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A critical reflection on digital disruption in journalism and journalism education

In this essay, we critically reflect on digital disruption in journalism and journalism education with specific focus on the South African context. After contextualising the problematics in terms of what Castells terms the "information technology revolution", we define data visualisation and survey the existing literature on the subject. The history of journalism education in South Africa is briefly revisited before assessing the current state of the profession in the country. The dangers posed by digital visualisation to the core ethos and function of journalism as a vehicle in the service of contributing to a resilient democracy is thrown into relief by utilising critical concepts from the work of Foucault, Habermas and Fuchs. We subsequently cite a few examples of the undisclosed bias inherent in data visualisation. In conclusion, we consider the feasibility and potential effects of the necessity to adopt data visualisation techniques on journalism in South Africa.

Keywords: Digital disruption; data visualisation; journalism; journalism education; South Africa

Contextualising the problematics

A critical interrogation of the impact of digital disruption on journalism and journalism education, the focus of our concern in this contribution first needs to be contextualised if it is to be conceived in all its complexity. As early as 1996, Manuel Castells analysed the rise of the "network society". As a result of what he calls the "information technology revolution" (see Castells 1996: 28-76), the social landscape of human life was radically transformed on account of the tripartite force field of "informationalism, globalisation and networking" (Castells 1996: 77-162). As Erikson (2005: 596) explains, the model of the *network* "enable us to think about complex technological, theoretical, economic and political processes in a coherent way that nevertheless cannot be reduced to a system". Castells's definition of a network as "a set of interconnected nodes" (1996: 470) is instructive here. What is important is that the identity of the nodal points is formed through their position and function as parts of the whole. The intersections of a network, therefore, do not have any privileged distinct meaning-content, but has meaning only in relation to its function in the topology of the network. Being interconnected the nodal points are subject to constant transformation in response to the force field in which it is embedded, which in turn constantly restructures the network. For Castells, this development had far-reaching implications for the economy. The coming into power of neoliberalism at the end of the 1970s coincided with the creation and development of the internet in the last three decades of the 20th century (see Castells 1996: 45). The subsequent exponential growth in the internet on account of the ongoing expansive technological infrastructure, and the utilisation of the internet in all areas of human activity (in April 2020, approximately 4.57 billion people were active internet users, encompassing 59% of the global population)[1] has been a decisive facilitator of the increasing globalisation of neoliberalism. Importantly, Castells (1996: 101) distinguishes between a *global* economy and a *world* economy. The latter, he states, is not a new phenomenon. A world economy is an economy in which capital accumulation proceeds throughout the world and has existed in the West at least since the 16th century, as Fernand Braudel (1967) and Immanuel Wallerstein (1974) have taught us.[2] A *global* economy is something different, he explains, "an economy whose core components have the institutional, organisational, and technological capacity to work as a unit in real-time, or in a chosen time, on a planetary scale" (Castells 1996: 102).

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1   Source: https://www.statista.com/statistics/617136/digital-population-worldwide/

2   See Braudel F. 1967. *Civilisation matérielle et capitalisme. XVe – XVIIe siècle.* Paris: Armand Colin; Wallerstein I. 1974. *The Modern World System.* New York: Academic Press.

Apart from being *networked* and *global,* the third distinctive and intertwined feature of this "new economy", is the fact that it is *informational:* "It is i*nformational* because the productivity and competitiveness of units or agents in this economy (be it firms, regions, or nations) fundamentally depend upon their capacity to efficiently generate, process, and apply knowledge-based information" (Castells 1996: 77). Conceptually, the network of the "new economy" with its respective interconnected nodes is therefore itself a constantly changing constellation subject to revolutionalising forces of creative destruction in response to dynamics of resistance that is not external to the network, but an intrinsic feature of its ontology and functionality. Like all revolutions, this information technology revolution proved to be profoundly disruptive. It is within this context that the notion of "digital disruption" may be understood. Skog, Wimelius and Sandberg (2018: 432) define digital disruption as, "the rapidly unfolding process through which digital innovation comes to fundamentally alter historically sustainable logics for value creation and capture by unbundling and recombining linkages among resources or generating new ones".

Disruptive technology, characteristic of the Fourth Industrial Revolution (4IR / 4.0)[3], refers to the Internet of Things (IoT), virtual reality, data science, robotics, artificial intelligence and cognitive technology proliferating into all aspects of life. These networked technologies are seen as disruptive on a global scale due to the speed of innovation and adoption. Digital disruption falls within the discursive field of 4IR alongside acceleration, innovation, acuity, interaction design, adaptation, fluidity, plasticity and dematerialisation. In the informational economy, data is central to disruption and hence, as Forrester states, it has become the business of all companies (Forrester 2016). It is unsurprising then that in 2000 the top four companies in the US were General Electric, ExxonMobil, Pfizer and Citigroup, whereas in 2018, the top four companies were Apple, Alphabet/ Google, Microsoft, and Amazon (Anthony, Viguerie, Schwartz and Landeghem 2018: 7).

