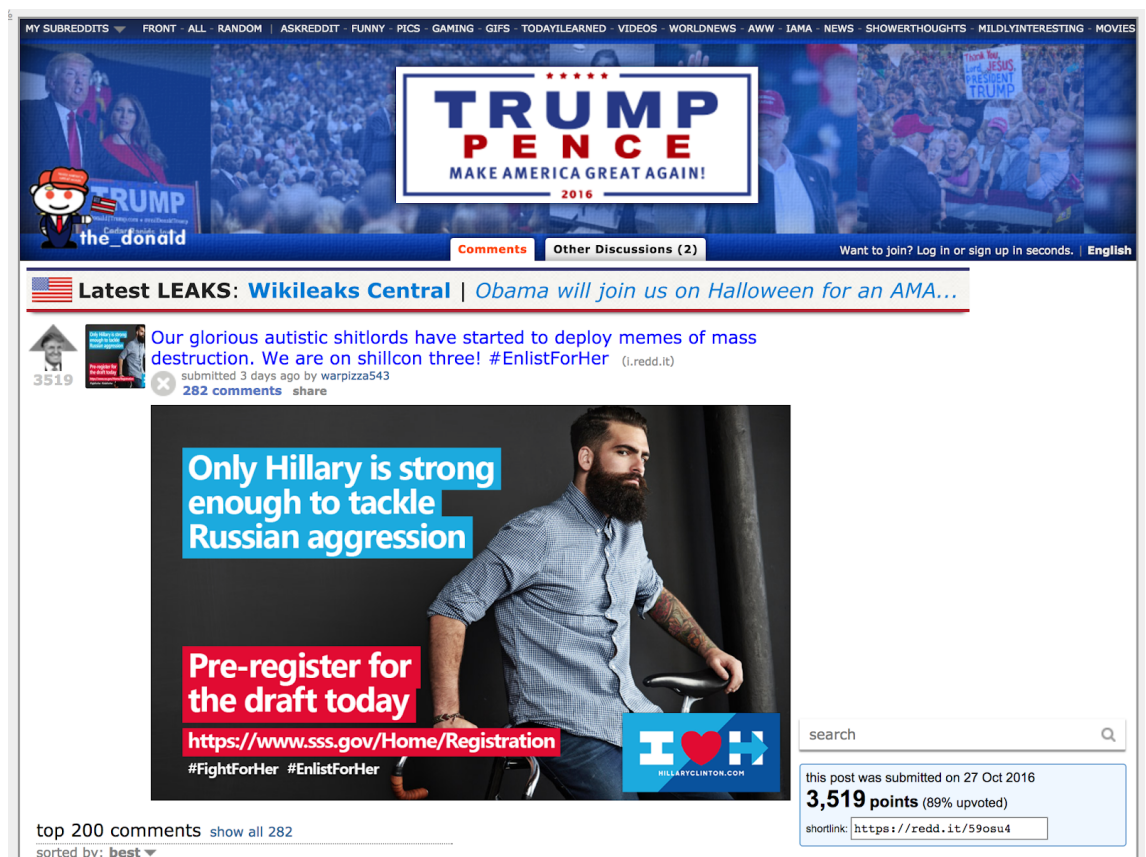


Figure 95: Thread on Reddit similar to threads on 4chan⁸²

⁸² Page archived at <http://archive.is/ZLXff>.



Figure 96: Thread on Reddit similar to threads on 4chan⁸³

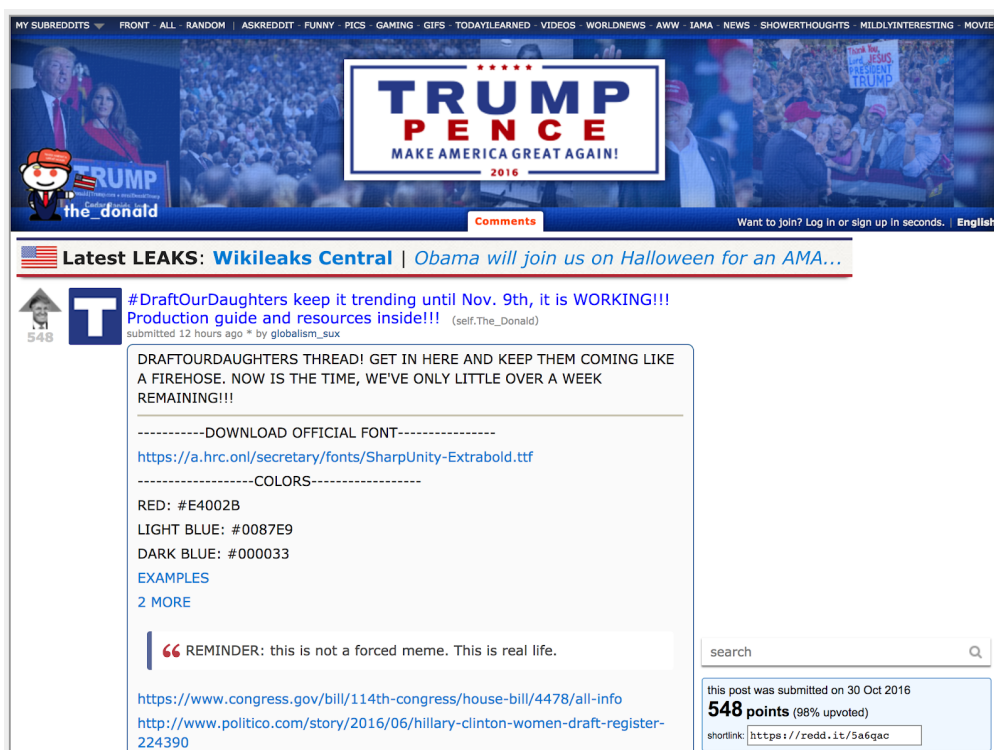


Figure 97: Thread on Reddit similar to threads on 4chan⁸⁴

⁸³ Page archived at <http://archive.is/gMi8g>.

⁸⁴ Page archived at <http://archive.is/GIK3z>.

Campaign Content Generated



Figure 98: An example of campaign content

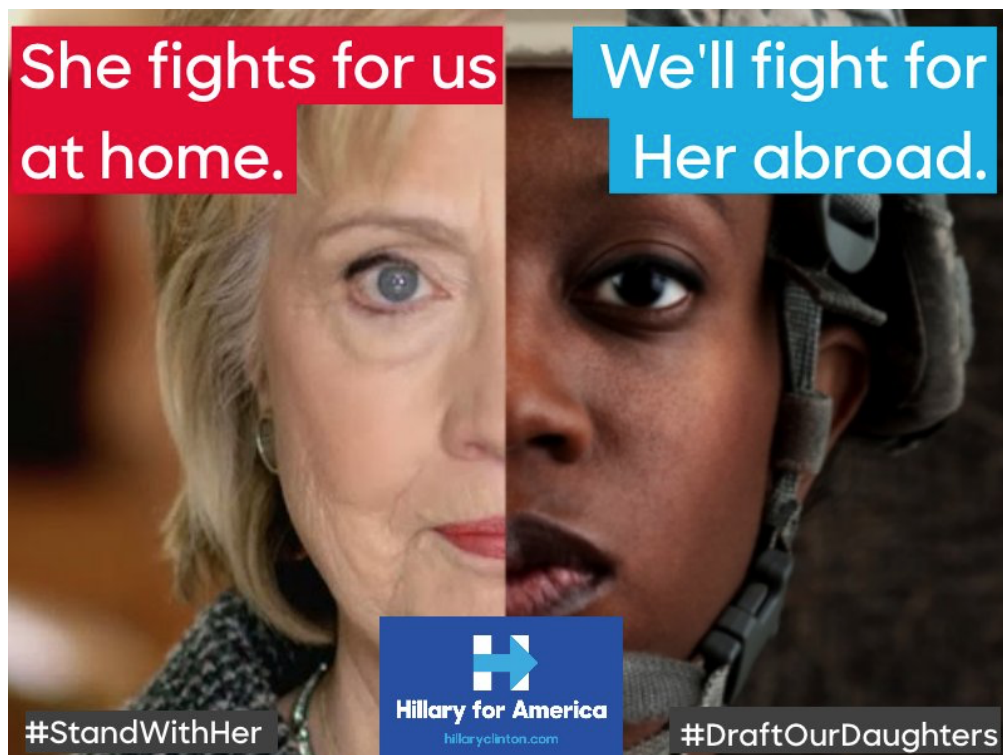


Figure 99: An example of campaign content.



Figure 100: An example of campaign content



Figure 101: An example of campaign content.



Figure 102: An example of campaign content



Figure 103: An example of campaign content

As can be observed in the images above, the fast feedback loop of the swarm led to a continuous refinement of the visual quality of the memetic warfare objects being produced, as well as to the rapid prototyping of new ideas and vectors of attack. Figures 98–103 document a sample of the images produced and deployed in the campaign. With /pol/ acting as the primary swarm space, and /r/the_Donald as its extension, Twitter became a primary distribution platform for the content, with the #DraftOurDaughters hashtag trending (See Figure 104).

The content generated confusion among legitimate Twitter users, with sockpuppet accounts boosting the perception of confusion and falsifying sentiment, therefore adding another vector to the memetic warfare campaign (See Figure 105). Interestingly, as the swarm subsided, it seemed to generate an ad hoc process of self-reflection, with users attempting to systematize the lessons learned from the process and ideating a new set of memetic attack vectors (See Figures 106 and 107).

