Interface-controlled Cyberocracy: A Critical Exploration of how Human Computer Interaction could facilitate the birth of a Cyber-regulated state of Governance

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INTRODUCTION

BACKGROUND AND SUMMARY

The advancement in technology over the last decade has increased exponentially. We have seen the computer begin as a mere instrument for generating tables and grow to a force that now pervades every aspect of modern society. It has already transcended its status as a simple tool to be applied to specific tasks. However, while there is still growth in the scope of what can be achieved technically, it is also important to keep a key enhancement about new technology in mind - the interface. The influence of different types of interfaces and the way they are designed on the kinds of technology that come into the market is more dominant than one might think it is. In this paper, we will examine how the decision choices and interactivity patterns though concealed to the ordinary user who is making them, is something that is intricately crafted after careful thought by the creators and more specifically, the designers.

The first part of the paper introduces a relatively new concept - Cyberocracy and asks the reader to consider looking at the user interface as an ideology. The second part of the paper brings in the role of design, incorporating its role as an actor in the bigger concept of interactivity.

Each design is created with the intention of impacting user interactivity in a specific way. There is almost a direct cause and effect relationship between the way anything is designed and the way a user interacts with it. Ideally, good design is self explanatory and should allow a user to navigate and manoeuvre easily. In the case of interface design, the key to good design lies in the user's ability to easily find what they are looking for while it is presented in a good format. (Sommerer, 2008, p.2) For the purpose of this paper, the word "design" is going to be used a little differently than how it is usually understood. It is not just the UI in terms of wireframes and aesthetically pleasing views which is being referred to. It is not just design from a technical User Interface designer's perspective. Design, for the purpose of this paper includes everything from colour, to placement of windows, to the type of targeted content shown its users, to navigation etc. Mainly, everything with "the intent to impact interactivity" which when intertwined, come together to form what can be seen to the eye as the user interface. The last section of this paper discusses concepts and ideas that offer potential solutions.

RESEARCH QUESTION

This paper is a think piece that aims to create an awareness about the revolution of the information technology era paving the path for a new type of government control i.e. Cyberocracy - which discusses how the new revolution of information technology may alter the nature of the bureaucratic government.
Using this concept as a basis, further focus is directed specifically to the role of Interface design in Human Computer Interaction that could lead to its advent. The purpose of this paper is not just to support the popular and already existing theory that we are at the soon to be seen birth of Cyberocracy, but also to temper Human Computer Interaction's rising optimism by identifying if it could be one of the potential causes, thereby creating an urgent and anticipatory awareness about its potential dark side.
At the end of the paper, the reader should have sufficient information to question if Human Computer Interaction can have any role to play in its contribution to a Cyberocracy.

RESEARCH OBJECTIVES

This paper takes the reverse of a "cause and effect" approach, discussing the possible effect first and then examining its possible causes. This paper aims to do two things:

1) Support the theory that there could, in the foreseeable future, exist a state of Cyberocracy favouring a totalitarian regime.
2) Explore whether the Graphical User Interface of Computers screens could be one of the reasons that help this through the exploitation of user interactivity.

CAVEATS AND CLARIFICATIONS

This paper is aimed at creating a philosophical awareness about Interactive technology, focusing on the user Interface as a medium. Although it looks at some cases in which the *design* of the user interface is being used to exploit the users, it is not trying to prove that design patterns alone could be the main cause for a Cyberocracy. It could also be the way in which content is shown on the interface or the utilisation of the interface for malicious and invasive purposes. This paper merely examines how the possibility of the *"act"* of the user interacting with the computer screen in general, (which is referred to as Human Computer Interaction in the context

of this paper) is being noticed by the companies and the government and this is the key factor that is being exploited. A holistic reading of this paper should make the reader cognisant of the way interactivity concepts weave together into a patterned whole questioning whether it could be a factor that could lead to a Cyberocracy.

LITERATURE REVIEW

CHAPTER 1

CYBEROCRACY

Feudalism, imperialism, capitalism, socialism, communism, theocracy, aristocracy, democracy, bureaucracy - the world we live in today, has been continually subjected to many different forms of "isms" and "ocarcies". "Bureaucracy has spread throughout the public and private sectors of all modern administrative systems." (Ronfeldt, D. F., 1996 p.1) The term Cyberocracy is a state of governance that focuses on "rule by way of information" (ibid). Ronfeldt argued that its control will become a dominant source of power as a natural next step in man's political evolution. This paper was written in 1996. Since then a lot has changed and Ronfeldt's theory, which remained only a theory in 1996, is soon appearing to cross the border and enter the territory of reality. Technology has indeed consumed and altered the way we live our lives. Although the shape of a full fledged Cyberocracy still remains obscure, it is apparent that with the advent of Artificial Intelligence - where there is no longer need for as much human labour as there was before, Machine Learning - where new data can be built on already existing data and computers are in simple terms, made to "self learn" and the Internet of Things - where all our physical devices ranging from our refrigerators to doors can essentially be controlled by a computer, our past way of life is most likely heading towards extinction because these developments have affected how people think about power and its use. Shifting perspective from the people's perception of power to the State's perception, the State essentially refers to the infrastructure of government that has the upper hand and exercises control over its people. During the industrial age, this control was purely bureaucratic. But a little over the past decade now, a subtle and unconscious shift is being witnessed where the different forms or

the ways by which the government can control us is gradually moving into the realm of cyberspace thus explaining the new word - "Cyberocracy".

According to Althusser, the State is an apparatus which is defined as a force of repressive execution and intervention 'in the interests of the ruling classes' (Althusser, L.,1970, p.2) He states that there are two kinds of State Apparatuses :

The Ideological State Apparatuses (ISA's) and

The Repressive State Apparatuses(RSAs).

The Ideological State Apparatuses consist of religion, education, family, culture etc and they function primarily through ideology. The Repressive State Apparatuses consist of entities such as the government, the administration, the police etc and they exercise control primarily through violence. However, in the context of potentially reaching a state of Cyberocracy, this can be argued by hypothesising a combination of the two. The reason RSA's function primarily through violence before, was because their constructs such as the police, the administration and the government were put in place to exercise authority and the most effective way they could do that was through violence. But with the rise of information technology where most of the people's information is digitised, the need for violence becomes obsolete. Rather, a new form of control that focuses on a new type of ideology is born. These entities of the Repressive State Apparatuses can exercise their authority by restricting our access to websites, banning the use of certain apps, monitoring our browsing history and expenditures by checking our bank statements etc. Two very good examples of this that are already put into effect can be seen in India and China.

In India, the government introduced the "Aadhar" (foundation) card. It is a 12-digit unique identity number that must be obtained by residents of India, based on their biometric and demographic data. The data is collected by the Unique Identification Authority of India (UIDAI), a statutory authority established in January 2009 by the government of India, under the jurisdiction of the Ministry of Electronics and Information Technology.[1] The process of generating this identification number will start with getting the biometrics of each resident of the country along with certain demographic details, as would be needed for any business (like a bank or a telecom operator) or government organisation (like that of the Ministry of Rural Development) to identify a particular Indian resident. Biometrics of all ten fingers, along with the iris scan of both the eyes and the photo of the face has been decided to be taken as identifiers of all residents (uidai.gov.in). There are two concerning factors about this. Firstly, the card consisting of a citizen's biometric as well as demographic details

[1] User, S. (n.d.). About UIDAI - Unique Identification Authority of India | Government of India. Retrieved from https://uidai.gov.in/about-uidai/about-uidai.html

although controlled by the government is an open access database, which means all their information can be potentially accessed by other countries. Secondly and more importantly, the answer as to what the government is going to do with this information has not been made clear to the citizens. Concerns have been expressed about an unprecedented degree of state surveillance and potential control of citizens. Although the effects of its power as a tool of mass surveillance by the government haven't been observed as yet, it is almost nearly there. (Dreze, J. 2017, p1)

China on the other hand, has already begun to exercise a form of cyber control over their citizens with their recent introduction of the social credit system.
The social credit system is a proposed Chinese government initiative for developing a national reputation.(Hatton C, 2015 p.1) It has been reported to be intended to assign a "social credit" rating to every citizen based on government data regarding their economic and social status.(Chin, J., 2016 p.1). This mass surveillance tactic allows the government to keep all their citizens in check or rather, in control and if their social credit rating is not satisfactory, the government is two steps ahead in making sure they are punished accordingly - “China’s “social credit” system has already seen over 12 million people slapped with domestic travel bans as punishment for bad behaviour. Nine million Chinese have been banned from buying domestic flights, and three million more from buying business class tickets in early trials of the scheme, under which citizens are rated on their compliance with social norms and rules. Behaviour that triggered the bans varied from obstructing footpaths with electric bikes to failing to pay fines. The social credit system is said to be tested soon on the country’s train system where some of the offences listed were smoking cigarettes in no smoking areas of trains, riding a train without a correct ticket and selling counterfeit tickets were among the offences listed, that could result in 180 day bans from buying train tickets.” (Fullertron, J., 2018)
We thus, are at the brink of witnessing a historic transformation of the traditional modes of power. Power today is becoming based less on bureaucratic forces that function through physical and material parameters like territory and military forces and more on factors linked to the capability of storing, managing, distributing and creating information. (Debray 1986., p.18)

ENTERING A POST-INDUSTRIAL SOCIETY

"The age of simulation thus begins with a liquidation of all referentials – worse: by their artificial resurrection is systems of signs, which are a more ductile material than meaning, in that they lend themselves to all systems of equivalence, all binary oppositions and all combinatory algebra." (Baudrillard, J., 1981 p.167)

Not soon after the Second World War, the industrial revolution took over making way for the mass production of commodities. But now, according to Baudrillard, this century is one that is in the era of post-industrialism where we are currently witnessing a historical shift to the "Third Order"[2] which is a state of hyperreality that replaces the real. Baudrillard argues that there is only simulacrum[3], endlessly "produced from miniaturised units, from matrices, memory banks and command models – and with these it can be reproduced an indefinite number of times". In the industrial society, just as capital and labor have been the strategic and transforming resources, the crucial point about a postindustrialism society is that knowledge and information become the strategic and transforming resources. But rather than writing about the effects and impacts of this in the foreseeable future, let us first understand the cause. Let us imagine a hypothetical scenario today, where the programmers, the developers, the designers and the testers are all working on a single project lead by a project manager. The project manager must in turn report to their manager and so on until the person in charge of the idea and its execution is informed. When we examine the hierarchy, the person at the top/head of the company has to report to a higher authority until eventually, there is no one to report to. The highest authority let us assume, is the government. The government is in turn, answerable to its people, thus making it a full circle with regard to the chain of command. Mackenzie Wark, in his book The Hacker Manifesto, calls for resistance to new class divisions - The Hacker Class and The Vectoral class. The Hacker Class as Wark explains, are the producers of information. It could be either in the fields of art, science, philosophy, etc. In the scenario explained above, it refers to all the people working in the office under the project, such as the programmers, the developers, the designers and the testers and the person that conceptualised the idea. Through a process of abstraction, hackers combine raw data to bring new ideas into the world. "The privatisation of information

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[2] Baudrillard categorised the historical shift into three orders. 1st order- Renaissance to Industrial Revolution, 2nd - Industrial revolution and 3rd-Hyperreality.