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3   The first industrial revolution marked the shift from hand production to machine production. The second industrial revolution saw the addition of science and technology streamlining production through the use of electricity, petroleum and steel. The third industrial revolution or evolution was the convergence of telephony which created efficiencies through digital networks. 4IR refers to rapid disruption of older modes of productive relations where the Internet of Things (IoT) brings everyday inanimate ordinary objects into the digital network, creating automated systems which connect devices and have the potential to generate large amounts of data about users.

As global in scope, 4IR and digital disruption inform South Africa as well, driving policy to the specialised focus of e-skilling.[4] Post 1994, the ICT sector was first unbundled and reconstituted on account of (neo)liberalisation, privatisation and deregulation. Government later instituted organisations to address the digital skills gap (Ikamva National e-Skills Institute of South Africa [iNeSI], The South African Centre for Digital Language Resources [SADiLaR], and DHASA [Digital Humanities Association of Southern Africa]).

Within the context of journalism and journalism education, digital disruption specifically emerges as data visualisation. Our research into data visualisation and its appearance in journalism has uncovered the paucity of related literature within the South African context. This lacuna, as we shall argue, along with the pressures brought to bear on journalism as industry and practice, are of profound consequence for journalism education in South Africa. By utilising a Habermasian-Fuchsian lens of the public sphere and communicative rationality/action, in the final instance, we show the extent to which core journalism may be disrupted and undermined by data visualisation.

Defining data visualisation

Data visualisation emerged in journalism as a result of big data sets[5] using visualisation and narrative techniques to convey complex information and the rise of prosumer-based media. A good example of data visualisation is Hans Rosling's "200 Countries, 200 Years, 4 Minutes – The Joys of Stats".[6] Bringing statistics to life by utilising top-quality data visualisation, this 2010 YouTube clip plots the health and wealth of 200 countries over 200 years. Animating data in real space, Swedish academic Hans Rosling explains how global health and wealth trends have changed since 1810. Despite persistent and extreme inequalities (both across countries and within countries), Rosling's data point to a closing gap between Western and non-Western countries, fostering a "converging world" perspective. He projects that, in the future, everyone can "make it" to the healthy and wealthy plots on the graph.[7]

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4   "E-skills can also be referred to as the ability of people to use and create all forms of ICTs to adequately improve life opportunities in their personal and learning environment, their quality expression, social engagement and to participate in the economy" (Source: http://inesi.org.za/pages/what-is.php).
5   Big data refers to the data that is characterised by volume, velocity and variety, making it difficult to analyse it using traditional methods.
6   https://www.youtube.com/watch?v=jbkSRLYSojo
7   Source: https://www.thesociologicalcinema.com/videos/hans-roslings-200-countries-200-years-4-minutes

Roels, Baeten and Signer (2017) define data visualisation as the capacity to "present data to the right people at the right time in order to enable them to gain insights most effectively". In this sense data visualisation in the form of charts and informational graphics and videos are not new. The contemporary form involves augmented reality presentations which are based on big data sets. Roels et al. (2017) indicated that the principle behind contemporary data visualisation is to "ensure that the consumer of the content understands the data that is being communicated, which they may not interpret clearly in its true sense". While comprehension is one aspect driving data visualisation, another key element is retention. Retention refers to the ability to *maintain* the attention of audiences, consumers, or clients. In fact, data visualisation is considered unsuccessful if it fails to engage, entertain and retain audiences. Retention is of critical concern to companies advertising online as hypertextuality allows for users to navigate their own pathways. Strictly speaking, hypertextuality is not exactly prosumption (production by consumers), however, it does result in disintermediation, i.e. the reduction of intermediaries between producers or consumers as it enables more user control and interactivity. Online journalism sites are equally subject to disintermediation and are thus also pressured by the need for retention. The challenge posed by retention takes on particular pertinence in light of the fact that journalism is a vital tool in democracy and online news sites, like most freely accessible sites, they are littered with advertisements and hypertexts drawing the proverbial red herring across the track/screen. For Scacco (quoted in Childs, Berk and Schroeder et al. 2009), data journalism serves democracy, since it narrates stories in numbers and numbers are used to tell stories.

