Critical incidents in everyday technology use: exploring digital breakdowns

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Abstract

This paper presents the analysis of 292 personal stories of digital media breakdown in everyday life. The analysis identifies significant occurrences (events, incidents, processes or issues) as identified by informants themselves; the way these occurrences are pragmatically negotiated; and the perceived outcomes in terms of cognitive, affective and behavioural effects. Against a backdrop of techno-optimism, techno-pessimism and technology as experience, the paper proposes four analytical dimensions, or tensions, common in digital media failures: the digital and the material; trust and lack of control; planned obsolescence and desirable updates; and nostalgia and reluctance to go back. While these dimensions indicate a highly ambiguous relation to digital media with the informants, the most striking observation is how the practical solution to these uncertainties is to irrevocably ‘accept and commit’ to being and becoming even more digital. That is, in the face of (a risk of) digital breakdown, individuals argue that more and upgraded digital media is always the best and undisputable response. In the light of these results, some design possibilities are suggested, including designing for nostalgia, designing for comprehensibility and designing for failing infrastructure resilience.

Keywords Human-computer interaction · Critical incident technique · Felt-life · Experiential computing · Digital failure

1 Introduction

This paper examines individuals who are frequent digital media users and to whom continuous internet access and presumed usability is omnipresent. Inevitably, however, these individuals are also subjected to sudden and accidental disruptions of use and this paper explores their reactions to such an ‘exposure’. The rationale behind this line of questioning is to examine firstly, what types of accidents individuals identify as particularly significant; secondly, how such accidents are negotiated; and thirdly, to what degree these incidents constitute moments of reflection and deliberation looking towards their future media use. Consequently, the research question for this paper can be summarised as follows: what do frequent digital media users identify as personal media-technological failures; how do they negotiate such failures, specifically in the light of a theoretical backdrop of cyber-optimism and cyber-

pessimism; and what are the perceived cognitive, affective and behavioural outcomes of that negotiation?

In an everyday context of increasingly ubiquitous and always-on media technologies, the issue of ‘digital failure’ is becoming progressively interesting to research. The experience of digital failure is intriguing since in modern societies, networked media technologies constitute an infrastructure that is hard to bypass. The integration of a digital substrate in society can be referred to as the development of an algorithmic culture [1] or even a relentlessly updating techno-cultural dimension of reality, where opting out will not be a viable alternative for most people [2, 3]. This paper makes a contribution to research on media technology use by further exploring the notion of digital failure and its position in contemporary society. By digital failure, this paper refers to situations where a sudden and momentarily breakdown in the engagement with new media technologies actualises emotional and sociotechnical responses and relationships. In this case, digital failure is an unintended consequence of the interaction and communication between a human and a machine, which may (or may not) lead to a prolonged period of changed behaviour, or even deliberate non-use. As Bødker puts it: ‘Break-downs transform a situation from being taken-for-

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granted to being an opportunity for reflection’ [4]. As such, the study explores the, what this paper will call, critical incidents that cause interruption in usage and make users contemplate their media and information behaviours—which, as mentioned, may also constitute starting points for new usage patterns. As critic Clive James expressed it: ‘it is only when they go wrong that machines remind you how powerful they are’ [5]. Thus, this paper argues that digital failures could be particularly revealing in terms of the affective position media technologies hold in society today (i.e. how is their position between ‘techno-optimist’ and ‘techno-pessimist’ negotiated by users). Naturally, we do not expect this to be a clear-cut position; rather, we find that the types of, and responses to, digital failure could be more nuanced and negotiating in relation to the classical debate between techno-optimism and techno-pessimism.

The paper will begin by outlining previous research done in relating topics. Then, a theoretical perspective on techno-optimism and techno-pessimism is presented in order to be able to frame and position the patterns that emerge from the provided critical incident stories. In parallel, this section will also argue for an approach to users focusing on technology as experience. The paper will then describe the methodological framework used to elicit and conceptualise the aforementioned stories and affective responses. Next, the result of the analysis is presented in the form of four analytical dimensions of digital breakdown. The paper is then concluded with a discussion of what these results say about digital technology use in general and digital failure in specific, as well as suggesting design implications and possible lines of inquiry for future research.

2 Previous research

Three previously researched concepts are significantly related to that of digital breakdown: disconnection, non-use and infrastructure. So, for example, Jung [6] examines patterns of (dis)connection among different age groups, concluding that Internet usage in older age groups lags significantly behind younger groups and that this should be remedied through political, commercial and civic means. Other studies have questioned the benefits of being constantly connected [7, 8] and even emphasised the difficulty of disconnecting in contemporary society [3]. Exemplifying this phenomenon, a recent study, interviewing adult students about their perceptions of citizenship, coincidentally found that difficulties in enacting citizenship were often connected to failures in digital media use [9]. In the light of such studies of disconnection, this paper seeks to get closer to users and let them define, more broadly, what kinds of failure they, in fact, experience as most critical and why.

Further, studies of (voluntary and involuntary) non-use of digital media have resulted in many insights relating to the study of everyday digital breakdowns. The results include concerns about privacy, context collapse, changes in news consumption, social dilemmas, feeling of isolation and a fear of missing out [10–14]. More importantly, these studies emphasise the need to analyse the interplay between use/connection and non-use/disconnection as actualised in modern societies:

Future research addressing media usage in its entirety should hence consider new forms of disconnection alongside connection. Furthermore, more research specifically addressing disconnection in media communication, standardized, interactive or virtual, is needed to develop a deeper understanding of how people navigate in mediatized societies nowadays [15].

Thus, experiences and coping techniques of digital breakdowns can be said to exist in relation to larger digital systems, which in turn reflect, organise, reinforce and alter wider contexts of social order [16]. Both historical and more recent studies of infrastructures [17] and infrastructuring [18] highlight this point. Echoing the introduction of this paper, algorithmic culture and e-infrastructures inconspicuously produce ubiquitous ‘master narratives’ and social orders, while hiding alternatives. The surfacing (and design) of such infrastructural alternatives is an important task and one which can be supported by the analysis of digital breakdowns. Because, as mentioned previously, the breakdown is one central way in which infrastructural norms comes to the surface [4, 5, 17, 18].