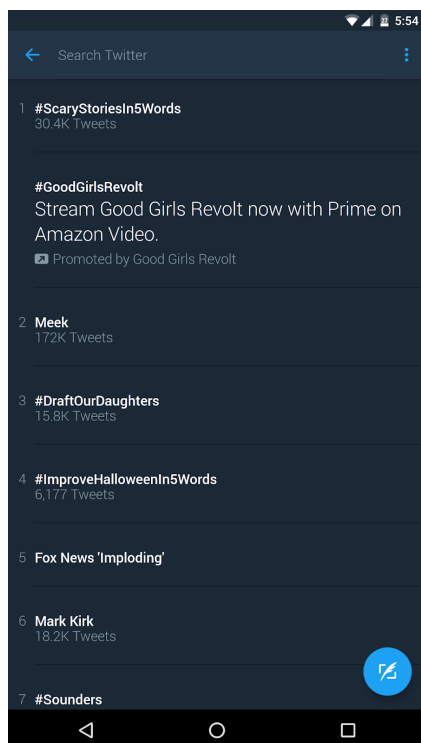


Figure 104: #DraftOurDaughters trends on Twitter⁸⁵

⁸⁵ Page archived at <http://archive.is/WgLsv>.



Figure 105: Sample of reactions from Twitter users to #DraftOurDaughters

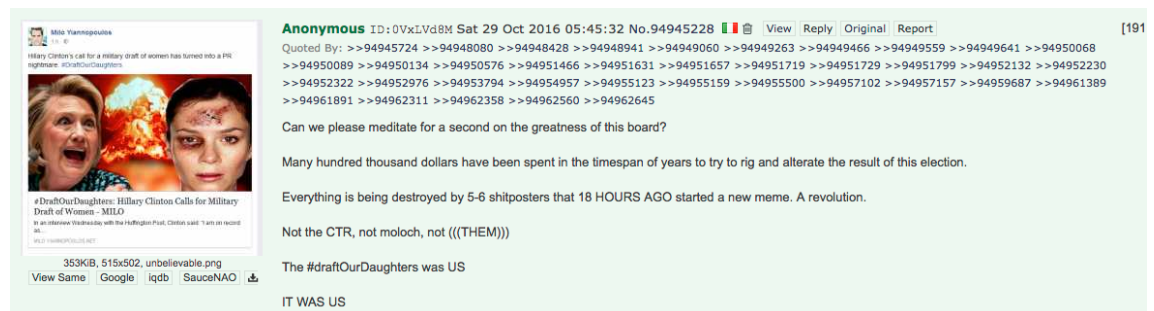


Figure 106: 4chan users reflecting on the success of the campaign⁸⁶

⁸⁶ Page archived at <http://archive.4plebs.org/pol/thread/94945228/>.



Figure 107: 4chan user identifying as a graphic designer reflecting on the success of the campaign⁸⁷

Through the case study of draft our daughters, we can see the deployment of the aesthetics of online media production to the specific intent of a targeted campaign highlighting logical weaknesses in Hillary Clinton's campaign themes. The swarm was successful in identifying a highly successful vector of attack through the continual crafting of meme content attacking the Clinton campaign and then using mass production to bombard Twitter with the general message while still employing mass customisation for specifically targeted content. The variation in the content could only be done by a centralised team at great cost.

Next, to conclude this chapter we will look at the frame of operation in this memetic warfare campaign, derived from the frame of operating as outlined in Chapter 3:

⁸⁷ Page archived at <http://archive.is/laJnX>.

Swarms and Sensibilities. We will see how in addition to the frame of online media making, memetic warfare is conducted with an additional layer operation allowing the swarm to function as a design team, translating their agency of undermining the Hillary Clinton campaign by creating messaging with specific semantic targeting.

Conclusion: The Memetic Warfare Campaign Frame

Similar to Chapter 3: Swarms and Sensibilities, the *frame of visual media exchange* was revealed through tracing the case study. The *memetic warfare campaign frame* is a modification of the frame of operating in the environment of online visual communication, built on the core principles of the *frame of visual media exchange*. It highlights particular sensibilities around campaign development in public, widespread use of open source protocol, anonymous participation, and decision making through memetics that afford collaborative operation around discovered vectors of semantic resonance such as those witnessed in #DraftOurDaughters.

Importantly, this framework can be successfully mapped to the findings of previous studies of memetic warfare, notably Chris Rodley's documentation of content around the Israel-Gaza conflict (2016) and Bradley Wiggins' documentation of content around the Russia-Ukraine conflict (2016). In addition, highlighting of this frame provides an insight into the kinds of platform affordances that facilitate a successful memetic warfare campaign.

Public Operations

The operation of the design team is entirely public in the #DraftOurDaughters case study.

- In the sense of an open source insurgency, any individual or group interested in attacking the Hillary Clinton campaign can contribute in any capacity, from starting the project to contributing a single wording suggestion or image.
- The lack of accounts on the 4chan platform means the campaign can be visible to everyone and it is easy to contribute content to 4chan. This allows effortless scaling of the swarming around the project, with groups distributed across a wide variety of other platforms able to observe, orient, decide, and act directly

based on ideas generated on /pol/. All users can see what is deployed by all other users, exposing the feedback loops of individual nodes to the rest of the network.

- The discovery of successful attack vectors is always already communal and immediately replicated across the swarm surface. When a successful attack vector is discovered, users can swarm around it and operate under open source production to build on top of it. The visibility of this swarming and building indicates to all users that a vector with high potential for resonance has been discovered, which then leads to rapid scaling up of the work on that vector.

This dynamic can be observed in other cases of memetic warfare, suggesting that any platform operating primarily as a space for public conversation is a possible facilitator of the swarming dynamic key to a memetic warfare campaign. 4chan, Twitter, and Reddit are key examples as evidenced by previous studies on swarming and campaign content creation. In Chris Rodley's documentation of content around the Israel-Gaza conflict, swarms of content creators are observed gathering around the public conversation about the conflict on Twitter, injecting content directly into conversation. Wiggins' documentation of content around the Russia-Ukraine conflict also focuses on Twitter, which is used to inject content into the public conversation. In the case of Wiggins' documentation, the content originally appeared on the "Russian internet" (p. 5) and was deployed on Twitter, reaching wider audiences in a process similar to #DraftOurDaughters. A similar occurrence of users swarming around a public conversation is found in Massanari's 2017 study of how the Reddit platform facilitated users swarming around a social issue and creating campaign content.

Open Source

Much like our examples of internet memes in Chapter 4, #DraftOurDaughters campaign material is assembled entirely of found objects. An open source protocol of memetic content production builds on the processual dynamic and is crucial in terms of the iterative nature of the creative process of a meme warfare campaign.

#DraftOurDaughters is a key example of the importance of this component of the framework.

- The swarming design team treats all content as open source. It picked up any

existing content with little regard for notions of ownership (such as the Hillary Clinton campaign's visual language, found images, etc.), cobbled together new combinations, reconfigured, and remixed to explore new semantic vectors of attack. Even contributions by other users can be picked up and iterated.

- The swarm is operating in the adhocracy conditions identified by Bolman and Deal (p. 86), where a flourishing of creativity and new directions is made possible by many nodes operating outside of a centralised coordinated OODA loop. Combined with the speed of digital image production, simultaneous exploration of many information and semiotic messaging attack vectors is happening in a fully scalable capacity.

The dynamic of continual remix through viral, “spreadable” media seen in Jenkins, Ford, and Green (2013), is used in memetic warfare, weaponised with a design approach where content is created with a particular semantic attack vector in mind. The occurrence of fast feedback loops and rapid iteration visible in #DraftOurDaughters can be observed in content documented by both Rodley and Wiggins, where content around each situation documented is typically constructed with remixed media. In both case studies digital images appear to be treated by users as essentially open source. There are documented examples of content generated through remixing media from popular culture, news sources, or other user-generated content and with little regard for notions of content ownership. This leads to content with powerful semiotic messaging attack vectors, as well-known images from popular culture are remixed with targeted political messaging and inserted into public conversations.

Anonymous

Anonymity is a fundamental component of a successful memetic warfare campaign because it allows rapid scaling up of the swarm, as well as fast feedback loops, thus, building on the topologic and processual dynamics. As we observed in the #DraftOurDaughters case study, the default state of 4chan as an anonymous platform re-enforces the distributed topologic dynamic through preventing centralisation mechanisms from appearing. Processually, anonymity creates a content production environment facilitating experimentation and fast feedback loops:

- Anonymity blurs lines between combatants and civilians in the information war, exemplifying conditions of fourth generation warfare (Lind & Thiele, 2015). We do not know who started or contributed to #DraftOurDaughters. It could be Donald Trump’s campaign team, an advertising agency, random groups of people, lone wolf media producers, or all of the above. This demonstrates the importance of John Robb’s observation of the “plausible promise” dynamics in combination with the mechanism for effortless network scaling as a key feature to the swarm.
- On /pol/ the swarm is unable to recognize any sort of social capital due to the absence of identity. However, it recognizes the absence of cultural capital through the inability of a user to understand forum-specific communication tropes (such users are usually told to “lurk more”).
- The mechanics of thread deletion mean that each new thread in the “/st/ stronger together” series essentially reboots conversation around the campaign, and all users participating receive new user IDs, wiping any social capital that may have been generated through content contribution in a specific thread.

