Digital marginalisation

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ORIGINAL PAPER

Digital marginalisation: "Everything, everywhere, all at once": A study of digital transformation from a lifelong learning perspective

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Abstract

This article discusses the digital divide from the perspective of lifelong learning. Building on extant empirical findings related to digital transformation in the Nordic region, the authors develop a relational approach to explore the ways in which digitalisation has become meaningful and influential in everyday life, producing moments of marginalisation that concern us all. The authors argue that marginalisation can be viewed as a performative effect of digitalisation that flows across bodies, spaces and times as a situated conditioning of the subject. This means that marginalisation is "everywhere" and concerns everything at all times. Thus, there is no subject position free from marginalisation. This article contributes to research on the digital divide as well as on lifelong learning. In terms of the latter, its contribution goes beyond situated perspectives on learning by unfolding the dynamics of "the situated" as relations that create marginalisation, thereby producing insights into the conditions needed for lifelong learning processes to succeed.

Keywords digitalisation · digital marginalising · lifelong learning · design-based research · new materialism

Résumé

Marginalisation numérique : « Tout, partout, en même temps » : Une étude de la transformation numérique du point de vue de l'apprentissage tout au long de la vie – Cet article traite de la fracture numérique du point de vue de l'apprentissage tout au long de la vie. S'appuyant sur des résultats empiriques existants liés à la transformation numérique dans la région nordique, les auteures développent une approche relationnelle pour explorer dans quelle mesure la numérisation a gagné en impor-

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tance et en influence dans la vie quotidienne, créant des moments de marginalisation qui nous concernent tous. Les auteures soutiennent que la marginalisation peut être considérée comme un effet performatif de la numérisation qui traverse les corps, les espaces et les époques, conditionnant l'individu dans des contextes spécifiques. Cela signifie que la marginalisation est « partout » et concerne tout à tout moment. Tout individu est de par sa position sujet à une marginalisation. Cet article contribue à la recherche sur la fracture numérique et sur l'apprentissage tout au long de la vie. En ce qui concerne ce dernier, il va au-delà des perspectives situées sur l'apprentissage en révélant la dynamique du « situé » comme relations qui créent la marginalisation, et permet de mieux appréhender les conditions nécessaires à la réussite des processus d'apprentissage tout au long de la vie.

Introduction

Since the mid-1990s, research on digitalisation and its influence on all levels of society (political, social, economic and institutional) has been conducted in multiple fields, including digital governance (Ebbers et al. 2016; Grönlund 2004; Helbig et al. 2009), the digital divide (Robinson et al. 2003; Van Dijk 2020; Warschauer 2003) and lifelong learning (e.g., Head et al. 2015, Buhl et al. 2022). Much of this research has focused on mechanisms that exclude certain people (whom we refer to in this article as the "digitally insecure") from availing of technological advancements, thus preventing them from actively participating in democracy.

For the past twenty years, the Nordic countries[1] have been at the forefront of digitalisation while pursuing initiatives that enhance citizens' general level of digital competence (Randall and Berlina 2019). However, the 2022 edition of the European *Digital Economy and Society Index* (DESI; EC 2022), which has been compiled by the European Commission since 2014, shows that a quarter of Nordic citizens are digitally insecure or at risk of digital exclusion. We argue in this article that the risk of marginalisation does not, however, only concern those who are digitally insecure and lack, for instance, basic digital skills. Rather, marginalisation can be viewed as a performative effect of digitalisation that flows across bodies, spaces and times as a situated conditioning of the subject (Davies and Harré 1990; Højgaard and Søndergaard 2011). This means that no one is entirely free from digital marginalisation. It concerns us all – although not in the same moments – as we move in and out of encounters with digital apps, platforms and infrastructures. This also means that marginalisation is not a static "label" that only relates to certain social categories or citizens, but is something more fluid and dynamic.

The aim of this article is to unpack processes of digital marginalisation and to offer a deeper understanding of how marginalisation is enacted. Thus, we ask how digital marginalisation occurs in everyday life and with what effects. In answering

[1] Here, "Nordic countries" refers specifically to Denmark, Finland, Iceland, Norway and Sweden.

these questions, we develop a relational approach we call *digital marginalising*.[2] Inspired by sociomaterial theory (Dille and Plotnikof 2020; Barad 2007; Fenwick 2015; Fenwick and Edwards 2013; Orlikowski and Scott 2015), this approach helps us illuminate and demonstrate how marginalisation occurs through relations between multiple acting "powers", which involve both human and non-human actors.[3] We explore these processes of digital marginalising by analysing the findings of a previous research project we conducted which sought to identify Nordic challenges and develop Nordic solutions to the problem of digital exclusion (Buhl et al. 2022).