Although information design in the advertising sector is centrally about consumer persuasion and spurring consumptive activity, there is a more neutral version emerging. As the volume of information and data increases on a global scale, information design is seen also as an efficient presentation of objective data in order to enable the user to make decisions. Wildbur and Burke (1998: 6) suggest that information design is a transformation of information. Here raw data is transformed into a visually engaging and interactive product which distils the essence for easy and efficient comprehension by users, audiences or consumers. Edward Tufte, one of the foremost graphic design practitioners, maintains that the task of the graphic designers is to "show the data" and to "avoid distorting what the data have to say" (Tufte 2001: 13). According to him, "[g]raphics *reveal* data". Drucker reminds us, however, that

> The conviction that information exists outside of – or in advance
> of – the presentation of data in graphical form is problematic,
> even inaccurate, from both a theoretical and a practical point
> of view. On a mundane level, certainly we can understand

that information designers see their task as the creation of clear, legible, unambiguous presentations of data. But every graphic representation is a rhetorical device. Every presentation structures arguments – it doesn't "reveal" facts in all their purity through the fallible, flawed system of graphical expressions. The relations between *what* is communicated and *how* have to be acknowledged (Drucker 2010: 18).

Existing literature on data visualisation

Data visualisation in the field of journalism has its own delineations which are computer-assisted reporting, data journalism and computational journalism. Data visualisation has grown across the board, however, literature around data visualisation has been limited to showcasing application in specific fields of big data sets (Jadega and Shah 2015; Muhongya and Maharaj 2015). Segel and Heer (2010), Maia, Chad and Eliason et al. (2013), and Taylor, Cowls and Schroeder et al. (2014) offer some examples and specific guidelines on data visualisation methodology.

South African literature on data visualisation reflects a similar narrowness of scope. The dominant field in which data visualisation appears is the intelligence sector (Thinyane and Coulson 2012; Van Heerden, Suné and Mooi 2016). Here data visualisation is promoted as a way to monitor citizens, expose cyber-attacks, and discern data leaks. Chiware and Mathe (2015) offer a different type of reference to data visualisation by exploring the new role of "digital librarians" as data scientists. Verweij and Noort (2014) and Bosch (2017) modestly use data visualisation with more direct references to news and journalism in terms of locating and charting debates on Twitter networks and #feesmustfall.

Globally, there are only three meaningful references to data visualisation, journalism and online news in a direct way. All three focus on the potentials for technological imperialism as a consequence of data journalism. Firstly, Van der Haak, Parks and Castells (2012) look at journalism on an international level which is being "networked". They indicate that new data journalistic forms may emerge as a dominant form as they may prove more engaging allowing for greater retention. Secondly, Knight (2015) directly analyses the field of "data journalism" examining form and content and how journalistic ethics could be compromised in the new age of big data and algorithmic complexity. Thirdly, Guo and Vargo's (2017) survey of international news reveals the way global agendas may be set by powerful interests which are reinforced as a result of data journalism and the capacity to generate data visualisations. This does not entirely negate the democratic possibilities generated by independent media like e-zines, blogs and open-publishing sites, which work on collective news generation (Beers 2006:

115-120), but it throws into relief certain dangers posed by data visualisation to journalism.

In the local and global review of the literature on data visualisation, an important lacuna became apparent. There are several good critical works dealing with the limitations of data visualisation itself. Childs et al. (2009) and Campbell, Chang and Hosseinian-Far (2015) note the quality issues when it comes to mismatched data, subjective data, old and questionable data, dirty data[8] and assumed data, all of which may not really be subject to public or user scrutiny. Campbell et al. add a salient point, stating that "politics, personality and culture will create biases in data" (2015: 6). However, only one article focuses on the critical nexus of data journalism, democratic potentiality and journalism education. Rinsdorf and Boers (2016: 2-3) observe that as news corporations migrated online, digital formats afford the potential for greater participation. In traditional journalism, journalists published 'final versions' of stories while in the digitised environment, journalists can include audiences in the research and creation of stories. In addition, data visualisation creates the possibility for users to customise their experience/ consumption. We contend that this revolutionary opportunity in the history of journalism to co-create what counts as truth claims in the world of news, is in need of extensive critical debate as it opens pioneering participatory pathways, which are nevertheless not unproblematic.

While these affordances are possible, they are often not realised for as Rinsdorf and Boers (2016: 4) indicate, "technological infrastructure and the content patterns are strongly influenced by powerful actors from the fields of government and the market economy". One of the key issues is that data journalism is expensive as it emerges out of a particular set of skills such as numeracy, coding and graphic design, which may be more easily marshalled (and masked) by powerful actors as opposed to journalists. Journalism education adds complexity to the problem as institutions of higher learning are much slower to adapt suitable curricula than the rate of innovation. It stands to reason that this is sure to undermine emerging journalists and their capacity to deliver on data visualisations. While data journalism is widely celebrated, the key issues

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8   In the context of big data sets, it is always possible that data is incomplete or inaccurate. If it is not possible to remove the questionable data from the larger set, then this is considered dirty data.

of journalistic capacity and visibility remain unaddressed. Hence the potentially troubling effect on core journalistic functions.[9]

Before turning to Foucault to critically interrogate the problematic status of the truth claims generated by way of data visualisation, we briefly review the history of journalism education in South Africa and the place and status of data journalism therein.