3 Techno-optimism, techno-pessimism and (failing) technology as experience

The debate on what it entails to live in a digitally augmented world often ends up in entrenched positions, where extreme drawbacks are weighed against excessive benefits. There are debaters and research that claim that ‘the Internet’ creates a social and informational anarchy, where processes such as selection, authority, truth and conviviality are effectively disrupted [19–21]. Other research claims that the very same ‘Internet’ creates fantastic opportunities for self-fulfillment, collaborative learning and democratisation [22–24]. While the strict division between pure ‘cyber-optimism’ [25] and ‘cyber-pessimism’ [26] has been criticised and perhaps even debunked, these two perspectives still often resound in the debates of today (see for example the current disputes between ‘transhumanists’ and ‘bioconservatives’). And to be sure, such more polarised dystopian as well as utopian accounts should not be dismissed out of hand. They may still contain relevant insights into the benefits and drawbacks of a certain

development and the nuances of the dimension at large. Increasingly common, however, is to develop a kind of in-between perspective, which is presented as more contemporary, pragmatic and ‘middle ground’ [27, 28]. For example, in the always-on digital culture of today media use is consequently more often seen as situated and complex, with mixed, and sometimes ambiguous, outcomes [7], and there is a tendency for technological solutionism to co-exist with more usefulness-driven development. Media users are often proposed to develop a critical stance towards the information they encounter. As such, information literacy and a skeptical eye on the underlying logic and work ethic of commercial media platforms are presented as ‘middle-ground’ and user-centered solutions. On a slightly more abstract and systemic level, issues around net neutrality and personal integrity are often highlighted. In practice, however, the media technology market is unceasingly filled with obscured surveillance, complicated terms of service, planned obsolescence and compromised personal integrity, and users often have no choice but to consent in order to keep using their, now everyday, services and gadgets [29]. In this media ecology, this paper wants to examine the everyday perceptions and experiences of users facing a breakdown in the human-technology relationship. As Morozov puts it:

As it happens, Internet skeptics and optimists share quite a lot of common ground; both depend on some stable notion of ‘the Internet’ to advance their arguments. Remove that notion, along with its simplistic assumptions about the inherent benefits of openness or publicness, and the pundits are suddenly forced to confront complex empirical matters [28].

It is these, ‘complex empirical matters’, and specifically the notion of digital failure that this paper seeks to explore. A useful framework for exploring complex empirical matters is the idea of technology as experience [30]. This framework emphasises how experience, while always cultural, historical and material, is also a question of individual feelings, knowledge and values. By putting the concept of ‘felt-life’ at the center, issues such as resistance, involuntary/voluntary non-use, identity negotiations, emotional attachments to technological artefacts and mediated actor-actor relationships can be highlighted. The felt-life approach is context- and user-sensitive in the meaning that user sensations and experiences are integral to the overall understanding of technologies in everyday life. In the words of McCarthy and Wright:

Analytically, it [felt-life] should enable us to identify the varieties of experiences that are salient in HCI [human-computer interaction], make empirically tractable distinctions between them, and investigate the

interrelationships between technology, activity, and various experiences [31].

As such, the technology as experience approach is put forward as personal, constructionist and transformative, rather than general, rational and static once and for all. Such an approach can thus complement more positivist accounts, perhaps relying on realist ontological stances, with accounts that emphasise the felt-life aspects of human-technology relationships.

Again, this paper answers this call by exploring digital failures, as a form of felt-life of ‘disconnection alongside connection’, in everyday media technology practices. Consequently, this paper will not argue (although it could easily be done) for a specific position on the dimension between techno-optimism and techno-pessimism, or for a specific predefinition of media-technological failure. Rather, what is interesting here is how users can be seen as positioning themselves, through their critical incident stories, on this dimension. As such, this paper takes an extremely pragmatic perspective on the overarching debate: whatever we see as driving technological development (technology itself, or society at large), we can assert that what new technological advancements always produce is *difference*. That is, the potential primary or secondary effects following the introduction of a specific technology may be ‘better’ or ‘worse’ than before (but most likely somewhere in-between depending on the evaluation criteria and target group). However, most importantly, the introduction of a new technology will produce mentioned *difference* (compared to previous technologies) which is experienced by users first hand (and arguably also necessary for the continuous evaluation of media and technology uses and effects). From a general and more abstract point of view, technological development can thus be seen as a massive difference engine, where new sociotechnical variances and specificities are produced and constantly experienced, evaluated and, in best case, (re)directed.

In the light of the ongoing debate between cyber-optimism and cyber-pessimism, this paper will consequently seek to explore what types of failure people do identify as significant personal media-technological breakdowns, how they negotiate such failures and what are the perceived cognitive, affective and behavioural outcomes of that negotiation? When systematically analysed, the answers to these questions tells us (1) what people think are the most important sociotechnical functions of digital technologies; (2) what they think are viable solutions to imperative technical problems; (3) how these proposed solutions relate to a grander narrative of technological optimism and technological pessimism; and (4) what (design) insights and implications that can be drawn from such an analysis.

4 Participants and method: the critical incident technique

In this study, 292 media and communication students in Sweden were asked to describe their most memorable experience of failure relating to the use of digital media technologies (i.e. a significant critical incident). Participants were given 1 week to complete their descriptions and all of the invited participants submitted valid accounts ($N = 292$). The descriptions were written down and stretched from around 200 to 500 words. In the elicitation of these stories, failure was, by the researcher, deliberately (non-)defined as an open concept, and in an attempt to cast the net wide (rather than prematurely exclude accounts), students were instead invited to fill this wide concept with what *they* regarded as relevant digital failures. Out of the 292 informants, 5 were born in the 1970s; 26 in the 1980s; and 261 in the 1990s. Consequently, because of the age of the informants, and the fact that they are media and communication students in Sweden, there is strong reason to assume that the main part, if not all, are very familiar with everyday digital media technologies and services, and many (although the concept is vague) can be referred to as ‘digital natives’ [32]. While the deliberate choice to not collect more detailed socioeconomic background variables could be seen as a limitation, the main research goal was to qualitatively explore everyday users’ cognitive, affective and behavioural experiences of digital breakdown, rather than conduct an age-, gender- or skillset-based quantitative comparison.