The present article contributes to research on the digital divide (Bruno et al. 2011; Van Dijk 2005, 2006, 2020; Warschauer 2003) but breaks with extant research that identifies specific social groups as *the digitally excluded*. Our article also aims to contribute to a better understanding of digitalisation as a continuous lifelong learning process. This involves pushing a situated perspective of learning (Lave and Wenger 1991) beyond the instructor–learner perspective by unfolding the dynamics of "the situated" as relations that create marginalisation, thus contributing insights for lifelong learning processes.

This article is structured as follows: first we review the literature on the digital divide and in extension develop a relational approach to digital marginalisation. We then analyse our findings to uncover moments of marginalisation. Finally, we discuss these findings in relation to the literature on the digital divide and connect this to discussions within the field of lifelong learning.

Studies of the digital divide

Since the late 1990s there has been intense debate on the impact of technology on societal inequality. This debate has taken place across different, yet related, research fields, such as within the literature on digital governance (Gil-García and Luna-Reyes 2006; Heeks and Bailur 2007;) or the digital divide (Barzilai-Nahon 2006; DiMaggio and Hargittai 2001; Helsper 2008; Nelson 2002; Robinson et al. 2003; Van Dijk 2005, 2006, 2020; Van Dijk and Hacker 2003; Warschauer 2003). Whereas the former is an umbrella term (Grönlund and Horan 2005) to describe the transformation of government, service delivery and related democratic opportunities (Helbig et al. 2009), the latter, which holds specific relevance for this study, explicitly concerns the end-users' (i.e., citizens') ability to digitally participate in society at any level (e.g., politically, socially, economically) and the inequality produced when they are excluded from such participation (Yu et al. 2018).

The term "digital divide" emerged in the early 1990s (e.g. in the title of Irving et al. 1999) to describe the gap separating those who have access to new forms

[2] In this article, we use the term "digital marginalising" to refer the process of becoming digitally marginalised and "digital marginalisation" as an effect of this process.

[3] Emerging within actor-network theory (ANT), the term "non-human actor" refers, for example, to "things, objects, [and] beasts" (Latour 1993, p. 13), to "microbes, scallops, rocks, and ships" (Latour 2005, p. 11). Sociomaterial theory takes inspiration from this line of thinking (Orlikowski 2007).

of technology from those who do not (Srinuan and Bohlin 2011; Van Dijk 2006); the *information haves* and *information have-nots* (Wresch 1996). Early discussions focused on access to information and communication technology (ICT) (e.g., Bélanger and Carter 2009), meaning access to devices, connections or applications, which later developed into a greater focus on the totality of a citizen's ability to make use of ICT in different situations (De Haan 2004; Van Dijk 2005; Yu et al. 2018). This includes aspects such as cognitive access (i.e., digital skills), motivational access (i.e., the desire to learn to use a new technology, indicating a distinction between those who want to learn and those who do not), and social access (Goldhammer et al. 2013; Yu et al. 2018). The latter describes how ICT use requires access to different time(s) and space(s) in order to become a participating member of a digital society – times and spaces that are often restricted and therefore come to play a part in digital exclusion (e.g., use of university libraries is limited to faculty members and students). Taken together, these aspects are all seen as producing a digital (and democratic) divide (Van Dijk 2020).

As is clear from the abovementioned literature, the reasons for the digital divide are multifaceted. However, there is still an underlying predominant conception that this divide is a simple one (Van Dijk 2020) – between two clear social categories (the "haves and have-nots" or "wants and want-nots") – that relate to specific "types" of citizens, for instance the elderly or migrants (Van Deursen and Helsper 2015). The problem with this approach, which this article will address, is that in our explorations of the digital divide we come to think that the solutions are merely a matter of, for example, motivating the "want-nots" or providing stable internet connections to the "have-nots". Such deterministic views prevent us from investigating the digital divide as more than a static label. Rather, it should be viewed as a practice that flows in and through our everyday lives creating moments of marginalisation depending on a specific situation or activity. In other words, unless we explore the digital divide as a situated practice that happens to everyone we will fail to understand its implications.

Following Mark Warschauer (2003) and Jan Van Dijk (2005, 2006, 2020), we argue that research needs to be designed around an attentiveness to the particular (learning) moments through which digital marginalising takes place if it is to inform policy and practice. This requires a focus that explores enactments and experiences of human/technology relationships in indivisible and entangled ways. As such, this article specifically contributes to literature that views the digital divide as a dynamic and multidimensional phenomenon (Bruno et al. 2011; Van Dijk 2005, 2006, 2020; Warschauer 2003).

