‘The Internet is my life’. Technology stories of older adults – a qualitative interview study

‚Das Internet ist mein Leben‘. Technikgeschichten älterer Menschen – eine qualitative Interviewstudie

Abstract

Objective: This paper outlines the core needs of older adults in their everyday use of technology. The background is the development of nurse-driven educational management to promote e-Health literacy among older adults.
Methods: Based on a qualitative research framework by Flick (1996), episodic interviews (n=11) with older adults (65 years and older) were conducted. The corresponding data was subjected to multilevel thematic content analysis.
Results: We mapped the participants’ life circumstances and attitudes toward technology in short descriptions. In addition, the four main categories subjective understanding of technology, appropriation and usage experiences, experiences handling of technology, and e-Health are presented in detail. The results show that learning prerequisites and learning dispositions are highly individual. Older adults experience, among other things, identity-forming spaces, autonomy gains, and emancipatory potential through technology use.
Conclusions: Findings are contrasted with current e-Health literacy literature. This study meets the requirements for qualitative studies that include life circumstances. The technology stories provide a basis for developing suitable educational programs that take biographical aspects and individual perceptions of technology into account. This approach is necessary to reduce inhibitions in a targeted manner. The results expose the need to look closer at the development potentials of age and aging in the context of technology use.

Keywords: older adults, e-Health literacy, qualitative research, qualitative interviews, persona

Zusammenfassung

Ziel: Dieser Beitrag stellt die zentralen Bedürfnisse älterer Menschen bei der alltäglichen Techniknutzung heraus. Hintergrund ist die Entwicklung eines von Pflegefachpersonen gesteuerten Bildungsmanagements mit dem Ziel, die E-Health-Kompetenz älterer Menschen zu fördern.
Methoden: Basierend auf einem qualitativen Forschungsdesign von Flick (1996) wurden episodische Interviews (n=11) mit älteren Menschen (65 Jahre und älter) geführt. Die erhobenen Daten wurden einer mehrstufigen thematischen Inhaltsanalyse unterzogen.
Ergebnisse: In Kurzbeschreibungen werden die Lebensumstände der Teilnehmenden und ihre Einstellung zu Technik dargestellt. Es werden zudem die vier Hauptkategorien subjektives Verständnis von Technik, Aneignungs- und Nutzungsstrategien, Erfahrungen im Umgang mit Technik und E-Health detailliert beschrieben.
Die Ergebnisse zeigen, dass Lernvoraussetzungen und Lerndispositionen hochgradig individuell sind. Ältere Menschen erleben durch Techniknutzung u.a. identitätsstiftende Handlungsspielräume, Autonomiegewinne und emanzipatorische Potenziale.

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Schlussfolgerungen: Die Ergebnisse werden der aktuellen Literatur zu E-Health-Kompetenz gegenübergestellt. Demnach erfüllt diese Studie unter Berücksichtigung des Lebenskontexts die Anforderungen an qualitative Studien in diesem Feld. Die Technikgeschichten bilden die Basis, um passgenaue Bildungsprogramme zu entwickeln, indem sie biografische Aspekte und die individuelle Wahrnehmung von Technik explorieren. Ein solches Forschungsdesign ist wesentlich, um Hemmschwellen gezielt abzubauen. Die Ergebnisse zeigen, dass es gilt, die Entwicklungspotenziale des Alters und des Alterns im Kontext der Techniknutzung vermehrt einzubeziehen.

Schlüsselwörter: ältere Erwachsene, E-Health-Kompetenz, qualitative Forschung, qualitative Interviews, Persona

