13 Technical utopias – political illusions?

What can we expect from autonomous assistance systems for older people?

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Abstract

This article aims to justify the thesis that the development of autonomous assistance systems for older people has so far been largely determined by rather irrelevant rationalization logics (e. g. cost economy, standardization and streamlining of processes) and political preferences (economic development) than by sufficient attention being paid to the actual needs, abilities and interests of the addressees. Undesirable developments result from a narrowing to aspects of the functional substitutability of nursing activities and insufficient knowledge, especially of gerontological findings. According to these, the development of technology should, on the one hand, consider the creative potential of old age as technically innervatable resources (empowerment approach) and, on the other hand, consider the fragility and vulnerability of the elderly, especially the very old, as the absolute limit to the substitutability of human attention and psychophysical support. The limits of the use of a therapy robot are shown using the example of an artefact constructed for rehabilitative gait training.

13.1 Introduction

In my contribution, I would like to deal with sociological and studies from psychology of aging in the sense of an empirical foundation of the ethical discussion. Firstly, I will briefly outline the demographic, epidemiological and health services research starting position of "age-changed societies" (Kuhlmey), in order to outline directional decisions and political preferences for the development of age-related assistance technologies. It is argued that decisions for concrete technological developments depend on certain rationalization calculations or logics in the field of health care, i. e. on assessments of, for example, functional substitutability of nursing activities. I will, therefore, deal more extensively with gerontological, in particular psychogerontological findings, and highlighted characteristics of nursing as constitutive prerequisites of technological development and the assessment of their appropriateness to the needs and demands of older people. Against this background of theoretically differentiating prerequisites, I will then briefly outline the state of development of autonomous assistance systems and examine the question of which of the needs and interests of older people are to be assumed in the development of technology. Finally, I will use the example of an artefact constructed for rehabilitative training to demonstrate its limited usability.

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13.2 Starting Position

The current demographic change – as is exemplified here by the German situation – is characterized by a continuously increasing average life expectancy with the consequence of an increasing proportion of older people and a simultaneous decline of the younger population (see figure 13.1).

It should be noted that for many older people, the life years gained mean a longer period of individual and social activity. Of course, the consequences of old age also (1) consist of a growing need for social and health care in this part of the population. As late as 1980, Fries (1980) had expected that the disease phase would become more acute in old age as a result of better health prevention (morbidity compression). This hope does not seem to be fulfilled (Crimmins and Beltrán-Sánchez 2011; Niehaus 2012; Strobelberger et al. 2012; Geyer 2015). (2) Demographically, we are also dealing with a shift in the relationship between the younger and older generations. As a result, a gap is widening between an increasing number of people in need of care, on the one hand, and an increasing shortage of skilled nursing staff because of a decreasing number of young professionals, on the other. (3) Regarding nursing care problems, a construction error in the social nursing care insurance system is drastically noticeable: Even when the law was introduced in 1995, it was assumed that families would be the central long-term care system. In fact, however, the proportion of domestic care provided by relatives will decline in the future due to the growing mobility of the younger generation and the increasing employment of women. Social long-term care