Approaching digital marginalisation through sociomaterial theories

In this article, we develop a relational approach to investigating processes of marginalisation. We call this approach *digital marginalising,* indicating that marginalisation occurs through the relationality of multiple acting "powers" in human/technology encounters; for example, when performing online banking, parking your car using a mobile app, or accessing information through a government website. Drawing

inspiration from sociomaterial theories (Fenwick 2015; Fenwick and Edwards 2013; Orlikowski and Scott 2015) and new materialism (Barad 2007; Plauborg 2018), this implies a focus on the agentic force as a mode of acting that is related both to human and non-human actors. With this approach we suggest that, for example, physical surroundings, timing, structures and affects produce particular moments of digital marginalising. Hence, the agentic force occurs in relationships between human and non-human actors rather than being driven exclusively by human intentionality (Cooren 2020). This does not mean that humans are without autonomy, it merely implies that they cannot be seen as the absolute point of departure when looking at issues of digital inclusion and exclusion.

This means that we attend to the various actors that contribute to marginalisation in varying contexts. This approach challenges existing binary categorisations of "who can" and "who cannot", instead focusing on the dynamics of multiple actors and their marginalising effects. This points to the fundamental premise of relational performativity by which digital marginalising is an emergent and open phenomenon without a proper beginning or end. From this perspective, we need not look for a specific skill set lacking among, for instance, a certain social group such as migrants. Rather, our focus should be on trying to understand what forms of digital marginalising occur when connections between human and non-human actors produce specific marginalised subjectivities (Juelskjær 2016; Plauborg 2018).

To understand processes of marginalisation, then, we must examine how a particular moment of digital marginalising unfolds. Inspired by sociomaterial theories of learning (Fenwick 2015; Fenwick and Edwards 2013), we attune to these precarious and ever-evolving learning moments. This implies a view of learning as a sociomaterial collective rather than something that simply "happens" within the individual learning subject. These learning moments comprise small or large "ruptures" produced in and through the human/technology encounter and its entanglement with other actors such as bodies, materials, affects, politics and discourses (Fenwick 2015). This entanglement, thus, reaches "behind and beyond" the actual learning moment. This implies that these learning moments contain different times and spaces (past/present/future as well as multiple contexts), which is why they can also be perceived as "thick" moments (Barad 2007) that echo what was (e.g., past experiences) and what is yet to come (e.g., expectations of the future conditioned by past and present). Thus, learning moments do not merely comprise a skill learned, but rather moments with no clear beginning or end that we all experience differently depending on the specific human/technology encounter and other constituting actors.

These moments are therefore not separable entities from which bodies or technologies can be detached. Rather, they are what bodies, technologies or other human/non-human actors have made them. The bodies involved, the specific technologies and affective aspects are all, when entangled, potential agentic powers enacting digital marginalising in any given time and space. And since digital marginalising cannot be separated from these moments, we need to pay attention to the entanglement of human and non-human actors that constitutes a learning moment. Below we examine digital marginalising in two learning moments that were revealed by our analysis. They engage with extant studies of the digital divide by offering a

conceptualisation that views marginalisation in processual terms, as a continuous *becoming* rather than a *being*. With this conceptualisation we hope to give critical attention to binary constructions of the digital divide – both theoretically and empirically – and embrace the complexity of this matter. Through this we hope to offer new explanations for why a considerable part of the population in the Nordic region (Denmark, Finland, Norway, Iceland and Sweden), despite its frontrunner status and recurring learning programmes, is still digitally insecure (Slåtto et al. 2020).

Methodology

Our analytical findings build on an empirical study that aimed to better understand the prerequisites for lifelong learning among hard-to-reach learners in the Nordic region, as well as to provide recommendations to support this change (Buhl et al. 2022). In this earlier study, the notion of *digital transformation* referred to the multiple ways in which "the digital" organises everyday life and working life (EC 2020) producing a growing number of "digitally insecure" citizens. The study was informed by design-based research (DBR) (e.g., Amiel and Reeves 2008), which takes a pragmatic approach to investigating and intervening in the field of study. This involves a close collaboration with a multitude of stakeholders during all phases of the research. In the study (Buhl et al. 2022), this included citizens, professionals, middle and senior managers within the public sector, as well as representatives of civil society. Throughout 2021, 33 participants from five Nordic countries (Denmark, Finland, Iceland, Sweden and Norway) participated in the study (ibid., p. 25). The participants were recruited through 12 representatives of the Nordic Network for Adult Learning: Digital (NVL Digital), drawing on national networks to extend invitations to professionals and citizens.