1 Introduction

Using information and communication technologies (ICTs), new types of social participation and interaction are emerging [1], [2]. The cultural historian Stalder [3] even speaks of a culture of digitality. According to him, digitalization does not replace analog but rather reshapes it. One characteristic is the so-called 'algorithmicity': due to the digital participation of humans (e.g., social media), new cultural processes are emerging through machine-generated algorithms [3]. Thus, digital technologies, as an integral part of modern society, also influence the subjective living environment of older adults. Nevertheless, in technology development and research, the actual embedding of technology in the everyday lives of older adults is only partially considered, and images of old age and aging are insufficiently reflected in this context [4], [5], [6]. On the other hand, prevailing individual and societal stereotypes of older adults or aging affect health care structures. This is problematic given the increasing digitalization of health-related information, data, applications, and structures regarding participation processes and equal opportunities. Thus, treatment pathways are not customized to the individual's needs and circumstances, and programs and technologies are not sufficiently classified or integrated to promote health [7]. Accordingly, there is still a lack of knowledge about how older adults in rural areas shape their support arrangements for using technology, including what they experience as helpful or obstructive.

We conducted this interview study in the context of the project "Dorfgemeinschaft 2.0" (further information see Funding) as a part of the development of a nurse-led educational management program focusing on promoting e-Health literacy among older adults (65 years and older). In this educational program, one approach is to provide older adults the opportunity to consult a technologically literate nurse who advises them on health and care-related issues and supports them using ICTs and e-Health applications [8], [9], [10]. In the project region, for the most part a sparsely populated area in Lower Saxony, located directly at the German-Dutch border, the (residential) living environments [11] and the intergenerational contact are subject to change. For example, a previous survey showed that respondents perceive their neighborhood as a functioning network of concerns in the region to be partly non-existent [8]. The projects' approach is to solve it by enabling access to (newly) developed digital environments.

Accordingly, this article examines technology use among older adults (65 years and older) and highlights its impact on well-being and social inclusion. The focus lies on healthcare, specifically self-management, and use of e-Health applications as well as online partnership with their healthcare providers. We used a qualitative research approach to answer the following research questions in the context of a bio-psycho-social perspective on aging:

- How do older adults (65 years and older) in the project region experience technology in their everyday lives?
- What preconceived notions do they have towards technical devices (in the context of health)?
- What ideas of technology influence their behavior?
- What appropriation strategies result from their technology use?

2 Methods

This study is embedded in a multilevel exploratory research design. The episodic interviews were conducted based on Flick [12]. Data collection took place between October 2019 and December 2019. We recruited participants at project events, such as information sessions, and contacted a local mobile care service, which served as a gatekeeper. We intended this approach to ensure that we didn't overlook persons who needed care and whose mobility might be restricted. Through purposive sampling [13], the sample included individuals living in the project region of various ages (65 years and older) and genders. Interviews took place at the participants' homes or the university campus, depending on their preferences.

We created an interview guideline based on the research questions (see Table 1). Also, we did a pretest with two participants to determine whether the respondents would understand the questions and to ascertain the validity of these questions. No chances had to be made. Interviews followed topical trajectories, however, we allowed the conversation to pivot away slightly from the main questions to gain deeper insights into the participants' views.

Additionally, to generate technology-associated experiences, we used conversation stimuli as an entry point, e.g., a mechanical coffee grinder brought along and/or a technology story read out loud (storytelling). The tech-stories are short narrative passages related to technology perceptions from citizen workshops (associated with the multilevel research design) conducted in 2017/2018 [8].

Table 1: Interview guide

How do older adults perceive technical devices in their everyday lives, and how do they experience technology in general?
(1) Would you please tell me what your day was like yesterday starting from the moment you woke up? • Did it differ from your daily routine? • When did you use a technical device? How did it make you feel?
(2) How do you generally experience technology in your everyday life? • Have you recently bought or been gifted a new piece of technical equipment? • Has anything changed in your routine/everyday life since then?
(3) Coffee grinder (as a stimulus)/Tech-stories (as a stimulus) • Do you still use an old coffee grinder like this one? What do you feel when you see this coffee grinder? • Are there any other devices that trigger the feeling __ for you? • After listening to XY's narration of a technology story, what is going through your mind? • What has it been like since you started using __? Can you tell me an anecdote/story about that?
What are the experiences of older adults related to technology use and health?
• Have you had experience/an experience with using technology for your health? (e.g. blood pressure/sugar measurement/experiences in hospital, ordering medication) • Thinking about your health and its preservation, do you see any additional value in using technology?