Brief history of journalism education in South Africa

The history of journalism education in South Africa reveals telling shifts in the emphasis and de-emphasis of critical theory. Journalism education in South Africa has evolved as a result of the combined forces of new modes of curriculum at universities and the strong pull towards vocationalism precipitated by the digital revolution.

Hardly any literature reflects on journalism curricula, and that which does is often located in the space of researching new (digital) methods of teaching (Cockcroft 2000; Terblanché 2015) or focuses on very specific strands of the discipline (Tomaselli and Shepperson 2010; Tomaselli 2012). Journalism falls within the cluster of Media and Communication Studies, however, the discipline has teased out the many strands that have developed post-convergence. This has evolved into a clustering of 'medium' (specific) studies, fostering a degree of inter-disciplinarity across theoretical approaches such as marketing from the discipline of commerce, and basic programming from information technology, indicating the divergent scope of the component strands of the discipline.

Global centres exhibit a few dated though relevant commentaries on Media Studies/Journalism curricula. In the UK context, the closure of the Birmingham School of Cultural Studies was symbolic of the move away from leftist media analysis marked by shifts from critical media theory towards media education focused on media literacy with a view to employability. This shift was already occurring as Ferguson (1994) indicates, drawing on important distinctions between 'media studies' and 'media education' and the problematic conflation of the two in the UK. He states,

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9   Core journalistic functions are encompassed in the notion of a fourth estate, a news media that can keep a public informed. This is a function of democracy working best when an informed public can make decisions about the terms of its own governance. Other functions of journalism are to expose publics to multiple points of view so that healthy debates around governance can occur; in addition news media promotes social cohesion by exposure to larger issues such as environmental disasters, etc.

> Media studies was understood by many ... as a form of 'oppositional practice' ... an activity which was politically committed and motivated by a desire for democratic social change and justice. It was also a burgeoning intellectual discipline which drew upon a range of sources from social and literary theory to theories of psychoanalysis (Ferguson 1994: 5-6).

The shift away from the overtly political (media studies) to media education or media literacy marks a shift to a media studies disciplined to serve industry. This would typically be marked by a move away from discussions around ideology and power relations to discussions around the ways in which consumption can become a 'creative act'.

A decade later, Garnham (2005) highlights a shift in the nomenclature in UK policy from "cultural" to "creative" industries.[10] He argues that this shift is by no means neutral, marking a decisive move away from the ideological and theoretical foundations marshalled by the term "cultural industries", essentially the politically committed oppositional practice invoked by Ferguson. The term "creative industries" connotes information society theory which includes economic and policy arguments. Here new media are seen as vital to "creative industries", "ushering in an era of cultural abundance" (Garnham 2005: 24) and hence a key driver of economic growth. As such there is a concomitant and powerful shift to reinforcing economic and managerial discursive fields in media policy (Garnham 2005: 16). Garnham argues that this shift has its consequence on media and arts funding and education, where media education may increasingly be disciplined for service of the market. Thornham and O' Sullivan (2004: 720) state that, "the pull of vocationalism in the UK is a recent development and a potential threat to the field". The challenge highlighted is between vocational and critical discourses and whether these can be authentically delivered together, suggesting policy lip service to the critical discourses and a dominant focus on the vocational discourses. Thornham and O' Sullivan also highlight the ironic

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10 "Culture industry" is a term used by the first generation of critical theorists, Theodor Adorno and Max Horkheimer, to describe how popular culture in capitalist societies functions like an industry in producing standardised products which produce standardised people. More precisely, "culture industry" draws on the seeming contradiction between human culture and mechanical industry (see Adorno and Horkheimer's chapter in *Dialectic of Enlightenment* (1944), "Culture Industry: Enlightenment as Mass Deception"). They argue that culture industry is associated with late capitalism in which all forms of culture (from literature, through films and all the way to the background music in shops and elevators) become part of the capitalist system of production which also has deep cultural mechanisms and not just economic ones. They further argue that these cultural products are designed to produce profit but also consumers that are conditioned according to and hence adapted to the needs of the capitalist system.

employer response in the face of continued vocational emphasis: "That's the main thing I'm looking for, people with the critical faculties that have been sharpened" (2004: 725).

Thus the UK media studies context – which Tomaselli (2010) demonstrates was influential in the South African media studies context – chronicles the rise of digital technology ushering in a discourse of vocationalism and employability as the dominant focus of tertiary media studies education. This has threatened a decline in critical media theory in the UK.