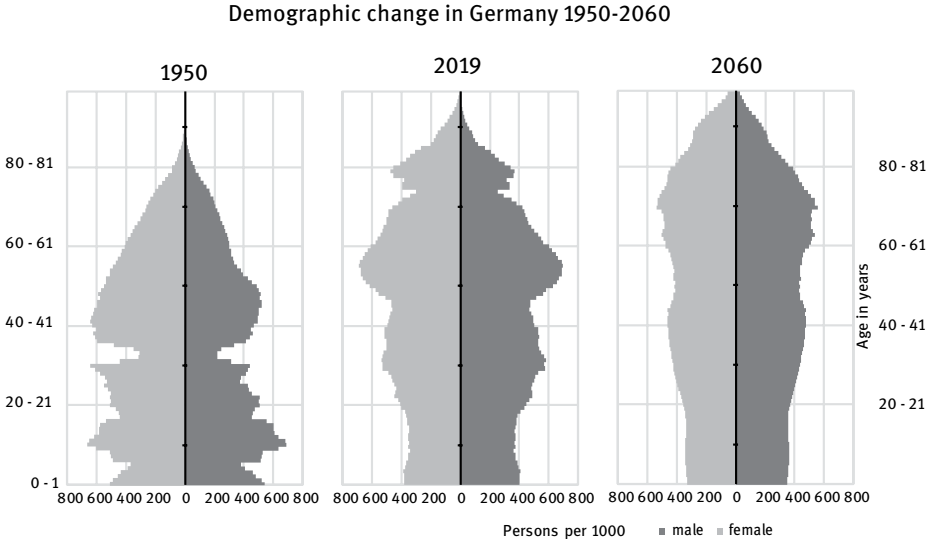

Fig. 13.1: The demographic change in Germany from 1950 to 2060 (moderate development) data source: Statistisches Bundesamt (Destatis), 2019.

insurance is based on a traditional (historical) image of women and families (Backes et al. 2008).

According to serious statistical studies, a shortage of 300,000 to 500,000 FTE in nursing staff is expected by 2030, also taking into account technological and organizational rationalization effects (Pohl 2011; Ehrentraut et al. 2015)[28]. However, federal politicians believe they can assume that the widening personnel gap will, at least, be partially closed by technically autonomous assistance systems.[29] In accordance with this logic, a generous funding program was established in Europe (European Commission 2010). New assistance technologies are intended to ensure the longest possible independent life in old age in a self-chosen environment, even with increasing impairment. Functional losses in older people are to be compensated, everyday skills maintained, and preventive and rehabilitative measures more effectively supported.

It is also expected that modern information and communication systems will enable all actors to be more effectively integrated into the health care system (Remmers 2016). There is no doubt that the systematic exchange of medical and nursing information urgently needs to be improved. It is also expected that assistance systems in the vicinity of robotics will relieve the physical and cognitive strain on nurses in particular – an important concern in view of the premature departure of many nurses due to high occupational stress.

13.3 Path Dependency of Technology Development

The objectives of technology promotion and development mentioned above are undoubtedly significant and worthy of respect. However, if we look back over a longer period of technological promotion in this area, the question arises: What has proven to be useful so far? What has proven itself in practice? Answers to these questions can hardly be given sufficiently without, at the same time, dealing with the ideas and

28 These demand calculations are supported by a recent prognostic calculation of the additional demand for nursing staff in the federal state of Lower Saxony. According to the State Care Report, an additional 19,000 specialists will be needed in outpatient care and 31,000 in inpatient care by 2030, i. e. a total of 50,000 specialists. As a rule, Lower Saxony accounts for 10 % of nationwide demand. The occupational age structure will have a devastating effect on future development: In 2018, 38.35 % of nursing staff in Lower Saxony will be 51 years and older. With the same career drop-out, more than 40 % of the nursing specialists working today will no longer be able to exercise their profession in 15 years. A figure of 5,000 new entries per year as a result of completed training and recognized foreign nursing staff are not enough to compensate for this (Parliament of Lower Saxony, 18th parliamentary term, printed matter 18/3574).

29 Also see the press release of the German Ethics Council No. 05/2019 of 25 June 2019: "The number of people to be cared for will increase dramatically in the future. Care techniques promise ways out of the impending care crisis," according to Council Chairman Peter Dabrock.

desires of members of our society regarding a good life in old and extreme old age emphatically expressed: Age with dignity.[30] Only then would there be a basis for a technology funding policy oriented towards comprehensive, and not merely selective, needs.

