Some Thoughts on Digitalization Research in Times of Corona

A Call for Universalization in Inter- and Transdisciplinary Research

Jörg Radtke[1]

Contact: Jörg Radtke, University of Siegen, Radtke@politikwissenschaft.uni-siegen.de

[1] University of Siegen, Siegen, Germany

1   Opening Up the Debate

This volume gathers contributions to Siegen University's early-career scholars-conference on digitalization research, which fittingly was held online on April 21st, 2020.

In the following, I will elaborate on whether – and how – digitalization can be both the subject of and a challenge to inter- and transdisciplinary research. I first came up with the idea of said conference topic due to everyday experiences. When talking to colleagues about the subject, I quickly realized how popular research on digitalization is at our university – in fact, one might consider it a focus. Some research domains appear particularly likely to deal with digitalization, e.g. computer science, digital health and digital humanities, computational social science, research on sensors, robots and autonomous systems as well as studies on digital media. Certainly, today, digitalization research plays a crucial role in further fields of inquiry, for instance regarding virtual learning, architecture and spatial planning, art, philosophy, linguistics, literature studies or cognition science. Evidently, research on digitalization provides a common basis, which might enhance interdisciplinary understanding. However, this requires a shared language. To this end, which links can be made fruitful?

As any other line of research, digitalization research may place emphasis on content. The content, however, possibly consists of topics that constitute well-known subjects of study in the respective discipline. For example, I, as a political scientist, could examine the digitalization of a parliament (which is a common subject of analysis in political science). Perhaps, I would focus on modes of virtual communication (while ideally bearing in mind that communication research, again, represents an established academic field, whose rich foundations, next to other disciplines' bodies of research, may nowadays be complemented by insights from digitalization research) or on how the parliament is administered digitally. Likewise, insights from studies on social media appear relevant to political communication research, as social media gain importance for political communication. As the examples show, shared research subjects, structures and patterns emerge, which are of interest to multiple disciplines. Against this backdrop, future disciplinary analyses on digitalization may merely be specific variations, based on shared insight from various research domains. At Siegen University, such broad integration of academic disciplines is mirrored by the sheer existence as well as the work of the Special Collaborative Research Center on media and cooperation.

2   Disciplinarity vs. Interdisciplinarity and Transdisciplinarity

Indeed, it is the synopses of disciplinary work which render the frequent (yet all too often mostly symbolic) calls for inter- and transdisciplinary cooperation worthwhile. To stay with my former example: as a political scientist gathers results on digital communication processes in parliament, contrasting those with insights on digital communication from other research fields undoubtedly appears promising. Yet, as far as I am aware, to date, such meta-work occurs mostly in disciplinary contexts – I can read a review on digital political communication if I like to, but it will most likely employ a strictly political science focus. Naturally, linking results from multiple academic disciplines sensibly poses a major challenge. Still, I argue that establishing such linkages is likely to generate additional insight and might even be necessary to prevent parallelisms as well as unilateral thinking. As I learned from myriad discussions with colleagues working in other scientific fields than my own, surprisingly often, different approaches lead to strikingly similar outcomes. Specifically, I observed this during exchange with scholars working in media and communication research, spatial planning and psychology, which obviously constitute bodies of knowledge profoundly different from political science. Irrespective of said experiences, I am not trying to make a case for a single, unified, in some ways universal notion of science, as was formerly argued for in modern sciences' history (consider historical attempts to focus purely on essentials, such as radically placing emphasis on language in philosophy), yet never brought about remarkable success. Still, as a well-substantiated matter of fact, myriad congruent or at least very similar insights and conclusions can be found across multiple academic disciplines and papers published therein (Bhattacherjee & Fitzgerald, 2012; Buchanan, 2011; Henriette et al., 2015; Hunsinger et al., 2019; Orlikowski & Barley, 2001). In the course of disciplinary studies, however, individual findings are classified and interpreted by recourse to the given field's knowledge base, which consists of established conceptual work (such as theories, typologies and heuristics) as well as the empirical state of the art. Coming back to my former example, I, as a political scientist, would seek to link my results to parliamentary studies and fundamental work on political communication, albeit my insights could be decisively enriched by theoretical perspectives and findings from other disciplines and might, in turn, contribute to their progress as well. To date, such inter- and transdisciplinary linkages mark an exception to the rule. Undeniably, they pose a massive challenge to researchers, as in order to identify fruitful intersections, they need to be proficient in knowledge fields they have probably not studied themselves. Additionally, disciplinary prejudice and reluctance to engage in exchange prevent many such bridges from being built.