The empirical part of the study built on interview data (Gubrium and Holstein 1997) as well as data generated through participant observations (Lofland and Lofland 1995). The latter were conducted in two virtual co-creative workshops lasting one hour each, where a cross-section of stakeholders identified challenges related to digital inclusion. The interviews were carried out as follow-up explorations with participants from the workshops in order to generate in-depth insights into themes that arose at the workshops. Both citizens and professionals participated in Workshop 1. The insights generated were presented during Workshop 2 to another group of stakeholders at management level. Both workshops were video-recorded and this material, as well as observation notes, was subjected to thematic analysis (Braun and Clarke 2006). Thus, the findings from that study emerged as a result of the thematic analysis performed on the entire dataset (interviews/observation notes).

In the data analysis below, we do not distinguish between "types" of participants as we are not interested in human intentionality or individual learning needs. Rather, we are interested in mapping the human and non-human actors and thus better understanding the multiple circumstances through which digital marginalising occurs in and through human/technology encounters. With reference to the theory section above, we therefore push beyond approaches informed by a subjectivist ontology and cultural-historical theories (e.g., Psaros 2022) and utilise a

performative ontology (Fenwick and Edwards 2013) that challenges the assumption "that a subject is separable from an object, or a knower from the thing that is known, and in some instances that a learner is necessarily human" (Fenwick and Edwards 2013, p. 52). In the following analysis, we examine two emerging learning moments that come to mean, and matter as, digital marginalising, illustrating the performative relationality of human and non-human actors in human/technology encounters and their effects.

Emerging learning moments of digital marginalising

In this section, we describe and discuss our findings on digital marginalising in relation to emerging learning moments. These moments illuminate how the constituting dynamics of human/non-human actors perform digital marginalising in human/technology encounters.

Digital marginalising as modes of participation

The ability to digitally participate in society – whether politically, socially or economically – emerged as a theme at the workshops (Buhl et al. 2022) when discussing the multifaceted challenges of digital inclusion and during the follow-up interviews with the participating citizens. Our findings show that digital participation occurs in moments where the citizen meets specific digital demands in order to participate in various aspects of everyday life. However, these encounters are not only conditioned by interactions between the citizen and technology (for example, an online banking platform), they are also conditioned by a multitude of other factors "outside" this concrete encounter that, when entangled, influence the way the citizen is able to participate (cf. mode of participation) in the specific moment (e.g., limited time slots for computer access at a public library). Aside from the human actor and the technology itself, these factors comprise non-human actors – which we call "digital paperwork" and societal discourses of motivation.

Digital paperwork

Many public and private services that used to be handled in person by government offices or private companies have been moved to remote self-service which leaves the citizen responsible for managing what might be called "digital paperwork". This comprises a diverse group of non-human actors that all require specific digital practices in order to act and thus participate in society; for example, ordering items such as health insurance cards and drivers' licenses, paying bills, or managing personal finances. Our analysis shows that these non-human actors place different, sometimes challenging, demands on the citizen, influencing both the present encounter with technology as well as future ones. This means that the human/technology encounters come to include "traces" of past encounters that change both present and future learning moments. We see this, for instance, when citizens and professionals

express how a past experience of communicating with the "system" (government or company) may affectively connect a person to feelings of confusion, frustration or "breakdown", thus negatively influencing the mode of participation in a given situation as well as expectations of future situations, awakening, for instance, doubts about whether they will ever be able to *get it right* or manage on their own:

> "They get help to get independence – but too much help makes you feel that you become too dependent on the other and not able to act yourself in the future" (professional at Workshop 1 with citizens and professionals).

Discourses of motivation

Another non-human actor is comprised of the discourses of motivation that generate everyday beliefs. These discourses are often associated with human agency and assumptions of an individual's willingness to learn. They influence the modes of participation by making human/technology encounters dependent on human intentionality and whether the individual is sufficiently self-determined, moved to learn, and essentially motivated. In our data, this gets highlighted when citizens refrain from engaging with technology because they are afraid of asking for help and thus appearing insufficiently assertive or:

> "You are simply an outcast if you can't follow. This [i.e., digitalisation] simply produces outcasts" (citizen at Workshop 1 with citizens and professionals, 2021).

Our findings show that the presence of human-centred motivational discourses in everyday beliefs reduces these encounters to a matter of an individual's willingness, thus closing off other possibly relevant actors that might contribute to a learning moment, even if they are not physically present in the specific situation. Other actors that come into play include, for example, educational or cultural backgrounds and personal narratives (e.g., traumatic or happy). These are all "non-human actors" that come to influence modes of participation and contribute to digital marginalisation by going unnoticed, since human actors are most often the focus of attention.