The promotion of so-called geronto technologies, however, was classically path-dependent, i. e. in accordance with the system imperatives of economic growth as a driver of innovation (Ropohl 2009). A closer look reveals that research and development programs which are primarily intended to serve health care security in old age are directly or indirectly intertwined with the funding interests of high-tech industries. It is no coincidence, for example, that representatives of the high-tech industry have been routinely included in prominent positions on the political agenda of the European Commission (2010). Representatives of interest groups of older people or of various caring professions have been sought in vain.

This confirms the findings of technical sociology which state that the success of technical action is defined by the respective reference system and its evaluation framework (Kornwachs 2013). From the point of view of the technical-industrial production sector, technical success is measured by different criteria than in the personal health services sector, especially under conditions of human fragility and vulnerability. According to the technical sociologist Ropohl (2009), technological developments have a directionality that is dependent on the economic exploitation of new technical products. Following on from this, Kornwachs (2013) also states that accelerated technological development is a result of accelerated capital dynamics. In his eyes, therefore, it is doubtful whether the development of the technology will be in accordance with its own laws. One driving force is the growing interest in certain technologies that make it possible to replace a cost-economically expensive labor force by apparatus, for example, when machine investment costs are significantly lower than the labor costs saved as a result. Technological innovations are, therefore, strongly driven by economic factors (Nemet 2009). According to Kornwachs (2013), a sevenfold increase in labor productivity has been achieved by technology both in machine production and process innovation in the Federal Republic of Germany from the 1950 s until today. What is propagated as innovation obeys those system imperatives of growth through technological progress and is increasingly dependent on globally operating super-enterprises.

30 See, among other things, the contributions in Kruse et al. (2012).

13.3.1 Political Preferences: Technology Promotion Versus Nursing Promotion

The highly economic path dependency of technological development is obviously dictated by the 'logic' that the German government has been following in its high-tech strategy for many years. This applies all the more to the interdepartmental "Forschungsagenda für den demografischen Wandel" [Research Agenda for Demographic Change] adopted in 2011 with the dazzling title: Old Age has a future. Demographic change, which is often associated with concerns and fears among the population, is being relabeled as a "demographic opportunity."

What concrete opportunities should be associated with the federal government's technology funding policy aimed at supporting older people? The funding area of the Federal Ministry of Education and Research (BMBF) "Forschung für Innovationen, Hightech-Strategie" [Research for Innovation, High-Tech Strategy] includes the funding for projects such as "Innovation durch neue Technologien" [Innovation through New Technologies] in the title group (TG 20). The BMBF's funding line, which is largely geared to age- and care-related technology development, operates under the title "Mensch-Technik-Interaktion" [Human-Technology Interaction]. The share of this funding line in the total BMBF budget for 2018 amounts to 1.24 %, which, at first glance, appears to be rather marginal compared to the BMBF's total annual budget of 17.6 billion Euro. Technical and social innovations are particularly promoted with the following focal points: 1. Self-determined life, 2. assistance systems in the domestic environment and 3. intelligent mobility. To a certain extent, many of these innovation priorities are upstream of inpatient intervention scenarios for the long-term care of the elderly. Further support for age- and care-related technology development can be found in other funding lines, such as "service innovations."

It should not be overlooked that innovation funding, which is not exclusively geared to technology development, is provided in fields of work in the social and nursing professions, which is reflected in federal research and development funding specifically addressed to universities of applied sciences, such as "Soziale Innovationen für Lebensqualität im Alter" [Social Innovations for Quality of Life in Old Age], with an annual funding amount of 5 million euros.