Methodologically, the study is framed using the critical incident technique (CIT), which is a qualitatively oriented framework focusing on gathering, analysing and categorising observations of human behaviour, specifically in relation to so-called ‘incidents’:

The critical incident technique is a qualitative interview procedure which facilitates the investigation of significant occurrences (events, incidents, processes, or issues) identified by the respondent, the way they are managed, and the outcomes in terms of perceived effects. The objective is to gain understanding of the incident from the perspective of the individual, taking into account cognitive, affective, and behavioural elements [33].

Originating from organisational psychology [34], CIT has since been extensively applied in many explorative studies in a wide range of academic fields. In an extensive survey [35], the authors outline four ways that CIT has evolved since first applied in 1954. Firstly, they point to a development of CIT to include not only behaviours, but also psychological states or experiences. Secondly, CIT has moved from relying mainly on direct observations to using retrospective self-reports as the main source of empirical data. Thirdly, many later studies have included additional analytical frameworks, which may

conflict with the original analytical intentions of CIT. While this may not be a problem in itself, the conclusion that can be taken from this is that it is crucial to report on the analysis procedure and the conceptualisation of incidents. Fourth and finally, there is a development in terms of how credibility and trustworthiness is established in CIT (and in qualitative studies in general; more on this below).

The incident then can be experienced as either positive or negative, but is one which has a particular significance or makes a crucial contribution to the activity being performed [36]. Incidents are usually elicited by asking respondents to tell a detailed story relating to their experience of a specific activity or practice. The fuller, clearer and more detailed the account is, the more accurate it regarded: ‘(1) they consist of antecedent information (what led up to it); (2) they contain a detailed description of the experience itself; and (3) they describe the outcome of the incident’ [35]. Some forms of content analysis (in this case, a thematic analysis) are then performed on the gathered material, with the intention to identify and classify incidents of specific importance and relevance to the research questions. As such, CIT has a number of methodological benefits. Firstly, data is gathered from the perspective of the informants. This provides the respondents with a degree of freedom in determining themselves what is the most important aspect(s) in relation to the researched phenomenon. This, in turn, provides the researcher(s) with highly relevant accounts of incidents which may otherwise have gone unnoticed due to various predetermined factors. In fact, studies have reported that CIT has been capable of gathering data unattainable through other methods, particularly when exploring a little known research area [37]. As was practiced within the study for this paper, not pre-defining exactly what constitutes an ‘incident’ leaves it open for informants to develop a relevant frame central to them. This means that CIT is able to produce data which is both detailed and grounded in the first-hand experience of the people involved in the activity, which leads us to another benefit of the CIT.

As CIT uses an inductive approach, it becomes helpful in exploring a phenomenon which may not be very theorised or which may be context-dependent (and thus varying). In the case of non-use, and especially accidental and everyday non-use, the contexts where the incidents occur may be very circumstantial and idiosyncratic. CIT, relying mainly on the stories of informants, can remain open to both informants who have varying backgrounds and skillsets as well as an emergent set of variables and practices. As such, it can be described as inclusive in terms of data sources and generative in terms of hypotheses and theories. As such, CIT connects clearly to what Bødker refers to as meditations [4]—a form of affective introspection that supports the felt-life experience of

users, particularly in relation to everyday (technology-rich) situations.

Meditations as an everyday research approach can help researchers become attentive to new research opportunities inside the setting of their own lives. In such situations, deeply personal and often incidental or serendipitous experiences may become visceral, sensed and reflective through introspection and writing as a form of inquiry [4].

This compels, from both the analyst and the participant user, to be sensitive to their own affects, to contemplate on their actions and reactions and to be considerate in relation to how feelings and sympathies develop over time. In Bødker's examples, these affective meditations mainly take the form of introspective accounts. For this paper, the researcher wanted to combine the felt-life approach of Bødker's meditations with an open approach to the critical incident technique. The main reason for trying such a method is to explore the potential to reach a sympathetic combination of affective accounts, where researchers can navigate and negotiate between their own affective experiences and those of other study participants, seeking positions and conditions where those accounts overlap.

4.1 Data analysis

A thematic analysis was conducted on all elicited material ($N = 292$). A thematic analysis is a generic qualitative approach in which data is recurrently read with the aim to categorise it into central themes, describing recurring patterns in relation to the research questions. Braun and Clarke [38] identify five central steps in a thematic analysis: a familiarisation with the data; a generation of initial codes/tags; a grouping of coded segments into (named) themes; a review, splitting and/or merging of themes; and a comprehensive description of the analytical capacity of each final theme. Notably, coded segments and themes emerge *across* the data. This means that one critical incident account can include several data points, referring to various codes and themes. As the analysis also showed that many themes expressed a paradoxical quality, this led to a grouping of themes into dimensions, expressing, more or less, ironic tensions in the material.