The interviews lasted from 40 min. up to 1.5 hours and were digitally recorded, transcribed word for word [14], and anonymized. Furthermore, we prepared postscripts to capture the conversations before and after the recording [15]. We analyzed the data thematically at an individual case level. An open, then selective coding for each case followed [12]. The first step in this process is to briefly characterize the key themes that relate to the research topic and to present the context of meaning for the individual. Next, we generated a specific category system for the main categories.

In a second step, we compared the case analyses and used the resulting thematic structure to modify the analytical procedure for explicit or implicit experiences and interpretations. Finally, using guiding questions, we compared the conditions, the interactions between the actors, the strategies, and consequences. We evaluated the data in a research group (consisting of nursing scientists and gerontologists) using the software MAXQDA (2020). Figure 1 represents the framework of key aspects used in the analysis. In this context, 'social representation' is understood as the individual and social engagement with the object of technology [12].

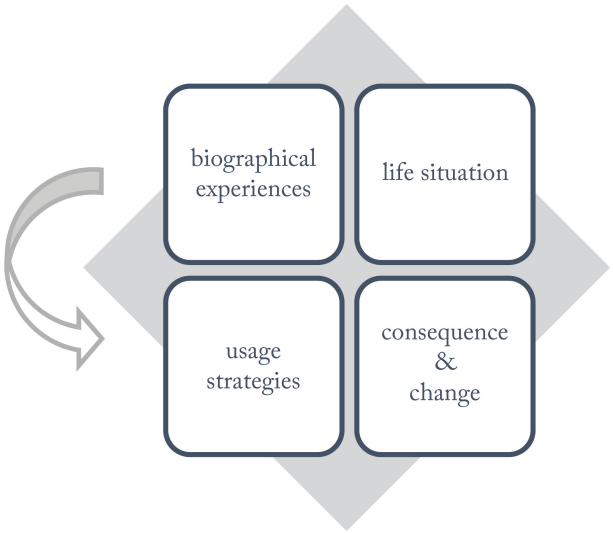

Figure 1: Social representation of technology in everyday life

3 Results

Through numerous analytical steps [12], we assigned individual categories to biographical experiences, current life situations, usage strategies, and consequences. We formed four main categories: *subjective understanding of technology, appropriation and usage strategies, experiences with the handling of technology*, and *e-Health*. These categories are illustrated in the following interview passages. We condensed each case into short descriptions [16], which contain different information exemplifying the perception and every day (non-)use of technology. Table 2 shows the brief description of the participants. The following interview quotes are referenced by "Mrs./Mr.: line number".

3.1 Subjective understanding of technology

The interviewees' subjective understanding of technology reveals different points of origin. Thus, their respective perception of technology can be linked to a particular purpose. Furthermore, specific properties are assigned to technology, e. g. that of a 'tool' (Mrs. A: 46,125; Mr. B: 145,153). The interviewees also declare technology as to be something fundamentally 'modern' (Mrs. E: 61; Mr. C: 93). For example, some interviewees perceive the mechanical coffee grinder as non-technical.