The program for the promotion of technology in nursing fields can be contrasted with a recent initiative by the Federal Government to finance 13,000 additional nursing places for medical treatment in inpatient long-term care facilities, which was taken under considerable pressure from the public in the face of an increasing nursing care crisis. It should be emphasized that this measure is not financed from a special fund of the Federal Ministry of Health but from current surpluses of the statutory health insurance funds. The costs for the additional costs of staffing the health care institutions are estimated at around 640 million euros (Handelsblatt 2018). Facilities with up to 40 residents will receive half the allotted amount for a complete institution; facilities with 41 to 80 residents will receive the full equivalent of a complete institution; facilities with 81 to 120 residents one and a half times a complete institution; and

facilities with more than 120 residents twice the allotted amount for a complete institution (GKV-Spitzenverband 2019). Based on the total number of inpatients in need of care, this means that an additional six minutes per day are available for wound care, medication or blood pressure measurement for each resident of a nursing home. Even if a differentiation has to be made depending on the degree of care of a resident, it is true that the residents of nursing homes have an average high degree of need for care. This does not yet take into account the communicative share of nursing work beyond the performance-related specialist medical care, i. e. personal attention. This ad hoc initiative cannot, therefore, be regarded as a significant and, above all, permanent improvement in nursing care.[31]

13.3.2 Premises of Different Rationalization Logics

By contrast, the promotion of technological innovations is tacitly carried out under the condition that Germany must not miss the boat regarding global markets. The preferential system of research funding also appears to be subject to these market-law imperatives.[32] However, the transfer of the rationalization logic that is decisive for commercial areas of production, distribution and administration and the technological innovations that are interwoven with it to areas of health care and nursing seems to be highly problematic. The procedural peculiarities of medical and nursing services as human services and the indispensable structural prerequisites for them, which show decisive differences, are misjudged. Turning care processes into objects of technical rationalization calculations would mean misjudging the highly personal, i. e. individualizing character of help, support or advisory tasks. The technical substitutability of such services by robotic systems, for example, in order to achieve personnel savings is, therefore, subject to strict limits. It would certainly be justifiable to replace certain functional tasks, at least in part, by machines. Mechanical aids for embarrassing toilet visits or for merely repetitive, less technically demanding tasks, such as determining vital signs, would possibly be welcome.

In all this, on the one hand, differentiated needs and acceptance analyses must be insisted on, namely from the evaluation perspective of all those concerned. On the other hand, with this evaluation perspective, as already indicated, the question will be connected with what is understood in our society by a good, humane age.

31 A reason why, in the meantime, the much too small political value of the care is also deplored in a high-ranking technical periodical of the medical professional organization. See: Ärzteblatt (2019)

32 See EPL 30: Funding areas and priorities of the Bundesministerium für Bildung und Forschung (2017). https://www.bundeshaushalt.de/fileadmin/de.bundeshaushalt/content_de/dokumente/2017/soll/epl30.pdf (03.01.2020).

13.4 Conditions for Technological Innovation in Support of Older people

Experiences from a large number of research and development projects on assistive technologies for older people can be summed up as follows: At best, the technical competencies of the addressees were examined as prerequisites for the successful implementation of the artefacts developed (Meyer 2016). Less attention was usually paid to nontechnical prerequisites, i. e. those to be developed in the social environment of the addressees and their concrete psychophysical constitution. Their exploration takes place in a social-scientific-psychological approach (Künemund 2016), which is why, in this context, the undoubtedly important ethical assessments, for example, of the consequences of assistive technologies for older people in terms of a balance of opportunities and risks, are initially of secondary importance (Remmers 2018, 2016; Nagel and Remmers 2012). In the following, I would like to concentrate on the nontechnical requirements of technological innovations and let myself be guided by the following questions: Which gerontological, in particular psychogerontological, findings on age and ageing processes must be considered when developing age-appropriate technologies? Which equally elementary insights into structural and process-related peculiarities of care for the (elderly) person must also be considered in the development of technology?

13.4.1 Phenomena of ageing and old age

Development potential

One of the most important results of gerontological research is that age in our time is characterized not only by physical, cognitive and psychological decline and losses but also by development potential at different age levels which are effective in the working world and in individual educational contexts (Börsch-Supan and Weiss 2010; Tippelt and Schmidt-Hertha 2010). There are biological and socio-emotional changes in old age which offer considerable opportunities for development, particularly self-stabilization, even in old age (Rott 2010). It should always be borne in mind that old age is actually a relatively young phenomenon in view of the early mortality of humans many hundreds of years ago. Nevertheless, ageing is biologically unavoidable regardless of the socio-historical developments.