In the South African context, as early as 1988, Tomaselli argued for a reflexive, introspective approach to media as technology as it could never be neutral, autonomous or ideologically free (Tomaselli 1988: 72). The potency of this argument could not be understated given the apartheid context. In 1994 Prinsloo analysed how possible shifts in modes of curriculum could affect media curriculum alluding to the strong pull of vocational discourses in early policy texts (1994: 31-32). She notes that the repressive apartheid media mobilised reflexive ways of teaching and 'doing media' at some dissident tertiary institutions adding that the discipline itself carried with it degrees of self-reflexivity. This means that media curricula at these dissident institutions,

> attempted to educate about the media, to construct a critical approach to information offered by the media, to contextualise those agencies that produce media … to nurture autonomous thinkers who approach information not as transparent, but as constructions that are selective and partial … precisely because all information is mediated (Prinsloo 1994: 19).

The case for the critical or political project in media studies is also made by Tomaselli,

> We can say after Marshall McLuhan that 'the medium is the message' but we need to add that the authority of the message is also defined by the audience's command of critical abilities – or the lack of them (1988: 73).[11]

Thus in the early pre- and post-1994 South African context, Media/Journalism Studies practitioners reflected a decided commitment to critical media studies through which counter ideologies could be marshalled in response to apartheid legacies of media (Boschoff and Garman 2016; Tomaselli 2012). An NRF-commissioned report on the state of the South African media, journalism and

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11   It is worth mentioning that Thomaselli's critical sentiment was already effectively captured much earlier on in Walter Benjamin's 1939 essay, "The Work of Art in the Age of Mechanical Reproduction".

communications discipline was delivered in 1999 by Keyan Tomaselli. A 2002 summary of this report indicates a few key findings. A laissez-faire approach to media, journalism and communication courses indicated an overall lack of collective direction by practitioners. There appeared to be a heavy focus on short-term goals, i.e. student numbers and employability. Former technikons were taking on the "flashy" sounding courses offering purely vocational tracks. Faculties of Arts followed suit, appropriating media, communications and journalism as a means of survival, seeking to attract fee-paying students to popular courses. As a consequence, certain institutions tended to emphasise vocational courses, while others emphasised professional courses and only a few maintained critical courses. The report indicated that all three discourses are important and need to remain in balance (Tomaselli and Caldwell 2002).

These studies display attention to Media and Journalism curricula holistically. Other studies have focused quite specifically on the crises of journalism education (Prinsloo 2010), the tension between balancing vocational and academic inflections (Jordaan 2004), and finally the tensions of maintaining social justice type critical courses in the face of students who seek glamorous media work (Boschoff and Garman 2016).

State of the profession in South Africa

The South African newspaper industry is riddled with challenges (competition from other platforms, pressure on circulation, political pressure) in the face of fundamental shifts, though some regional, language-specific papers and tabloids like the indomitable *Daily Sun* seem to be surviving rather well. Notwithstanding new reading platforms and digital market entrants, the state of the economy and its effects on advertising budgets have put newsrooms under severe pressure. This has led to media owners rethinking business strategies and the efficacy of traditional structures (Gill 2016). News production and consumption are increasingly being digitised, and South Africa news media organisations are often critiqued for not adapting fast enough with respect to digital adoption.

Data visualisation in South Africa has emerged in the more rudimentary formats of texts and photographs, which are static and linear. Repurposing of news from print to online platforms has generally taken a skeuomorphic approach (Blewett 2015), where content is lifted from traditional formats and merely pasted into digital formats without any significant augmentation.

Pressures on South African newsrooms include reduction in circulation, economic and political pressure, contraction of newsrooms and journalists, the shifting nature of ownership as well as sectoral (regulatory) transformation

(Finlay 2017; 2018).[12] Fake news[13] has caused its fair share of havoc in the industry (Wasserman 2020), but digital disruption in the form of data journalism may yet prove more harmful, also with respect to journalism graduates lacking sufficient data skills (Heravi 2018). We submit that the industry-specific pressure for data journalism which promises competitiveness through greater power of retention of audiences, may not actually be a viable solution at this time as it threatens the journalistic contribution to democracy and risks unfairly overburdening an industry which is receiving graduates who are not yet equipped to service it toward the meaningful management of digital disruption. To get to the bottom of how data journalism risks undermining as opposed to bolstering a robust democracy, we need to interrogate the status of the truth claims generated by way of digital visualisation by briefly revisiting Foucault's critical understanding of "truth" as always being "a politics of truth". This avenue of critical inquiry serves as groundwork for our turn to Habermas and Fuchs whose conceptual apparatuses may be harnessed to throw the inherent dangers posed by data journalism into relief, especially how these threaten to undermine journalism's fundamental role in bolstering a robust democracy.