Swarms around memetic warfare campaigns typically include users with obfuscated identity. In Rodley’s study, content on both sides of the Israel-Gaza conflict was contributed by a disparate patchwork of users, some identifiable as state and non-state groups, and some using anonymous Twitter accounts. This does not account for possible false identity accounts used to deploy content or generate false community sentiment, as seen in #DraftOurDaughters. Similarly, content documented in Wiggins’ study has no indicator of authorship, meaning content could be created by any state or non-state entity. Absent in both studies is observable hierarchy or centralized decision making in content production. The closest dynamic is found in Wiggins’ study, where the content observed is from a Twitter account aggregating content from Russian social media and deploying on Twitter. Anonymity is also a key dynamic to Massanari’s 2017 documentation of swarming on Reddit, where users operate anonymously for the most part, as user accounts are typically pseudonyms (p. 335).

Runs on Memetics

Memetic warfare leverages the sensibility of memetics and virality to generate a media campaign where the end result of content appears highly coordinated despite being driven by the distributed topology of the chaotically organised underlying swarm of users:

- Copying rather than coordinated decision making drives all facets of the campaign, from production of content to strategies of deployment to wider audiences, particularly on Twitter.
- Coordination of the swarm appears through adoption of a similar frame across the swarm.
- 4chan's culture of trolling (Phillips 2013, Milner 2013b, Massanari, 2017) means that even discussion approving or dismissing possible directions cannot be taken at face value. Actions copied multiple times are the only indicator of adoption.
- True consensus decision making is indicated through the stabilization of content. In the case of #DraftOurDaughters early campaign material was varied in terms of visual style, language, and concept. However, as successful angles were discovered and copied, the consistency evolved into a template.
- In turn, stabilization is viewed by the 4chan community as a property to be exploited. This is typical of Arquilla and Ronfeldt recognizing swarms as particularly strong in disrupting coordinated and well-resourced stable systems. In the case of #DraftOurDaughters the swarm successfully uses the Hillary Clinton campaign visual language (a visual signifier of coordination and resource) as a weakness.
- Thread deletion and creation of sequel threads test the adoption of content, as content must regain momentum at the beginning of each new thread. Only the most well-adopted content messaging vectors survive creation of a new thread.
- The end point of a campaign is found when the memetic intensity of a swarm begins to subside as sequel threads fail to regain the momentum of previous threads. In any given ongoing memetic warfare campaign particular semantic

tropes emerge and become memetic as the swarm copies what it finds to be a successful semantic attack vector.

In Wiggins' content use of images of Russian president Vladimir Putin become widespread as the swarms, either favoring Ukraine or favoring Russia, gravitate towards using him as a message container and figure to remix with popular culture (pp. 19-20). Rodley's study finds that memetic content around the Israel-Gaza conflict developed as the swarms adopted remix of popular culture images as a key tactic of resonance generation, with infographics also emerging as content format frequently deployed. While #DraftOurDaughters differs from these studies in the sense that content is produced by only one side of the conflict, content generation by the swarm through copying the actions of others rather than coordinated, doctrine-driven consensus decision making is the key driver of content development and refinement.

Chapter 5

Conclusion

Introduction

The #DraftOurDaughters campaign of the 2016 US Presidential election is not an isolated incident of memetic warfare; similar occurrences appear in competition over narrative and perception of commercial brands. These recurrences of the dynamics of the #DraftOurDaughters campaign, which was documented in the previous chapter, demonstrate that the way #DraftOurDaughters operated is now becoming part of the fabric of the digital and online visual communications space. One example of this is the Starbucks campaign conducted by 4chan users in 2018 which demonstrates the recurrence of the #DraftOurDaughters campaign dynamics and highlights the impact that these campaigns can have. The instigation for this campaign came in April 2018 when Starbucks encountered public relations problems after an incident in a Starbucks store where two men were arrested for trespassing in what developed into accusations of racial profiling by Starbucks staff (Segarra 2018). A public relations problem for Starbucks quickly developed (Starbucks 2018a) with Starbucks responding by implementing diversity training for staff (Barnes 2018) and promoting this implementation through public messaging channels to help counter negative impact to the Starbucks brand (Starbucks 2018b).

As this public relations problem for Starbucks was developing, anonymous members of the internet forum 4chan gathered on 4chan's /pol/ (politically incorrect) forum in a manner similar to previous seen in the #DraftOurDaughters campaign to ideate ways to deepen Starbucks' problem and cause further damage to the Starbucks brand. Users began to swarm around the project, ideating various false campaign themes designed to exacerbate a perception problem by careful exploitation of the frame of legitimate messaging of the target. A campaign was generated and deployed to wider audiences on Twitter and Facebook, directly mirroring the processual and topological dynamics of the #DraftOurDaughters campaign undertaken in 2016. This new campaign convincingly

used the Starbucks brand assets, visual language, and voice to promote Starbucks implementing new in-store policies such as homeless people being allowed to be in the store without making a purchase and free coffee for people of colour, as illustrated in Figure 108 below:



Figure 108: Content from a memetic warfare campaign targeting Starbucks in 2018

The public relations issue exacerbated and extended by this campaign resulted in a rising cost of delivering diversity training to staff (Meyer 2018), causing rescheduling of planned marketing campaigns and subsequently pushing share prices down (Garcia 2018), and lingering public relations damage of the event as news stories still appearing in December 2018 of accusations of racial profiling at Starbucks stores (Johnson 2018). This example shows that any brand is now subject to these sorts of campaigns and that trust in any kind of content appearing on the internet can not be afforded just on visual appearances alone.

As we see through the Starbucks campaign and the same dynamics of artefact production examined throughout this thesis, the environment of online visual

communication design does not follow an industrial production paradigm of requiring permission to access the project and artefacts, a chain of command of production, and a clarity in distinction between producer and consumer. Online visual communication design projects operate chaotically, use whatever found artefacts are determined as useful to achieve the objective, and are open for anybody to participate in. This shift in the practice becoming much more open and participatory than before has similarities to the disruption faced by journalists. Journalism was first to be disrupted by a shift to digital and online, and visual communication design is starting to follow with similar dynamics. Could we use these shifts as insight into what a shift toward a broader digital and online material culture might look like as more of material culture and the surrounding industries become digital and online? In this concluding chapter will use the findings of the nature of online visual communication design to sketch out what general *frame of online material culture* might emerge.

The New Environment and Frame of Visual Communication Design

The environment of symmetrical media exchange and the dynamics of agency translation fundamental to making media means that anyone who makes an internet meme on their phone and uploads it to social media is a visual communication designer using images to influence at a distance. Visual communication design as translation of agency into durable visual objects covers the art poster and a media environment of symmetrical media exchange where anyone who makes an internet meme on their phone and uploads it to social media is performing visual communication design. This represents a reframing of the figure of the designer to somebody operating in an environment of media exchange populated by professional and non-professional designers intending to generate perceptual shifting within a target audience through ad-hoc construction of information items and cohering around projects through emergent shared directionality. The transitionary period of reframing happens as the open access exchanges of media currently appear in our information environment. This is the operation of images in the environment of global guerrilla information warfare, anticipated by Marshall McLuhan, where images influence at a distance and at scale and there are no distinctions between military and civilian combatants.

The shift to participatory media has dramatically changed media industries by creating new opportunities for media makers as well as corroding business practices of established industries. For example, the shift to many-to-many media has greatly disrupted journalism as documented in work by media researchers such as Jay Rosen and Axel Bruns. In 2005, Jay Rosen wrote that the biggest story of journalism was that symmetrical interaction in media via digital and online technology has generated a “tsunami” of content appearing across the internet on blogs and web forums. This created for the profession of journalism “the biggest humanitarian disaster ever in the lifetimes of most career journalists” (2005). Given the democratisation of image making and distribution capacity through ubiquitous devices, the profession of visual communication design may face similar disruption. In the emergence of this kind of online exchange of visual communication design artefacts, many of the same concepts that have been prominent in this discussion around journalism are evident, such as new ways of collaborating between users in this many-to-many environment and the disappearance of the distinction between producers and consumers.

The frame of operation in this environment moves away from the industrial paradigm of production of the 20th century to new models of participatory media and digitally native ways of working with greatly accelerated feedback loops. In this environment there is no distinction between producers and consumers or designers and non-designers; there are only interactions of symmetrical media exchange between participants. All media converging into this environment could be a possible piece to be used in assembling an artefact of visual communication design, as facilitated by a technical environment where duplication of all media in the environment is the natural state of play. Duplicates of existing and newly created media pieces tangle in a flow of rapid reframing and reconfiguring exchanges, generating flows of copies in slight variation, whether that be copies of media artefacts or frames constructing the media. Collaboration is ad-hoc, and swarms appear around projects, and scale as required, with anonymous participants cohering through memetic consensus. These new ways of working produce new aesthetics, new communities, and new ways of conducting a kind of memetic information warfare via ubiquitous connected devices. As material culture becomes increasingly digital and online, this way of working provides insight into new material

artefact production process and the frame of working with material culture in this environment.

Modelling this process, we found that the frame problem generates the processual driving of interactions in symmetrical media exchange. As in participatory media there are no distinctions between producers and consumers, the concepts of framing documented in professional journalism apply broadly. The malleability of perceptual schema through exposure to media creates an environment of ongoing perceptual change. It dissolves the distinctions between designers and non-designers as all participants can make media aimed at generating schematic change. In this environment, we found how central organising frames used to make media flow memetically to other media makers as schema are modified through exposure to media where the frame effect and positioning occur. This, in turn, leads to media making in response using central organising frames produced by the realigned schema.