There is some evidence that people are invariably able to compensate for the losses associated with old age: On the one hand, on a social level by reorganizing the living environment and, on the other, by a process of development taking place in the personality system of the elderly person. Older people are in a position to change goals or set new goals, and to develop different patterns of action and routines than those they have acquired in earlier life years. They are more and more able to compensate for the increasingly biologically limited capacities. The development model

formulated by Baltes and Baltes (1990) is: Selection and optimization of possibilities while simultaneously compensating for losses in other functional areas.

This evolutionary selection has an effect on life in old age, for example, more abilities are being acquired to help others competently. A pool of experience and knowledge of one's own is passed on to younger people. The importance of emotional and social goals also grows with increasing age in comparison to instrumental goals.

The time perspective also changes in older people: Thinking is more oriented towards the future well-being of other people and questions of how lasting things can be created (Kruse 2017; Biggs 2010; Kohli 2005).

Based on their experience, older people have the skills to deal with boundaries in both private, public and professional life. Such skills find greater opportunities for realization in old age because creative action at this stage of life is no longer associated with the risks characteristic of young people's development phases, such as career failure. The processing of biographical borderline experiences, thus, enables them to deal more calmly with fears and analyze problems in a sober way. The need for new information in decision-making situations is assessed in a more controlled way. Creativity and a moderate serenity form a certain mixture. According to the principle of generativity, such attitudes can be passed on as virtues of maturity (Biggs 1999). However, ageing processes are very heterogeneous. The influence of social differences increases with age. Especially in old age, social inequalities with poverty and health risks have an increasing cumulative effect.

If one disregards social structural 'determinants,' people in old age show themselves to be capable of development in certain areas. Even under conditions of health losses, they are often able to perform creatively.

As far as the development of geronto technologies is concerned, Kruse and Schmitt (2015) come to the conclusion that development potentials do not yet represent a systematic approach for the technical-constructive use or stimulation of, for example, the creative capacity of older people. To communicate electronically with relatives, friends, etc. by means of key commands is by no means to be described as creative or creativity-promoting.

Experiences of interdependencies and dependencies

On the other hand, we will have to deal with less pleasant phenomena of ageing and old age. seem to be abhored by the technical sciences in a certain way due to a structural 'optimism' anchored in the world view of the scientific community. Knowledge about the fragility and vulnerability of the elderly is rather marginal. One explanation could be that in modern societies, which in one way or another are protected by the welfare state, individualistic lifestyles are overaccentuated – possibly as a reaction to postindustrial overflowing flexibilization strategies and the associated pressures to adapt (Bröckling 2007).

Faced with proven trends of individualization, i. e. the decoupling of work and life as well as personal life from natural communities, it is important to be aware of the fact that human life ultimately takes place under historically varying conditions of physical and social dependencies. People experience mutual dependencies in very elementary areas of their lives. These experiences manifest themselves in moral attitudes. The more people become aware of their mutual dependencies and dependencies on assistance, the more they become aware of their vulnerability.

Principles of both solidarity and protection can be considered as a response to this fundamental background of experience. In this context, the social significance of a purely biological fact can also be highlighted: Already at birth, man is dependent on help, attention and recognition of his social environment, and he remains so in varying degrees depending on predictable and unforeseeable crises (Habermas 2001).

Vulnerability

While the creative development potential of old age has so far been emphasized, it is now necessary to become aware of opposing development criteria, such as the fact that the risk of multiple illnesses increases, especially at an age of 80 and over. Chronic degenerative diseases, including neurodegenerative diseases of the Alzheimer type, increase exponentially. Old age is especially characterized by increasing vulnerability with limited mental resistance (Kruse 2017).