Table 2: Description of the participants

Mrs. A (65 y) is single and still working at mobile nursing services. In the interview she provides technology anecdotes from her daily work life and takes on the role of the professional. She contrasts intimate narratives with her professional experiences. Mastering technology is part of her (professional) self-image.
Mr. B (67 y) a retired qualified radio and television technician, lives with his wife. He has worked in a commercial-technical profession for over thirty years. Mastering the use of technology is part of his self-conception. He wants to be 'up to date'. He categorically rejects technologies that he feels do not meet his personal needs.
Mr. C (75 y) is single. Despite retirement, he still accepts contract work as a translator. Mr. C leads a social life. His stories include the topics of capitalism, culture, and politics. He is open to technical devices but experiences the increasing technologization of everyday life as threatening.
Mr. D (65 y) lives with his wife. He has worked in the automotive industry and is passionate about crafts in his free time. Besides narrating his everyday use of technology, which he takes for granted, he addresses emotional topics such as caring for his parents, fear of old age and falling ill.
Mrs. E (65 y) lives with her husband. Her stories increasingly include the topics of health and care. Mrs. E looks anxiously at the prospect of aging in the countryside. She defines technology as something "modern" and is quickly overwhelmed by too many "settings and buttons". When she has questions about using technology, she turns to her husband.
Mrs. F (78 y) is widowed and lives alone. Emotional, biographical experiences are very present in her narratives. Her main topic is social relationships. Mrs. F has traveled extensively with her husband and has spent much of her life in England. For her, technology is a means of communication and entertainment. She is in regular contact with her family abroad via video chat. English-language e-books create a sense of home for her.
Mrs. G (87 y) is widowed and lives with her daughter and family on a hermit's farm. In her stories, she discusses formative experiences from the Second World War and reports on the heavy physical labor in the fields then. For Mrs. G., technology has a fundamentally positive meaning. First and foremost, it means making work easier; for example, the washing machine she remembers from the past still had to be spun by hand.
Mrs. H (87 y) is widowed and lives alone. She is actively involved in the village community and is an emancipated person who lives close to nature. She tells comparative episodes of everyday life from the past and present. Topics are relationships and daily life. Mrs. H associate's technology primarily with comfort. She perceives the ongoing development of technology as something natural, for example, it is natural for her to use an e-bike and a smartphone in her everyday life.
Mrs. I (71 y) lives with her husband. She used to work in banking. She had limited mobility at the time of the interview and received assistance from a mobile nursing service once a day. Mrs. I is passionate about watching the biathlon on TV and is an active member of the local bowling club. She is technologically 'up to date' but is critical towards some technological developments.
Mr. J (78 y) lives with his wife, and together they regularly take care of their grandchild. He used to work as an engineer. For Mr. J, technology has a lot to do with safety and structure; mastering it is essential for his self-conception. He uses technology that he considers useful for a specific personal purpose. In his stories, Mr. J also addresses emotional experiences such as events from the war.
Mrs. K (71 y) is single and has Dutch roots. Her children and grandchildren do not live nearby. Mrs. K leads an emancipated life, is close to nature, likes to travel, and is interested in art and culture. She describes her current living situation as lonely and does not feel needed by her fellow men. She associates technology with independence, social exchange, and learning. She repeatedly addresses the added cultural value and the need to master technology to participate in social life.

On the one hand, there is a deeply rooted perception of technology as being something 'normal' (Mrs. H: 55,101) and 'just there' a 'part of life' (55,75; Mrs. I: 53) and that you don't even think about it anymore' (101;163). On the other hand, some assigned attributes like 'coldness' and 'normativity'. In one case, technology was even perceived as an antagonist.

'Technology is structured. (...) But it is cold, it is normative.' (Mrs. A: 136)

3.2 Appropriation and usage strategies

A broad spectrum of technology use is evident in the participants' everyday lives. When their technological competence is limited, the interviewees resort to various strategies for technical appropriation. These include 'writing things down' (Mrs. G: 72; Mrs. F: 9,63) and 'always asking' (Mrs. H: 195). Furthermore, access to technology is dependent on personal resources. For example, Mrs. H regularly uses the regional educational program 'Schoolchildren Explain Technology', and Mrs. F uses the 'Beginner's Course for Older Adults'. Mrs. E turns to her husband for questions and Mrs. G to her grandson. Sometimes there is also the strategy of deliberately not using technology because of 'little interest' (Mrs. E: 87; Mrs. I: 83) or 'no desire' (Mrs. E: 105) to use it. But when the individual benefit of a certain technology is recognizable, they will then use it.

'A good societal achievement. But I don't have to do everything with it.' (Mrs. I: 55)

3.3 Experience with the handling of technology

The use of technology increases personal agency and the interviewees perception of safety resulting in visible re-

lieving effects and autonomy gains. In addition, there are the phenomena of 'fun' (Mrs. F: 83; Mr. C: 9,119; Mr. D: 69) and 'stress' (Mr. J: 82), which the interviewees experience when dealing with technology.