[3] Simulacrum- an image, imitation or representation of someone or something.

produces the hacker as a class, as they must sell their capacity for abstraction to those that own the means of production (the Vectoral class)".

The Vectoral class - These are the class of people that aim to dispossess the hacker class through monopolisation. They are called the Vectoral class because they ensure that monopoly is used to control the vectors along which information is passed. "the Vectoralist class hopes to extract a surplus from selling back to the producing classes their own souls. But the very strength of the Vectoralist class—its capacity to monopolise the vector, points to its weakness. The only lack is the lack of necessity. The only necessity is the overcoming of necessity. The only scarcity is of scarcity itself." (Wark,M., 2004 p. 146). In our scenario, although we are assuming that the highest authority is the government, there is no absolute certainty that it is. The Vectoralists could even be an intermediate group of people that are facilitating control between the hacker class and the government. It could either be the technocrats or the bureaucrats or even both. Technocracy emphasises "hard" quantitative and econometric skills such as programming and budgeting methodologies. Technocrats command scientific expertise and analytical skills. In contrast, bureaucrats command offices and channels.(Ronfeldt, D. F., 1996 p.255). But irrespective of the class of people, it is important to remember that they hold very high authority. Therefore, in a Cyberocracy, our fate lies in the hands of the Vector class.

THE INTERFACE AS AN IDEOLOGY

Being on the verge of witnessing a world dominated by Cyberocracy, it is important to think about the cause and where it all began. How did we reach a stage where everything is now in the palm of our hands in a small handheld device that not only allows us to access any and all kinds information in the world, but also allows us to communicate with the rest of the world? The obvious if not apparent answer is as simple as one word - computers. Computers that gave rise to the internet and the internet which further gave rise to social media, e-Commerce websites, Netflix etc. all of which are subtly designed to take up the maximum amount of our time under the guise of recreation or unwinding. It is obvious that computers are the main cause, a good and bad necessary evil in the world we live in today. But the one key factor that is conveniently being ignored and one that is blindly going unnoticed, is the medium. The medium through which these computer interactions are possible and the medium without which technology would have been a mere piece of inaccessible electronic devices that can only be used by engineers or professionals in that field - the

interface. The interface is slowly becoming the indispensable medium in which individuals live out their relations to a social structure. The interactivity with the user interface is abundant and eventually will cause it to form its own type of new ideology. Replacing the word "ideology" with "user interface", in Slovaj Žižek's famous book, "The sublime object of ideology", "The function of the "user-interface" is not to offer us a point of escape from our reality but to offer us the social reality itself as an escape from some traumatic, real kernel." (Žižek, S.,2008 p.45) If the user interface satisfies its requirements as the definition of what an ideology actually is, can it be looked at as an ideology? "My underlying thesis is here that no effective ideology simply lies: an ideology is never a simple mystification obfuscating the hidden reality of domination and exploitation; the atrocious reality obfuscated and mystified by an ideology has to register, to leave traces, in the explicit ideological text itself, in the guise of its inconsistencies, gaps, etc." (Žižek, S., 2013). And indeed, the interface is doing just that - subtly leaving traces in the minds of its users by registering itself. When we imagine ourselves scrolling through Facebook or Instagram etc, almost, (let us assume) five seconds before we use it)in our minds, it is the interface which is the first thing that comes into our minds.

Social media sites like Facebook, Twitter and Instagram being the most popular, are subtly but vastly occupying the lives of their users and it is their interface design which catches the eye. Websites such as these and websites with maliciously intended bad interface design are what this paper aims to examine in the coming sections.

CHAPTER 2: PART - A

THE "HOW" OF IT ALL

Humans today, we can say from first hand experience, spend nearly all of their time interacting with a screen. Be it computers, laptops, phones or iPads. (Epstein, Z. 2014 p.1) What is mostly overlooked while interacting with these screens by their respective users, is the underlying design patterns that are intricately crafted and created to draw our attention to what the company wants you to see and to subvert your attention from what they don't want you to see. Interaction designers themselves might not fully be aware of what they are actually designing because they're only being told to do what their companies ask of them. However, companies, through the use of strategic and manipulative design techniques, as will be discussed later on in this paper, can ensure their users see and interact with their interface in

the manner the company desires. The following section looks at some of the fundamental design elements and concepts and describes them through the context of user interactivity. It is crucial to understand how the design psychology behind each of these small and benign concepts work to be able to see that although seemingly harmless, these strategies are potentially contributing to the bigger overall threat of Cyberocracy through the malicious use of these concepts that are efficiently utilised to manipulate the users interactivity patterns.

THE USER INTERFACE(UI) FROM A TECHNICAL PERSPECTIVE

The user interface (UI), in the industrial design field of human–computer interaction, is the space where interactions between humans and machines occur. The goal of this interaction is to allow effective operation and control of the machine from the human end, whilst the machine simultaneously feeds back information that aids the operators' decision-making process. (Griffin, B., Baston L., 2014)
On the surface although interfaces may seem harmless and beneficial to the advancement of technology, according to Davies (2015, p.1), the average person spends 8 hours and 41 mins on electronic devices This is 20 minutes more than the average night's sleep, it is claimed. Four in 10 smartphone users check their phone in the night if it wakes them. More time is spent checking emails in the morning than eating breakfast.(Davies, M. 2015, March 11)

Interfaces are increasingly dominating the life of modern day humans. From the screen of our laptops, and from the ubiquitous portable devices, smart phones, and media players, to the embedded computation in clothes, architecture and big urban screens, interfaces are everywhere. They are simultaneously demanding our attention and computing quietly in the background, turning action into inter-action, and mediating our experience of and relations to the social and environmental. (Andersen, 2011, p.1) Having no interaction with the user interface in today’s times requires a conscious effort where people decide to go off technology and cut off all ties with anything that requires them to interact with a screen. Similar to a juice cleanse, they call it a technology cleanse. (Leasca, 2016, p.1) where the steps involve deciding when your detox will begin, what devices to put away, letting people know before you disappear and then finally making your technology free plans. The amount that needs to be done before you go off technology is a lot. Not to mention, once people come back to it, there is a lot they have missed out on.

HUMAN COMPUTER INTERACTION (HCI)

Human Computer Interaction is defined as "The point of contact between the application and the end user" (Sheppard & Rouff, 1994, p.1402). It is HCI that offers theories in terms of understanding how people interact with computer systems and new technology. It was the crucial instrument in popularising the idea that the interaction between a computer and the user should resemble a human-to-human, open-ended dialogue. It initially focused on using knowledge in cognitive and computer sciences to improve the usability of computers (i.e., concentrating on how easy computers are to learn and use).

However, since then—and thanks to the advent of technologies such as the Internet and the smartphone—it has steadily encompassed more fields (including information visualisation, social computing, etc.). While initially concerned with Computers, HCI has since expanded to cover almost all forms of information technology design. (Interaction Design Foundation, p.1)

Originally conceived as a conjunction between psychology and computer science, over the last 30–40 years, HCI has emerged as its own scientific research domain, which continues to expand its understanding.(O'Neill, S. 2008) As such, in the context of a media and internet dependent environment, Human Computer Interaction plays a role by enabling the users to communicate with the computer by sharing their own data such as pictures, videos, personal information and details, performing online transactions and also viewing and responding to the shared data of others.In this respect, it would be fair to say that the main goal of HCI is to improve the interaction between users and computers by making computer systems more user- friendly, usually by improving the usability of the systems' interface.

But as advances in technology change the way in which we interact, the demands on the theories that HCI uses to understand interaction increase dramatically.

However, While the traditional HCI approach remains concerned with the discussion of usability issues and system design methodologies, the more critically framed approaches, such as semiotics and media studies, offer broader insights into the transformation that interactive media is having on our production, reception and interpretation activities at a cultural level - that is the area of Human Computer Interaction that this paper aims to focus on. It is hard not to agree with O'Neill when

he argues that this continues to force a compartmentalisation of cognitive structures and a distinction between the world of the mind and the world around us.

When we interact with our screens, the world of our mind dominates the world around us. According to Heidegger,(1962, p.87) the primary and most revealing way of encountering the equipment of the world around us is through our embodied interaction with the physical matter that constitutes it. (i.e the interface for the purpose of this paper) Through this process of interaction we develop skilful use of the material of the world and we in turn develop tacit, embodied knowledge or 'know-how' that allows us to cope smoothly with the world around us, enabling our immediate survival. That is to say, interacting with our screens constitutes a type of being-in-the-world that provides us with a second kind of knowledge of 'know-that' rather than 'know-how'. The things disclosed to us through thinking about the world around us are experientially different in character from those disclosed to us through acting upon the world directly - a system of living that is an ideal womb preparing for the birth of a Cyberocracy. Interestingly enough, the organisations that obtain this knowledge could use it for malicious purposes knowing that what is perhaps most important about this approach to understanding our relationship to things in the world and interactive technologies in particular is that, it focuses on our connection to the world through our bodies in the first instance, promoting the idea that we are so connected to our surroundings that we need not build mental models of the world around us in order to act, but that we might simply act through a 'direct' relationship to them. This is very different from the original cognitive approach to HCI.