Naturally, scholars have discussed disadvantages and limitations relating to CIT. For example, issues of reliability and validity have been pointed out as potential weak spots [33]. This is a common objection towards qualitative and interpretative methods in general. Without going into detail, it may be worth mentioning that many have argued that the positivist legacy of validity and reliability as methodological concepts make them less suited for the evaluation of qualitative research. Still, it is of course necessary to address such concerns. One significant issue relates to the fact that CIT is mainly a

retrospective method. As such, informants may suffer from information biases, not recalling all details, or selectively remembering and exaggerating certain aspects. For an explorative study of this kind, such issues may be of less importance since absolute details are of less interest compared to overall tendencies. Also, the phenomenon explored (digital breakdowns) is not particularly socially unacceptable or addressing particularly sensitive issues. It may be the case, however, that informants enter the study with pre-existing beliefs about media use and technical failures. For this study, these pre-existing beliefs can actually be seen as an integral part of what is being researched in this case, providing more reflexive accounts. Also, the instrument (i.e. the given instructions) was exactly the same for all informants; and they were given a total of 1 week to reflect and think through this chosen event in their life story.

In relation to CIT more specifically, three additional credibility checks [35] were applied: participation rate; theoretical validity; and descriptive validity. In terms of participation rate, all of the 292 analysed stories included critical incidents that were related to digital media failure (this is perhaps obvious since participants were specifically asked to provide a story of their most conspicuous digital media failure). Theoretical validity refers to the degree of grounding in related literature of the descriptive and interpretive terms used. According to Butterfield et al. researchers should 'make explicit the assumptions underlying their proposed research and then scrutinize them in light of relevant scholarly literature to see if they are supported' [35]. In a second phase, researchers compare their own categories to the literature to see if there is theoretical support for them. While theoretical validity has been attempted through supporting references, it is also important to note that a 'lack of support in the literature does not necessarily mean a category is not sound, as the exploratory nature of the CIT may mean the study has uncovered something new that is not yet known to researchers' [35]. In this paper, the critical incidents, a part from being data-driven, were also analysed against the backdrop of 'cyber-optimism' and 'cyber-pessimism' indicating theoretical grounding. In terms of descriptive validity, the stories are written down by the informants themselves, providing them with room and time to reflect and express themselves as they find most fitting, which, in turn, provides researchers with accurate and reflexive accounts of critical incidents as experienced first-hand by informants.

5 Results: dimensions of digital failure

The critical incident analysis revealed a number of things. On an overarching level, it became clear that incidents are often sequential. That is, one problem leads to several others (in an infrastructural domino effect). This connectivity, which is now

integral to life for the respondents, echoes the necessity to look at disconnection alongside connection. Nevertheless, it is interesting to identify what we may call the starting points of these sequences of incidents. These are not only indicative of where users identify the beginning of a cluster of problems, but these also illustrate the types of problems that users find more common or significant.

To report the analysis, and reflect the often double-edged nature of incidents and their solutions, the paper presents the most salient themes as four analytical dimensions. These dimensions reveal the most interesting tensions in the collected data material. At times, they will be overlapping, but they also represent important and distinct dimensions on their own. Presenting the results as dimensions also makes it possible to reflect the ambiguity of emotions and responses that the informants expressed. In an attempt to maintain the integrity of the material and convey the felt-life qualities of it, several vigorous quotes will be included. They are presented in connected sections to maintain topical coherence and bring added ‘thrust’ to the specific details of the proposed dimension.

5.1 Digital and material

The perhaps most encompassing dimension present in the material is between the digital and the material. Several theorists have, of course, argued that the digital and the material are connected concepts, continuously co-influencing each other. While this is of course true, especially in a connected society with more or less ubiquitous digital media in all aspects of life, there is also reason to take notice of the incidents where conflicts and mismatches arise between the digital and the material. Consider for example these quotes:

For a day and a half, we tried to come up with jobs we could do without the computers, without the system. This was extremely hard since we were so incredibly dependent on our network and our computers.

In the restaurant where I work we have these card readers with touch screens. These screens often freeze up and when they do, there is nothing we can do but wait and hope it jumps out of it. If the guest has no cash, we basically have to offer them a free meal... or earn a really bad reputation... or both, perhaps.

New technology and new gadgets are probably great when they work, but I find it difficult to trust them to always function. In this case there are several factors that needs to be coordinated: the customer must have a smartphone, bring it to class, make sure they have surf quota, make sure they have internet access, make sure they have the right app installed. The responsibility is passed down to the individual and the technology to the extent that just being able to afford it and being interested is no longer enough – you need access to certain

technologies and to be technically prepared, just in order to take a yoga class.

The insights demonstrated by these respondents (that digital materiality is interconnected in daily life) has of course been theorised previously by many scholars [39–41]. Nevertheless, the phenomenological awareness and understanding of this fact is something that will be continuously repeated as new users are relentlessly subjected to digital failures. The expressed disbelief facing digital information which is not a perfect representation of reality is surprisingly significant. Both the quotes also illustrate a kind of hopelessness or resignation in the face of such critical incidents. The solution for these individuals becomes to ‘abandon’ to non-use. This type of non-use is naturally not limited to work life only:

In the end it is a crappy web service that decides whether I get to go to a concert or not. In this case I couldn’t do anything about it, just have to sit there. So, this is a clear example of how much we use and rely on technology, until it doesn’t work. It is so natural to us that we don’t even think about it... at least when it works.

Again, the mismatch between the affordances of digital systems and the material outcomes becomes a form accidental non-use, or temporary involuntary disconnection [13]. Arguably then, if users are not able to get the results they want from a particular interactive service, this can be seen as one specific form of breakdown existing within a larger spectrum of breakdown activities and negotiations. Again, the response is at first a kind of resignation, which is later followed by a demand to improve services to not let this form of digital-material mismatch ever happen to users again. As such, the solution is more and better digital media (as shall also be more clearly illustrated henceforth).

Similarly, there is another form of breakdown emerging from over-use. That is, some individuals refer to the great amount of time they are spending online (which also had material, social and corporeal effects) as a reason to restrict their use and reflect on socio-digital circumstances more widely.

After a while I discovered that this was not just my problem [being on the internet all the time], all young people around me did the same thing. Instead of hanging out in our spare time, we chatted on the net. Before, we studied together in the library, now we sat by our own computers at home. Instead of going out socializing, we created online friends, which we maybe met up with later on.