It is also clear that the interviewees assume certain roles and are concerned about others when dealing with technology. For example, Mr. B says of himself: 'I was always (...) the contact person.' (9,17).

As there are no shopping opportunities in her village, Mrs. F orders online for those, she knows can't do it themselves. The use of technology constitutes one's self-conception through the assumption of roles by which it creates identity-forming spaces and emancipatory experiences.

'I think it's fabulous that I can do that. Now I am taking three online workshops for about one hour every day for a week. (...) Without that, I wouldn't be able to be here on my own. That fulfills me that gives me grounding. I also see for myself: Ok, my thinking is correct. I am not crazy. Like this, I am not an outsider here, lonely. I am alone. I stay that way. (...) Without the internet, I couldn't do this.' (Mrs. K: 123)

'We were poor back then. With three people we bought one of those irons together, my brother-in-law, a neighbor. It cost 30 marks. We didn't have any money so we each gave ten marks so we could afford such an iron. Well, that was 60 years ago. It broke. I bought a new one a few years ago, which I paid for all by myself.' (Mrs. F: 85)

3.4 E-Health

The results also show the fundamental openness of the interviewees towards technology, also regarding e-health. The interviewees predominantly accept the use of health-related technologies. For example, the use of a digital blood glucose meter is integrated into the lives of Mr. C and Mr. D, and they perceive it as an everyday occurrence. In the wake of the digitalization of the healthcare system, the interviewees do not yet use digital health data, but appeared to be open in this regard.

'Whenever technology fits the health context and the person responsible can use it adequately, it's great. I think this can help immensely under certain circumstances. But you need to teach people how to use it.' (Mr. D: 157)

In terms of health, technology is predominantly perceived as a positive advance, provided it does not replace interpersonal contact, e.g., in a care setting.

'It may be beneficial, but it is also impersonal. The human interaction is irreplaceable. (...) when they say a few good words.' (Mrs. E: 195)

'In nursing, it is essential that people talk to each other and always stay on the ball (...). That is extremely important. (...) the robot is not terrible when putting the patient to bed, but that's about it. Okay, it can also hand out coffee (...). With technology, people must be careful that they don't fall behind.' (Mr. C: 123)

'There shouldn't be too much technology in care because it's all about humans. And communication with the human being. Due to time restrictions, we already have difficulties going even a little beyond the usual. That means being in touch with the patient or listening to what other problems they have. They may be sad. Maybe because the husband has been dead for so long. (...). Today you have almost no time and must be careful that the use of technology doesn't get out of hand. Technology is simply inhuman. Technology is not human. It's not evil. I don't mean that. But it's not warm.' (Mrs. A: 134)

4 Discussion

How we experience and construct technology influences our social life. Flick refers to it as a social representation of technological change in everyday life [12]. The results show that there are older adults who are fluent in their use of technology, while others are not engaged with the digital world at all. However, not all older adults who are outside of the digital world are the same. There are older adults who explicitly reject the opportunity to participate in the digital world, reasoning that they simply have no interest or use for technology. Accordingly, the dimension 'subjective experience' is an expression of the different attitudes toward technology. The short descriptions of the participants show a range of social representations of technology. For example, the computer is experienced as an 'elixir of life' (Mr. B) and the Internet as 'my world' (Mrs. K). This experience goes beyond a mere expansion of the scope of action. Rather, technology control [17] can be constitutive for one's own self-conception. For example, Mr. J describes that he wouldn't 'feel comfortable' without technology. Other interviewees take on specific roles when dealing with technology, such as 'contact person'. It becomes evident that the individual usage of technology can be a fundamental need of older adults. For the approach and access to (health) technologies, it is, therefore, significant to consider the personal life conditions and personal benefit. In addition, the diversity of perceptions, attitudes, and use of technology also demonstrates the need to use biographical research and learning approaches to prevent age-related stereotypes in technology development. To make the relational conditions between biographical narratives and (digital) artifacts visible, educational researcher Bettinger also advocates a research strategy based on media-sensitive biographical research, which is based on newly forming or dissolving 'relations between people and things' [18]. Consequently, impulses from biographical research [19] can be of interest for techno-sociological approaches.