CHAPTER 2: PART - B

LOOKING THROUGH THE CREATOR'S LENS

The sections from here aim to provide a somewhat descriptive understanding of the concepts that go into making or creating the user interface with the intent of bringing to light the very fact that these designs that are overlooked by the users on the surface are subtly being intricately crafted after careful thought by the creators and more specifically, the designers beneath the surface. Although conceptually, these concepts do not possess a malicious threat, their invasiveness based on the clever utilisation of human psychology, could easily pave the way for manipulation and misuse. When we look at each of the following concepts and think, "how they can be

misused if these concepts are not used with the utmost caution so as to not be invasive", the previous statement is easier to ascertain.

INTERACTION DESIGN

Interaction design can be understood in simple (but not simplified) terms: it is the design of the interaction between users and products. Most often when people talk about interaction design, the products tend to be software products like apps or websites. The goal of interaction design is to create products that enable the user to achieve their objective(s) in the best way possible. (Siang, 2018, p.1) Interaction designers ensure that there is great amount of care taken while designing an interface that is presented before the users. "I believe that interaction design is still in the equivalent of the early stages of cinema. As yet, we have not fully developed language unique to interactive technology. So we are still drawing on the language of previous creative modes." - Gillian Crampton Smith, an interaction design academic, stated in her book "Designing Interactions". (Smith G, 2007) She conceptualised the four dimensions of an Interaction design language. A fifth dimension was added later by Kevin Silver, senior interaction designer at IDEXX Laboratories. (ibid, 8).

1D: Words

Words—especially those used in interactions, like button labels—should be meaningful and simple to understand. They should communicate information to users, but not too much information to overwhelm the user.

2D: Visual representations

This concerns graphical elements like images, typography and icons that users interact with. These usually supplement the words used to communicate information to users.

3D: Physical objects or space

Through what physical objects do users interact with the product? A laptop, with a mouse or touchpad? Or a smartphone, with the user's fingers? And within what kind of physical space does the user do so? For instance, is the user standing in a crowded train while using the app on a smartphone, or sitting on a desk in the office surfing the website? These all affect the interaction between the user and the product.

4D: Time

While this dimension sounds a little abstract, it mostly refers to media that changes with time (animation, videos, sounds). Motion and sounds play a crucial role in giving visual and audio feedback to users' interactions. Also of concern is the amount of time a user spends interacting with the product: can users track their progress, or resume their interaction some time later?

5D: Behaviour

This includes the mechanism of a product: how do users perform actions on the website? How do users operate the product? In other words, it's how the previous dimensions define the interactions of a product. It also includes the reactions—for instance emotional responses or feedback—of users and the product. (Ibid, 8)

Taking these five dimensions into careful consideration, Interaction designers have managed to produce successful, fully functional interfaces with the aim of facilitating a good user experience. However, with the proliferation of newer types of digital interfaces - Facebook, Twitter, Instagram, blogs and wikis, cell phones and iPods, come new opportunities for designers and new frustrations for users. For every relevant answer given by a search engine, for every new website that has led successfully to the page we want to be at, there have been dozens of irrelevant links that we have clicked on which has led us to untrustworthy websites. As more and more information is disseminated electronically for personal computers via the internet, the artistic design and narrative quality of this digital content become increasingly important. But the importance of interaction design revolves around this apparent paradox: we live in a society that is increasingly shaped by the events in cyberspace, and yet cyberspace remains, for all practical purposes, invisible, outside our perceptual grasp. Our only access to this parallel universe of zeroes and ones runs through the conduit of the computer interface, which means that the most dynamic and innovative region of the modern world reveals itself to us only through the anonymous middlemen of interface design. (Steven, J 1997, p.19). Keeping this in mind, many of the interface designers today have begun to understand that this can be exploited for their own gain and have thus begun creating manipulative interfaces. In order to create interfaces that can trick the users into clicking and navigating to the pages that they want them to, it is important to understand user perception and behaviour when they interact with an interface.

PERCEPTION AND BEHAVIOUR

We have all experienced first hand that when we use a badly designed interface we often feel frustrated and end up closing the window almost immediately. One example of this would be the ubiquitous case of pop up windows. But an interface can affect our emotions and behavioural patterns in a much deeper way than one might presume. In terms of visual organisation, most schemes for digital media rely heavily on the principles of visual perception (McCracken et al.,2004), such as proximity, similarity and continuity, the same Gestalt principles that are commonly used in document design(Schriver, 1996) and web design (Williams and Tollett, 2006). These principles stress on the fact that humans, rather than understanding objects atomistically, have a stronger tendency toward holistic visual perception. This means that for interface design, when creating a page for instance, it should be created in such a way that the elements of the page (such as images, text blocks, white spaces) are appealing and sensible as an integrated whole, not just as separate parts. The influence of perception of the usability of a system can be best exemplified by the case where Kurosu and Kashimura (1995) and Tractinsky (1997) found that ATM machines with higher aesthetic attractiveness but equivalent functions were perceived as more usable than ATM machines with lower aesthetic attractiveness. Therefore, each of these visual organisation schemes is part of a very powerful "cueing" system that can help the user understand the underlying conceptual organisation of an interface while minimising cognitive load.

COGNITIVE LOAD

In cognitive psychology, cognitive load refers to the effort being used in the working memory. Cognitive load theory was developed out of the study of problem solving by John Sweller in the late 1980s. Sweller argued that instructional design can be used to reduce cognitive load in learners. Cognitive load theory differentiates cognitive load into three types: intrinsic, extraneous, and germane. (Sweller, J 1988)
Therefore, when it comes to designing any interface, interaction designers take great care to ensure that the cognitive load for the users is minimised as much as possible. The fact that human working memory can hold only a limited number of items at a certain time (Baddeley, 1992; Miller, 1956) is common knowledge in user interface design. Methods for reducing memory load consist of having users focus on recognition rather than recall, for example by externalising information; preventing

users from having to remember information from one screen to the other; using generic commands such as copy and paste; keeping displays simple and clear; offering functionalities only in the context in which they are needed; and training users when complex interactions are required.(Mandel, 1997; Nielsen, 1994a; Shneiderman, 1998). The lesser the cognitive load, the higher the likeliness of the user performing the intended behaviour. In HCI, the importance of reducing cognitive load has been crucial in making interfaces more usable, and much of the work done here has followed the idea of simplifying graphical images or using metaphors within interfaces that mimic real world behaviours. The potential threat here could arise if the principles of cognitive load theory somehow manage to integrate themselves into a darker side that could influence a form of bureaucratic control. If so, it will be a form that affords embodied interaction rather than thinking. Decreased cognitive load could make the users interactivity change by making them perform tasks that they normally would find difficult and avoid to making users become more likely to perform them because of the ease in usability.

HOW EMOTIONS IMPACT COGNITION

Two information-processing systems determine the human emotional response: the affective and cognitive processing systems. The affective system operates outside of conscious thought and is reactive, in that a series of psychophysiological events are initiated automatically following the receipt of sensory information. In contrast, the cognitive processing system is conscious and involves analysis of sensory information to influence and even counteract the affective system. Affects (i.e. things that induce some change to the affective system) are divided into positive and negative groups. Positive affect has the potential to improve creative thinking, while negative affect narrows thinking and has the potential to adversely affect performance on simple tasks. Emotions are the product of changes in the affective system brought about by sensory information stimulation. Research suggests positive emotions—such as happiness, comfort, contentedness, and pleasure—help us make decisions, allow us to consider a larger set of options, decide quicker, and develop more creative problem-solving strategies. (Komninos, A. 2018) These findings suggest attractive things really do work better (Norman 2005), even if this is only the case because they make us feel better when we are using them.

NEGATIVE AND POSITIVE AFFECT

According to Norman (2002), negative emotions are examples of affective states: *"...affect changes how well we do cognitive tasks*". Negative and positive affect have different implications for cognition; negative affect limits thinking, but focuses our attention, while positive affect allows us to think more broadly, which enables creativity and supports problem-solving. Therefore, when you want people to concentrate intently, but there is no call for creative thinking, you might induce some negative affect by using warnings or alerts, for example, or using different types of audio. However, if you want your users to tackle complex problems, develop new strategies or simply think creatively, you might use design features which induce positive affect. Some computer games use this knowledge to good effect for designing the user experience, by setting the background music to something dramatic and ominous when the player enters an area where enemies are present (thus, creating anxiety and helping the player to focus on the bad guys), and by using calming and gentle music when the player enters an area where they need to solve a puzzle (thus, supporting their creative thinking).(Komninos, A. 2018). These types of interfaces are what are known as diegetic interfaces in the game world where the aim is to create a narrative and make the user see the "player character" within the narrative of the game rather than just the player.

DESIGN FOR BEHAVIOUR CHANGE AND PERSUASIVE TECHNOLOGY

Design for behaviour change is a sub-category of design, which is concerned with how design can shape, or be used to influence human behaviour. All approaches of design for behaviour change acknowledge that artefacts have an important influence on human behaviour and/or behavioural decisions.(Lockton, D., Harrison, D., Stanton, N.A. 2010, p.382) They strongly draw on theories of behavioural change, including the division into personal, behavioural, and environmental characteristics as drivers for behaviour change. The principles of design to influence the psychology of the user remain the same no matter what the medium. Therefore, if these principles are extended to the design of the user interface, it intersects or enters into the realm of persuasive technology. Although persuasive technology is defined broadly as technology that is designed to change attitudes or behaviours of the users through persuasion and social influence, but not through coercion,(B. J. Fogg, 2002) there are still concerns regarding the ethical principles of the strategies that are used.

According to Fogg, persuasive technology uses seven strategies to influence behaviour: (ibid)

1. Reduction – simplifies a task that the user is trying to do.
2. Tunneling – guides the user through a sequence of activities, step by step.
3. Tailoring – provides custom information and feedback to the user based on their actions.
4. Suggestion – gives suggestions to the user at the right moment and in the right context.
5. Self-monitoring – enables the user to track his own behavior to change his behavior to achieve a predetermined outcome.
6. Surveillance – observes the user overtly in order to increase a target behavior.
7. Conditioning – relies on providing reinforcement (or punishments) to the user in order to increase a target behaviour.

These principles, are not as effective by themselves or when looked at individually. Therefore, they are used as the basis for the following set of strategies (Zhuang D., 2013) meant to create designs for behaviour change:

1.)Determine the target behaviour

The first step in any behavioural design process is determining the behaviour to design. Start by asking the question: "If we could wave a magic wand and get our users to do anything, what would that be?" After deciding, determine how motivated your users are as well as how difficult the target behaviour is for them now (Hint: conduct a mental model exercise).