The heterogeneous complexity of the construction of media are often hidden by perception, although, as we have seen, this framing is necessary for humans to cognitively function, just like all information processing entities. By examining the logistics of agency translation through actor-network theory we have seen how actor-network theory is a useful mental corrective for frame shifting within the bounds of human cognition, heating and cooling components as we shift frames and find new points of salience. We saw how *pragmatic framing* and *speculative framing* appear as two distinctly different frame shifts, highlighting how frame shifting can be performed in a manner specific to the circumstance, or how we can frame shift to reimagine any given artefact of material culture. Importantly, this frame shifting highlighted frames of operation as central to material artefact generation, with shifting high level frames of operation providing a useful perspective on generating methodologies of working in environments as frames set modes of operation that drive all decision making.

Having established modelling of the environment of media exchange and frames of operation as methodological tools, in Chapter 3 we moved into online visual communication to develop a frame of operation for making images in the environment

of interactions of symmetrical media exchange between participants, the *frame of visual media exchange*. Examining a set of case studies using a conceptual toolkit of participatory media facilitating visual communication, we developed the *frame of visual media exchange*. We saw how within this frame, authorship operates across a spectrum of anonymity and artefacts exist in perpetual incompleteness. This means after a participant decides they have finished a work, other users can always pick up that work and continue working on it. Images in particular are fast, inexpensive, simple, and tiny because of the low bandwidth required to make, distribute, and view them. This facilitates proliferation of memetic replication of variations of images, with many copies and slight variation producing an online cobbling aesthetic as participants engage in rapid production and exchange of image content. It is not just components created through citizen journalists that are available to be picked up and used by anybody. As we have seen, the technology of the internet provides an environment where any media on it is essentially open source, fuelling media convergence and the spread of pieces available for assemblage, whether copyright holders agree to the use of their content or not. This cobbling aesthetic transfers to moving image, where an aesthetic of hyper collage appears in edited videos or videos composed in real time through interactive components where users can exchange media within media through objects like screen overlays containing viewer reactions on video streams.

We saw how participation in this media making environment is often driven by personal interests where people are pulled together by shared, niche interests and memetic ideas. Participation is entirely open to anyone willing to contribute and often formally defined roles and hierarchies are non-existent. We have seen how these groups of collaborative networks organised under distributed network topology form shared directionality. Rapid and public feedback loops appear as swarms of participants gather around these interests and memes, make media, and often merge skillsets to innovate vectors of impact through trial and error that is visible across the entire network of participants. These conditions of media making and collaboration produce immense non-linearity, with unexpected outcomes of media production, uneven distribution of successful media produced, and swarming around projects occurring on time scales as required.

With this frame of image making in online visual communication in place, we moved to an examination of a case study of memetic warfare, a new kind of visual communication design campaign that appears as users swarm around discovered vectors of impact, and production of visual material surges. We traced the development of the #DraftOurDaughters memetic warfare campaign that appeared during the 2016 US Presidential election. We saw how anonymous members of 4chan's politically incorrect forum /pol/ used legitimate news stories and commentary concerned with Hillary Clinton's complex relationship with Russia and her campaign's own frame to generate campaign material from which it appeared Hillary Clinton would be drafting women for front line combat in military conflict with Russia. We also saw how a swarm appeared around images tested on Twitter, with a swarm of participants massively scaling across /pol/ and Reddit's The_Donald subreddit to produce an enormous amount of coordinated, semiotically targeted content. This development was characterised by real time deployment of the campaign in public, the widespread use of open source protocol, anonymous participants, and decision making through memetics. Importantly, we saw how memetic warfare campaigning out-maneuvered and out-performed a heavily resourced campaign of an industrial production paradigm.

Further direction

As we moved through, we noted points of further development. Here we will examine some of these issues to present a general landscape of issues relevant to this new environment of online visual communication that houses the use of images in online information warfare. We will look at other processual components of perception and framing that can be placed in the loop developed in Chapter 2. We will also look at ways the *frame of visual media exchange*, which was developed in Chapter 3, could be further developed, as well as possible further development of the *memetic warfare campaign frame*, developed in Chapter 4, and subsequent issues presented by the practice of memetic warfare.

Within the literature on media framing in journalism there is a space of research based on analysis of the performance of framing. The field is cobbled together from backgrounds in communications and media, and cognitive psychology. The main

methodology of research is looking at existing media, analysing the content and suggesting the frame constructed by the media, with a proliferation of studies existing. For example, Matthes and Kohring (2009) look at the framing of biotechnology in the *New York Times* over a time period and track the framing effect of language use and the positioning of other objects associated with the topic over this time period as the Overton window of the topic shifts. This space is closely linked to critique of artefacts. However it differs by honing into the processual component of media construction. Frame analysis presents an interesting concept to map as a *processual moment* of perception shaping, as well as a component of the *frame of visual media exchange* as *frame literacy*. For example, the #DraftOurDaughters case study demonstrates both of these by the anonymous operators of the campaign. The campaign was developed by assessing the frame of the Hillary Clinton campaign themes and the frame of her supporters and then constructing media using that frame with a subtle push of the Overton window of the frame of the campaign too far for the frame of supporters, and in turn bringing into question core themes of the campaign. This kind of subtle undermining is also behind the example of the Starbucks campaign. The extent to which users continuously participate in framing helps generate a sense of translation of agency in media making as a core part of the literacy.

This component of the *frame of visual media exchange* of frame literacy may then produce another component of *distrust*. From the perspective of trust, these campaigns highlight immense problems of content authenticity and provenance in this digital and online environment. Users are able to generate false campaigns for brands and organisations by understanding the opposition frame, mimicking voice, and even replicating the appearance of an industrial campaign roll-out while using exact copies of visual assets. To many social media users, these false messaging campaigns are indistinguishable from legitimate campaigns and designed to exacerbate a perceptual problem for the target.

This opportunity also extends to look at the past of guerrilla or activist propaganda, or artefacts of visual communication design appearing out of fan cultures such as fanzines. The processual and topological perspectives of producing these artefacts would appear

to be similar, as the artefacts are cobbled together out of available pieces of found and self-generated objects and with a distributed network topology of participants. However, digital and online media negates issues of accessibility of media production. Previously, these dynamics were actually at play, but may not have been as visible. The *frame of visual media exchange* may be used to processually understand dynamics of these practices, for example applying it to activist poster making and leaflet production. This research could in turn help further develop the *frame of visual media exchange* in the online space. Also, given we have seen how in this digital and online environment artefacts can easily flow from online to offline, production of these kinds of offline communication materials may be reinvigorated through supplementation with online content and digital and online production practices.

We also found that modelling of methods of design in visual communication design did not suit the environment of symmetrical media making and basic modelling of the process of produsage, as there seemed to be a foundational misalignment of frames of operation. Methods of design have only ever appeared within modern industrial culture, seemingly a distinct frame of operation. Perhaps the *frame of visual media exchange* could be developed further by examining production of material artefacts within a non-industrial culture. For example, the work of David Pye contrasts pre-industrial production and industrial production paradigms using examples of craft (1968), which could be used to further develop the frame. Katie Bunnell (2004) frames digital artistic practice as a new form of craft, which we will explore further in the final part of this conclusion mapping the possible frame of operation as material culture shifts to digital and online.

Collective intelligence is also an issue of design, as we have seen how frame alignment generates the swarm effect. The expansion of frame analysis as a processual component could also benefit from collective intelligence, as collective frame analysis generates possibilities of design. This is a form of the distributed feedback loops, where distributed frame analysis operating under anonymity generates risk-free analysis of artefact frames that can be contributed for possible exploitation in memetic warfare attacks. This kind of distributed anonymous frame analysis is actually at the heart of

4chan's 'Politically incorrect' forum, which may explain why it is a location of memetic warfare campaign generation.

The #DraftOurDaughters campaign also reveals tactics of information dissemination that move beyond typical definitions of visual communication design. Instead, we have seen that they revolve around the use of persuasion to achieve the objective of modification of behaviour of the audience. In information warfare, behavioural modification could be achieved by many uses of information designed to generate behavioural change of confusion or distraction. The types of information used could be misinformation or disinformation. While framing is a way of obscuring through selection and salience, the explicit use of these approaches is not a prominent discussion in visual communication design despite being used by participants in the #DraftOurDaughters campaign. The frame of the media inevitably spreads because the media made in response must exist in coherence to the campaign media. Therefore, the frame must be adopted and used in some capacity, even if it is oppositional.

The Frame of Online Material Culture

The conclusion of both Chapters 3 and 4 focused on developing frames of operation. As more of material culture becomes both digital and online, what components of these two frames of operation might apply more broadly to digital and online material culture? Here we lay out the final frame of this thesis, the *frame of online material culture*. Much like previous frames of operation illustrated, this frame of operation is presented as a sensibility towards artefacts and decision making in the environment of media exchange. However this frame is more anticipatory than the previous ones. It presents a broad sketching out of a working position for an emergent frame given the themes of frames of operation in this digital and online environment appearing so far.

Interestingly, the trajectories illustrated by these frames and the emerging frame of material culture may shift concepts of design mapped in the Introduction chapter of this thesis. This developed *frame of online material culture* suggests that the concepts of design appear to be a *frame of design*, containing the decision making logic of the family of design research, and the fields of design. As fields of design increasingly

become digital and online, how much of this emerging frame will flow from the bottom up and subsequently cause a shift in the frame of design?

Frame of Mass Customisation

- Digital and online technology users can customise products by using digital technologies, which allow users to craft their own modifications of things and embed craft into culture (Bunneil 2004).
- Any material artefact existing as digital files can be copied, reconfigured, and redistributed at low cost.
- All material culture should be considered in a state of incompleteness and can be customised.
- Delivery of content is anticipated to be customisable, as anything that can be made can be targeted specifically and potentially algorithmically towards a specific audience.
- Artefact makers shift from finalising artefact decisions to defining optionality to be delivered to users.
- Long tails effects appearing in material artefacts.