However, vulnerability is also a component of the basic human constitution. There is no other way to understand caring behavior towards sick people in need of help and care. Care work is part of human culture. It also includes instrumental practices of compensation for human exposure and defenselessness – an aspect that is decisive for a technology philosophy oriented towards functional interpretations (Grunwald 2013). It will be necessary to consider the fact that techniques are not determined solely by their tool character but also by the fact that they become a structuring part of human lifestyles. The functions of a subject and object are no longer easy to oppose, but rather form a kind of “action programme” (Nordmann 2008, 68; with reference to Latour 1969).

Old age is the phase of life in which physical, cognitive and social losses are increasingly being dealt with. Emotional vulnerability is of particular importance here. There is widespread agreement that certain living conditions have a direct influence on the degree and forms of vulnerability. Vulnerability can be the result of a lifelong development or a current life situation, for example, an acute illness. It should be borne in mind that individuals can also do something in old age to avoid, alleviate or compensate for certain forms and manifestations of vulnerability in such a way that a largely self-determined life under conditions of social participation is possible.

Social participation is, therefore, of great importance. It is undisputed that a lack of opportunities to participate in the level of development and prosperity of a society is a decisive reason for pronounced vulnerability. However, people react very dif-

ferently to objectively comparable pressures. Stress does not always have to lead to high emotional vulnerability. This is shown by the results of resilience research, i. e. the investigation of complex processes of individual stress processing. To put it in a nutshell, it turned out that certain processes of stress processing are linked to social networks and the support they provide (Kruse 2017; Oswald 2014). It should always be noted that the emergence and maintenance of resilience is linked to an interplay of psychological, social and institutional factors. Above all, older people are dependent on an environment of familiar or/and trustworthy people. Under these conditions, as the Berlin Ageing Study (Lindenberger 2010) has shown, older people are capable of productive adaptation even in the face of various losses. Resilience, thus, proves to be a specific result of the plasticity of human performance and organizational capacity (Staudinger et al. 1995).

The previous presentation of gerontological findings provides starting points for the development and use of technical assistance systems. However, it is important to warn against false conclusions and exaggerated expectations. Ageing processes cannot be manipulated arbitrarily in old age if vulnerability increases or resources decrease. This fact has been given far too little consideration in the design of technical assistance systems and false assumptions have often been made. Technical constructions are often too strongly oriented to questionable models of human self-optimization. Instead, requirements for technical assistance systems arise under the following questions: Are they suitable for supporting and stabilizing individuals, for example, in already initiated prevention strategies? To what extent can technical assistance systems support older people in mental and spiritual growth processes? To what extent do they help people to cope better with stressful situations (Kruse and Schmitt 2015)?

13.4.2 Some typological characteristics of nursing work processes

A further problem of the federal government's previous technology support programs aimed at supporting people in need of care is a lack of knowledge about the structural characteristics of nursing work processes (Hülsken-Giesler and Krings 2015). From an anthropological point of view, care is an elementary component of human reproduction. There is a special need for nursing services in the event of restrictions caused by illness or irreversible degradation processes in old age. The focus is on the need for security and the successful handling of losses. Nursing care is, therefore, rightly characterized as relationship work that focuses on the basic needs of people in need of help, with specific emotional requirements. In addition, the direct contact with physically severely restricted people represents a high physical strain. To a certain extent, care takes place in the medium of physical reciprocity with risks of unlimited psychophysical expenditure (Remmers 2015, 2006).

Further difficulties result from the cyclical structure of nursing activities. These activities are geared to the natural, cyclically recurring basic needs of people in need of care, which vary in nature and urgency. Due to this situation-bound nature, i. e. its contingency character, care is difficult to plan and formally control. In contrast to the production of material goods or the processing of administrative processes, for example, the results of work are fleeting. They lack the vividness of success in infirmity and physical or mental decay.