2.)Select the right trigger to apply to the target behaviour

Using the Fogg Behaviour Model, determine where your users lie with regards to motivation and ability. BJ Fogg frequently states the best approach is to make it easier for people to do the things they already want to do.

For every behaviour, target users who already have the motivation and ability but have not yet experienced a trigger. For example, if the target behaviour is biking instead of driving, target users who are already motivated and able to bike. Implement signals, such as an iPhone push notification that suggests biking instead of driving to work, to serve as a reminder for these users to do the behaviour.

Next, target users who have motivation but not ability. Implement facilitators that simplify the task and create a progression dynamic where these users work towards a

final goal.

Target users who do not have the motivation only if you have no other choice. Spending time and effort on unmotivated users is a poor choice, because motivation is slippery. You may be able to motivate someone to do a behaviour once or twice but their motivation may decline quickly if the behaviour is too hard to do.

3.)Brainstorm and pick the right strategy(s) and implementation(s)

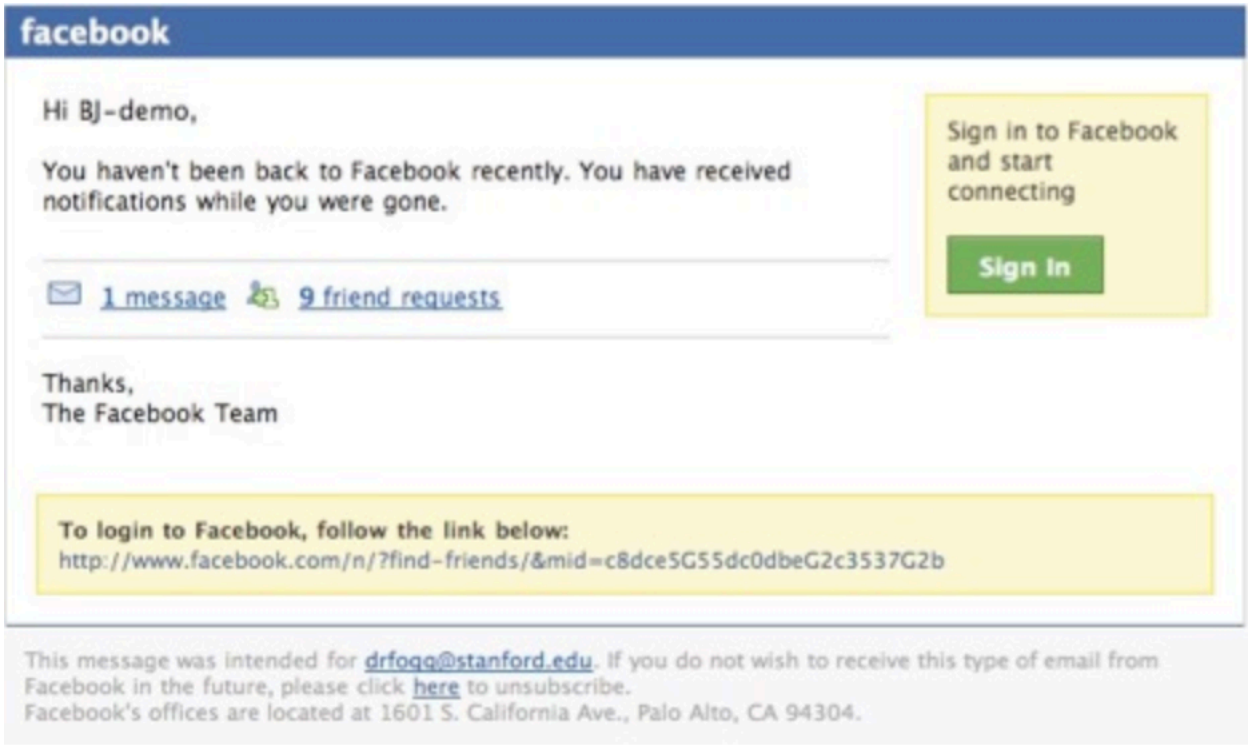
After determining which triggers a website or application might use to facilitate behavioural change, reconsider Fogg's seven strategies, mention above. Reduction, for example, might make a task considerably easier to do. This fits the facilitator trigger. Offering suggestions fits the signals trigger, etc. etc.

The sixth and seventh strategy described by Fogg titled surveillance and conditioning make one question if observing the user (even if it is overtly) and providing reinforcements or punishments to increase target behaviour is ethical. Although full disclosure will require this to be mentioned to respective users, perhaps in the terms and conditions, the full extent or the question as to what end this observation will take over is uncertain, allowing the lines of morality to easily be nudged. In addition, selecting the right trigger to apply in order to prompt a determined target behaviour are techniques devised to manipulate feelings and desires through persuasive technology. Although these do not necessarily qualify as "coercion" (like Fogg uses to define persuasive technology), as Harry Brignull rightly remarked, "pretty much any usability principle there is you can just invert and use for an evil purpose". (Brignull, H. 2013)

THE TAKEAWAY

The sections above do their best to outline the techniques that are in play while creating a user interface. It is important at this point to ask, can computers change what you think and do? Can they motivate you to stop smoking, persuade you to buy insurance, or convince you to join the Army? Dr. B.J. Fogg, director of the Persuasive Technology Lab at Stanford University, in his book "Persuasive Technology" has determined that they in fact can.(Fogg B. J. 2003) Fogg reveals how Web sites, software applications, and mobile devices can be used to change people's attitudes and behaviour and by looking at the extent to which humans interact with their screens, it is safe to say that we are no longer conscious of technology - and its

transparency is what makes it more powerful. A Cyberocracy requires everything to be digitised and that is where interfaces take centre stage. In the words of Godfrey Reggio, “It's not just the effect of technology on the environment, on religion, on the economic structure, on society, on politics, etc. It's that everything now exists in technology to the point where technology is the new and comprehensive host of nature of life.” The transparency of technology lies in its ubiquity. Because the interaction with technology has become so innately intertwined with human existence, individuals can see all the content on their screens getting access to all the information they need when they want. Nothing is out of reach, thus making it transparent. But the concealed truth that makes it more powerful is the registering of these interactive patterns by organisations and using *that* to create interface designs that can benefit them. The barriers between interfaces are gradually being erased. It does not matter what interface, i.e., desktop, phone, iPad, laptop we are accessing the websites, apart from accommodating to the different screen sizes, the interfaces and the interaction patterns remain the same. With this in mind, Baudrillard’s shift into the third-order, I.e. a state of hyperreality is becoming more clear. This raises the significant question making us wonder if reality, as we know it, is being replaced? - and if interface design has a surprisingly big role to play in controlling it. It can be seen that these design strategies are not just taking simple creativity into account while designing an interface, but also playing to our strengths and weaknesses by carefully examining how the human brain works, i.e. as mentioned earlier, the affective system being analysed and split into positive and negative affect groups. If Fogg’s hypothesis is correct, this no doubt immediately raises questions about the other side of the picture, some of which are what design techniques are promoted and to whose benefit, how ethical is it and the most important question, to what extent can it go and could it help in eventually leading to a state of authoritative control? When we look at the strategy mentioned earlier based on Fogg’s behaviour model which is using triggers to determine the target behaviour, a company that is successfully using it can be considered - Facebook. The reason Facebook has millions of users is because Facebook uses Triggers effectively to achieve their target behaviours. The following example(Fogg B.J. BehaviourModel) shows how a user with the account “BJ-demo”, hadn't logged into Facebook in a while. Therefore Facebook used a trigger that would enable him to log in. Note how this specific behavior - “signing in” is the first step of Facebook’s larger goal: To re-involve him in Facebook.



So the behaviour chain to re-involve users in Facebook looks like this:

1. Get users to log in (the email does this)
2. Get user to link to more friends (the "Find people" page does this)
3. Trust that new friends will respond to inactive user (a natural result of friending people)
4. Trust that inactive user will respond to friends and get more involved with Facebook (again, a natural reaction)

Note how these steps move inactive users toward Facebook's bigger goal - making Facebook a daily habit, a ritual, and perhaps an obsession. After logging in, yet again, users are prompted to spend as much time as they can logged in to Facebook. This is where it can get tricky because the type of content shown on their feed can perhaps be controlled using the same triggers to get users to like and subscribe to desired pages. It is after this stage that parallels can be drawn to Chomsky's propaganda model and the hypodermic needle theory according to which messages of propaganda are injected into the users through the media. This is best expressed by Marx and Engels in the German ideology, "The ideas of the ruling class are in every epoch the ruling ideas, i.e. the class which is the ruling material force of society, is at the same time its ruling intellectual force. The class which has the means of material production

at its disposal, has control at the same time over the means of mental production, so that thereby, generally speaking, the ideas of those who lack the means of mental production are subject to it" (p.14, emphasis mine).

According to Mackenzie Wark's Hackers and Vectoralist's theory, this would be the perfect example to demonstrate how the hacker class are being instructed to create more effective design patterns by the Vectoralists who are using this for their profit[4] because, it is not certain as yet, if the designers are even aware that the designs they are creating are causing these behaviour changes in their users. Even if they are, what is definitely not certain is if they know whether some of the strategies that are used could be borderline unethical. For now, however, the aim of the above sections is to make it apparent that if the goal of these companies owning websites that let users perform any sort of interactive transactions such as buying or selling of items (or clicking the button to view posts, photos and videos like in the case of social media websites) is to reach and target a maximum audience to increase their profits, they seem to have found a rather invasive way to do it and as explained above, this could easily have the potential to accelerate to some form of propaganda or control by authorities. Although, some of their design tricks are starting to be noticed and the next section throws some light on it.

CHAPTER 3: DARK PATTERNS

Dark Patterns are features of interface design, crafted to trick users into doing things they might not want to do but which benefit the business in question.(Brignull, H., 2017) They utilise tricks used in websites and apps that make you buy or sign up for things that you didn't mean to.If a company wants to trick you into doing something, they can take advantage of this by making a page look like it is saying one thing when it is in fact saying another. (ibid) The neologism was coined by user experience designer and consultant, Harry Brignull in 2010. Brignull argues that
normally, when you think of "bad design," you think of the creator as being sloppy or lazy — but without ill intent. Dark patterns, on the other hand, are not mistakes.