In a comparable interview study, Wangler and Jansky outline the beneficial potentials in the context of the appropriation and use of new media among older adults: *Hobby extension, support network, compensatory tools, opportunity to connect and escape from everyday life* [20]. These phenomena are also reflected in the results of the technology stories presented. These categories can be extended by the potential's *emancipatory experiences* and *identity-forming spaces* (e.g., 'English humor

is just more interesting. I only read e-books because of that. I have them all in English.' Mrs. F: 33). Furthermore, we add the potential *gains in autonomy*. The use of technology thus promotes, at least in some places, far-reaching processes of participation that lead to a greater sense of well-being on the part of the interviewees (e.g., 'It fulfills me, it gives me ground.' Mrs. K: 221).

4.1 Learning

Social construction processes and the perception of technology influence learning paths and are thus requirements for successful learning. The literature shows that especially smaller (qualitative) studies and projects must be advanced to develop effective (everyday) technologies tailored to the needs of older adults [21]. For the development of new support services and structures empowering older adults in appropriating new technologies, it is necessary to consider the inclusion of their biography, and social environment, in addition to the existing regional IT infrastructure [22]. As a result, the presented technology stories lead to a better understanding of the different mechanisms underlying technology use in a regional context.

An earlier survey in the project region already showed that citizens have a pragmatic approach to everyday technology, perceive it as supportive, and want to use technology to the extent of their individual needs [8]. For example, the use of a smartphone was only considered sensible after the function of a navigation app was discovered, which meant more safety in everyday life for that person.

The interviewees are confronted with technology in different ways. Within the acquisition of technology, the learning prerequisites, and learning dispositions are also highly individual (e.g. 'I think it's great to learn digitally at the age of 87. So, I can participate in life.' (Mrs. G: 83) vs. 'I don't care to learn anything else.' (Mrs. H: 181)). The results further show that as soon as the individual benefit of technology is recognized, it will be used, or at least the willingness to come to grips with its handling increases.

Some of the interviewees experienced learning situations as cognitively demanding and, in some cases, stressful. All interviewees who described themselves in this way have developed individual strategies for use and appropriation. The most frequently mentioned strategy was to 'always ask'. Usually the 'contact person' then was a specific person with whom there was a basis of trust. Whenever the interviewees had access to specific educational offers for older adults, they would tend to make the use of them. Concentrating on a few specific functions and ignoring other possible uses, for the time being, makes it easier for the interviewees to use technology [20].

Influenced by negative experiences or merely a negative image of technology, some interviewees proactively avoid technology. Thus, we interpret the deliberate (non-)use of technology as a strategy to preventively counteract 'stress' and negatively perceived notions of technology.

4.2 E-Health

The interviewees resort to different strategies of technology appropriation. In particular, the openness and interest of the respondents should be used to explain the individual benefits. Hänninen et al. [23] describe a continuum of older adults' digital technology use, ranging from active, independent to limited. It becomes apparent that non-technical incentives are significant to the individual use of digital technology. These are: attitudes/perceptions, life transitions, and personal health status [23]. Thus, digital literacy includes a constellation of life skills necessary for full participation in our information-rich and media-saturated society [24]. Digital literacy among older adults is thus closely related to physical and mental well-being [25]. For example, older adults can profit from ICTs through tracking health parameters [21], [26], [27]. Lee & Kim find that socially isolated older adults who are experiencing health problems particularly benefit from using internet technology (to complete tasks, or manage their health, when, for example, health and service providers are lacking) [28]. The interviewees use health-related technologies (e.g. digital blood glucose meters) and express openness towards using digital health data. However, one fear mentioned several times is that technology could eventually minimize or even replace care, touch, or social exchange. This fear underlines the assumption of Heitmann-Möller & Remmers that the contingency of human existence and the associated vulnerability in (care) relationships cannot be made obsolete by technology [29].

