Making space for the future: the importance of deletion for LIS and the information society

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Abstract

Introduction. *The information society generally, and information studies specifically, are understandably concerned with productive actions done with data and information, like preservation, access, and (re)use over time. While such concerns are important and their related activities are clearly valuable, we will soon be facing limits to storage and related resources, and so information scholars and practitioners must more fully consider and support the complementary part of the information lifecycle: deletion.*

Analysis. *We outline the growing necessity of data and information deletion for social and environmental sustainability through several example concerns. We then consider several challenges of and to deleting that must be considered and addressed, from societal to individual scales, by drawing on works in information behaviour, personal information management, human-computer interaction, and the history, philosophy, and ethics of information.*

Conclusions. *Deletion is an understudied phenomenon of growing importance, and although it has a broadly negative perception in comparison to preservation, it has some notable advantages for individuals and society. Information scholars and practitioners have an important role to play in understanding and supporting deletion; recommendations for each are provided here.*

Keywords*: deleting, information society, sustainability, information behaviour, personal information management*

Introduction

When dealing with information, humans are usually concerned with keeping and remembering it, whereas intentional deleting and forgetting are not as often a concern (Bannon, 2006; Johnson, 2014; Mayer-Schönberger, 2018). This tendency is then reflected in information practice and research, which have had relatively little cause to focus on deletion thus far; for example, information behaviour and personal information management research have been largely concerned with activities like seeking, storing and (re)using information (Bates, 2017; Jones, et al., 2017). This may need to change, however, as sustainability concerns are growing and storage limits are approaching. Here we examine the necessity and challenges of deletion at individual and societal scales. We end with recommendations for how information researchers and practitioners can help with appropriate and warranted deletion.

The problem: too much information

Everyday life in the information society entails encountering increasingly large amounts of data (Vitale, et al., 2018) and personal information (Dinneen, et al., 2019). This is owed in part to the explosive growth of information (Johnson, 2014) enabled by the ease with which information can be created and accessed on the Web and social media platforms (Johnson, 2014; Post, 2017), as well as cheap and readily available local and cloud storage (Vitale, et al., 2018). Keeping a variety of information has become common among individuals (Dinneen and Julien, 2019; Vitale, et al., 2019), leading to lifelong requirements for personal information management (Jones, et al., 2016; Marshall, 2007) and in response, to diverse kinds of information behaviour (Julien and Michels, 2004). Information scholars have so far collectively accepted that information grows endlessly and thus sought to improve systems and services to help people cope, but it remains unclear if this is a sufficient and *socially* sustainable solution.

The above story has also been playing out at a societal scale and with implications for environmental sustainability: the volume of data and information produced has been growing every year, and thus they consume increasing natural resources. For example, since 2007 the growth of new information has outpaced new storage, with the gap closing faster each year (Floridi, 2014). Data storage is also frequently environmentally destructive, for example in sensitive arctic zones (Hogan, 2015b) and when immense volumes of water must be transported to cool servers in dry inland places (Hogan, 2015a). Energy consumption of data and information is another imminent concern. It has been predicted that 200 zettabytes of data will be stored in the cloud by 2025 (Morgan, 2020) and even though cloud storage is relatively energy efficient, the growing amount of information streamed, shared and stored still leads to a greater overall energy consumption (Molitch-Hou, 2019). As a result of this data growth and its power requirements, it is estimated that within 250 years '*digital information production alone will consume most of the planetary power capacity*' (Vopson, 2020, p. 5). Even in the nearer term there are reasonable concerns: ICT's consumption of electricity could reach 51% of all produced energy by 2030 (Andrae and Edler, 2015) and ICT use could contribute 7% of global greenhouse emissions by as soon as 2025 (Griffiths, 2020). Clearly, the current path cannot be sustained, and without radical change we may thus be forced into an era characterised by information loss and deletion (Floridi, 2012).

Cultural heritage and memory institutions have long recognised that it is not possible, even in the short term, to keep everything (Van der Veer Martens, 2017). They have developed guidelines about what to keep and what to discard (Post, 2017) and the decision-making processes of what or when to delete might be driven by pragmatic or economic factors, rather than by evaluation (Van der Veer Martens, 2017). For individuals, deleting is often more emotional, associated with fears or technological difficulties (Vitale, et al., 2019) and with seemingly unlimited storage space at hand deleting becomes rare or is even avoided altogether (Vitale, et al., 2018; Whittaker, 2011). For society, deletion is a complex intersectional matter: data or information are created and stored by or for some members of that group and for some purpose. In other words, all data are political. As the main difficulty lies in deciding what to keep and what to delete (Whittaker, 2011), we believe information scholars and practitioners are well poised to understand and help with deletion, but to make useful suggestions for

how we must first review some of its challenges. In the following section, we examine such challenges at societal and individual scales.