Frame of Non-linearity

- Mass customisation in this environment generates a landscape of non-linearity as makers experiment with reconfigurations across long tails.
- Distributed feedback loops across development of material culture produce unpredictable reconfigurations based on local circumstances.

Frame of Finding Frame-alignments

- Projects and collaborators organise around frame alignments.
- Frame alignment operates through memetics, not particularly expressed, agreed upon, and documented terms, but through distributed collaborative structures.
- Algorithms draw together similar frames.
- Shared frames and goals pull together collaborators, not necessarily formalised structures, such as organisations, institutions or companies.

Frame of Battling of Agencies and Information Warfare

- Primary feedback loop paradigms, such as the OODA loop, are combative (Boyd 1986).
- Industrial production processes outperformed by swarming distributed collaborative structures through agility and rapid feedback loops.
- Ongoing conflict between top-down control over information flow and bottom-up media makers.
- Locations of agency conflict are impossible to predict.
- There is general distrust of the media due to awareness of agency translations and influence.

Journalism was one of the first things to be disrupted by participatory culture; visual communication design is showing similar changes. As more material artefact production becomes digital and online, other things may be disrupted in similar ways. This new way of operating material culture seems positioned to produce new aesthetic sensibilities toward material culture, possibly shifting away from mass production and finding new ways of producing artefacts. However, this may come at a cost of conflict, as extension of agency and participation in agency conflict becomes open to all through more than just our screen based media, but our entire material culture.

List of References

Acute, N 2017, 'We talk 'Unreality Journeys' with Plastician', *UK Bass Music*, 10 September, viewed 29 August 2019,

<<https://ukbassmusic.com/we-talk-unreality-journeys-with-plastician/>>.

Adobe 2019, viewed 29 August 2019,

<<https://www.photoshop.com/products/photoshopexpress>>.

Akrich, M & Latour, B 1992, 'A Summary of a Convenient Vocabulary for the Semiotics of Human and Nonhuman Assemblies', In W E Bijker and J Law (eds), *Shaping Technology, Building Society: Studies in Sociotechnical Change*, MIT Press, Cambridge, Mass., pp. 259–64.

Al-Fuqaha, A, Guizani, M, Mohammadi, M, Aledhari, M, Ayyash, M 2015, 'Internet of Things: A Survey on Enabling Technologies, Protocols and Applications', *IEEE Communications Surveys & Tutorials*, vol. 17, no. 4, pp. 2347-2376.

Alexander, C 1964, *Notes on the Synthesis of Form*, Harvard University Press, Cambridge, Mass.

Alternativeto.net 2019, viewed 29 August 2019,

<<https://alternativeto.net/software/adobe-photoshop/>>.

Ambrose, G & Harris, P 2015, *Design Thinking for Visual Communication*, Bloomsbury Visual Arts.

Apple 2019, viewed 29 August 2019,

<<https://itunes.apple.com/au/genre/ios-photo-video/id6008?mt=8>>.

Archer, B 1979, 'Design as a discipline', *Design Studies*, vol. 1, no. 1, pp. 17-20.

Arisman, M & Heller, S (eds) 2000, *Education of an Illustrator*, Allworth Press.

Armstrong, H 2009, *Graphic Design Theory: Readings from the Field*, Princeton Architectural Press.

Arntson, A 2012, *Graphic Design Basics*, 6th edn, Clark Baxter.

Arquilla, J & Ronfeldt, D 2000, *Swarming and the Future of Conflict*. RAND Corporation, Santa Monica, viewed 29 August 2019, <
https://www.rand.org/content/dam/rand/pubs/documented_briefings/2005/RAND_DB311.pdf>.

Baran, P 1962, On Distributed Communications Networks, RAND Corporation, Santa Monica, viewed 29 August 2019,
<<http://www.rand.org/content/dam/rand/pubs/papers/2005/P2626.pdf>>.

Barnes, T 2018, 'Starbucks closes 8,000 stores to give staff diversity training amid race storm', *The Independent*, May 29, viewed 29 August 2019,
<<https://www.independent.co.uk/news/world/americas/starbucks-stores-closed-diversity-training-racial-bias-philadelphia-arrests-racist-a8374426.html>>.

Bayazit, N 2004, 'Investigating Design: A Review of Forty Years of Design Research', *Design Issues*, vol. 20, no.1, pp. 16-29.

Benkler, Y 2016, 'Peer Production and Cooperation', In: J M Bauer & M Latzer (eds) *Handbook on the Economics of the Internet*, Edward Elgar Publishing, pp. 91-119

Berkowitz, B 1995, 'Warfare in the Information Age,' *Issues in Science and Technology*, Fall 1995, pp. 59–66.

Bernays, E 1928, *Propaganda*, Routledge.

Bierut, M 2007, *79 Short Essays on Design*, Princeton Architectural Press.

Bisen, A 2018, 'The Path to "Agile" Policymaking, *Harvard Kennedy School Ash Center for Democratic Governance and Innovation*, weblog post, 5 October, viewed 29 August 2019, <<https://www.innovations.harvard.edu/blog/path-agile-policymaking>>.

Blackmore, S 1999, *The Meme Machine*, Oxford University Press.

Blake, B & Pope, T 2008, 'Developmental Psychology: Incorporating Piaget's and Vygotsky's Theories in Classrooms', *Journal of Cross – Disciplinary Perspectives in Education*, vol. 1, no. 1, pp. 59 – 67.

Bolman, L & Deal, T 2008, *Reframing Organizations: Artistry, Choice, and Leadership*. Josey-Bass, San Francisco, CA.

Born, G & Haworth, C 2016, 'Mixing it: Digital Ethnography and Online Research Methods-A Tale of Two Global Digital Music Genres' In L Hjorth, H Horst, A Galloway, G Bell (eds), *The Routledge Companion to Digital Ethnography*, Routledge, pp. 70-86.

Boyd, J 1986, 'Patterns of Conflict', Presentation, unpublished collection of diagrams by John Boyd, dated December 1986.

Brown, T, & Katz, B (2009), *Change By Design: How Design Thinking Transforms Organizations and Inspires Innovation*. New York: Harper Business.

Bruns, A 2007, 'Produsage: Towards a Broader Framework for User-Led Content Creation', in *Proceedings Creativity & Cognition 6*, Washington, DC.

Bruns, A 2008, 'The Future Is User-Led: The Path Towards Widespread Producership'. *Fibreculture Journal*, vol 11, <<http://eleven.fibreculturejournal.org/fcj-066-the-future-is-user-led-the-path-towards-widespread-producership/>>.

Bruns, A 2010. 'Distributed creativity: Filesharing and Producership', In: Stefan Sonvilla-Weiss (ed), *Mashup Cultures*. Springer, Wein, pp. 24-37.

Buchanan, R 1992, 'Wicked problems in design thinking' *Design Issues*, vol. 8, no. 2, pp. 5- 21.

Bunnell, K 2004, 'Craft and Digital Technology', World Crafts Council annual Conference 2004, viewed 29 August 2019, <<http://autonomic.org.uk/archive/team/kb/craft%20and%20digital%20technology.pdf>>.

Burns, M 1999, 'Information Warfare: What and How?', viewed 27 July 2020, <<https://www.cs.cmu.edu/~burnsm/InfoWarfare.html>>.

Cacciatore, M, Scheufele, D & Iyengar, S 2016, 'The End of Framing as we Know it ... and the Future of Media Effects', *Mass Communication and Society*, vol. 19, no. 1, pp. 7-23.

Callon, M 1987, 'Society in the making; the study of technology as a tool for sociological analysis' In W E Bijker, T P Hughes, T J and Pinch (eds), *The Social Construction of Technological Systems, New Directions in the Sociology and History of Technology*, MIT Press, Cambridge, Mass. pp. 83-103.

Callon, M 1998, 'An essay on framing and overflowing: economic externalities revisited by sociology', In: Michel Callon (ed), *The Laws of the Markets*. Oxford, Blackwell, pp. 244-269.

Callon, M & Law, J 2004, 'Absence - presence, circulation, and encountering in complex space', *Environment and Planning D: Society and Space*, vol. 22, pp. 3-11.

Castells, M 2004, 'Informationalism, Networks, and the Network Society: A Theoretical Blueprint', In: Manuel Castells (ed.), *The Network Society: A Cross-Cultural Perspective*. Edward Elgar, Cheltenham, UK, pp. 3-48.

Carpes da Silva, G & Sanseverino, G G 2020, 'Business Model Innovation in News Media: Fostering New Relationships to Stimulate Support from Readers', *Media and Communication*, vol 8, no 2, pp. 28–39.

Chan, E & Loftus, P 2020, 'Chinese Communist Party Information Warfare: US–China Competition during the COVID-19 Pandemic', *Journal of Indo-Pacific Affairs*, Summer 2020.

Chen, L 2017, 'Continuous Delivery: Overcoming adoption challenges', *Journal of Systems and Software*, vol. 128, June 2017, pp. 72-86.

Churchman, C W 1967, 'Guest Editorial: Wicked Problems', *Management Science*, vol. 14, no. 4, pp. 141-142.

Chivvis, C S 2017, *Understanding Russian "Hybrid Warfare" And What Can Be Done About It*, RAND Corporation, Santa Monica, viewed 08 December 2020, <<https://www.rand.org/pubs/testimonies/CT468.html>>.