[4] This can be ascertained by the following statement in the "negative and positive affect" section "*Negative and positive affect have different implications for cognition; negative affect limits thinking, but focuses our attention, while positive affect allows us to think more broadly, which enables creativity and supports problem-solving. Therefore, when you want people to concentrate intently, but there is no call for creative thinking, you might induce some negative affect by using warnings or alerts, for example, or using different types of audio. However, if you want your users to tackle complex problems, develop new strategies or simply think creatively, you might use design features which induce positive affect.*"

They're carefully crafted with a solid understanding of human psychology, and they do not have the user’s interests in mind.
The thing about dark patterns is that you design them from the exact same rulebooks that we use to enhance usability. If we look at the 10 Usability heuristics for user interface design(Nielsen J., 1995) they seem benign and simple. Consider the following three for example:

Visibility of system status: The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

Match between system and the real world: The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

User control and freedom: Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

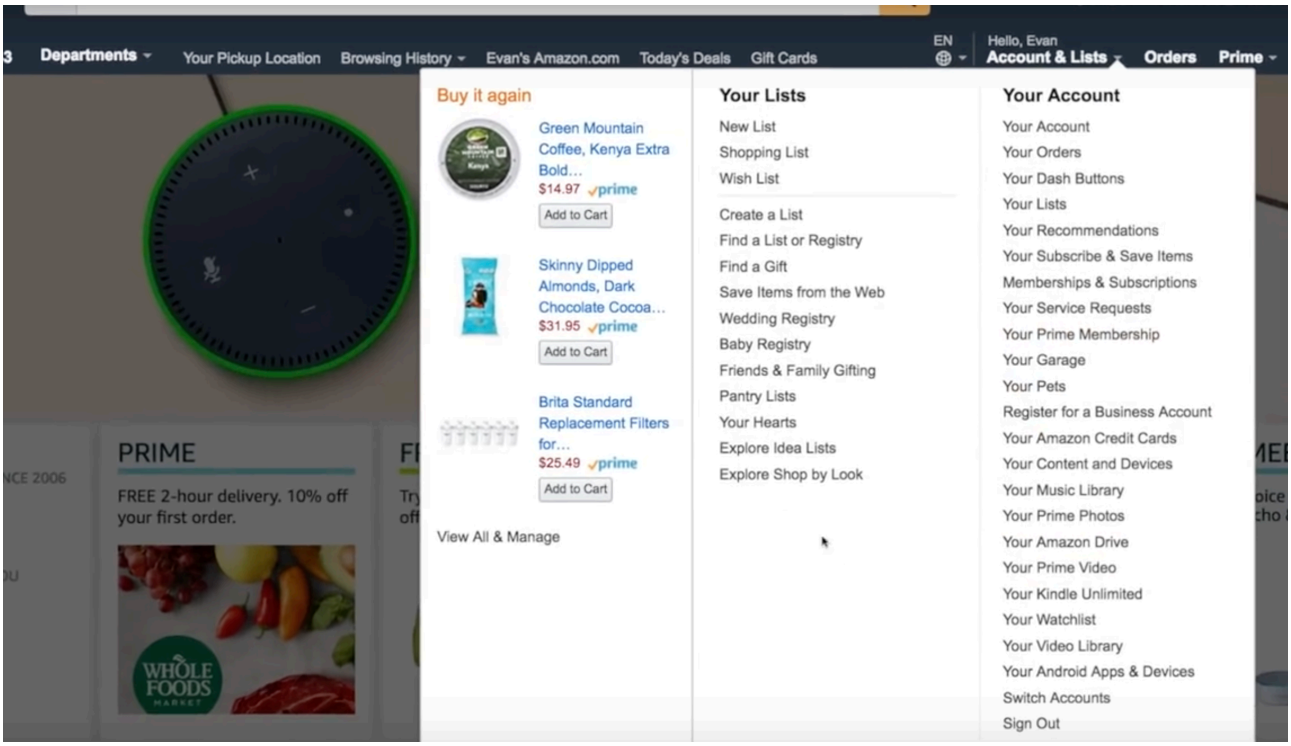
Brignull proposes that if we take the above three examples and invert them, we can describe Apple's UI strategy:

Visibility of system status. Instead of showing key status information, hide it. Do this with unclear labels, obtuse navigation, and untimely messages.

Match between system and real world. Instead of "speaking the user's language," the system should use "weasel wording" so that it appears to say one thing while it really says another.

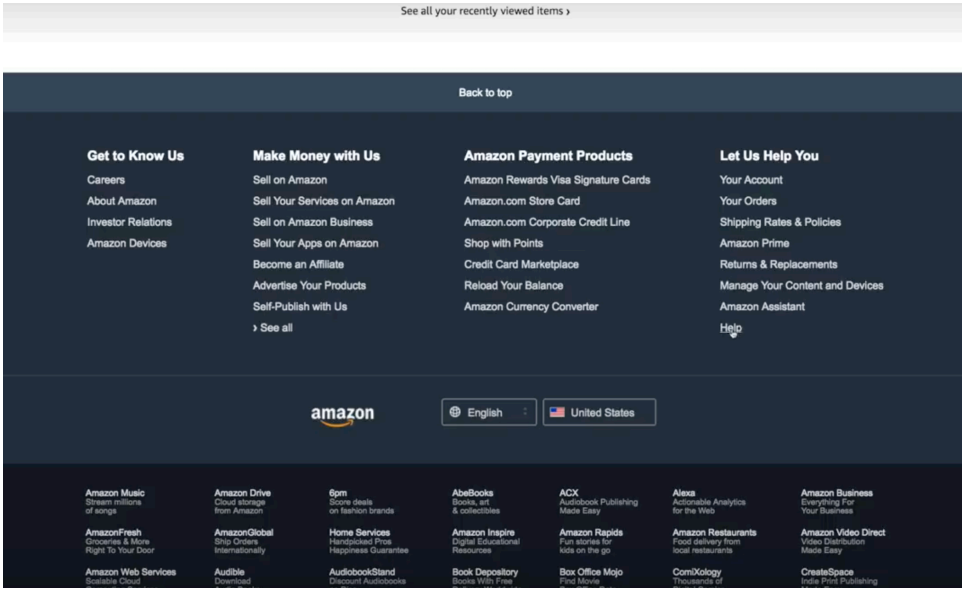
User control and freedom. Take advantage of your users' natural capacity to make mistakes to have them accidentally complete actions that are beneficial to your objective.

An example to demonstrate the first two strategies would be the amazon website. When you log on to the amazon website, and if you want to delete your account, the obvious place to look is the account tab. Ideally, there should be a "delete my account" button there but there isn't.

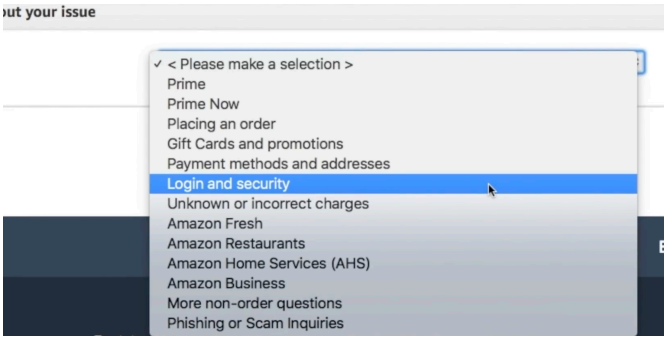


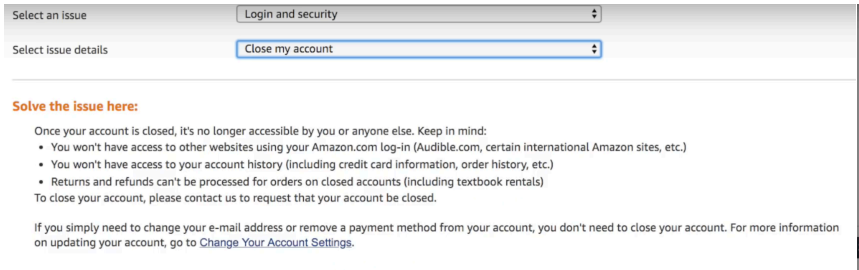
Once you click on the "your account" button, you are redirected to another page with a bunch of information which has no indication of a delete button anywhere on the page. Even when the user tries clicking every single link on that page, not one of them directs you to a place where you can delete it. This is a dead end.

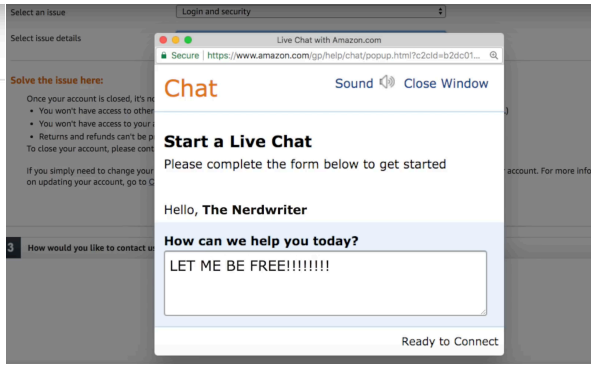
In order to actually delete your amazon account, you have to scroll down all the way to the bottom of the homepage and click the "help" button under "let us help you".



Once you're again redirected to another page, you have to click another button that says "need more help" after which you have to click "contact us". There is still no indication of anything that points to the user deleting their account. The user should supposedly just know to click "prime or something else" under which there is a "tell us more about your issue" dropdown menu. On selecting that and choosing the "login and security" option, a second dropdown appears with a series of options, one of which happens to be "close my account".