Some challenges of deleting

Protecting the infosphere & privacy

Information deletion is generally undesirable, as all information is part of our information world or *infosphere*. The infosphere, according to Floridi's philosophy of information, refers to the informational environment that we live in as an information society and encompasses any existing information or any type of mental creation. In this system, the loss of information (i.e. information entropy) should be reduced as much as possible and focus should be placed on extending, improving and enriching the infosphere with information as it helps agents in the infosphere flourish (Floridi, 1999, 2013; Van der Veer Martens, 2015). Therefore, *ceteris paribus*, information should not be deleted, and to do so without appropriate cause would be immoral. Importantly, however, there can be overriding reasons to delete information, such as if its presence is harmful to members of the infosphere, who are themselves composed (in part) of information. Therefore, actions like deleting personal information collected without consent, while it causes information loss, also benefits the infosphere (e.g. by protecting members' privacy) and may be warranted (Floridi, 2013). Arguably, large collections of personal data held by tech giants like Google and Facebook are ethically questionable and should be deleted. But this, too, depends on various, still unsettled factors, as we may have a contrary ethical obligation to keep the digital remains of some deceased people (Stokes, 2015). It is through a similar rationale that the right to be forgotten is used to compel search engines to remove certain links to personal information on request: to protect the privacy (and autonomy) of individuals, especially if some information might harm them (Floridi, 2015). In short, the value of information for the infosphere, and its consequent ethical status, means that deleting it generally requires careful consideration and a compelling reason, and the permissibility of some kinds of deletion are often complex or unclear.

Forgetting & remembering

Another challenge to the promotion of deletion is its perceived relationships to its opposite, *preservation*, and their respective socio-psychological themes, *forgetting and remembering* (Rosenbaum, et al., 2006). Forgetting is today regarded by society generally and information research specifically as something to be avoided in favour of remembering (Pereira, et al., 2014). Though the benefit and perceived value of remembering is demonstrated throughout recorded history, remembering is especially ubiquitous today thanks to digital technologies and global networks (Mayer-Schönberger, 2009) such that the relative successes of forgetting and remembering have been reversed: whereas previously *forgetting* was inevitable and therefore frequent, *remembering* has now become more common, and forgetting is therefore less discussed and valued (Bannon, 2006; Mayer-Schönberger, 2009). And, of course, there are cases where societal-level forgetting is plainly undesirable (e.g. episodes of human history we wish not to repeat). There are, therefore, negative connotations to forgetting, and thus negative associations to deleting. One consequent challenge to deletion research and initiatives is reduced stakeholder buy-in; for example, research on people's deletion behaviour would (today) require further introduction than seeking behaviour (for example) and would have less literature to draw on.

Minimalism & hoarding

The need to forget (or remember) leads to different types of information behaviour, with the extremes of deletion and storage of digital information characterised as minimalism and hoarding. Whereas minimalists easily and regularly delete digital information, hoarders store great amounts of information and have an aversion to deleting due to fears of forgetting or identity loss (Vitale, et al., 2018). Though motivated by reasonable concerns about some data's later availability (e.g. memories in photos; Gulotta, et al., 2013), digital hoarding can lead to a loss of control and a feeling of being overwhelmed by increasing amounts of information (Neave, et al., 2019). Such hoarding also has

negative implications for cybersecurity, as storing large amounts of personal information makes hacking very effective (Neave, et al., 2019), and as all data are arguably personal data (Søe, et al., 2021), keeping data without a deletion strategy is also a risk to privacy and safety. Information overload might inhibit good judgement and decision making, as well as reducing productivity and innovation (Bannon, 2006; Johnson, 2014). Deleting is proposed as one solution to information overload (Bawden and Robinson, 2020) and could reduce the misuse of personal information (Neave, et al., 2019). But even if individuals desire to delete information, this is not necessarily a straightforward action: deleting information from the cloud can be difficult, causing people to feel unable to complete the task (Ramokapane, et al., 2019), and the scale and structure of even local collections makes deletion a challenge (Dinneen, et al., 2019; Vitale, et al., 2018).

