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Outside the digital bubble: Digital illiteracy is common and deserves more attention when implementing eHealth

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1. Access to digital care

The COVID-19 pandemic has served as a catalyst for a digital revolution, bringing previously fringe digital services to the fore. Digitalization enabled us to continue work meetings, collaborations, social gatherings, and service delivery. This shift has affected all aspects of our lives, with digital devices and applications gaining increasingly stronger footholds in most domains. A key area of change, relevant to our work, has been the increased role of technology in healthcare, namely eHealth.

During the COVID-19 pandemic, eHealth services offered an expedient solution to an urgent problem: the need to self-isolate to reduce the risk of infection spreading. From the earliest stages of the pandemic, eHealth rose to prominence as a way to maintain care provision when clinic visits needed to be reduced to a minimum, particularly for those at risk of developing severe COVID-19 (Jacobs, Lou, Ownby, & Caballero, 2014; World Health Organization, 2016). Ehealth services were embraced as an opportunity to reduce the number of on-site medical appointments. A Dutch website (thuisarts.nl), for example, was developed in 2011 by general practitioners to provide reliable and contemporary information for the general public about health and illness. Research has shown that this effectively reduced the number of unnecessary medical appointments by providing reliable advice about symptoms (Spoelman et al., 2016). During the pandemic, Thuisarts.nl provided reliable information regarding COVID-19 including an online self-test, to support citizens.

Increased uptake of eHealth applications is a trend that is likely to persist well beyond the pandemic. Indeed, although growth in the global eHealth market peaked at a staggering 135.2% in 2020 compared to the average for 2017–2019. Projections suggest that its market growth will continue to grow from 90.74 billion USD in 2021 to reach 636.38 billion

USD by 2028 (Fortune Business Insights, 2021). Simply put, eHealth is here to stay and will become increasingly important in diagnosing, managing, and treating patients over the coming years.

2. Potentially millions of people are at risk of being left behind

Developments in digital health over the last few years have led the European Parliamentary Research Service to conclude that the pandemic redefined what care is delivered how, encouraging a policy whereby “[t]he European Commission is speeding up the digital transformation by co-financing research, development and deployment of innovative technologies” (Negreiro, 2021). Together with other policy makers and stakeholders, the European Commission now considers eHealth an important healthcare priority (European Commission, 2018). However, an effective eHealth service requires a digitally literate population that can “use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills” (American Library Association, 2022). As we continue to digitalize health care, we must not forget that millions of people cannot access the benefits of this change. Digital illiteracy a very real and common problem in medically relevant parts of the population.

The acceleration of eHealth use triggered by the COVID-19 pandemic has, in fact, increased the gap between the digitally literate and illiterate (Buchholz, DeHart, & Moorman, 2020; Eberly et al., 2020; Hassell, Peterson, & Pantanowitz, 2021; Lai & Widmar, 2021; Martins Van Jaarsveld, 2020; van Deursen, 2020). Even in western European countries where most households have an Internet connection, a quarter (25%) of the population lacks basic digital skills. Table 1 details the proportions of citizens with at least basic digital skills in European countries where ≥95% of households have an Internet connection

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(Eurostat, 2022). This highlights earlier findings that 11% of Dutch adults younger than 65 years have poor digital skills (Rijksoverheid). This is a remarkable outcome given that Dutch households have the highest proportion of Internet connections in Europe. The problem of digital illiteracy has been recognized amongst vulnerable groups, with high levels widely acknowledged in older (>65 years), lower educated, and ethnic minority populations. However, surprisingly digital illiteracy is also present in younger and higher educated populations. A large proportion of relatively young people (around 50%; Table 1) with low educational attainments have poor digital skills that prevent them from using the varied online services that many of us take for granted. If you are digitally literate, you can mitigate the impact of a lockdown by using digital services and technology to work, receive care, find social support, or apply for social services. However, being digitally illiterate during the pandemic excluded people many people from these options and effectively blocked them from accessing eHealth and its many benefits (Sanders & Scanlon, 2021, pp. 1–14).

The problem of digital illiteracy grew with the importance of digital services during the pandemic. This close relationship is self-evident given the reliance on digital services to manage COVID-19, such as making an online appointment for a COVID-19 test, using a contact tracing application, or activating an online COVID-19 vaccination passport. These and many other changes during the pandemic required the digital skills that are increasingly considered essential to participate in society (Buchholz et al., 2020). For example, during the Dutch curfew in the Winter of 2021, people needed to complete an online form to travel during the evening and at night, with no alternative to the digital format. This meant that many without digital skills, including digitally illiterate patients and caregivers, could not complete the form without help. Many other examples came to the fore during the pandemic, such as the use of video consultations, medical record access by patients, self-monitoring for hypertension by pregnant women, access to online information (Thuisarts.nl), and online peer contact (e.g., Coronaplein.nl). This led to multiple areas where unnecessary and undesirable inequalities in accessibility to key services could grow.

The increasing importance of eHealth to health care delivery only serve to widen the existing health gaps between the digitally illiterate—a group that already comprises some of the most marginalized people in society—and the digitally literate. This may result in a significant loss of healthy life years, especially in younger populations, unless we take steps to close the gap.