In the context of e-Health, health literacy plays a critical role alongside health-related technology use. However, in healthcare, education, policy, and research in Europe, the concept of health literacy is not comprehensively integrated [30], [31]. In addition, the e-Health literature shows that age is generally associated with low e-Health literacy. Older adults are lagging younger adults in the use of e-Health resources with health limitations being but one aspect that prevents them from using technology in everyday life [23]. Currently, the integration of educational strategies, particularly for older adults, has not been established. Nevertheless, there is a steadily growing number of older adults accustomed to technology.

In their socio-spatial-tech positioning, Oswald and Wahl [32] attribute great importance to (new) technologies for participation processes regarding the subjective well-being of older adults. Accordingly, technology use represents a participation aspect and can enable new (digital) exchange processes. As a current research task, both the subjective experience and the increasingly overlapping spatial boundaries (analog and digital worlds) are thus gaining relevance in terms of an expanded concept of living [32].

4.3 Further considerations and recommendations

We recommend considering the points given in Table 3 in terms of barriers and solutions to the implementation of e-Health practices.

5 Conclusion

In this qualitative interview study, we used the interviewees' statements to create short descriptions that illustrate how older adults in rural areas shape their support arrangements regarding technology. We outline what they experience as helpful or obstructive. This study meets the demand for qualitative studies, which include life circumstances in the research field of older adults and their experience of technology. The presented technology stories serve as a basis for the development of specifically tailored educational offers that take biographical aspects and individual perceptions of technology into account and to be able to reduce inhibitions in a targeted manner. The results show that it is necessary to take a closer look at the accompanying potentials for the support of technology use in the context of age and aging. The generalizability of this study is limited due to the small sample size and the open-ended, flexible interview guide. Another significant limitation of this study is the lack of a clear definition of technology to compare interviewees' experiences. For future qualitative studies, an assessment of what older adults rate as learning gains or whether a specific intervention increased their use of, for example, computers and the Internet over time would be desirable. Therefore, further longitudinal studies/longitudinal research is needed to allow follow-up of detailed technology adoption strategies.

Technological development is fast-moving and rarely geared to the needs of older adults. There is a lack of research regarding the lifeworld and everyday significance of technology for older adults. In this context, qualitative study designs often take a back seat. However, these aspects are of immense importance to counteract stereotype images of age and address the needs of older adults in an increasingly digital and complex health care system. Empirical technology stories reveal highly individual potentials, which are especially significant for the acquisition of digital sovereignty and indispensable for the development of tailor-made educational offers. Consequently, future research and its methodological designs will also need to take up suggestions from biographical research methods to map older adults' actual (autonomous) technology use.

Notes

Contributorship

AH identified the research question, developed the study design, prepared the documentation for ethics approval, conducted interviews, analyzed the related data, and wrote the manuscript. SS assisted to analyze the data. AH handled the revisions and re-submission. All authors critically reviewed the manuscript and approved the final version submitted for publication.

Ethical approval

Ethical approval was obtained from Osnabrück University of Applied Sciences Research Ethics Committee (HSOS/2019/2/4), and informed written consent was obtained from all participants.

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Table 3: Considerations and recommendations

Considerations and recommendations	Examples
For introducing technology consider a persons' subjective understanding.	When a person declares technology as normatively 'cold' or an 'antagonist', a sensitive approach is needed. For example, it can be helpful if a trusted person accompanies the appropriation process. Especially in the case of health-related technology, the fear that the use of technology will reduce interpersonal contact (e.g. with nursing staff) should always be countered.
Life circumstances and individual benefits should always be the starting point of e-Health education offers.	Clarify the consequences of using an e-Health application or technology in the context of educational offers and where it could simplify the personal user's life. Concentrate on e-Health applications with a demonstrated personal benefit.
Existing appropriation and usage strategies should be used or expanded.	Have emancipatory or identity-building experiences already been made? If so, use this tech experience as a starting point.
If the users reject a particular technology, the relevant reasons should be considered.	For example, a (initially) limited use of functions can make sense until one is familiar with the technology.
Consider biographical aspects that can be beneficial for the implementation of e-Health.	For example, if specific roles are already filled, you can use this as an incentive/encouragement.

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Competing interests

The authors declare that they have no competing interests.

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