Recommendations and conclusions

We have identified above the need for and challenges to deletion. We now end with recommendations for information researchers and practitioners keen to help individuals and society with appropriate and warranted deletion.

One promising direction for promoting deletion through research could be to explore, understand and promote the lesser-known advantages (i.e. silver linings) of deletion. For example, deleting can offset disadvantages and social sustainability issues stemming from abundant storage of personal data and information. In short, stored data are a liability to security or privacy, whereas deleted data (generally) cannot be hoarded, hacked, stolen, re-identified (Sweeney, et al., 2018). Further, careful deletion of items from personal collections reduces their size and thus makes it easier to transfer them between owners (Krtalić, et al., 2021) and address anxieties about how a digital legacy is perceived (Chen, et al., 2021). At an industrial scale, deleting personal data contributes to emerging good industry practises like data minimisation (Muller, 2021) and, deleting data reduces (*a priori*) the extent to which individuals may be inundated by it (Johnson, 2014). In other words, deletion can be personally advantageous and socially responsible. Forgetting, too, has broad advantages. For individuals, forgetting is an essential mental process (Bannon, 2006; Mayer-Schönberger, 2009) that facilitates brain plasticity, which in turn helps us to learn, move on, develop, change and forgive (Mayer-Schönberger, 2018; Nietzsche, 1874). For societies, forgetting is a critical component of historical processes like amnesty and group identity formation (Bannon, 2006). Better understanding these benefits may help increase them, and in turn, help understand and promote deletion more generally.

As noted above, the choice of what to delete is important but complex, and there is a key area where information scholars and practitioners can help. Deletion is practised in some institutions today and managed by information professionals: memory institutions make decisions about what to keep and delete, retention schedules determine when to delete (when communicated clearly; McKellar, et al., 2020), and research ethics review boards enforce data deletion deadlines. These practices are useful starting points for studying deletion, and because information practitioners are present and experienced in such cases, they are in a good position to provide guidance for individuals and facilitate deleting. Meanwhile, individuals (hoarders and minimalists alike) feel the need to compare their information management to that of others (Vitale, et al., 2018), which libraries and other memory institutions can leverage in hosting knowledge-exchange workshops (e.g. instructive delete-athons). Additionally, institutions could provide access to applications that incentivise or help with the deletion process, such as: duplicate-deleting apps (Bannon, 2006), applications that centralise information to make it easier to decide what to delete (Vitale, et al., 2019), or apps with self-destructing messages or information that fades after a certain time (Bergman, et al., 2015).

We have not discussed here the roles of politics, policy and power in deletion. As long as data remains a valuable commodity, the tech sector will disincentivise deletion and encourage unsustainable storage practices, for example through lobbying and misleading narratives (Hogan, 2018), and dark patterns like hard-to-access deletion options and removing data from sight rather than deleting it (Muller, 2021). We recommend that, in addition to information behaviour and personal information management research on deletion in specific user contexts, critical information scholars join ongoing discussions about the global dynamics of deletion in fields like media studies and communications

(e.g. Hogan and Shepherd, 2015). Researchers can also contribute to sustainable technological trends, for example by making functionality and interface recommendations for open and privacy-respecting platforms rather than for the tech giants' products (c.f. Dinneen, 2021).

Finally, we sympathise if readers worry about possible detrimental implications of deleting. After all, deletion can constitute censorship (Harris, 2021), violate digital sovereignty (or aid it; Floridi, 2021), or facilitate epistemicide (Patin, et al., 2020). We emphasise that while we are promoting deletion, it can only be done with acknowledgement that every deletion decision is political; thus, ethical, practical and sustainability concerns must be balanced. So, while information scholars and practitioners have a role to play in promoting deletion to address sustainability, research should also enable *purposeful and well-considered deletions*. We hope future research will therefore expand on information seeking and use to explore how and why people delete, their related needs and challenges, and broadly applicable recommendations and practices. Only through understanding and supporting the whole information lifecycle can we help individuals and institutions to develop well-rounded and sufficiently sustainable information practices (Nathan, 2012). And as the information society encounters imminent electricity and storage constraints, knowledge about and help with deletion could be among the most valuable services we can provide.

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