The complexity and limited plannability of nursing work processes can, thus, only be illustrated in part. It can first be assumed that the use of electronic data processing systems in hospitals will lead to a rationalization of clinical workflows with qualitative improvement and cost-saving effects (Flemming 2015). Nevertheless, fundamental concerns arise: To what extent, for example, can the logic of professional relationship work be reconciled with a logic of economy and planning administration that manifests itself in technological programs (Hülsken-Giesler and Krings 2015)?

Perhaps these questions can be answered by some technical theoretical considerations. According to Grunwald (2013), it can be assumed that technology functions according to the principle of situation-invariant regularity. This means that the results of technical procedures can, in principle, be repeated at any time and in any place. Technical functionality requires context independence. This is the only way to make the results of technical processes calculable, thus, creating certainty of expectation, which has a positive effect on labor economics and labor psychology. Frequently observed resistance of nursing staff to the technification of their work seems to have something to do with the aforementioned situation-invariant regularity of technologically preformed processes. Many healthcare professionals fear that this will devalue professional principles of individualization and contextualization of care activities.

There is no question that, for example, labor-saving mechanical support technologies for lifting, turning and moving patients are perceived as beneficial (Krick et al. 2019). By contrast, nursing professionals react very ambivalently (Pols 2012) when friendly technical companions occupy, so to speak, original, identity-creating areas of nursing action; when they touch those structures of reciprocity, of responsiveness (Waldenfels 1994); in other words, that reciprocity of feeling and being felt, of touching and being touched, whose physiological and psychological correlates are of high therapeutic value. Admittedly, assistance systems in nursing are perceived as relieving and productive when their use provides greater scope for development and decision-making (Pols 2012).

13.5 On the State of Development of Autonomous Assistance Systems

Autonomous assistance systems exhibit a great diversity that can be classified into various technologies (Hülsken-Giesler and Remmers 2016).

13.5.1 AAL-Technologies

So-called AAL technologies for the compensation of age-specific losses and the support of an independent life at home will not be discussed in more detail here. There are overlaps here, for example, with e-health, telemedicine and telenursing. On this information technology basis, opportunities for networked health care by multi-professional teams are opening up – a major topic for future security of medical services. I will leave it at key words such as case management, intersectoral treatment paths and cross-institutional electronic health records.

13.5.2 Robotic

In the meantime, technology development for the physical and cognitive support or relief of nursing staff and elderly people has made considerable progress. Regarding these autonomous assistance systems, a distinction should be made between assistance robots, therapy robots and interaction robots. An example of an assistance robot is Care-o-bot 4 (Fraunhofer IPA 2019), which performs manual activities such as gripping or enriching food and beverages on command. Intelligent care trolleys keep care utensils in stock and document their consumption. There are assistance robots for physical support of home and inpatient care, such as lifting and carrying a patient. The development of advanced human-machine systems, such as exoskeletons or exoskeletons, does not fall into the narrower circle of robotics. Exoskeletons combine human intelligence with machine power to support or amplify the movements of the wearer. These systems are used where human work cannot be meaningfully replaced