Cooke, M 2006, 'Design Methodologies: Toward a Systematic Approach to Design' in A Bennett (ed.), *Design Studies: Theory and Research in Graphic Design*, Princeton Architectural Press, pp. 36-50.

Cooper, M 1989, 'Computers and Design', *Design Quarterly*, no. 142, pp.1+4-31.

Coorey 2008, 'How Australia persuaded Donald Trump not to wage his trade war', *Australian Financial Review*, 9 March, viewed 29 August 2019, <<https://www.afr.com/politics/how-australia-persuaded-donald-trump-not-to-wage-his-trade-war-20180309-h0x8ke>>.

Cross, A 1984, 'Towards an understanding of the intrinsic values of design education', *Design Studies*, vol. 5, no. 1, pp. 31-39.

Cross, N 1982, 'Designerly ways of knowing', *Design Studies*, vol. 3, no. 4, pp. 221-227.

Cross, N 1993, 'A History of Design Methodology' in MJ de Vries, N Cross and DP Grant (eds.), *Design Methodology and Relationships with Science*, Dordrecht ; Boston: Kluwer Academic Publishers, pp. 15-27.

Cross, N 2007, 'Forty years of design research', *Design Studies*, vol. 28, no. 1, pp. 1-4.

Dawkins, R 1976, *The Selfish Gene*, Oxford University Press.

Deacon, T W 2004, 'Mememes as Signs in the Dynamic Logic of Semiosis: Beyond Molecular Science and Computation Theory'. In: Wolff K E, Pfeiffer H D, Delugach H S (eds) *Conceptual Structures at Work. ICCS 2004. Lecture Notes in Computer Science*, vol 3127. Springer, Berlin, Heidelberg.

Degani, A 2013, 'A Tale of Two Maps: Analysis of the London Underground "Diagram"', *Ergonomics in Design: The Quarterly of Human Factors Applications*, vol. 21, no. 3, pp. 7-16.

Deleuze, G & Guattari, F 1980, *A Thousand Plateaus*, University of Minnesota Press.

Dennett, D 1984, 'Cognitive wheels: The frame problem of AI', In Christopher Hookway (ed.), *Minds, Machines and Evolution*, Cambridge University Press.

Dennett, D 1995, *Darwin's Dangerous Idea: Evolution and the Meanings of Life*, Simon & Schuster.

Design Thinking Bootleg. (2018) d.school, viewed 29 August 2019,
<<https://dschool.stanford.edu/resources/design-thinking-bootleg>>.

Dingsøyr, T, Nerur, S, Balijepally, V, Brede & Moe, N 2012, 'A decade of agile methodologies: Towards explaining agile software development', *Journal of Systems and Software*, vol. 85, no. 6, pp. 1213-1221.

Dorst, K 2011, 'The Core of 'Design Thinking' and Its Application', *Design Studies*, vol. 32, no. 6, pp. 521-532.

Dorst, K 2015, *Frame Innovation: Create New Thinking by Design*, MIT Press.

Douglas, N 2013 'It's Supposed to Look Like Shit: The Internet Ugly Aesthetic', *Journal of Visual Culture*, vol. 13, no 3, pp. 314-339.

Dreyfuss, H 2003, *Designing for People*, Allworth Press.

Dubberly, H 2005, 'How do you design: a compendium of models', viewed 29 August 2019, <http://www.dubberly.com/wp-content/uploads/2008/06/ddo_designprocess.pdf>.

Entman, R 1993, 'Framing: Toward Clarification of a Fractured Paradigm', *Journal of Communication*, vol. 43, no. 4, pp. 51-58.

Enten, H 2016, 'How Much Did Wikileaks Hurt Hillary Clinton?', *FiveThirtyEight*, December 23, viewed 08 December 2020,
<<https://fivethirtyeight.com/features/wikileaks-hillary-clinton>>

Fallan, K 2009, 'An ANT in our pants? A design historian's reflections on actor network theory', in F Hackney et al. (eds), *Networks of Design: Proceedings of the 2008 Annual International Conference of the Design History Society (UK) University College Falmouth, 3-6 September*, BrownWalker Press, pp. 46-52.

Fallan, K 2010, *Design History: Understanding Theory and Method*, Bloomsbury Academic.

Ferrier, A 2014, *The Advertising Effect: How to Change Behaviour*, Oxford University Press.

Flaherty, C 2010, 'Command, Influence and Information in 3D Tactics', *Journal of Information Warfare*, vol. 9, no 1.

Flusser, V 2008, 'About the Word Design', In B Highmore (ed.), *The Design Culture Reader*, Routledge, pp. 36-39.

Frascara, J 2004, *Communication Design: Principles, Methods and Practice*, Allworth Press, New York.

Frascara, J 2006, 'Graphic Design: Fine Art or Social Science', In A Bennett (ed.), *Design Studies: Theory and Research in Graphic Design*, Princeton Architectural Press, pp. 26-35.

Frascara, J 2007, 'Hiding Lack of Knowledge: Bad Words in Design Education', *Design Issues*, vol. 23, no. 4, pp. 62-68.

Gal, N, Shifman, L & Kampf, Z 2015, '"It Gets Better": Internet memes and the construction of collective identity', *New Media & Society*, vol. 18, no. 8, pp. 1698-1714.

Gamson, W A & Modigliani, A 1987, 'The changing culture of affirmative action', In R G Braungart and M M Braungart (eds.), *Research in Political Sociology*, vol. 3, JAI Press, pp. 137–177.

Ganzach, Y & Karsahi, N 1995, 'Message framing and buying behavior: A field experiment'. *Journal of Business Research*, vol. 32, no. 1, pp. 11-17.

Garland, K 1994, *Mr. Beck's Underground Map: A History*, Capital Transport Pub.

Garcia, T 2018, 'Starbucks says racial bias incident delayed its marketing push, hurt same-store sales', *MarketWatch*, 21 June, viewed 29 August 2019, <<https://www.marketwatch.com/story/starbucks-says-racial-bias-incident-delayed-its-marketing-push-hurt-same-store-sales-2018-06-20>>.

Garner, B K 2008, 'When Students Seem Stalled', *Reaching the Reluctant Learner*, vol. 65, no. 6, pp. 32-38.

Gibson, W 1989, 'Rocket Radio', *Rolling Stone*, 15 June, pp. 84–86.

Giese, J 2015, 'It's Time To Embrace Memetic Warfare', *Defence Strategic Communications: The Official Journal of the NATO Strategic Communications Centre of Excellence*, vol. 1, no. 1, pp. 67-75.

Google 2019, viewed 29 August 2019, <https://play.google.com/store/apps/category/ART_AND_DESIGN>.

Google for Startups 2014, *Lean Startup Meets Design Thinking*, <https://www.youtube.com/watch?v=bvFnHzU4_W8>.

Gregory, S A 1966, 'Design and the Design Method', in SA Gregory (ed.), *The Design Method*, Springer, pp. 3-10.

Grunig, J & Hunt, T 1984, *Managing Public Relations*, Holt, Rinehart and Winston.

Hains, T 2016, 'Jill Stein: Trump Is Less Dangerous Than Clinton; She Will Start Nuclear War With Russia', *RealClearPolitics*, 12 October 2016, viewed 29 August 2019,

<https://www.realclearpolitics.com/video/2016/10/12/jill_stein_hillary_clintons_declared_syria_policy_could_start_a_nuclear_war.html>.

Hebdige, D 1979, *Subculture: The Meaning of Style*. Routledge.

Heller, S (ed) 2004, *Education of a Typographer*, Allworth Press.

Heller, S 2001, 'Introduction' In G Ballance, S Heller (eds), *Graphic Design History*, Routledge, pp. xiii-x.

Heller, S 2004, *Design Literacy: Understanding Graphic Design*, Allworth Press.

Herwig, J 2011, 'The Archive as the Repertoire. Mediated and Embodied Practice on Imageboard 4chan.org', In: G Friesinger, J Grenzfurthner and T Ballhausen (eds), *Mind and Matter: Comparative Approaches Towards Complexity (Cultural and Media Studies)*, Transcript-Verlag, Bielefeld, Germany.

Heuer, R J 1999, *Psychology of Information Analysis*, Center for the Study of Intelligence, Central Intelligence Agency,

<<https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/PsychofIntelNew.pdf>>.

Hine, E G, Onaolapo, J, De Cristofaro, E, Kourtellis, N, Leontiadis, I, Samaras, R, Stringhini, G & Blackburn, J 2017, 'Kek, Cucks, and God Emperor Trump: A Measurement Study of 4chan's Politically Incorrect Forum and Its Effects on the Web', in *International Conference on Web and Social Media (ICWSM)*, May 2017.

Hollis, R 2001, *Graphic Design: A Concise History*, Thames & Hudson.

Jaccard, J & Jacoby, J 2010, *Theory construction and model-building skills: A practical guide for social scientists*, Guilford Press.

Jenkins, H 2006, *Convergence Culture: Where Old and New Media Collide*. New York University Press, New York.

Jenkins, H, Ford, S & Green, J 2013, *Spreadable Media: Creating Value and Meaning in a Networked Culture*. New York University Press, New York.

John Robb 2016, 'Welcome John Robb (/u/John_Robb), author and entrepreneur. Ask Him Anything!', *Reddit*, 12 August, viewed 29 August 2019, <https://www.reddit.com/r/The_Donald/comments/4xgeb5/welcome_john_robb_ujohn_robb_author_and/>.