3   A Need for Universalization?

So, while interdisciplinary exchange bears considerable potential to enrich empirical findings, forward theory-building and ameliorate methodical approaches, to date, we lack strategies to broadly and lastingly establish such exchange processes, as this cannot be done by individual researches alone (and for some may even prove detrimental to their own career, e.g. regarding their disciplinary reputation). To encourage such profound mutual understanding, large entities and institutions – such as special collaborative research centers – appear as promising advocates. Still, up to now, their successes in fulfilling such hopes remain modest. While researchers from various disciplines do indeed collaborate to develop meta-frameworks, integrative conceptualizations and theories, their results are eventually received as individual pieces of work in disciplinary contexts. Thus, genuine interdisciplinary cooperation still awaits broad diffusion and institutionalization. Evidently, research disciplines constitute enclosed, self-sufficient systems operating by logics of their very own. Against this backdrop,

few, sporadic efforts to bridge such idiosyncratic modes seem unlikely to promote (and preserve) interdisciplinary resonance. Does, thus, the call for interdisciplinary collaboration merely echo the emphasis on discipline-transcending research as stressed by contemporary funding programmes?

Allowedly, scholars seeking to further interdisciplinary understanding are not facing an entirely new challenge. When today's sciences emerged, the humanities were at best frowned upon by the established natural sciences. At the time, natural scientific approaches predominated academic thinking, assuming that everything could be explained by universally applicable laws of nature. How the sciences' separation and continuing specialization would take effect was subject to much debate and speculation: would they, as they lost their common basis – that is, one shared notion of reality accepted by all – see an atomisation and fragmentation contrary to humanistic idea(l)s of comprehensive, integrated academic thinking, as postulated by the Humboldt brothers and other scholars of their time (Davies, 2006; Herdt, 2019)?

Undoubtedly, Alexander von Humboldt is widely renown as a universal scholar and, in the course of his vast expeditions, did in fact study myriad matters of tangible reality – be it plants, animals, humans or the surface of the earth. Yet, a closer look at Humboldt's work reveals his (from a contemporary perspective) clearly natural scientific approach (von Humboldt 2014; Martin, 2018; Meinhardt, 2018; Wulf, 2015). His way of thinking became apparent even in his elaborations on and examinations of humans and social processes, which he would at times make subject to his scrutiny, albeit studying them in a very similar manner as he studied plants.

4   Starting Points for Interdisciplinary Research on Digitalization

This leads to a second decisive aspect of the major challenge that is posed by inter- and transdisciplinary research: the paradigmatic foundation of methods. Still unknown to Humboldt, today, a variety of methods and underlying paradigms from the humanities, cultural studies and social sciences constitute multiple disciplines' arsenal on appropriate strategies to gather new findings and insights. Here, finding shared approaches seems comparably easy – for example, bearing in mind the widespread use of quantitative and qualitative methods for data generation and processing. At a closer look, however, profoundly different traditions and styles of handling and interpreting such data emerge. While the bases of statistical analyses remain the same, the contexts in which such methods are employed as well as how their results are used and interpreted vary considerably across different lines of research.

Digital data, which likely provide the very foundation of research on digitalization, appear as a unique common ground, showing a clearly universalistic component. The term digital refers to data underlying a wide range of contemporary phenomena – be it, for example, communication, individual mobility or healthcare and medicine. Speaking of big data marks a conceptual effort to grasp this gigantic, seemingly infinite generation of data, which is continuously processed and analysed by globally operating technology and internet corporations and may itself constitute as well as be transferred to new, wholly digital spheres. While this is outlook is intriguing, in my opinion, focusing on this rather basic aspect distracts from the fact that data only gains meaning in interaction, as it is being looked upon and referred to. Put frankly, if we sent our rich data bodies to the moon, there, they would prove just as useful as the many rocks covering its surface. Thus, as has become a popular bon mot today, behind most data are people – and it is them who make data come to life, who render its interpretation worthwhile. Contemporary grand debates on data aside, research almost naturally – and often implicitly – presumes this coherency, as the data we analyse is, of course, not arbitrarily chosen, but needs to align with our research interest. Coming back once again to my already slightly overused own example, I might look at data on twitter usage of members of parliament. Political scientists such as myself may find the