I was only 18 years old and weighed 100 kilos. My body was aching all the time, my shoulders, my back. I spent weeks indoors without going out, and I also

chose to take distance learning courses due to my heavy Internet use.

Here, digital breakdown is not a question of absolute resistance and complete refrain from screens and computer networks as such, but it is, nevertheless, a form of milder resistance (which may be hard enough to enforce for the individual) against the omnipresence of digital media. Interestingly, the triggering factor here is not located within digital media as such, but in the material consequences that the over-use of it generates. That is, the intrinsic workings of digital media are still regarded as something good (or at least neutral), but an *excessive* use can have consequences outside of it, which then becomes perceptible as a problem for the user.

5.2 Trust and lack of control

Another pertinent tension in the material was between a faithful trust in computer systems to ‘just work’ and the overwhelming experience of mistrust, insecurity and lack of control if (once) they malfunction. Consider for example these quotes:

This was something I could not accept! We were supposed to live without the Internet for FOUR DAYS!? Now I had no internet on my phone or at home. How was I supposed to look up bus tables, have my Skype meetings, keep up with friends or relax with my favourite TV shows? I was furious.

When some online service notifies you that its servers are down I just can’t understand how this can be happening! These people should be working hard to provide us users with a problem-free media landscape!

Of course I’ve had web pages crash on me before, but you still maintain a strong trust that they should just work without complications and if they don’t my lack of patience shows itself and I get irritated real quick. When the solution is beyond your control you feel helpless and small.

My generation doesn’t know how to pay bills without the Internet, we don’t know how to find phone numbers, we can’t find our way without the maps in our phones, we wouldn’t have access to news and so on. And what would we, who totally rely on the internet, do if it crashed?

These informants all acknowledge their reliance on computer systems that ‘just work’—they trust the systems to keep them satisfied and in control. At the same time they also display feelings of mistrust, frustration and lack of control in the face of even momentarily failure. These feelings seem to emerge from a deeper sense of uncertainty about when, how and who that has control over ‘the workings’ beneath and

behind the shiny user interfaces. As one informant succinctly puts it:

When it comes to computer systems it has become much harder to know what the problem actually is and this makes my frustration bigger.

While informants do feel lost and helpless when suffering accidental non-use they are also trying to overcome problems, for example by adapting their behaviour to the ‘strange behaviours’ of digital media, or by trying to troubleshoot technologies even though they are perceived as ‘abstract’ and unresponsive:

I instinctively turn the screen [in order to make a faulty touch screen respond] in a process I’ve now been through millions of times, in order to keep writing. I have absolutely no idea why this works, but I don’t question the phone, I just do it.

No connection between the phone and the stereo receiver is just weird. Complete silence when you want to play music feels so abstract and hard to explain. Trying to troubleshoot when you get no feedback and have no idea where the error is located is extremely frustrating.

The strangeness and abstractness of digital media is perhaps even more emphasised once informant’s own solutions grind to a halt, and they have to rely on someone else to fix it:

It took them [customer service] a day to reply and in the mean time I couldn’t do anything, because I wanted to know what was wrong first. The person who then responded to my email seemed very surprised and said *they* had no idea what was wrong and that they would inform a technician. The next day everything was back to normal and I had no idea what had happened or why.

We manage to get the [broken down] car towed to the shop, the mechanic takes out a small computer with some wires, connects it to the car, presses a few buttons, and within a minute the car starts again. The bill for this came to a couple of thousand. So there was nothing wrong with the car as such, it just needed a system restart. [...] This makes you think about current times, where a grown man with decades worth of experience in engine maintenance can no longer fix his car without a small electronic gadget which a 12-year old could probably operate.

I was in a complete state of panic and resignation when my colleague finally shows up. Right then, the customer support guy calls back and says ‘everything is fixed’. It was like none of the problems had ever happened and

my colleague just went ‘but everything is working as normal!?’ Ugh!

The sensation of ‘not understanding’ how and why something works generates a lot of subsequent emotions. When technologies work, they are normalised and mundane (and as such, perhaps, indistinguishable from magic as sci-fi writer Arthur C. Clarke once put it). When technologies do not work, however, mistrust, irritation and insecurity prevail. Technological breakdowns are thus revealing in terms of showing the mundane (or magic) work that technologies actually perform. This ‘magic’ becomes even more pertinent in the cases where the informants have to rely on the help from someone else (who may, incidentally, not be entirely sure of how or why something works either), and the previously unbearable and almost existential problem just evaporates through the pressings of some buttons.

5.3 Planned obsolescence and desirable updates

It is perhaps no surprise that many of the informants reported that they *desired* new and updated technologies that could overcome current experienced shortcomings in both hardware and software.

This problem was so unnecessary. Now I was stressed, lacking time, worked up and anxious. If I just had updated first it would have been fine.

The problem is that I have forgotten my password so many times, which has then led to creating new ones. It may not sound like a big problem, but it is stressful. If you could just use your fingerprint or something this would no longer be a problem.

But I’m guessing that very few of us see our iPhones as something to be thankful for or humble about. Unfortunately, it is probably more likely that we jealously and bitterly conclude that it is not the latest model.

As can be seen, this desire refers to both software and hardware as well as ‘wetware’ (i.e. corporeal) solutions. New technical features addressing current technical problems are seen as the way to go. In fact, no other options seem viable or thinkable to the informants in this study.

There is, however, also an antithetical tendency to this constant desire for updates (although it is not proposed as a resolution to a breakdown). Planned obsolescence is the idea that (media) technologies are being deliberately designed to last for a limited amount of time [42]. Notably, the informants recognise such tendencies in their critical incident stories as well. Thus, while planned obsolescence does not have to be taken as the only theory explaining the development of new technologies, there are lived experiences, as well as an amounting mass of e-waste, suggesting that it is likely a part

of the media technology life cycle today [43]. As such, this was something that informants experienced not only as existing, but also as annoying, as it was recurring.