Digital visualisation as a politics of truth

According to French philosopher Michel Foucault, truth claims are always and inextricably embedded in "a politics of truth". In other words, what counts as knowledge or "truth" is always contingent upon the regime of power that determines a particular knowledge claim as "true". Hence, there is no such thing as "knowledge"; only "power/knowledge". What counts as true is determined by the prevailing regime of power, and inversely, the prevailing regime of power is affirmed and buttressed by what counts as the truth (see Foucault 2007: 50-53). Digital visualisation also generates truths subject to the prevailing regimes of power.

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12   Also instructive in the present context and with direct bearing on this matter is Gilles Deleuze's 1990 essay, "Postscript on the Societies of Control". It not only deals with how neoliberalism and digitality are increasingly enmeshed today in a mutually supportive relationship, but with what he terms "dividualization". In relation to the argument pursued here, its relevance pertains to the reduction of the erstwhile critical 'individuality' of journalists to their contemporary "dividualization", i.e. their reduction to coded economic matter in a context that prioritises marketability and employability over everything else.

13   Fake news refers to deliberate misinformation that is usually created on social media platforms to damage the credibility of businesses or individuals, or even just a hoax. As fake news gains traction on social media it spreads through traditional news media.

Foucault's method treats knowledge in the sense of *savoir,* as the conditions that are necessary in a particular period for this or that type of object to be given to *connaissance* as something that is known. *Savoir*, then, as the historical conditions of possibility of that which is taken to be true (*connaissance*), is more accurately translated as power/knowledge, since the conditions of possibility are inextricably tied to relations of power (Foucault 2007: 51). Digital visualisation, as a regime of truth production, is subject to a range of conditions of possibility that, when critically scrutinised, fundamentally problematise the "truth" status of the knowledge claims so generated. Some conditions prove abstruse; while others prove inscrutable. The big data from which the statistics is generated is inaccessible; the algorithms utilised are unintelligible. In other words, it is difficult, if not impossible, to ascertain what information is measured and which (statistical) methods govern and therefore determine how the information is interpreted. The validity of the knowledge claims contained in the visualisation can therefore not be subjected to the same critical scrutiny that is habitually brought to bear on textual artefacts. Yet, digital visualisations are forcefully persuasive and implicitly discourage any critical scrutiny of their validity. As Drucker (2010: 10) points out, information can seem even more self-evident presented in a graph than in the disordered fields of enquiry from which the presentation arose. Over-simplified representations of complex and emerging data spanning numerous contexts and historical epochs, such as Rosling's "200 Countries, 200 Years, 4 Minutes" (2010) referred to earlier, are inherently reductive. Digital visualisation is quite simply an incarnation of an attempt to organise the messiness of observed experience through the guidance of simplified schema. The schematic diagramme guides vision, as much as perception gives rise to any diagrammatic representation. Hence, the digital visualisation of something comes to constitute the "reality" or "truth" of that something, enabling such simplistic and misleading conclusions such as Rosling's optimistic conclusion that all of humanity is progressing to a healthy, wealthy, bright future.

Not only the content but also the *form* of visualisation determines how it is interpreted and what conclusions are drawn from it. The challenges posed to journalism by digital visualisation are compounded by the fact that a critical understanding of visual knowledge production remains oddly underdeveloped. As Drucker (2010: 3) explains, visual epistemology has to be conceived as procedural, generative, emergent, as a co-dependent dynamic in which subjectivity and objectivity are related. Visual perception should be understood as embodied, affective, situated, and circumstantial in physiological, psychological, and cultural terms. Graphical knowledge cannot be grasped in any self-evident way. After all, no image is self-evident. We learn to interpret through the situated

and subjective condition of perception whereby an encoded expression provokes a response for cognitive processing.

In the following section, we utilise the thought of Habermas and Fuchs in an attempt to fully come to grips with what the implications are for data journalism of the unverifiability of visual knowledge production.