3. Access to digital health care is a human right

We believe that the time has come for policy makers and relevant health care organizations to address the issue of digital illiteracy as a matter of urgency. As the evidence suggests, many young people are blocked from access to health care due to digital illiteracy. This means that a passive approach of waiting for society to catch up will leave many with inadequate health coverage in our continued efforts to

digitalize, seemingly at any cost. Indeed, the time has come for a greater focus on digital illiteracy in research, not merely a passive acceptance of the need for digital literacy.

While in an ideal world patients would be able to choose whether they would prefer digital healthcare to on-site healthcare, we argue that digitalization of healthcare is inevitable given the complex set of challenges the sector is facing. In aging, developed countries, like the Netherlands, care is to be delivered to an increasing number of chronically ill and complex patients, while trained staff is scarce, workload is high, and costs of healthcare are ever increasing (OECD, 2023). When implemented effectively, eHealth could be part of the solution to this complex problem.

If we accept that digitalization of healthcare, and hence eHealth, is necessary to continue delivering high quality care to more people, with less staff and on a limited budget, then efforts must be directed toward developing a better understanding of the factors that explain digital illiteracy at individual and structural levels. Very little is known about the barriers to, and facilitators of, digital literacy (Watkins & Xie, 2014). This necessitates research into why individuals remain digitally illiterate, including who they are, what factors shape their non-use decisions, and how they can be engaged. Moreover, tailored and theory-based decision support methods are needed to help engage those who are digitally illiterate. To date, no adequate research exists in Europe, either because this group is often not included in intervention studies or because earlier eHealth studies were conducted in the USA and are not necessarily generalizable to Europe (Parker et al., 2018; Watkins & Xie, 2014).

We stand to gain much from developing tailored solutions to engage digitally illiterate citizens in eHealth and/or finding alternative solutions to ensure these groups continue to receive optimal healthcare. Access to healthcare is a human right (Horder, 1983; Sanders & Scanlon, 2021, pp. 1–14), but the move to digitalize service provision is already failing a significant proportion of our population. We must urgently reduce the health gap between the digitally literate and illiterate to ensure that every person has equal access to healthcare. The actions provided in this article can already mitigate the lack of accessibility in you digital illiterate patients. Still, more research is needed to find sustainable solutions to make the future of healthcare in reach for us all.

4. How to stop the gap from widening?

- 1) **Raise awareness:** Currently, clinicians are not trained to use eHealth and medical faculties are only slowly starting to adapt their educational programs towards the digital future of healthcare. A first step is, therefore, to raise clinicians' awareness about digital literacy and its prevalence not only amongst vulnerable groups but in society as a whole.
- 2) **Start from the digital proficiency level of the patient:** Before an eHealth tool is implemented, it is important to access at the level of digital literacy of the patient. This can be done by evaluating the type

Table 1

People with at least basic digital skills among European countries with $\geq 95\%$ households connected to Internet.

	Share of individuals with at least basic digital skills in 2019							
	Luxembourg	Denmark	Sweden	Norway	Iceland	Netherlands	Germany	UK
Total adult population	65%**	70%	72%*	83%	85%	79%	70%	74%
high education								
25–54 years	91%**	86%	94%*	95%	98%	96%	94%	95%**
55–74 years	79%**	76%	77%*	87%	96%	89%	74%	84%**
low education								
25–54 years	37%**	57%	47%*	69%	73%	59%	48%	17%*
55–74 years	24%**	35%	26%*	50%	47%	38%	22%	8%**
Non-EU born	59%**	54%	58%*	70%	76%	73%	58%	72%
Retired/other inactive	44%**	48%	41%*	54%	77%	57%	44%	44%
Unemployed (2019)	85%***	74%*	50%*	Missing	Missing	85%	54%	68%

Table data were sourced from Eurostat (2022). * low reliability. ** break in time series.

of technology the patient already uses (e.g. email address, apps, browser), the type of device that the patient is familiar with (e.g. none, tablet, desktop computer) and whether the patient can use these technologies without support (PHAROS, 2020).

- 3) **Provide accessible Tools and Tasks:** When offering eHealth, the tool used needs to be easy to use and useful for the targeted patient population (Davis, 1989; Holden & Karsh, 2010). For example, a tablet might work if a smartphone app is too small for elderly with poor vision and/or poor eye hand coordination. In addition, the tasks a patient needs to perform need to be easy as possible. For patients who are digitally illiterate or low literate, logging in to a system can present an insuperable use barrier.
- 4) **Offer training and support:** Offering eHealth specific training for patient groups with equal (low) initial skill levels is crucial. However, even when patients complete their training, technical problems are to be expected. Offering long-terms support in the form of a helpdesk is essential to prevent eHealth abandonment. Luckily, there are many societal and voluntary organizations providing computer courses or digital support (Jones, Ashurst, Atkey, & Duffy, 2015 May 18). Ideally, clinicians are aware of these offerings, reach out to the parties offering, and know how to refer their patients to the proper support channels. You can also involve a digital literate spouse or family member when you train your patients in using eHealth (Hayat, Brainin, & Neter, 2017 Mar 30).
- 5) **Provide an escape:** When implementing eHealth into work processes, consider introducing an alternative analogue patient-route for patients who are unwilling or unable to partake in the digitalization of healthcare. An effective example is to call the patient if the video consultation connection cannot be established.

CRedit authorship contribution statement

Esther Immanuela Metting: Writing – original draft. **Eveline Hage:** Conceptualization, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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