This experience [getting a smart phone] was a shift for me. From the older longer-lasting technology, to the newer more temporary technology. My previous phone was the same brand, but not a smart phone, and it lasted me six years. Naively, I thought a smart phone would last just as long.

Like when apps that are dependent on each other doesn’t sync, for example the banking app, Swish [an app to quickly transfer money], and the electronic ID. Sometimes an update of one leaves the others not working, and suddenly you have a progressive problem. Surfing the web took forever and many apps just froze when I opened them. The update had completely countered its purpose. After a few days of frustration, I had to reset the phone, which actually solved all the problems, the phone was like new again. But then I was back to square one and couldn’t use the app I originally updated the phone for!

Continuous software updates, making perfectly functional machines redundant and obsolete, are causing practical and ‘progressive’ problems for the informants. The interdependence of software and hardware capacities, combined with a market of many independent actors and a desire for updates, creates planned obsolescence as a systemic effect. As such, accelerating technological updates to solve problems is both a cure and a poison [44]. It solves certain issues, but simultaneously creates others. In this process, it also makes machines unattractive and dysfunctional. Hard disk drives that can no longer be read due to missing cables, new operating systems or scrapped associated machinery; phones that no longer function as desired due to incompatibilities between software; and computers that are no longer fast enough to run the latest versions of programmes are all dismissed to growing heaps of e-waste (which, incidentally, are often located far from the places where the technologies were sold and used).

5.4 Nostalgia and reluctance to ‘go back’

Even though most informants belong to a category described as digital natives [45], they interestingly also displayed an unmistakable yearning for the (not so distant) past:

I don’t trust it [the hard drive] one bit! If I really want to save something for the future, I print it to paper. I have used an iPhone ever since it came out in 2007. Before that I had simple Motorolas and Sony Ericsson phones, which I can really miss today. [...] Those phones never gave me any trouble.

I am very ambiguous about this. While it is unthinkable for me to not use this sophisticated technology, I miss the days when you weren't so very dependent on and totally restless without your iPhone glued to your hand. Technology has made our lives easier in many ways, but also more vulnerable. A ripped-out map from the yellow pages or an old-school photo album is still there, even when electricity is not.

This sentimental desire goes against findings by other studies [11], but was also contrasted by individuals within this study acknowledging that 'going back' was not an imaginable option for them. The rationale underlying this emotion was that once you get used to the speed or fidelity of a certain medium, the thought of returning to a previous (e.g. slower, lower resolution) version simply became unthinkable.

I am so used to HD [high definition] that I'd rather not watch, than watch something with lower quality. I think we are now so pampered that when technologies fail and we have to go back to the ways we did things before, we get really annoyed. Even though this was just a few years ago.

You get used to new technologies so quickly. Today I wouldn't manage without a smart phone connected to the Internet. It would feel so empty.

It is interesting to see how a certain reminiscing melancholia is setting in, even with these relatively young informants. At the same time, this is not a desire they are (at all) willing to act on. This shows how completely integrated digital media are in our lives. Even though there are wishes to return to a simpler age, less dictated by digital media, the necessity, comfort and desire to stay updated permeate their existence. Some would argue that today, it is even the case that in order to remain a full citizen, we are in fact required to become digital [9].

6 Implications for design

The results of this study, both in terms of felt-life and infrastructures, point to a few design possibilities. Firstly, one design space that could be explored is *designing for nostalgia*. Nostalgia is, like in many other contexts, not always very appreciated in design practices. The uniqueness and newness of the digital medium is often accentuated. As such, designing for nostalgia, may be understood as a less explicit form of undesigning [46], where the old takes precedence over the new. The acknowledgement of user concerns in terms of existing everyday media habits, the ontological distinctions actualised by systems [47] and the familiar control loops can help designers to recognise what Star refers to as 'all manner

of articulation work performed invisibly by the user' [17], so as to not disrupt interaction conventions unnecessarily, or unsettle chains of hidden articulation work that helps users make sense of systems.

Second is *designing for comprehensibility*. Arguably, the black-boxing of functionality construes users as lazy consumers instead of as cognisant users capable of learning, understanding or even being technologically ingenuous [18, 48, 49]. If automation becomes a priority, people may lose understanding of what the system does and hence feel out of control—they become excluded from the control loop (something which was often experienced by participants in this study). That is, the user's current comprehension of the system is deterred due to not only a lack of transparency, but also a lack of comprehension. As Dourish puts it: 'people need to understand how a system works in order to understand how to make it work for them' [50]. In order to reduce user uncertainty of the potential outcomes of their actions (or the current functional state of a system), designers could work more concisely to foster comprehension and provide (optional) contextual and adequate feedback and feedforward.

Third is *designing for failing infrastructure resilience*. How can designers of digital technologies support the user beyond the always connected digital system (e.g. in a failing infrastructure [17, 18])? Increasing the robustness of the system under such conditions, and imagining how everyday critical incidents can become opportunities for learning, rather than sources of frustration seems like a way forward. Also, thinking about how flexibility and support in operating procedures can be designed; multiple task paths and offline support in contexts that goes beyond the system in itself (while also avoiding the constant availability of human support [51]) could help move decisions closer to the user in terms of control over resources in situations where infrastructures break down.

7 Conclusion

This paper has presented a study of what users themselves identify as significant incidents in everyday technology use. The results help us to get a better understanding of how contemporary consumers actually perceive, cognise and reason about the pervasiveness of digital media technologies. While it does not go into meticulous detail on perceptions of, for example quality, authority or truth, in digital settings, it provides readers with a 'mid-range' perspective on routine usage and its inevitable incidents, as expressed by users themselves.

It is clear that the informants perceive an ever-present usefulness of digital media. According to them, digital media has made life better in practically all walks of life. Regardless of the flurry of failures that comes with digital media use, it generally contributes to a higher quality of life and makes

mundane activities simpler, more fun and more efficient. As such, the critical incidents the studied users describe are also, most often, relatively minor—they are temporally situated in the everyday and rarely become life-changing. However, the four proposed dimensions also reflect a certain ambiguity in relation to (failures in) digital media technologies and their embeddedness in daily life.