frequency and timing of tweets interesting – as well as their content, which can be made subject to respective analyses. Consequently, two components of gathering empirical data in disciplinary research on digitalization can be differentiated: a) digital data which is generated by technical devices and b) information on their usage in a broader context of interest, which is determined by discipline. By now, the computer scientists among the readers probably figured the point I am trying to make, as they are familiar with user-centered-perspectives and the notion that an in-depth understanding of technologies' effects, its context-specific usage modes and interactions with individuals can only be attained by including the people behind the screens in the picture (Abras et al., 2004; Endsley, 2016; Garrett, 2010). Without a user, a computer is meaningless.

Both methodical approaches in digitalization research – looking at digital data generated by technical devices as well as user data generated by individuals – offer valuable starting points to further a foundation shared across multiple disciplines.

5   A Glance at the Past: On Technology and Responsibility

In the early 1990s – when I was still used to a commodore 64 and little by little becoming acquainted with newly invented Pentium processors, CRT monitors and eventually the first modem – a new line of research on "informatics and society" was formed in computer science, whose proponents dwelled on various (possible) effects of digitalization on society. Today, their elaborations appear as clear-sighted as unheard of, a silent revolution of which most parts of the public have not taken any notice at all. Decades later, in 2017, the German Internet Institute – also known as Weizenbaum Institute – was founded as a hub for research on interactions in sociotechnical systems. It was its eponym, Joseph Weizenbaum, who, as he introduced the speech processing software ELIZA in 1966, partly anticipated artificial intelligence and chatbots and already sought to veil human-machine interaction. Behind this idea stands the turing test, aimed to uncover such simulations. Today, as I enter a modern car, after casually greeting it with "hey, car", I may inform said automobile on my music preferences, ask to regulate the temperature – and get a sensible response. Nowadays, artificial intelligence is everywhere and the turing test has, so to speak, overrun itself – although it has not lost any of its significance and is still applied today (e.g. to identify spam e-mail). As much as we know about Alan Turing and Joseph Weizenbaum, both were – at least at times and for a variety of reasons – not happy people. Also, they have both reflected profoundly on their work and its relevance (which, among pioneers of computer science, appears to be a fairly common phenomenon). Turing engaged in dispute with the philosopher Ludwig Wittgenstein on the significance of mathematics (which Wittgenstein deemed overrated) (Casti, 1998; Floyd, 2015; Floyd & Bokulich, 2017; South & Engels, 2018), while Weizenbaum referred to himself as a heretic. A look at his work reveals his primary objective: to link insight with responsibility and reason (Hartkemeyer & Weizenbaum, 1999; Weizenbaum, 2008; Weizenbaum & Rennert, 2008; Weizenbaum & Wendt, 2015). He was by far not the only one engaging in what I suggest to call critical computer science, with some of his colleagues being members of the German non-profit association Forum InformatikerInnen für Frieden und gesellschaftliche Verantwortung (computer scientists for peace and social responsibility). Today, most scholars agree that responsibility and reason are essential to digitalization. The fundamental question which underlies Weizenbaum's critical elaborations is whether we can or should promote technological progress without taking responsibility for its potential effects – which essentially brings us back to issues already dwelled upon by Turing and Wittgenstein. When Hiroshima and Nagasaki were devastated by the end of World War II, nuclear physicists around Albert Einstein and Robert Oppenheimer recognized their ground-breaking work had laid the foundations for weapons as fatal as atomic and hydrogen bombs. Since at least then it is obvious that technology is never a neutral thing of its own, but always subject to modes of utilization and contested