Habermas's public sphere and Fuchs's digital applications

In 1962 German philosopher Jürgen Habermas defined "the public sphere" first of all as "a realm of our social life in which something approaching public opinion can be formed. Access is guaranteed to all citizens." He further explains that "[c]itizens behave as a public body when they confer in an unrestricted fashion […] about matters of general interest" (Habermas 1989, in Durham and Kellner (Eds.) 2006: 73). Here, matters of general interest include "rules of governing productive relations", as Fuchs (2014: 181) points out. At the time, Habermas contended that newspapers and magazines, radio and television were the media of the public sphere. Habermas's *The Structural Transformation of the Public Sphere* was developed within the context of the Institute for Social Research's analysis of the transition from the stage of liberal market capitalism of the 19th century to the stage of state- and monopoly-organised capitalism of the 20th century, developed by the Frankfurt School (see Kellner 1989). The two major themes of the book are (1) an analysis of the historical genesis of the bourgeois public sphere, which is followed by (2) an account of the structural change of the public sphere in the contemporary era with the rise of state capitalism, the cultural industries, and the increasingly powerful positions of economic corporations and big business in public life (Kellner 2000: 2). Habermas's focus on democratisation was linked with emphasis on political participation as the core of a democratic society and as an essential element of individual self-development. While acknowledging the flaws in his notion of the public sphere, Habermas did not abandon the idea but developed it into a feasible concept of how public opinion may be formed to mobilise legitimate (political) power (Pusey 2003). Although this idea received robust critique, Habermas's linking of the public sphere to journalism endures (Pusey 2003). Even though journalism is subject to influence and even control by

powerful private or government interests, the ideal of an unfettered press is still celebrated as one to work towards and achieve.[14]

Habermas developed the idea of the public sphere by introducing the theory of communicative action and the idea of communicative rationality. In Habermas's theory of communicative action he talks of "acceptability conditions" for the possibility of "illocutionary success" (Pusey 2003: 42-44), which may be understood as speech acts that are legitimate and compelling due to agreement or the potential for agreement arising out of reasoning becoming visible. Here Austin's further categorisation of illocutionary acts is helpful to clarify illocutionary success as exercitive acts when speakers exercise their powers and rights or influence through speech acts (Austin n.d.).

In terms of Habermas's acceptability conditions, in order to accept or reject a statement or claim, we need access to the speaker's reasoning which led to their own trust in the validity of their claim. It is only when one has access to the speaker's reasoning that we may evaluate the process of reasoning as well as the conclusion. Where there is no immediate agreement or acceptance of a statement or claim, Habermas indicates a shift in reflexive levels from speech to discourse. This is a process of testing claims via dialogue and argumentation in order to determine if these hold rational justifiability for truth or authenticity (Pusey 2003: 69-83).

Transposed to journalism and a public sphere, to make quality political discussion possible Fuchs indicates that there must be disclosure of the speaker's subjectivity (2014: 184-5). There must be the possibility for reflexivity, which means the ideas must be understandable and inclusive. There must be transparency at the level of discourse. This means that the sequence of reasoning must be made visible and must be made accessible to the hearer (the public).

The problem with data journalism (visualisation) is that the science behind it (or the reasoning) behind it remains largely invisible. The reasoning is invisible and the claim itself is condensed to a very small, information packet that

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14   In this context is it instructive to remind our readers of Edward S Herman and Noam Chomsky's seminal book, *Manufacturing Consent: The Political Economy of Mass Media* (originally published in 1988 and later revised to account for new developments such as the fall of the Soviet Union; the newest edition was published in 2002). It provides its readers with a detailed sense of what the role of economic and government pressures in influencing journalism were before the advent of digitality. What we therefore see in the present context is that this new problem, i.e. the power of digital visualisation to convince and manufacture the consent of the governed, emerges as a new variant of an old problem – namely, the difficulty of limiting political and economic influence in the communication of information, when the platforms for such communication are reliant on significant political and economic support in order to operate successfully, and indeed, competitively.

is entertaining and efficient to consume. The accent is on consumption and retention of audience attention rather than making the line of reasoning visible, which could further allow acceptance or rejection of the claim or argument. Data visualisation is presented as a complete and concluded idea, while what Foucault calls the historical conditions of possibility (*savoir*) of that concluded idea, which is taken as true (*connaissance*) remains invisible, often even inaccessible, and hence non-falsifiable.

Put differently, Habermas's "acceptability conditions" for "illocutionary success" are compromised in that there is no possibility for a shift in reflexive levels. There is no possibility for the public to advance to the level of discourse and test the validity of claims made, thus reducing the possibility of being able to determine if claims hold rational justifiability for truth and/or authenticity.

Fuchs calls this asymmetrical power in discourse, which is largely generated by the intransparency of the science (or reasoning) behind the industries creating the data visualisations. This lends an inordinate amount of seepage from largely economic interests into public discourse.

Habermas warns against the colonising tendency of the system on the lifeworld to reconstitute public spheres in the service of economic sub-systems. The features of digital disruption are marked by speed, acceleration, interactive design and plasticity. The imperative on local journalism is to adapt quickly and innovate in order to stay relevant and to compete with international "online disrupters" using data visualisation, keeping in mind that information packets need to be entertaining in order to retain audience attention.