The tension between the digital and the material exists on a general level, where the otherwise converging lifeworlds are instead diverging. The anticipated connection between digital systems and material reality breaks down and results in perceptible and sometimes tangible consequences for the individual. This relates to the next dimension where a lot of trust is put into digital systems to ‘just work’. As a result, few preparations are taken to keep practices resilient to failure. That is, when systems break down, individuals experience much insecurity, mistrust and lack of control. Moving on, the two next dimensions also hold certain parallels. Planned obsolescence is a design policy of planning or producing a certain artefact with an artificially limited life cycle. This makes the product obsolete (e.g. unfashionable or no longer functional) after a pre-planned period of time. Informants recognise this phenomenon in the current digital media ecology and find it a source of problems. At the same time, they see continuous updates as part of the solution for the problems they encounter. In a similar fashion, the informants hold a certain amount of nostalgia for time prior to the omnipresence of pervasive media. Older technologies are regarded with a certain notion of reminiscence and warmth. Still, virtually no one would consider going back to using older technologies, at least not voluntarily. This is explained as users having gotten used to a certain level of technical sophistication, but also by being seamlessly embedded in contemporary algorithmic culture. As such, this can be seen as both a result of an active choice in the face of perceived structural conditions and a ubiquitous socialisation into a digitally permeated everyday life.

In the debate between techno-optimism and techno-pessimism, the users in this study seem aware of both hypothetical and real drawbacks, but they are also clearly techno-solutionists. As such, the felt-life of the users is perhaps best described as ambivalent, particularly in moments of breakdown. At those points in time, a certain hesitance and doubtfulness can be identified. However, this ambiguity never comes to question the potential for technology to improve and thereby also overcome the situations of failure. That is, while the proposed dimensions indicate a certain negotiation around current digital media practices and the ways they falter, there is also a clear tendency when it comes to the applied solutions. Virtually all informants display what can only be

referred to as an ‘accept and commit’ attitude to the digitalisation of everyday life. So, while individuals reflect on the pervasive nature of computing today, they accept that there is practically nothing to do about it, and ultimately, the decisions they take are always varieties of accepting the current ubiquity of computing and to commit to being and becoming *even more* digital. As such, they display relatively few signs of the voluntary simplicity, or techno-resistance, reported in other studies [49, 52]. For example, when facing the risk of losing important data again, the individual decides to get bigger and better hard drives or migrate to cloud services; when having experienced a period without mobile internet connection, they buy larger surf quotas; when forgetting a password, they long for biometrics; when suffering a bad web experience, they demand that online services become more accommodating to their needs. All in all, they seem to fully and unequivocally subsume themselves in algorithmic culture. While this is perhaps not very surprising, it also raises questions about the structural difficulties of opting out. The lack of realistic alternatives that take anonymity, personal integrity and openness seriously appears to not exist (or are at least not reaching critical mass in use). So even though a critical ambivalence against the omnipresence of certain technologies may be present, practical resistance is rarely expressed. Rather, anger and frustration seems to more often result in feelings of resignation and desires for more of the same, but slightly improved, technologies. This experience of technology, and adherence to infrastructure, without plausible alternatives, is worrying and is something that should arguably worry designers as well.

7.1 Future research

In terms of future research, there were several additional themes of critical incidents that emerged during analysis. These included, for example, the designed control of attention as exercised by increasingly pervasive media; the widespread psychological, social and societal consequences of being hacked; expressed fears of internet or computer ‘addiction’; and the social dilemmas arising from confronting expectations of being online by friends, colleagues and public authorities. Many informants also experienced a tension between the ephemerality of data (e.g. when a hard drive crashes and several years of photos, and thereby memories, are lost) and the permanence of data (e.g. when an old Facebook post would create social awkwardness, or even missed opportunities, for them later in life). Another visible theme, which has not been touched upon in this paper, was the level of constant maintenance (i.e. physical and cognitive work) that was required to make each and every technology work together smoothly (something informants could spend significant

amounts of time on). In the light of such findings, and to conclude, we find that exploring disconnection and connection jointly provides us with a fruitful basis for a design agenda that takes the critical ambiguity of felt-life as a starting point.