ascriptions of meaning. Once invented, controlling even early-stage technology's effects can prove utterly impossible (Banco, 2016; Monk, 2012; Oppenheimer, 1955). To be honest, when I think of my very own, early 1990s experiences with digital spheres, at times I feel we might have again become overwhelmed by technology – similar to Goethe's famous Zauberlehrling (sorcerer's apprentice), who, after summoning a respectable number of ghosts, eventually found himself unable to get rid of them. We live in smart cities and in the age of the internet of things, develop highly complex virtual spheres, e.g. with the aid of augmented reality, employ diversified sensor technologies to re-assess and ever so precisely measure every inch of the physical world, promote artificial intelligence and autonomous systems as to render them increasingly independent of human input. When I was a teenager, the holodeck on starship enterprise seemed as fascinating as unattainable. Today, we appear to have gotten unlikely close to let that famous fictional simulator become reality. Is this, however, a cause for concern?

6   Ubiquitous and contested: Digitalization today

Contrary to Weizenbaum's apprehensions, nowadays, addressing societal challenges posed by digitalization is deemed crucial by many. Additionally, critical reflection on digital technology's impact on society is encouraged by its growing ubiquity. Personally, as a social scientist interested in technology, I find witnessing these developments intriguing. Considering the history of technology in modern societies, a certain pattern can be distinguished: First, the introduction of a new technological accomplishment is met with euphoria and scepticism alike (just think of the first, still rather explosive steam engines that gave the Industrial Revolution momentum or Bertha Benz's early roaring automobiles). After a phase of trials, learning and user-oriented modifications, eventually a complex, well-controlled and highly regulated socio-technical system emerges, which reduces risks and dangers to a minimum and thereby renders the respective technology utilizable for many. Nevertheless, every technology implies its drawbacks, although we tend to forget about them: while cars constitute almost integral elements of contemporary inhabited spaces and landscapes, they still pose a danger to human health and lives on every single day they are used.

With digitalization progressing quickly, this dialectic relationship between technology and society increasingly becomes a focus of public debate. As we witness the amalgamation of the real world and digital spheres, we recognize how the latter continues to gain relevance. Asking how far the digital world influences the real one is a question of utmost topicality. Numerous fictional dystopias are based on the idea of technology and machines taking control. Current progress in research on artificial intelligence gives way to extensive elaborations on its possible detrimental effects, with renown intellectuals such as Margaret Boden, Marvin Minsky, Melanie Mitchell, Stuart Russell and Toby Walsh engaging in lively debates (Boden, 2016; Minsky, 2006; Mitchell, 2019; Russell & Norvig, 2009; Walsh, 2018), which are additionally fired by highly controversial statements such as made by Google, therein proclaiming the dawn of a new age of super-advanced digital technology (Kurzweil, 2012).

7   Online Communication at a Crossroads

Due to recent events, in our everyday work at university, we are once again reminded how crucial social interactions and personal communication are. Of course, this can be (and is increasingly) done online, as we met virtually for this conference. However, with the current circumstances forcing us to rely almost exclusively on digital communication, its limits and shortcomings become all too clear. As valuable as online courses prove to be in these times, many colleagues will agree with me that they cannot replace actual human interaction or the atmosphere and learning environment of a traditionally taught seminar. While we will surely come out of this pandemic with a number of insights to enrich

post-corona academic life, maintaining a shift so radical as the one we experience right now will most likely not be deemed desirable by many. A world in which digital spheres outweigh real-life experiences is barely imaginable – perhaps because their immediateness and tangibility, stimulating all senses, is so hard to replace. After all, are digital spheres no more than back-up resources, merely elaborated transmitters to complement offline living?

In 2020, it is perfectly obvious that digitalization has permeated various domains of everyday life and society. Still, after gaining a brief impression on what living in a more thoroughly digitalized society might look like, we would prefer not to. Probably, due to lack of genuine human interaction, a such society would feel somewhat clinical and deficient. The aforementioned Margaret Boden assumes that technology will never be able to completely replace human beings. Accordingly, an entirely digitalized society remains a vision of technology corporations (Boden, 2016). If Joseph Weizenbaum were to learn about her assessment, he might acclaim "Thank god!". Yet, digital spheres exert considerable influence on the physical world and social interaction, as we witness, for example, through smartphones' effects on face-to-face communication (e.g. division of attention between the people one is surrounded with and one's phone).