The actors mentioned above influence learning moments by limiting or hindering the citizen's mode of participation and field of possibility when engaging with technology. However, these actors should be considered neither universal nor the dominant factors contributing to digital exclusion. Rather, their involvement in specific human/technology encounters alerts us to how digital marginalising influences modes of participation – a process that is conditioned by several actors that are both outside the human and technology realms, and outside the specific encounter.

Thus, the process of overcoming digital marginalising is much more than a matter of "figuring out the technology" or finding the right attitude or the right course to attend. Instead, digital marginalising shifts or flows depending on prior, present, or anticipated future experiences, dominating discourses, extant logics, etc. Our findings show that digital marginalising is contingent on multiple forces acting at different times and in different spaces and thus is not something that merely "happens" to a particular group of digitally insecure individuals. This is evidenced by the fact

that, despite the Nordic countries' status as frontrunners of digitalisation, situations of digital marginalising still occur there. There is, thus, a constant tension between this status and the enacted citizen and system practices.

Digital marginalising as a form of organising

Another theme that emerged from the co-creative workshops and follow-up interviews is the forms of organising produced by an increasingly digital society. These manifest as precarious and fluid "orderings" of everyday human/technology encounters and include, for example, citizens' experiences of being "outside the norm" (i.e., the perceived norm that "everyone else but me knows how to do digital things"):

> "Society is built for only the capable ones" (citizen, Workshop 1).

Another form of organising is being "counteractive to a societal dogma" that recognises the value of society as a digital frontrunner. The counteractive attitude consists of citizens insisting on an analogue lifestyle for ideological reasons, which manifests itself as, for instance, refusing to use digital public services. These forms of organising concern actors, affect, and space. They reach "behind and beyond" the actual encounter and point to the open-endedness and complexity of the digital divide in general and digital marginalising specifically.

Affect

Affect unfolds as a form of experienced and enacted (in)action that organises digital marginalisation in several different ways. For instance, a human/technology encounter may produce feelings of shame and of being left behind amid ever-evolving digital advancements. Or it produces feelings of discouragement that "the finishing line" is constantly moving, as there is no final set of competences one can achieve, and feelings of embarrassment when admitting to others or revealing a lack of technical skill. In this sense, affect becomes an intense bodily feeling that induces certain forms of action, making citizens steer away from or totally avoid human/technology encounters due to their visceral and "defining" implications. For example, by being afraid to fail, and by avoiding technology (in-action), digital marginalising becomes amplified, thus potentially defining the citizen's digital identity as someone who "cannot":

> "Some people are simply afraid to make a mistake. Particularly when it comes to contact with the public services, so they won't. It's too hard" (professional, Workshop 2).

Space

The actor space also unfolds as a form of organising. Like affect, spatial organising emerges in human/technology encounters as learning moments in relation to which

action (or inaction) becomes possible. In our study, this manifests particularly in relation to clearly defined or intentional spaces that often include select groupings of people and clear boundaries in terms of what it means to be "in" and what it means to belong. This concerns, for example, public spaces such as libraries. Here, we see human/technology encounters that are contingent on certain "native" practices relating to the space:

> "In the library where I use the computer, there is no space for me to do my personal or sensitive things. The library is not a space for that. Where do I do it then?" (citizen, interview).

At other times, this space becomes an organising principle in less intentional ways and emerges "organically" and *ad hoc,* and thus dissolves as soon as the citizen leaves the realm of the human/technology encounter. For example, momentary "collective" spaces become organising to the way that patients are able or unable to book an online doctor's appointment without necessarily experiencing themselves as part of a "collective". Whether this spatial organising is intentional or not, it comes to represent digital marginalising when individuals stand "outside" the spatial organising and sphere of action; when they are constrained from action.

Affective and spatial organising emerges in this study as orderings and patterns involved in everyday encounters between humans and technology with implications for digital marginalising. They become entangled in those encounters producing a "thick" here and now, meaning that they are present and influence a sphere of action. In these encounters, paradoxically, the action that is often made possible is *in-action*, i.e. a withdrawal or steering away from, or exclusion from, the learning moment at hand, thus fostering digital marginalising. This entanglement of actors in human/technology encounters points to a more complex understanding of the digital divide, since we become aware how different factors or forces, which occur and exist both inside *and* outside the actual encounter, are what determine how the encounter plays out. This is why the digital divide is not merely a matter of "can and cannot" or "have or have not". There are a multitude of entangled actors that come into play in each encounter, some of which appear in our analysis. These actors become hindrances in some situations but not in others. This is why we see digital marginalising as something that "pops up" only to dissolve again.