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References

1. Striphas T (2015) Algorithmic culture. *Eur J Cult Stud* 18(4–5): 395–412
2. Bardzell J, Bardzell S (2015) Humanistic HCI. Morgan & Claypool, San Rafael
3. Karppi T (2018) Disconnect: Facebook’s affective bonds. University of Minnesota Press, Minneapolis
4. Bødker M (2017) “What else is there...?”: reporting meditations in experiential computing. *Eur J Inf Syst* 26(3):274–286
5. James C (1981) The crystal bucket: television criticism from the “observer”, 1976–79. Jonathan Cape Ltd, London, UK
6. Jung J-Y (2016) Connectedness and disconnectedness to new and old media within different age groups. *First Monday* 21 (8). doi: <https://doi.org/10.5210/fm.v21i8.6330>
7. Boyd D (2016) Participating in the always-on lifestyle. In: Chun WHK, Watkins Fisher A, Keenan TW (eds) *New media, old media: a history and theory reader*, 2nd edn. Routledge, London, pp 425–428
8. Lagerkvist A (2017) The media end: digital afterlife agencies and techno-existential closure. In: Hoskins A (ed) *Digital memory studies: media pasts in transition*. Routledge, London
9. Rahm L, Fejes A (2015) Ubiquitous computing, digital failure and citizenship learning in Swedish popular education. *Citizenship, Teaching & Learning* 10(2):127–141
10. Alt D (2015) College students’ academic motivation, media engagement and fear of missing out. *Comput Hum Behav* 49:111–119
11. Baumer EPS, Adams P, Khovanskaya VD, Liao TC, Smith ME, Schwanda Sosik V, Williams K Limiting, Leaving, and (re)lapsing: an exploration of Facebook non-use practices and experiences. In: *Proceedings of CHI 2013*, Paris, France, April 27–may 2 2013. ACM, New York, pp 3257–3266
12. Lampe C, Vitak J, Ellison N Users and nonusers: interaction between levels of Facebook adoption and social capital. In: *Proceedings of CSCW’13*, San Antonio, TX, USA, Feb 23–27 2013. ACM, New York, pp 809–820
13. Lucero A Living without a mobile phone: an autoethnography. In: *Proceedings of DIS’18*, Hong Kong, June 9–13 2018. ACM, New York, pp 765–776. doi: <https://doi.org/10.1145/3196709.3196731>
14. Peters O, Allouch SB (2005) Always connected: a longitudinal field study of mobile communication. *Telematics Inform* 22(3):239–256
15. Kaun A, Schwarzenegger C (2014) “No media, less life?” Online disconnection in mediatized worlds. *First Monday* 19 (11)
16. Woodruff A, Augustin S, Foucault B Sabbath day home automation: “It’s like mixing technology and religion”. In: *Proceedings of CHI 2007*, san Jose CA, USA, April 28–may 3 2007. ACM, New York, pp 527–536
17. Star SL (1999) The ethnography of infrastructure. *Am Behav Sci* 43(3):377–391
18. Pipek V, Wulf V (2009) Infrastructuring: toward an integrated perspective on the design and use of information technology. *J Assoc Inf Syst* 10(5):447–473
19. Keen A (2015) *The internet is not the answer*. Atlantic Books, London
20. Talbott S (2007) *Devices of the soul: battling for our selves in an age of machines*. O’Reilly Media Inc., Sebastopol
21. Turkle S (2015) *Reclaiming conversation: the power of talk in a digital age*. Penguin Press, London
22. Tapscott D, Williams AD (2008) *Wikinomics: how collaboration changes everything*. Penguin Books Ltd., London
23. Hess ED, Ludwig K (2017) *Humility is the new smart: rethinking human excellence in the smart machine age*. Berrett-Koehler Publishers Inc., Oakland
24. Gauntlett D (2011) *Making is connecting: the social meaning of creativity, from DIY and knitting to YouTube and Web 2.0*. Polity, Malden, MA
25. Negroponte N (1995) *Being digital*. Alfred A. Knopf, Inc., New York
26. Postman N (1993) *Technopoly: the surrender of culture to technology* vintage books, New York
27. McChesney RW (2013) *Digital disconnect*. The New Press, New York
28. Morozov E (2013) *To save everything, click here: the folly of technological solutionism*. PublicAffairs, New York
29. Lovink G (2016) *Social media abyss: critical internet cultures and the force of negation*. Polity, Malden
30. McCarthy J, Wright P (2004) *Technology as experience*. MIT Press, Cambridge
31. McCarthy J, Wright P (2005) Putting ‘felt-life’ at the centre of human–computer interaction (HCI). *Cogn Tech Work* 7(4):262–271
32. Prensky M (2001) Digital natives, digital immigrants on the horizon 9 (5):1–6
33. Chell E (1998) Critical incident technique. In: Symon G, Cassell C (eds) *Qualitative methods and analysis in organizational research*. Sage, Thousand Oaks, pp 51–72
34. Flanagan JC (1954) The critical incident technique. *Psychol Bull* 51(4):327–358
35. Butterfield LD, Borgen WA, Amundson NE, Maglio A-ST (2005) Fifty years of the critical incident technique: 1954–2004 and beyond. *Qual Res* 5(4):475–497
36. Gremier DD (2004) The critical incident technique in service research. *J Serv Res* 7(1):65–89
37. Bittner MJ, Booms BH, Mohr LA (1994) Critical service encounters: the employee’s view. *J Mark* 58(4):95–106
38. Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qual Res Psychol* 3(2):77–101
39. Deuze M (2012) *Media life*. Polity Press, Cambridge
40. Rasmussen T (2014) *Personal media and everyday life*. Palgrave MacMillan, London
41. Chalkley T, Hobbs M, Brown A, Cinque T, Warren B, Finn M (2015) *Communication, digital media and everyday life*. Oxford University Press, Oxford
42. Waldman M (1993) A new perspective on planned obsolescence. *Q J Econ* 108(1):273–283
43. Hertz G, Parikka J (2012) Zombie media: circuit bending media archaeology into an art method. *Leonardo* 45(5):424–430
44. Stiegler B (2012) Relational ecology and the digital pharmakon. *Cult Mach* 13:1–19
45. Ahn J, Jung Y (2016) The common sense of dependence on smartphone: a comparison between digital natives and digital immigrants. *New Media Soc* 18(7):1236–1256

46. Pierce J (2012) Undesigning technology: considering the negation of design by design. In: Proceedings of CHI 2012, Austin, TX, USA. ACM, New York, pp 957–966
47. Siegert B (2015) Cultural techniques: grids, filters, doors, and other articulations of the real. Fordham University Press, New York
48. Bainbridge L (1983) Ironies of automation. *Automatica* 19(6):775–779
49. Håkansson M, Sengers P Beyond being green: simple living families and ICT. In: proceedings of CHI 2013, Paris, France, April 27–May 2 2013. ACM, New York
50. Dourish P (2003) The appropriation of interactive technologies: some lessons from placeless documents. *Comput Supported Coop Work* 12(4):465–490
51. Mazmanian M, Erickson I The product of availability: understanding the economic underpinnings of constant connectivity. In: Proceedings of CHI 2014, Toronto, ON, Canada, April 26–may 1 2014. ACM, New York, pp 763–772
52. Ames MG Managing mobile multitasking: the culture of iPhones on Stanford Campus. In: Proceedings of CSCW'13, San Antonio, TX, USA, Feb 23–27 2013. ACM, New York, pp 1487–1498