8   A Life online is imaginable, but not desirable

Communication has emerged as a particularly contentious issue in public debate. At this point, please endure my last reference to my well-exploited example as I come back to the parliament which, formerly characterized by the physical presence of its members, might see its very core (as being a place of gathering for political debate) eroded by concepts of liquid democracy. Such ideas were argued for by the Piratenpartei, which held considerable popularity in Germany a few years ago. However, to date, while said party has largely dissolved, the parliament remains a time-honoured institution of German democracy. Digital modes of participation diffuse, albeit rather reluctantly. In times of increasing digitalization, democracy faces a number of profound issues: who is participating in online debates? How does the culture of debate differ from non-digitalized discourse modes in public spheres? Probably, we agree that a president communicating mainly via twitter, insulting comments below online news articles, set-up Instagram stories and shitstorms do not constitute an optimal basis for fruitful democratic discourse. Indeed, such outcomes have become a popular study subject, so far adding to the impression of online-based debates being rather emotional, frivolous and short-sighted, while traditional, offline modes of dispute warrant more rational, reliable and balanced exchange. Whether this differentiation holds true in the long term remains to be seen. Bernhard Pörksen, a researcher mostly engaged in media studies, compares the degree of our ability to communicate beneficially online to toddlers only just learning how to speak. Consequently, we are merely at the beginning of learning digital manners and still await major parts of our online socialisation (Pörksen & Schulz von Thun, 2020). Perhaps digital spheres will forever appear as artificial spaces, although today, an incremental hybridisation of the online and the real world seems far more likely.

9   The Future of Scientific Collaboration

Returning to our initial question, to promote inter- and transdisciplinary collaboration, I argue for the broader diffusion of contemporary models for the study of micro-spaces: topic-centred research labs (Bergvall-Kåreborn & Ståhlbröst, 2009; Dell'Era & Landoni, 2014; Filho, 2019; van Joolingen, 2005; Keyson, 2016; Marvin, 2018; Pallot, 2010; Ståhlbröst, 2008). In my opinion, such spaces of manageable size provide excellent opportunities for interdisciplinary analyses of intersections and linkages between contemporary meta-developments and grand challenges such as climate change, migration and health in

an increasingly digitalized world. In the future, I hope to see more exchange between scientific domains to encourage more integrated thinking, particularly on issues that a) can only be understood by reconciling multiple perspectives and b) eventually affect us all (such as threats posed by climate change and global pandemics). For example, the overall concept of a sustainable, digitalized society paradigmatically aims to incorporate multiple claims, interests and issues (Bradley, 2007; Hazas, 2018; Osburg & Lohrmann, 2017).

Do we need a shared language to promote interdisciplinary collaboration? Perhaps, such a common foundation can emerge in a bottom-up manner, as studies are conducted and received across various research domains. Such exchange, naturally, requires compatibility and mutual understanding, but certainly not (as is sometimes argued) surrendering disciplines' conceptual, methodical and empirical bodies of knowledge. Indeed, building a respectful co-existence between methods and theoretical approaches instead of preserving dissent and competition seems both overdue and more fit to bear comprehensive insights. In retrospect, the conditions to strengthen interdisciplinary exchange and mutual acknowledgement look particularly favourable today, as several rapprochements have already been initiated. Furthermore, adhering to ethical standards for research such as the inclusion of various perspectives, cooperation, participation and allowing for diversity of arguments, theories, methods and scholars alike contributes to the success of forward-looking interdisciplinary exchange (AI-Youbi, 2020; Fitzpatrick, 2019; Mitchell, 2017; Ranson, 2018; Schuelka, 2019).

To this end, modern universities should offer multiple arenas and opportunities for dialogue and collaboration, so that researchers from diverse disciplinary backgrounds can, as suggested by the conference title, actually get together (Alexander, 2020; Aoun, 2017; III, 2019; Kerrey, 2017; Staley, 2019) and build strong academic communities to come up with robust, sensible and comprehensive insights as basis for a future both digital and analogue.

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