Discussion and conclusion

In this article, we analysed learning moments of digital marginalising. Our findings demonstrate the constituting mechanisms and performative effects that prevent citizens from engaging in digital learning and achieving relevant competences. Although the study on which this article is based (Buhl et al. 2022) investigates mechanisms that exclude a specific group of citizens (i.e., hard-to-reach citizens), we argue that the learning moments extend this social category since digital marginalising is something that depends on, for example, past, present or anticipated future experiences, dominating discourses, certain logics, affects etc. and is thus not merely something that "happens" to a particular group

of digitally insecure citizens. Rather, it is a situated conditioning of (potentially all) subjects when faced with new digital developments.

Building on sociomaterial theories (Fenwick 2015; Fenwick and Edwards 2013; Orlikowski and Scott 2015) and new materialism (Barad 2007), we developed a relational approach that views the digital divide as a dynamic and multifaceted phenomenon that runs through specific human/technology encounters in everyday life. We demonstrated how digital marginalising is constituted through relations between multiple human and non-human actors.

Such a view challenges a predominant view of the digital divide as a binary issue; a simple divide between clear-cut social categories such as "haves and have-nots" or "wants and want-nots". In much of the literature, this categorisation renders specific social groups (for example, the elderly, migrants, or citizens on the fringe of the labour market) digitally excluded. In line with Jan Van Dijk (2005, 2020) and Giuseppe Bruno et al. (2011), we argue that such views promote a "reductionist" approach to understanding the digital divide that runs the risk of identifying certain social groups as "non-users", and thus contribute to their further stigmatisation and social exclusion (Robinson 2018).

This push to go beyond reductionistic views is substantiated in the research on which this article builds as we show that, rather than attaching to certain social groups and categories, digital marginalising attaches to certain situations, making the experience of being marginalised a situated practice that is both complex and fluid.

This indicates that well-intended efforts (e.g., specifically targeted courses for the "digitally vulnerable"/"have-nots"/"want-nots") sometimes do more harm than good (e.g., in terms of stigmatisation). It may also lead us to notice that digital marginalising is not a problem of a few, but a much broader and all-inclusive challenge with the potential to facilitate new approaches to digital inclusion that transcend institutional course formats and recognise the blurring of boundaries between, for example, the categories of teacher, learner, citizen and professional. When there is no subject position free from marginalisation, we all, at moments, become digitally marginalised. In that case, it becomes necessary to approach future digital developments by recognising this blurredness. We consider these insights useful for all professionals engaged in implementing digitalisation in public and private service, for teachers planning learning processes, for civil servants engaging in local communities, and as a mirror for challenges we all face from time to time.

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References

Amiel, T., & Reeves, T. C. (2008). Design-based research and educational technology: Rethinking technology and the research agenda. *Journal of educational Technology & Society*, *11*(4), 29–40. Retrieved 14 March 2025 from https://www.researchgate.net/publication/220374789

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke University Press.

Barzilai-Nahon, K. (2006). Gaps and bits: Conceptualizing measurements for digital divide/s. *The Information Society, 22*(5), 269–278. https://doi.org/10.1080/01972240600903953

Bélanger, F., & Carter, L. (2009). The impact of the digital divide on e-government use. *Communications of the ACM, 52*(4), 132–135. https://doi.org/10.1145/1498765.1498801

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Buhl, M., Dille, M. H., & Kårstein, A. (2022). *Livslang lærings rolle i den digitale transformation: The hard to reach citizens* [The role of lifelong learning in digital transformation: The hard-to-reach citizens]. Helsinki/Aalborg/Copenhagen: Nordisk Netværk for Voksnes Læring/Aalborg Universitet/Nordisk Ministerråd. Retrieved 14 March 2025 from https://vbn.aau.dk/files/472493958/NVL_Livslang_l_rings_rolle.pdf

Bruno, G., Esposito, E., Genovese, A., & Gwebu, K. L. (2011). A critical analysis of current indexes for digital divide measurement. *The Information Society, 27*(1), 16–28. https://doi.org/10.1080/01972243.2010.534364

Cooren, F. (2020). Beyond entanglement: (Socio-) materiality and organization studies. *Organization Theory, 1*(3), online. https://doi.org/10.1177/2631787720954444

Davies, B., & Harré, R. (1990). Positioning: The discursive production of selves. *Journal for the Theory of Social Behaviour, 20*(1), 43–63. https://doi.org/10.1111/j.1468-5914.1990.tb00174.x