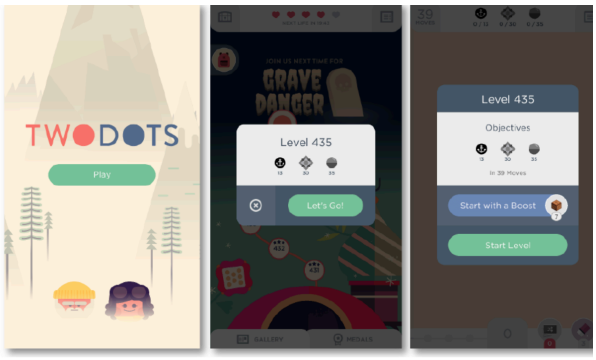




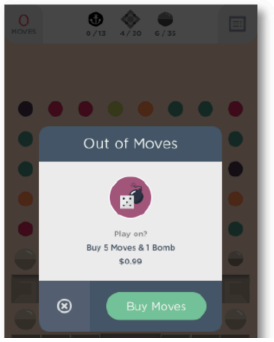
One would assume that this is the last step that allows you to finally delete your amazon account, except that it isn't. In order to do that you have to have a chat conversation with an amazon associate who after trying several times to persuade you into not closing your account, will inform you that you can't actually delete your account and that they have to do it for you. This is an example of a dark pattern - An inconveniently terrible user experience that intentionally makes it difficult, and almost impossible to perform a (what should be simple) task without help from a company employee. In other words, it intentionally makes it impossible to do something that could potentially disrupt the company's profits and agenda. How will the user know that those are the buttons they have to click and the pages they must navigate to in order to reach their end goal with absolutely no indication of how to do so whatsoever

from the website? They won't. And maybe this could lead to the users probably giving up and eventually deciding to perhaps not delete their account after all. Mainly because the time spent in trying to figure out how to get to a page that eventually enables you to do what you intended to, is much more than any user with a busy schedule would be likely to invest and this is where companies like amazon can win. They win because their numbers and statistics would not have shown any decrease. By implementing this dark pattern, the statistic that shows the number of people who have an amazon account is most likely to only go up.

An example to illustrate Brignull's third strategy based on Nielsen's principle when inverted, I.e. "user control and freedom", is the online mobile game "two dots". (Derome, J. 2015) This dark pattern users colour to misdirect its users. "Players are trained to associate the green buttons with gameplay. You select a green button to start the game once you've opened the app. Then once again when you've selected the level you'd like to play, and yet again before you begin that level. That's three times you're asked to select the green button. But when you lose a round/level, the colour scheme changes. The first green button you see labelled "Buy Moves", leads you right to an in-app purchase, while the cancel and continue button is represented by just a small "x" within a circle that blends into the larger element of the design." - Derome, 2015

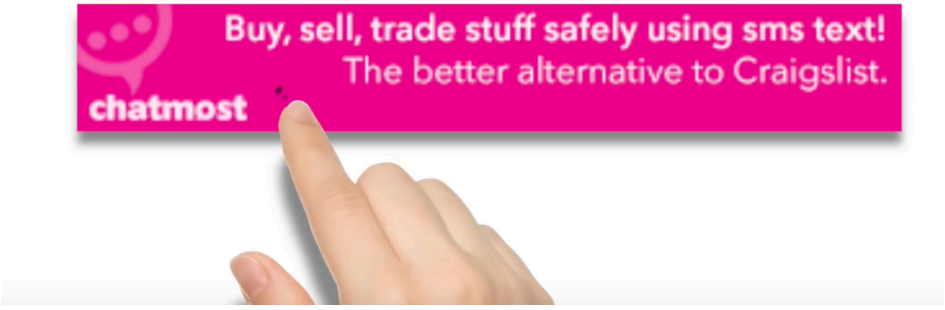


Now here's what players see if they lose a round:



This design technique is created with the intention of intuitively enabling the users to click the "Buy Moves" button almost reflexively as a Pavlovian response.[5] Although this dark pattern is quite harmless, it still shows us how a company can use something as simple as colour to manipulate its users for their own gain.

Jennifer Derome argues that as a business, it is perfectly natural to want your users to take some sort of action. Whether it's to buy your product or sign up for a newsletter, there is nothing wrong with a company having these goals in mind. However, what does make the pattern a dark pattern, is that the company uses manipulative design strategies to influence their user's choices. She further clarifies by saying "To be clear, I'm not talking about choosing a red button versus a green one after a series of A/B tests showed it performed better. But when a company purposely leads a user down a certain path by highlighting options that are beneficial to the company, but not necessarily the user, that's getting into shady territory." (ibid). The technique through which the company took advantage of its users' natural capacity to make mistakes to have them accidentally complete actions that are beneficial to the company's objective is clearly exemplified in the case above. Another similar example is the banner ad for the company, Chatmost. (Suresh S.,2018) The trick used here is that the banner is made to look like it has a spec of dust on it, causing people to brush it away and accidentally click the link which takes them to the chatmost site.



[5] Pavlovian response/conditioning refers to a learning procedure in which a biologically potent stimulus (e.g. food) is paired with a previously neutral stimulus (e.g. a bell). It also refers to the learning process that results from this pairing, through which the neutral stimulus comes to elicit a response (e.g. salivation) that is usually similar to the one elicited by the potent stimulus. Rescorla, R. A. (1988)

This is done to increase the "number of visits" statistic that the company needs to maintain in order to reach their goals.[6] There are many more examples such as these which show the malicious intent of companies, knowing well, the importance of how crucial the interface is.

Nevertheless, dark patterns although many and are slowly but surely becoming prevalent, are still only small examples of how control is established by interacting with the interface.[7] The next section examines how this control can affect the users on a much larger[8] scale where privacy is of concern.

CHAPTER 4: FACEBOOK - THE CAMBRIDGE ANALYTICA CASE

Information designer and former Facebook employee Nicholas Felton is known for his unique data visualisation ideas and has quantified almost every aspect of his life, from the miles he's walked to the average length of his personal conversations. In his interview with the New York Times,(Gerdau A., 2014) he mentioned that his biggest fear is that people will go into a state of ignorance about all the data that is being generated today and this key factor is what is being taken advantage of by companies accessing our data today. All this data, as Felton says, represents a piece of your identity and knowing who has access to this data and what is being done with it is crucial. Which brings us to the recent example of the Cambridge Analytica case. (Meredith, S. 2018, April 10). To summarise, In April 2010, Facebook announced the launch of a platform called Open Graph to third-party apps. This update allowed external developers to reach out to Facebook users and request permission to access a large chunk of their personal data — and, crucially, to access their Facebook friends' personal data too. Cambridge academic Aleksandr Kogan and his company Global Science Research created an app called "thisisyourdigitallife" in 2013. The app prompted users to answer questions for a psychological profile. Almost 300,000 users were thought to have been paid to take the psychological test — with the app then

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[6] As long as their statistics are meeting their requirements, so are their profits. But the important question here is, who are these requirements coming from, that causes the companies go to such extreme measures? Again, we find ourselves coming back to Mackenzie Wark's theory, exhibiting how this could be another win for the Vectoralists. The Hacker class is made to meet these design requirements while the Vectoralists are facilitating this in the background, well aware of the actual motives.

[7] More examples of dark patterns include viago's strategy to make users who want to buy 1 ticket for example, see a button that says there is only one ticket left. If they change it to 6 tickets, this button also changes to show there are only 6 tickets left and another example for a shoes website which has a fake hair that makes users swipe up. For more dark patterns, see https://darkpatterns.org/hall-of-shame

[8] A recent example has just surfaced and is the focus of this thesis. Government dark patterns - that is the hostile environment policy established in 2012 to encourage migrants to leave the country using nudge theory. Read more here: http://www.politics.co.uk/comment-analysis/2018/05/01/hostile-environment-the-dark-side-of-nudge-theory

harvesting their personal data. It also gathered data from their Facebook friends, which reportedly resulted in Kogan having access to the data of millions of Facebook profiles. In an explosive expose published in mid-March, The Guardian and The New York Times initially reported that 50 million Facebook profiles were harvested for Cambridge Analytica in a major data scandal. This number was later revised to as many as 87 million Facebook profiles. The articles sought to outline how the data of millions of Facebook users ended up being given to Cambridge Analytica. Although this alone is a major breach of privacy, at this stage, it can still be argued that although Cambridge Analytica had access to the users' data, they did not misuse it or use it for any malicious activities. Until of course, Christopher Wylie, a co-founder of the political data analytics firm, revealed the alleged practices to both newspapers. Wylie claimed the data sold to Cambridge Analytica was then used to develop "psychographic" profiles of people and deliver pro-Trump material to them online. To be specific, Cambridge Analytica used an algorithm capable of psychologically profiling these users, from their interactions on Facebook. (ibid.)

The key word to note in the previous sentence is "interactions" - because when we analyse the root cause, at the core of it all lies the word interactivity. Our digital footprint is a vast, ever-growing web of status posts, shares, photos, likes and comments. Every button we click and every key we tap in order to perform the aforementioned tasks in the blink of an eye, is interactivity and all of these actions are being recorded and stored in a database. This is a clear instance of how interactivity allowed companies to maliciously use their data not just for company profits, but also for political propaganda, which brings us to the very same observation that Victor Kaptelinin and Bonnie A. Nardi talk about in their book Acting with Technology - "People act intentionally in specific ways with technology. - Ways that can be studied and for which effective designs can be produced." This specific way in which people act stems from a phenomenon known as activity theory. Activity theory holds that the human mind is the product of our interaction with people and artefacts in the context of everyday activity and proposes that consciousness is realised by what we do in everyday practical activity. (Kaptelinin, V., Nardi, B. A. 2009 p.4)

Although it can be argued in the Cambridge Analytica case, whether the design strategies played any part in enabling the users to click on the link that would let them take the quiz, it is clear that the power of activity theory in this case played a significant part in the way it tied insights into a larger whole. By explaining how it is the "*doing"* of the activity in a rich social matrix of people and artefacts that form the environment for a social media website like Facebook, it grounded the analysis to

provide a clarifying framework for the bigger picture - which is the global impact that the "act" of the users who were prompted to take the quiz caused.[9]

However, Facebook as a social media website in itself according to its founder Sean Parker, is made to exploit human vulnerability. (Wong, J. C. 2017) He explained that when Facebook was being developed the objective was: "How do we consume as much of your time and conscious attention as possible?" It was this mindset that led to the creation of User Interface design features such as the "like" button that would give users "a little dopamine hit" to encourage them to upload more content. "It's a social-validation feedback loop", Parker stated … "exactly the kind of thing that a hacker like myself would come up with, because you're exploiting a vulnerability in human psychology." Parker is not the only Silicon Valley entrepreneur to express regret over the technologies he helped to develop. The former Googler Tristan Harris also criticised the social media website. "All of us are jacked into this system," he said. "All of our minds can be hijacked. Our choices are not as free as we think they are." (ibid) Victor Kaptelinin and Bonnie A. Nardi argue that behind every design there is intention - and the former directors of the company Facebook, confirm just that by stating that everything at these companies is designed to be aimed at making people addicted to their product. "They are advertising companies: the bigger the audience, the more they earn. People have to come back as often as possible. For this purpose Facebook managers visit conferences about behavioural influence. When users open the app, they must be surprised. The algorithm takes care of that." (Kreling T., 2018)