Johnson, M 2018, 'Starbucks barista accused of mocking man with racist name: 'How could they get John and Chang messed up?', *Yahoo Lifestyle*, 2 December, viewed 29 August 2019, <<https://finance.yahoo.com/news/starbucks-barista-accused-mocking-mans-name-get-john-chang-messed-162140759.html>>.

Jones, J C 1992, *Design methods*, 2nd edn, John Wiley & Sons, New York.

Kelly, K 2008, 'Better Than Free', *Edge.org*, <https://www.edge.org/conversation/kevin_kelly-better-than-free>, accessed 4 December 2017.

Knobel, M & Lankshear, C 2007, 'Online Memes, Affinities, and Cultural Production', In: Michele Knobel and Colin Lankshear (eds), *A New Literacies Sampler*, Peter Lang, New York, pp. 199-227.

Knuttila, L 2011, 'User unknown: 4chan, anonymity and contingency', *First Monday*, vol. 16, no. 10, <<http://firstmonday.org/article/view/3665/3055>>.

Kohavi, R, Longbotham, R, Sommerfield, D, Henne, R M 2009, 'Controlled experiments on the web: survey and practical guide', *Data Mining and Knowledge Discovery*, vol. 18, no. 1, pp. 140-181.

Kokotovich, V & Dorst, K 2016, 'The art of 'stepping back': Studying levels of abstraction in a diverse design team', *Design Studies*, vol. 46, pp. 79-94.

Koskinen, I, Zimmerman, J, Binder, T, Redstrom, J & Wensveen, S 2013, 'Design Research Through Practice: From the Lab, Field, and Showroom', *IEEE Transactions on Professional Communication*, 56(3), pp. 262-263.

Krippendorff, K 2006, *The Semantic Turn; A New Foundation for Design*, Taylor & Francis.

Latour, B & Woolgar, S 1979, *Laboratory Life: The Construction of Scientific Facts*, Sage Publications.

Latour, B 1991, 'Technology is society made durable', In J Law (ed), *A Sociology of Monsters*, Routledge, pp. 103-131.

Latour, B 1999, 'On recalling ANT', In J Law and J Hassard (eds), *Actor Network Theory and After*, Athenaeum Press, pp. 15-25.

Latour, B 2009, 'A cautious Prometheus? A few steps toward a philosophy of design (with special attention to Peter Sloterdijk)' in F Hackney et al. (eds), *Networks of Design: Proceedings of the 2008 Annual International Conference of the Design History Society (UK) University College Falmouth, 3-6 September*, BrownWalker Press, pp. 2-10.

Law, J 1986, 'On the Methods of Long Distance Control: Vessels, Navigation, and the Portuguese Route to India', J Law (ed), *Power, Action and Belief: A New Sociology of Knowledge? Sociological Review Monograph 32*, Routledge, Henley, pp. 234-263.

Law, J 1999, 'After ANT: complexity, naming and topology' in J Law and J Hassard (eds), *Actor Network Theory and After*, Athenaem Press, pp. 1-15.

Law, J 2004, *After Method: Mess in Social Science Research*, Routledge, London.

Law, J 2009, 'Actor Network Theory and Material Semiotics', In B S Turner (ed), *The New Blackwell Companion to Social Theory*, pp. 141-158.

Law, J 2014, 'Working well with Wickedness', *CRESC Working Paper 135*, viewed 29 August 2019,

<<http://hummedia.manchester.ac.uk/institutes/cresc/workingpapers/wp135.pdf>>.

Lawson, B 2005, *How Designers Think, Fourth Edition: The Design Process Demystified*, 4th edn, Architectural Press, Oxford; Boston.

Leedy, P D & Ormrod, J E 2015, *Practical research. Planning and design (11th ed.)*, Pearson.

Levin, D 1993, *Modernity and the Hegemony of Vision*, University of California Press

Levin, I P & Gaeth, G J 1988, 'How consumers are affected by the framing of attribute information before and after consuming the product, *Journal of Consumer Research*, vol. 15, no. 3, pp. 374-378.

Levin, I P, Schneider, S L & Gaeth, G J 1998, 'All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects', *Organizational Behavior and Human Decision Processes*, vol 76, no 2, pp. 149-188.

Libicki, MC 1995, *What is Information Warfare*, National Defense University, US Government Printing Office, Washington DC.

Licko, Z & VanderLans, R 1989, Ambition/Fear, *Emigre 11*,
<<https://www.emigre.com/Essays/Magazine/AmbitionFear>>.

Lind, WS & Thiele, GA 2015, *4th Generation Warfare*, Castalia House, Finland.

Locke, K 2001, *Grounded Theory in Management Research*, SAGE.

Mackinac Center for Public Policy n.d., *The Overton Window*, Mackinac Center for Public Policy, viewed 29 August 2019, <<https://www.mackinac.org/OvertonWindow>>.

Martin, R L (2009), *The Design of Business: Why Design Thinking is the Next Competitive Advantage*, Boston, Mass. Harvard Business Press.

Massanari, A 2015, ‘#Gamergate and The Fappening: How Reddit’s Algorithm, Governance, and Culture Support Toxic Technocultures’, *New Media & Society*, vol. 19, no. 3, pp. 329-346.

Matthes, J & Kohring, M 2008, ‘The Content Analysis of Media Frames: Toward Improving Reliability and Validity’, *Journal of Communication*, vol. 58, no. 2, pp. 258-279.

McCarthy, J & Hayes, P J 1969), ‘Some Philosophical Problems from the Standpoint of Artificial Intelligence’, in D Michie and B Melzter (eds), *Machine Intelligence 4*, Edinburgh University Press, pp. 463–502.

McKim, R 1973, *Experiences in Visual Thinking*, PWS Publishing, Boston.

McLuhan, M 1962, *The Gutenberg Galaxy: The Making of Typographic Man*, University of Toronto Press, Canada.

McLuhan, M 1964, *Understanding Media: Extensions of Man*, McGraw-Hill Book Company, New York, NY.

McLuhan, M 1970, *Culture is Our Business*, Balantine Books.

Meyer, Z 2018, 'Starbucks' racial-bias training will be costly, but could pay off in the long run', *USA Today*, 26 May, viewed 29 August 2019, <<https://www.usatoday.com/story/money/2018/05/26/starbucks-racial-bias-training-costly/642844002/>>.

Millman, D 2007, *How to Think Like a Great Graphic Designer*, Allworth.

Milner, R 2013a, 'Pop Polyvocality: Internet Memes, Public Participation, and the Occupy Wall Street Movement', *International Journal of Communication*, vol. 7, pp. 2357-2390.

Milner, R 2013b, 'Hacking the Social: Internet Memes, Identity Antagonism, and The Logic of Lulz', *Fibreculture Journal*, no. 22, <<http://twentytwo.fibreculturejournal.org/fcj-156-hacking-the-social-Internet-memes-identity-antagonism-and-the-logic-of-lulz/>>.

Milner, R 2013c. 'Media lingua franca: fixity, novelty, and vernacular creativity in Internet memes', *Selected Papers of Internet Research 3*.

Mintzberg, H 1979, *The Structuring of Organisations*, Pearson.

Mirkovic, J & Reiher, P 2004, 'A taxonomy of DDoS attack and DDoS defense mechanisms', *ACM SIGCOMM Computer Communication Review*, vol. 34, no. 2.

Mu-Ming, T (Director) 2012, *Design & Thinking*: Muris Media.

Muratovski, G 2016, *Research for Designers: A Guide to Methods and Practice*, SAGE Publications Ltd.

Nissenbaum, A & Shifman, L 2017, 'Internet memes as contested cultural capital: The case of 4chan /b/ board', *New Media & Society*, vol. 19, no. 4, pp. 483-501.

Noble, I & Bestley, R 2005, *Visual Research: An Introduction to Research Methodologies in Graphic Design*, Bloomsbury.

Pangaro, P & Dubberly, H 2015, 'How Cybernetics Connects Computing, Counterculture, and Design', in *Hippie Modernism: The Struggle for Utopia, exhibition catalogue*, Walker Art Center, October 2015.

Pangaro, P 2006, *Cybernetics: A Definition*, viewed 29 August 2019, <<https://pangaro.com/definition-cybernetics.html>>.

Paton, B & Dorst, K 2011, 'Briefing and reframing: A situated practice', *Design Studies*, vol. 32, no. 6, pp. 573-587.

Pee S H, Dorst, K & Van der Bijl-Brouwer, M 2015, 'Understanding Problem Framing through research into Metaphors ', *IASDR 2015*, Brisbane, Australia.

Phillips, W 2013, 'The House That Fox Built: Anonymous, Spectacle, and Cycles of Amplification', *Television & New Media*, vol. 14, no. 6, pp. 494-509.

Piaget, J 1952a, 'Autobiography', In E G Boring, H S Langfeld, H Werner, and R M Yerks (eds.), *A History of Psychology in Autobiography: Volume IV*, Clark University Press, pp. 237-256.

Piaget, J 1952b, *The Origins of Intelligence in Children*, International Universities Press.

Porlezza, C 2019, 'From Participatory Culture to Participatory Fatigue: The Problem With the Public', *Social Media + Society*, April 2019.

Press, M & Cooper, R 2003, *The Design Experience*, Routledge.

Prier, J 2017, 'Commanding the Trend: Social Media as Information Warfare', *Strategic Studies Quarterly*, vol. 11, no. 4, pp. 50-85.

Proferes, N & Summers, E 2019, 'Algorithms and agenda-setting in Wikileaks' #Podestaemails release', *Information, Communication & Society*, vol. 22, no 11, pp. 1630-1645,

Pye, D 1968, *The Nature and Art of Workmanship*, Cambridge University Press.