Creating visualisations is a highly specialised and expensive business, which requires skills in mathematics, graphics, basic algorithms, (statistical) data analysis, and information design. Traditionally trained journalists are rarely equipped with this range of skills. Thus it may not always be the case that journalists themselves create data visualisations. External companies with programming, research and information design skills are the ones creating these byte-size information packets for news sites. This further distances the journalistic ethos from news production.

Much has been made of the interactive potentials of data visualisations, which are meant to engage audiences and allow them to navigate images themselves and accordingly see information popping up at different points in the image. This is argued to be information differentiation which promotes disintermediation and an interactive audience. However, Appelgren (2019: 17) argues that this is an illusion as users are offered a sense of control by the design but these are pre-packaged pathways, often in the direction of consumerism.

This becomes especially significant in journalism where quality interactivity is key to communicative action.

In terms of communicative competence, the key thing missing in data journalism is disclosure of the speaker's subjectivity, which is bias inherent in data visualisation.

Undisclosed bias in data visualisation

Reiterating Campbell et al.'s point about bias inherent in data, this section explores a few examples which illustrate how bias occurs and the subsequent effects. The first example shows how outdated land data was used to mark out areas which were at low risk for flooding. Hurricane Katrina hit in 2005 and the effect of using this data affected residents in the marked areas. Insurance was rendered invalid as a result of the outdated land data (Campbell et al. 2015). The second example features a survey in Wisconsin. The survey was done with landline phones. This method of gathering data excluded ethnic minorities who favour cell phones. Hence, the results were skewed due to the absence of ethnic minority responses. The third example in Canada measured unemployment and deliberately excluded aboriginal groups residing in the areas surveyed. This resulted in a newspaper reporting the results of survey as: "Aboriginal groups being highly likely to be without work" (Campbell et al. 2015). The final example features the collection of data from public data bases in New York. It was an interactive map showing names and addresses of residents who held gun permits. This publicity naturally caused outrage even though the information was in the public domain (Campbell et al. 2015).

These examples indicate how dangerous data journalism can be if journalism is diminished in the equation. The link between data visualisation, design aesthetics and audience retention must be subject to visibility especially when reporting on news of a sensitive nature. An added concern is that data visualisation tends to advance consumer action[15] as opposed to communicative action[16], which will ultimately disable journalistic practice and any potential for communicative discourse.

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15   Consumer action implies the narrow space of consumer agency. While this refers to simple consumption it can also be where consumers may retract or give their support for merchandise depending on whether the companies producing these products are aligned to their politics.

16   Communicative action refers to citizen agency, which leans more towards emancipatory potentials as a result of openness on the level of subjectivity, reflexivity, inclusivity and transparency.

Potential effects on South African journalism

Independent and impartial quality journalism plays an important role in building democracy in South Africa as elsewhere. As we have seen, however, South African journalism is subject to a range of pressures. The information technology revolution necessitates the adoption of data visualisation techniques as a means of audience retention and developing a competitive edge. This added burden of the digital imperative on both journalism and journalism education threatens to undermine core values of the field. These values have traditionally been advanced by critical theory in journalism education and 'cleaner' public discourse where the processes of reasoning in discourse was more visible.

Although South African traditions of journalism education have been influenced by British traditions of critical theory, the modern South African university has steadily de-emphasised this. The forces of managerialism effected changes in higher education, aligning the academic agenda with an economic rationality that accords cost-benefit decision making primacy. This resulted in the drive to ensure increased and speedier throughput of graduates. The emphasis shifted from education to the training of the student as customer demanding to be equipped with skills that make them vocationally competitive. This resulted in a de-emphasis of the traditional liberal arts education (from Latin *liberalis* "free" and *ars* "art or principled practice") with its focus on the learning of how to ask the right questions (i.e. problematisation and critical engagement) as opposed to offering quick and easy answers. As a consequence, content was repackaged into shorter modularised courses; entry and exit within faculties and across universities became easier; and a greater degree of choice became available to students.

The exigencies of the information technology revolution call for a journalist equipped with the necessary skills to write, edit, take pictures, repurpose content, and gather and crunch data into engaging visualisations. It is interesting that while convergence has occurred in the shift to the offering of vocational and technical training, the content of the curricula themselves do not reflect a parallel convergence.

Rinsdorf and Boers report that journalism schools are either struggling to keep up with servicing new data science skills or debating whether this change is indeed necessary. They make a plea for a different thoroughgoing way of merging data journalism into curricula by rebuilding existing programmes from the ground up, taking into account the complexities of contemporary newsrooms (2016: 5). However, in the South African university, neoliberal governance structures keep to a business as usual stance with little or no provision or incentive to rebuild cohesive programmes. So while the form has changed the content has

not, resulting in woefully ill-equipped contemporary South African journalism graduates. This is bound to have a catastrophic impact on the industry and on its potential to contribute meaningfully to ensure a resilient democracy.

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