De Haan, J. (2004). A multifaceted dynamic model of the digital divide. *IT & Society, 1*(7), 66–88. Retrieved 14 March 2025 from https://www.researchgate.net/publication/251533052

Dille, M. H., & Plotnikof, M. (2020). Retooling methods for approaching discourse–materiality relations: a new materialist framework of multimodal sensitivity. *Qualitative Research in Organizations and Management: An International Journal, 15*(4), 485–501. https://doi.org/10.1108/QROM-09-2019-1821

DiMaggio, P., & Hargittai, E. (2001). From the "digital divide "to "digital inequality": Studying Internet use as penetration increases. Princeton University Center for Arts and Cultural Policy Studies Working Paper #15. Princeton, NJ: Princeton University Center for Arts and Cultural Policy Studies. Retrieved 14 March 2025 from https://doi.org/10.31235/osf.io/rhqmu

Ebbers, W. E., Jansen, M. G. M., & van Deursen, A. J. A. M. (2016). Impact of the digital divide on egovernment: Expanding from channel choice to channel usage. *Government Information Quarterly, 33*(4), 685–692. https://doi.org/10.1016/j.giq.2016.08.007

EC (European Commission) (2020). Human capital. In EC, *The Digital Economy and Society Index (DESI): Thematic chapters* (pp. 51–56). Brussels: European Commission. Retrieved 2 February 2022 from https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index-desi-2020

EC (2022). *The Digital Economy and Society Index (DESI) 2022*. Brussels: European Commission. Retrieved 14 March 2025 from https://digital-strategy.ec.europa.eu/en/policies/desi

Fenwick, T. (2015). Sociomateriality and learning: A critical approach. In D. Scott & E. Hargreaves (Eds.), *The SAGE handbook of learning* (pp. 83–93). London: SAGE.

Fenwick, T. & Edwards, R. (2013). Performative ontologies. Sociomaterial approaches to researching adult education and lifelong learning. *European Journal for Research on the Education and Learning of Adults, 4*(1), 49–63. https://doi.org/10.3384/rela.2000-7426.rela0104

Gil-García, J. R., & Luna-Reyes, L. F. (2006). Integrating conceptual approaches to e-government. In Mehdi Khosrow-Pour, D. B. A. (Ed.), *Encyclopedia of e-commerce, e-government, and mobile commerce,* vol. 1 (pp. 636–643). Hershey, PA: IGI Global. https://doi.org/10.4018/978-1-59140-799-7.ch102

Goldhammer, F., Naumann, J., & Keßel, Y. (2013). Assessing individual differences in basic computer skills. *European Journal of Psychological Assessment, 29*(4), 263–275. https://doi.org/10.1027/1015-5759/a000153

Grönlund, Å. (2004). State of the art in e-gov research: A survey. In R. Traunmüller (Ed.), *Electronic government. Proceedings of the third International Conference, EGOV 2004* (pp. 178–185). Berlin: Springer. https://doi.org/10.1007/978-3-540-30078-6_30

Grönlund, Å., & Horan, T. A. (2005). Introducing e-gov: History, definitions, and issues. *Communications of the association for information systems*, *15*, 39. https://doi.org/10.17705/1CAIS.01539

Gubrium, J. F., & Holstein, J. A. (1997). *The new language of qualitative method*. New York, NY: Oxford University Press.

Head, A. J., Van Hoeck, M., & Garson, D. S. (2015). Lifelong learning in the digital age: A content analysis of recent research on participation. *First Monday*, *20*(2), Article no. 5857. https://doi.org/10.5210/fm.v20i2.5857

Heeks, R., & Bailur, S. (2007). Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice. *Government Information Quarterly, 24*(2), 243–265. https://doi.org/10.1016/j.giq.2006.06.005

Helbig, N., Ramón Gil-García, J., & Ferro, E. (2009). Understanding the complexity of electronic government: Implications from the digital divide literature. *Government Information Quarterly, 26*(1), 89–97. https://doi.org/10.1016/j.giq.2008.05.004

Helsper, E. J. (2008). *Digital inclusion: An analysis of social disadvantage and the information society.* London: Department for Communities and Local Government. Retrieved 14 March 2025 from http://eprints.lse.ac.uk/26938/1/__libfile_REPOSITORY_Content_Helsper,%20E_Digital%20inclusion_Helsper_Digital%20inclusion_2013.pdf

Højgaard, L., & Søndergaard, D. M. (2011). Theorizing the complexities of discursive and material subjectivity: Agential realism and poststructural analyses. *Theory & Psychology, 21*(3), 338–354. https://doi.org/10.1177/0959354309359965

Irving, L., Klegar-Levy, K., Everette, D.W., Reynolds, T., & Lader, W. (1999). *Falling through the net: Defining the digital divide.* A report on the Telecommunications and Information Technology Gap in America. Washington, DC: National Telecommunications and Information Administration, US Department of Commerce. Retrieved 14 March 2025 from https://govinfo.library.unt.edu/ecommerce/document/digital_divide_rpt.pdf

Juelskjær, M. (2016). Gendered subjectivities of spacetimematter. *Gender and Education, 26*(6), 754–768. https://doi.org/10.1080/09540253.2013.831812

Latour, B. (1993). *We have never been modern*. Cambridge, MA: Harvard University Press.