OBSERVATIONS AND ANALYSIS

In the previous sections, we have examined each of the actors: User Interface, Human Computer Interaction and Interaction Design. We have seen how designers are made to think by studying user psychology - looking at perception, cognitive load, emotions, affect, behaviour change and persuasive technology. We have seen how this

[9] This insight was expressed in Eastern thought by Buddha thousands of years ago when he said "Action makes the world go round Action makes this generation turn. Living beings are bound by action Like the chariot wheel by the pin." Here the poet intimates the close link between human action and the technologies that support it, i.e action here is characterised by interactivity with the interface or what in today's world has come to be known as human computer interaction.

can be used against users by looking at two case studies: Dark Patterns and Facebook's hand in Cambridge Analytica. When we reflect on these sections and think about how all these concepts merge together as a whole, it becomes transparently clear that there is most certainly some form of control already being exercised on people through their user interfaces - whether it is through design or through psychology or the type of content shown. But significantly enough, at this point it has come to the stage where it is now a valid question to ask - where is this type of control headed and what kind of future it could lead to. In the case of Dark patterns, the profit was intended to benefit the companies and therefore, control lay in their hands. In the examples that discussed India's "Aadhar" identity card system and China's social credit system, the control was in the hands of the government. In the case of Cambridge Analytica, although it can be argued that the profiling of users which was used for propaganda was to benefit the company, it was also to benefit the government so the candidates running for office could win the election. This raises the question of whether a Cyberocracy could be controlled by a one world government or a one world company. It could also possibly be both if they are working hand in hand. But more importantly what could this mean for us. Will the world eventually be controlled by making the user interface a central ideology? An enormous bureaucracy led by a single corporate company aiding government-controlled propaganda and news media, powerful and pervasive surveillance technology, suppression of intellectual dissent, no real freedom of information and expression for common citizens, restrictions on travel and communications abroad? Interestingly enough, some of the aforementioned (i.e. propaganda- Cambridge Analytica, surveillance- India and travel restrictions- China) as discussed earlier have already taken place.

On the larger scale, it looks as though control is being exercised on its people by the authorities. But on the lower level, could it be possible that there is some form of control that is being exercised even by individuals on themselves? Has interactivity and acting with technology somehow programmed us to lead an algorithmic existence? Totaro and Ninno (2014, p.33) argue that the culture of mechanisation did not arise as a 'superstructure' generated by the existence of machines. Rather, the opposite is true, in the sense that it was the rise of a mentality oriented towards process formalisation that facilitated the designing of mechanical equipment and their spread. Walker (1966: 591–2) has expressed this concept with the following interesting statement: men must themselves 'become mechanical' before they can realise the usefulness of introducing machines in their activities.

As subjects, it is worth asking if we now live in a state of algorithmic thinking. We are locked in to a certain form of interaction which is based on the algorithm in function at that moment. A small example, would be an algorithm to present dating matches for people. Users input certain data such as interests, gender, age, profession, sexual preference etc. The way the actual algorithm of the app functions is almost similar to the way the users' algorithmic conditioned brain functions. In the case of sexual preference, the user inputs their preference with the following algorithmic mindset:

if (gender == 'F')

If (sexual preference == "M")

match(M)

Else if (sexual preference == 'F')

Match (F)

Else if (sexual preference == "MF")

Match (MF)

This is a simple example that shows how continuous interactivity with machines has made users inclined to think exactly like an algorithm would. The presumption that one could reduce ontological entities, individuals, to standardised ones through formal classification so that they could be included in algorithmic processes is what led to the crisis of the bureaucratic model. These algorithms hinder social interaction not because they physically distance subjects, but because they force them to abandon the plane of communication to connect them according to the formal rules of a process. (Totaro, P., & Ninno, D. 2014) Therefore, Human Computer Interaction has not only helped government organisations and companies profit, but it has also centralised individuals by making them the subjects of algorithmic conditioning. In the words of Rouvroy, "The subjects of algorithmic governmentality are not persons but the infinitely indexable and profileable entities, competing with each-other at a quasi-molecular scale, affected by alerts and stimuli generating reflex responses in a real-time economy of reputation, risk and opportunity." - Antoinette Rouvroy. Algorithmic Governmentality: A passion of the real and the exhaustion of virtuality.

CONCLUSIONS

As the information revolution alters people's consciousness of the world around them, their perceptions of time and space are affected. Numerous corporate leaders have spoken and written about the information revolution.(Ronfeldt D., p.250) The underlying thesis of this paper is this: Although a vast speculative literature exists about the political effects of the information revolution, people are yet to recognise that it is the act or the very *pattern* of individual users interacting with their user interface which could advertently lead to the discussed possible future. Therefore, the following conclusions can be drawn from this paper:

1. Human Computer Interaction is altering the way we as humans are seeing and perceiving things, making us more algorithmic day by day.

2. Companies are beginning to take advantage of this fact by incorporating design patterns that can predict the way we behave and manipulate the interfaces accordingly to increase their profits.

3. Companies are using data collected on individuals for predictive behaviour patterns and using them for propaganda, advertising and also to increase the time users spend interacting with the computer.

4. Governments are beginning to exercise control by collecting individual data to use for mass surveillance ensuring individuals are checked to comply with the rules of the state and failure to comply earns them the appropriate punishment.

There is thus an urgent need to further examine the case of Human Computer Interactivity, whether it is through interface manipulation or psychologically profiling users by extracting their personal data or by using an interface to manage and monitor individual citizens through their respective screens. The relationship of the body, media and its interpretation has to be understood if we are to get a handle on interacting with these new types of interfaces. If there is a possibility that this world is heading towards a cyber controlled totalitarian regime, some form of action needs to be taken so as to slow down or possibly even prevent the rise of it.

THE POSSIBILITY OF A DIFFERENT OUTLOOK, A POTENTIAL SOLUTION AND NEXT STEPS

Given that this paper paints Human Computer Interaction as the main culprit that could lead to a Cyberocracy, there is also the possibility that a Cyberocracy may favour democratic tendencies rather than authoritarian and totalitarian regimes. Looking at the impact that Human Computer Interaction can have on a Cyberocracy optimistically, Ronfeldt, D. F., (1996 p.277-278) argues that:

Firstly, no regime will be able to isolate itself or its country from connecting with people around the world. The "Big Brother" system of George Orwell's 1984 will not be possible because most readers forget that Big Brother was not all seeing and only 10% of the people were monitored at any given time.

Secondly, power could accrue more to individuals than to institutions. As a result of improved access to information resources, the presumably smaller, weaker individuals should be able to compete with bigger stronger organisations. A similar argument holds good for the developing countries seeking to compete economically and politically with the developed nations and with multinational companies because a Cyberocracy could mean that the digital divide may finally be bridged granting people around the world equal access to all the different forms of technology.

Thirdly, the free flow of information is inherently compatible with our political systems and values. Totalitarian societies face a dilemma: either they try to stifle these technologies and thereby fall further behind in the post industrial revolution of information or they permit these technologies and see their totalitarian control inevitably eroded.

However, Ronfeldt fails to consider another possible option to his third argument, which is the possibility of them neither stifling nor permitting these technologies, but manipulating them. Human Interaction with a machine is the one thing they are certain will remain constant. Therefore, the only work around they can find instead of stifling it, is manipulating it to purposefully persuade users to act with the interfaces in a way that benefits their method of control. "Propaganda is the deliberate, systematic attempt to shape perceptions, manipulate cognitions, and direct behavior to achieve a response that furthers the desired intent of the propagandist." (Jowett and O'Donnell 1986) - and what better medium than an interface to do so.

Nevertheless, this section aims to throw a positive light and offer a different outlook on the foreseeable outcome and undeniably, there have been some positive changes. The fact that companies like Cambridge Analytica and Facebook have been exposed and the concept of Dark patterns coming to light are in itself a step in the right direction. It is important to remember that although there are companies and organisations seeking to gain control, there are always going to be opposing companies and authorities that will fight against them, hopefully maintaining the precariously struck balance at the moment. This can be illustrated by presenting the case of the GDPR(General Data Protection Regulation) law. (GDPR and you, 2018) Although it is only in Europe, the GDPR law strengthens the rights of individuals and increases the responsibilities on the companies that use any individual's data. Organisations and businesses collecting and processing personal data will be required to meet a very high standard in how they collect, use and protect data. Very importantly, organisations must always be fully transparent to individuals about how they are using and safeguarding personal data, including by providing this information in easily accessible, concise, easy to understand and clear language. This means that companies like Facebook for instance, will need to request consent from their users before recording any of their personal data. The GDPR will also permit individuals to seek compensation through the courts for breaches of their data privacy rights, including in circumstances where no material damage or financial loss has been suffered. To reiterate Ronfeldt's second argument, this is a step towards power being bestowed more into the hands of individuals rather than to institutions. Another possible solution could be to enhance the way terms and conditions on websites are shown to the users. Taking into consideration the perceptive and cognitive patterns of humans and using that to create an interface that displays the terms and conditions in a more comprehensible and memorable form so that users become clear on exactly how their information is being used can be beneficial. The ignorance of interactive patterns by individuals stems from recursive interactions by humans with technology. (Slade., E, Clement, M.,Shareef.,M 2018 p.123). Their continued interactions like a recursive algorithm are being noted by organisations on a deeper level than they presume. Therefore, users should be made more aware of their interactive patterns and habits. This way, people can interact with their screens in a more cautious and well informed manner knowing fully well what they are getting into. Maybe creating an awareness could unravel a potential solution that can somehow prevent or not allow the world to reach a Cyberocracy after all.