Rand P, 2017, *Design, Form, and Chaos*, Yale University Press.

Rand, P 2014, *Thoughts on Design*, Chronicle Books, San Francisco.

Raymond, R 1999, 'The Cathedral the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary', O'Reilly, Beijing.

Rheingold, H 2002, *Smart mobs : the next social revolution*, Perseus Publishing, Cambridge, Mass.

Ries, A & Trout, J 2001, *Positioning: The Battle for Your Mind*, McGraw-Hill Education.

Rith, C & Dubberly, H 2006, 'Why Horst W.J. Rittel Matters', *Design Issues*, vol. 22, no. 4, pp. 1-20.

Rittel, H & Webber, M 1973, 'Dilemmas in a General Theory of Planning', *Policy Sciences*, vol. 4, no. 2, pp. 155-169.

Robb, J 2007, *Brave New War: The Next Stage of Terrorism and the End of Globalization*. Wiley, Hoboken, NJ.

Robinson, M, Jones, K & Janicke, H 2015, 'Cyber warfare: issues and challenges', *Computers & Security*, vol. 49, pp. 70-94.

Ronfeldt, D & Arquilla, J 2020, *Whose Story Wins: Rise of the Noosphere, Noopolitik, and Information-Age Statecraft*. RAND Corporation, Santa Monica, viewed 08 December 2020, <<https://www.rand.org/pubs/perspectives/PEA237-1.html>>.

Rodley, C 2016, 'When memes go to war: Viral propaganda in the 2014 Gaza-Israel conflict', *Fibreculture Journal*, no. 27, <<http://twentyseven.fibreculturejournal.org/2016/03/18/fcj-200-when-memes-go-to-war-viral-propaganda-in-the-2014-gaza-israel-conflict/>>.

Rosen, J 2005, 'Bloggers vs. Journalists is Over', *Pressthink.org*, weblog post, <http://archive.pressthink.org/2005/01/21/berk_essay.html>.

Rosen, J 2006, 'The People Formerly Known as the Audience', *Pressthink.org*, weblog post, <http://archive.pressthink.org/2006/06/27/ppl_frmr.html>.

Rosen, J 2008, 'A Most Useful Definition of Citizen Journalism', *Pressthink.org*, weblog post, <http://archive.pressthink.org/2008/07/14/a_most_useful_definition.html>.

Rusbridger, A 2010, 'The Hugh Cudlipp lecture: Does journalism exist?', *The Guardian*, 26 January, viewed 08 December 2020, <<https://www.theguardian.com/media/2010/jan/25/cudlipp-lecture-alan-rusbridger>>

Savor, T, Douglas, M, Gentili, M, Williams, L, Beck, K & Stumm, M 2016, 'Continuous Deployment at Facebook and OANDA', in *2016 IEEE/ACM 38th International Conference on Software Engineering Companion (ICSE-C)*, Austin, TX, USA, 14-22 May 2016.

Sayes, E 2014, 'Actor-Network Theory and Methodology: Just what Does it Mean to Say that Nonhumans Have Agency?', *Social Studies of Science*, vol. 44, no. 1, pp. 134-149.

Scheufele, D 1999, 'Framing as a Theory of Media Effects', *Journal of Communication*, vol 49, no 1, pp. 103–122.

Schmaus, B 2013, 'Deploying the Netflix API, *Netflix Technology Blog*, weblog post, 14 August, viewed 29 August 2019, <<https://medium.com/netflix-techblog/deploying-the-netflix-api-79b6176cc3f0>>.

Schon, D A 1988, 'Designing: rules, types and worlds', *Design Studies*, vol. 9, no. 3, pp 181-190.

Segarra, L M 2018, 'Starbucks Apologizes After 2 Black Men Were Arrested While Waiting Inside Store', *Fortune*, April 14, viewed 29 August 2019, <<http://fortune.com/2018/04/14/starbucks-black-men-arrested-philadelphia/>>.

Shehabat, A & Mitew, T 2017, 'Distributed Swarming and Stigmergic Effects on ISIS Networks: OODA Loop Model', *Journal of Media and Information Warfare*, vol 10, pp. 79-109.

Shi, M & Nisbet, M 2011, 'How Media Frames Structure Our Political Perceptions', *Big Think*, weblog post, 9 December, viewed 29 August 2019, <<https://bigthink.com/age-of-engagement/how-media-frames-structure-our-political-perceptions>>.

Simon, H 1969, *The Sciences of the Artificial*, MIT Press, Cambridge.

Smith, M 2011, *The Aztecs*, Wiley-Blackwell.

Starbucks 2018a, 'We regret that our practices and training led to the reprehensible outcome...', Twitter, 20 May, 14 April, viewed 29 August 2019, <<https://twitter.com/Starbucks/status/985350075181219840>>.

Starbucks 2018b, 'On 5/29, we'll close US company-owned stores to conduct racial-bias training...', Twitter, 17 April, viewed 29 August 2019, <<https://twitter.com/Starbucks/status/986327280073895936>>.

Stewart, S C 2011. 'Interpreting Design Thinking', *Design Studies*, vol. 32, no. 6, pp. 515-520.

Stuhl, M 2014, 'What Is Behind The Rise Of The Chief Design Officer?', *Forbes My Say*, weblog post, 11 November, viewed 29 August 2019, <<https://www.forbes.com/sites/grouphink/2014/11/11/what-is-behind-the-rise-of-the-chief-design-officer/#102eda5933c2>>.

The Century of the Self - Part 1: Happiness Machines 2002, documentary, BBC, directed by Adam Curtis.

Thornton, R 2015, 'The Changing Nature of Modern Warfare: Responding to Russian Information Warfare', *The RUSI Journal*, vol. 160, no. 4, pp. 40-48.

Traub, C H, Heller, S, Bell A B (eds) 2006, *Education of a Photographer*, Allworth.

Triggs, T 2011, 'Graphic Design History: Past, Present, and Future', *Design Issues*, vol. 27, no. 1, pp 3-6.

Tversky, A & Kahneman, D 1981, 'The framing of decisions and the psychology of choice, *Science*, vol 211, no. 4481, pp. 453-458.

Tyler, A C 2006, 'Shaping Belief: The Role of Audience in Visual Communication', in A Bennett (ed.), *Design Studies: Theory and Research in Graphic Design*, Princeton Architectural Press, pp. 36-50.

United States Congress 2016, *All Bill Information for H.R.4478 - Draft America's Daughters Act of 2016*, viewed 29 August 2019, <https://www.congress.gov/bill/114th-congress/house-bill/4478/all-info>.

Usal, S S & Evcil, A N 2017, 'An experience on analogy and metaphor: Creative design tools to increase students' creativities', *New Trends and Issues Proceedings on Humanities and Social Sciences*, vol. 4, pp. 50-55.

Visser, W 2006, *The Cognitive Artifacts of Designing*, CRC Press.

Voyat, G 1981, 'Jean Piaget 1896-1980', *The American Journal of Psychology*, vol 94, pp. 645- 648.

Wadsworth, B J 2004, *Piaget's theory of cognitive and affective development: Foundations of constructivism*. Longman Publishing.

Walker, S 2011, *The Spirit of Design: Objects, Environment and Meaning*, Routledge.

Walker, S 2017, *Design for Life: Creating Meaning in a Distracted World*, Routledge.

Wall, T, & Mitew, T 2018, 'Swarm networks and the design process of a distributed meme warfare campaign', *First Monday*, vol. 23, no. 5-7, <https://firstmonday.org/ojs/index.php/fm/article/view/8290/7202#app>.

Ward, D 2011, 'Fast, Inexpensive, Simple and Tiny', *Defense AT&L*, May-June 2011, <<http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA543610>>, pp. 33-38.

Weber, S 2004, *The Success of Open Source*, Harvard University Press, Cambridge, MA.

Wiener, N 1948, *Cybernetics: or control and communication in the animal and the machine*, The Technology Press//Wiley.

Wiggins, B 2016, 'Crimea River: Directionality in memes from the Russia-Ukraine conflict', *International Journal of Communication*, vol. 10, pp. 451–485.

Wilson, P L 1997, *A network of castles*, viewed 29 August 2019, <<http://www.liudmila.org/nettime/zkp4/17.htm>>.

Winkel, H, Ratitamkul, T, Brambley, V, Nagarachinda, T & Tiencharoen, S 2016, 'Decision-making and the framing effect in a foreign and native language', *Journal of Cognitive Therapy*, vol. 28, no. 4, pp. 427-436.

Woodhouse, E & Patton, J W 2004, 'Design by Society: Science and Technology Studies and the Social Shaping of Design' *Design Issues*, vol 20, no 3, pp. 1-12.

World Economic Forum (2018) *Agile Governance: Reimagining Policy-making in the Fourth Industrial Revolution*.

Wragg, N & Barnes, C 2016, 'Graphic Designers' Sense and Knowledge of the User- Is thinking differently the groundwork for acting differently?', *Visible Language*, vol. 50, no. 3, pp. 29-62.

Yaneva, A 2009, 'Border Crossings – Making the Social Hold: Towards an Actor-Network Theory of Design', *Design and Culture*, vol 1, no 3, pp. 273-288.

Zeitzoff, T 2017, 'How Social Media Is Changing Conflict',
Journal of Conflict Resolution, vol 61, no 9, pp. 1970-1991.

Zittrain, J 2008, *The Future of the Internet and How to Stop It*, Yale University Press,
New Haven & London.

Zuckerman, E 2019, 'QAnon and the Emergence of the Unreal', *Journal of Design and Science*, issue 6.