Latour, B. (2005). *Reassembling the social: An introduction to actor-network theory*. Cambridge, MA: Oxford University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lofland, J., & Lofland, L. H. (1995). *Analyzing social settings: A guide to qualitative observation and analysis* (3rd ed.). Belmont, CA: Wadsworth Publishing Company.

Nelson, L. (2002). Protecting the common good: Technology, objectivity, and privacy. *Public Administration Review, 62*(s1), 69–73. https://doi.org/10.1111/1540-6210.62.s1.12

Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization studies, 28*(9), 1435–1448. https://doi.org/10.1177/0170840607081138

Orlikowski, W. J., & Scott, S. V. (2015). Exploring material-discursive practices. *Journal of Management Studies, 52*(5), 697–705. https://doi.org/10.1111/joms.12114

Psaros, H. (2022). Learning, digital technologies, and sociomaterial approaches: A critical reflection from the perspective of materialist dialectics. *Theory & Psychology, 32*(6), 827–847. https://doi.org/10.1177/09593543221129235

Plauborg, H. (2018). Towards an agential realist concept of learning. *Subjectivity, 11*(4), 322–338. https://doi.org/10.1057/s41286-018-0059-9

Randall, L., & A. Berlina (2019). *Governing the digital transition in Nordic regions: The human element.* Nordregio Report 2019:4. Stockholm: Nordregio. https://doi.org/10.6027/R2019:4.1403-2503

Robinson, L. (2018). The identity curation game: Digital inequality, identity work, and emotion management. *Information, Communication & Society, 21*(5), 661–680. https://doi.org/10.1080/1369118X.2017.1411521

Robinson, J. P., DiMaggio, P., & Hargittai, E. (2003). New social survey perspectives on the digital divide. *IT & Society*, *1*(5), 1–22. Retrieved 14 March 2025 from http://webuse.org/p/a11/

Slåtto, T., Buhl, M., Larjanko, J., Ossiannilsson, E., Gjelsvik, T., & Huttula, T. (2020). *Learning for everyone in a digital society*. Helsinki: Nordic Network for Adult Learning. Retrieved 14 March 2025 from https://nll.org/rapporter/learning-for-everyone-in-a-digital-society/

Srinuan, C., & Bohlin, E. (2011). Understanding the digital divide: A literature survey and ways forward. Paper presented at the 22nd European Regional Conference of the International Telecommunications Society (ITS2011) "Innovative ICT Applications – Emerging Regulatory, Economic and Policy Issues", held 18–21 September in Budapest. http://hdl.handle.net/10419/52191

Van Deursen, A. J., & Helsper, E. J. (2015). A nuanced understanding of Internet use and non-use among the elderly. *European Journal of Communication, 30*(2), 171–187. https://doi.org/10.1177/0267323115578059

Van Dijk, J. (2020). *The digital divide*. Cambridge: Polity.

Van Dijk, J. A. G. M. (2005). *The deepening divide: Inequality in the information society*. Thousand Oaks, CA: SAGE Publications.

Van Dijk, J. A. G. M. (2006). Digital divide research, achievements and shortcomings. *Poetics, 34*(4–5), 221–235. https://doi.org/10.1016/j.poetic.2006.05.004

Van Dijk, J., & Hacker, K. (2003). The digital divide as a complex and dynamic phenomenon. *The Information Society, 9*(4), 315–326. https://doi.org/10.1080/01972240309487

Yu, B., Ndumu, A., Mon, L. M., & Fan, Z. (2018). E-inclusion or digital divide: An integrated model of digital inequality. *Journal of Documentation, 74*(3), 552–574. https://doi.org/10.1108/JD-10-2017-0148

Warschauer, M. (2003). *Technology and social inclusion: Rethinking the digital divide*. Cambridge, MA: The MIT Press.

Wresch, W. (1996). *Disconnected: Haves and have-nots in the information age*. Brunswick, NJ: Rutgers University Press.

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