REFERENCES

1. Althusser, L. (1970). Ideology and Ideological State Apparatuses Retrieved from https:// www.marxists.org/reference/archive/althusser/1970/ideology.html

2. Andersen, C. U., & Pold, S. B. (2011). Aesthetics Beyond the Buttons. Retrieved February 26, 2018, from https://dl.acm.org/citation.cfm?id=2028975 , Aarhus University Press

3. Baddeley, A (1992) Working Memory: The interface between memory and cognition. Journal of cognitive neuroscience, 281-288

4. Baudrillard, J. (1981). Simulacra and Simulation. Retrieved from http://individual.utoronto.ca/bmclean/hermeneutics/baudrillard_suppl/Baudrillard_Simulacra.html

5. Brignull, H. (2017). What are dark patterns? Retrieved from https://darkpatterns.org/

6. Brignull, H. (2013, August 29). Dark Patterns: Inside the interfaces designed to trick you. Retrieved from https://www.theverge.com/2013/8/29/4640308/dark-patterns-inside-the-interfaces-designed-to-trick-you

7. Chin, J. (2016, November 28). China's New Tool for Social Control: A Credit Rating for Everything. Retrieved from https://www.wsj.com/articles/chinas-new-tool-for-social-control-a-credit-rating-for-everything-1480351590

8. Davies, M. (2015, March 11). Average person now spends more time on their phone and laptop than SLEEPING, study claims. Retrieved from http://www.dailymail.co.uk/health/article-2989952/How-technology-taking-lives-spend-time-phones-laptops-SLEEPING.html

9. Debray, Regis. April 1986. Interview as excerpted and quoted in Harper’s magazine (pp. 18-20)

10. Derome, J. (2015, October 1st). Published on 2016, January 12th. Dark Patterns: The Sinister Side of UX. Retrieved from https://www.usertesting.com/blog/2015/10/01/dark-patterns-the-sinister-side-of-ux/

11. Dreze, J. (2017, March 24). Hello Aadhaar, Goodbye Privacy. Retrieved from https://thewire.in/government/hello-aadhaar-goodbye-privacy

12. Epstein, Z. (2014, May 29). Horrifying chart reveals how much time we spend staring at screens each day. Retrieved from http://bgr.com/2014/05/29/smartphone-computer-usage-study-chart/

13. Fogg, B. J. (2002). Persuasive technology: Using computers to change what we think and do. Amsterdam: Morgan Kaufmann

14. Fogg, B. J. (2002). Behaviour Model Retrieved from http://www.behaviormodel.org/triggers.html

15. Fullerton, J. (2018, March 24). China's 'social credit' system bans millions from travelling. Retrieved from https://www.telegraph.co.uk/news/2018/03/24/chinas-social-credit-system-bans-millions-travelling/

16. Gerdau, A. (2014, August 19). Nicholas Felton: A Quantified Life. Retrieved from https://www.nytimes.com/video/technology/100000003050767/nicholas-felton-a-quantified-life.html

17. Griffin, Ben; Baston, Laurel. "Interfaces" (Presentation): 5. Archived from the original on 14 July 2014. Retrieved 7 June 2014. "The user interface of a mechanical system, a vehicle or an industrial installation is sometimes referred to as the human-machine interface (HMI)."

18. Hatton, Celia. "China 'social credit': Beijing sets up huge system". BBC News. Retrieved 2015-12-23

19. Heidegger, M. (1962). Being and Time. SCM Press, London. http://pdf-objects.com/files/Heidegger-Martin-Being-and-Time-trans.-Macquarrie-Robinson-Blackwell-1962.pdf

20. Isen, A. M., & Means, B. (1983). "The influence of positive affect on decision-making strategy". Social cognition, 2(1), 18-31.

21. Isen, A. M. (2001). "An influence of positive affect on decision making in complex situations: Theoretical issues with practical implications". Journal of consumer psychology, 11(2), 75-85.

22. Johnson, Steven.(1997). Interface Culture: How new technology transforms the way we create and communicate. New York: Basic Books.

23. Jowett, G. S., & O'Donnell, V. (2012). Propaganda and Persuasion. Retrieved from http://hiddenhistorycenter.org/wp-content/uploads/2016/10/PropagandaPersuasion2012.pdf

24. Kaptelinin, V., & Nardi, B. A. (2009). Acting with technology: Activity theory and interaction design. Cambridge, Mass: MIT Press.

25. Kohrs, Christin, et al. "Delays in Human Computer Interaction and their Effects on Brain Activity." PLoS ONE, Public Library of Science, 8 Jan. 2016, Retrieved February 27, 2018, from www.ncbi.nlm.nih.gov/pmc/articles/PMC4712932/.

26. Komninos, A. (n.d.). How Emotions Impact Cognition. Retrieved from https://www.interaction-design.org/literature/article/how-emotions-impact-cognition

27. Kreling, T. (2018, April 21). De hel achter de façade van Facebook. Retrieved from https://beta.volkskrant.nl/nieuws-achtergrond/de-hel-achter-de-facade-van-facebook~b884f37c5/

28. Kurosu, M., & Kashimura, K.,(1995) Apparent usability vs. Inherent usability: Experimental analysis on the determinants of the apparent usability. In I. Katz, R. Mack, & L.Marks (Eds.), Conference on human factors in computing systems (pp. 292-293). Denver, Colorado: ACM

29. Leasca, S. (2016, May 5). Here's How To Go On That Technology Cleanse You So Desperately Need. Retrieved February 26, 2018, from https://www.elitedaily.com/life/how-to-go-on-a-technology-cleanse/1484865

30. Lockton, D., Harrison, D., Stanton, N.A. (2010). The Design with Intent Method: a design tool for influencing user behaviour. Applied Ergonomics, 41 (3), 382-392.

31. Mandel, T. (1997) Elements of user interface design. New York, NY: John Wiley and Sons.

32. Marx, K., & Engels, F. (1976). The German ideology. Moscow: Progress. p.14

33. McCracken, Daniel D., Wolfe, Rosalee J., & Spool, Jared M. (2004). User-centered web site development: A human computer Interaction approach. Upper Saddle River, NJ: Prentice Hall.

34. Meredith, S. (2018, April 10). Facebook-Cambridge Analytica: A timeline of the data hijacking scandal. Retrieved from https://www.cnbc.com/2018/04/10/facebook-cambridge-analytica-a-timeline-of-the-data-hijacking-scandal.html

35. Miller, G. A (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. Psychological review, 63, 81-87.

36. Nielsen, J. (1995). 10 Heuristics for User Interface Design. Retrieved from https://www.nngroup.com/articles/ten-usability-heuristics/

37. Nielsen, J. (1994a): Usability engineering, San Diego, CA: Academic Press.

38. Norman, D. A. (2013). The design of everyday things(2002 ed.). NY, NY: Basic Books.

39. O'Neill, S. (2008). Interactive media: The semiotics of embodied interaction. London: Springer- Verlag. doi:http://blogs.iad.zhdk.ch/embodied-interaction-advanced/files/2013/11/Semiotics_of_Embodied_interaction.pdf

40. Persson, M. "China rates its own citizens – including online behaviour". www.volkskrant.nl. 25 April 2015. Retrieved 2015-12-26.

41. Rescorla, R. A. (1988) Pavlovian Conditioning: It's not what you think it is. Retrieved from https://web.stanford.edu/class/psych227/RESCORLA%20(1988).pdf

42. Ronfeldt, D. F. (1996). Cyberocracy is coming. The Information Society.

43. Rouvroy, A. (2015). Algorithmic governmentality: A passion for the real and the exhaustion of the virtual. Retrieved from http://www.academia.edu/10481275/Algorithmic_governmentality_a_passion_for_the_real_and_the_exhaustion_of_the_virtual

44. S., L.|Selfe, C., & J., R. (1993, November 30). The Politics of the Interface: Power and Its Exercise in Electronic Contact Zones. Retrieved from https://eric.ed.gov/?id=EJ498884

45. Schriver, Karen (1996). Dynamics in document design. New York: John Wiley and Sons, Inc.

46. Sheppard, S., & Rouff, C. (1994). In J. John Marciniak (Ed.), Encyclopedia of Software Engineering (Vol. 2). New York, NY: John Wiley & Sons.

47. Shneiderman, B (1998). Designing the user Interface. Strategies for effective Human Computer Interaction.(3rd ed.) Reading, MA: Addison-Weseley.

48. Siang, T. (n.d.). What is Interaction Design? Retrieved April 15, 2018, from https://www.interaction-design.org/literature/article/what-is-interaction-design.

49. Slade, E. L., Clement, M., & Shareef, M. A. (2018). Emerging Markets from a Multidisciplinary Perspective.

50. Smith, G. 2007. "What is Interaction Design?". In Designing Interactions, edited by Bill Moggridge, 8-19. Cambridge, Massachusetts: MIT Press.

51. Sommerer, C. (2008). The art and science of interface and interaction design. Berlin: Springer.

52. Suresh, S. (2018, April 17). Dark Patterns in Marketing. Retrieved from https://paulwriter.com/dark-patterns-in-marketing/

53. Sweller, J (June 1988). "Cognitive load during problem solving: Effects on learning". Cognitive Science. 12 (2): 257–285. doi:10.1207/s15516709cog1202_4.

54. Totaro, P., & Ninno, D. (2014). The Concept of Algorithm as an Interpretative Key of Modern Rationality. Retrieved from http://journals.sagepub.com/doi/pdf/10.1177/0263276413510051

55. Walker PG (1966) The origins of the machine age. History Today, 16 September: 591–600.

56. Wark, M. (2004). A hacker manifesto. Cambridge: Harvard University Press.

57. Williams, Robin & Tollet, John. (2006). The non designer's web book. Berkeley: Peachpit Press.

58. Wong, J. C. (2017, December 12). Former Facebook executive: Social media is ripping society apart. Retrieved from https://www.theguardian.com/technology/2017/dec/11/facebook-former-executive-ripping-society-apart

59. Zhuang, D. (2013, February 26). Designing for Behavioral Change in Health | UX Booth. Retrieved from http://www.uxbooth.com/articles/designing-for-behavioral-change-in-health/

60. Žižek, S. (1989). The sublime object of ideology. London: Verso. P.45

61. Žižek, S. (2013, July 25). Some Bewildered Clarifications: A Response to Noam Chomsky by Slavoj Žižek. Retrieved from https://www.versobooks.com/blogs/1365-some-bewildered-clarifications-a-response-to-noam-chomsky-by-slavoj-zizek

FIGURES:

1. Pg 25: http://www.behaviormodel.org/triggers.html

2. Pg 28,29,30,31: https://darkpatterns.org