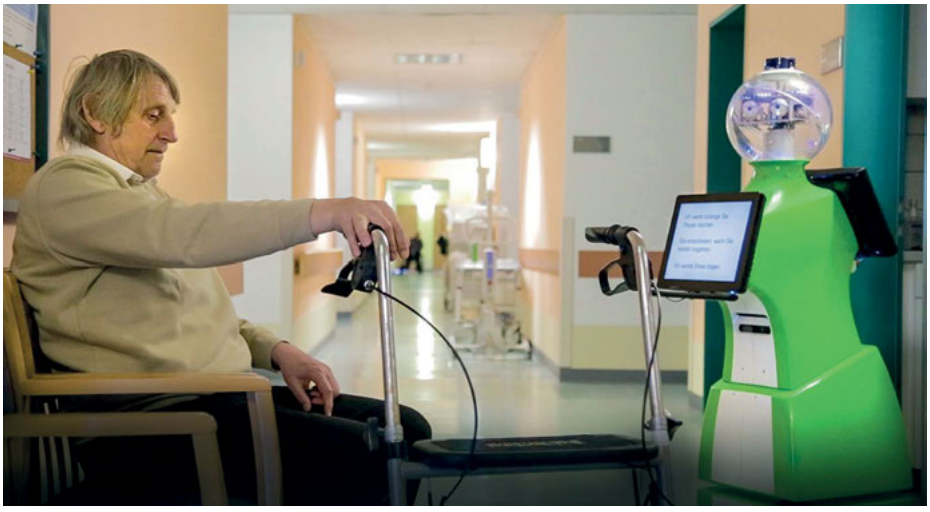

Fig. 13.2: Therapy robot ROREAS.

by robotic systems, such as in subareas of industrial production, and in physically heavy work in the construction and care industries. Tracking systems are used for the local self-control or external control of cognitively impaired, possibly slightly demented people. Therapy robots are used, for example, to support mobility. One example is the ROREAS robot (Technische Universität Ilmenau 2019), which supports patients during gait training in rehabilitation and serves as a reminder or navigation aid.

The emotion robot PARO (Parorobots 2019) developed for dementia patients should also be mentioned. PARO reacts to tactile and verbal speech with its own movements (eyelids, extremities, lifting and lowering of the head) and with sound formation.

The interaction robots include the ALIAS robot platform (Rehrl et al. 2011) with three core functions: (1) Communication (with web-based access to social networks), (2) physical and cognitive activation through games on the display, and (3) assistance through reminders of medication or planned appointments. Relatives can control or use these functions themselves via remote access.

13.6 The Needs and Expectations of Older People in Need of Care

The question as to what technical support and assistance older people actually need and what they want in terms of their circumstances has been answered rather abstractly so far, Brändle et al. (2016) in a critical balance state. Almost in unison, interviewees say that a self-determined, independent life with opportunities to participate in public life is very much desired among their peers. Technical support systems to compensate for physical and psychological losses are also desirable. However, an interest in personal security is more strongly emphasized by the relatives of older people than by the older people themselves (Hülsken-Giesler 2009). What quality of life means for older people *in concreto*, however, can only be understood through methodically differentiated surveys and observations (Paetzold and Pelizäus-Hoffmeister 2016) . Gradually, more recent social science studies are focusing their attention above all on diverse forms of life design and personal, biographically varying life plans in old age as influencing factors in technical support needs (Koppenburger et al. 2016).

Since the development of fewer target-oriented assistance technologies has swallowed up immense financial resources, a certain sensitivity towards scientifically sound technical development needs seems to be emerging from the BMBF and the VDI/VDE/IT (Birken et al. 2016). Previous “user scenarios” were almost always characterized by negative age stereotypes (Künemund and Tanschus 2013) . Up to now, psychological questions of human adaptation to technology have been strongly in the foreground (Robert 2018). However, questions of construction or adaptation must be answered from primarily the original perspective of different users (user-centered

design). In the meantime, the number of social science studies that focus analytically on the spatial-material life context of older people, on their spatial-social radius of action and on habits that are suitable for mastering recurring challenges of everyday life is growing (Heinze and Hilbert 2016; Saup 1999). Older people are proving to be extraordinarily imaginative in dealing routinely with obstacles or limitations, including the effect of cognitive training. Brändle et al. (2016), therefore, regarded it as groundbreaking to pay much greater attention to the "nontechnical needs for technology," for example, to focus less on a telematic replacement of authentic social relationships than on telematic support in establishing and maintaining living social relationships. A further challenge will be to find out how older people can be technically supported in their creative handling of everyday problems without taking over the problem solving for them, rather to support them in their creative wealth (Remmers and Hülsken-Giesler 2012). On the agenda is a real user-orientation, a real transition to the so-called demand-pull approach. The technical support that can really be provided to elderly people in need of care and their relatives must be explored through methodologically elaborated studies in the context of a process evaluation (Künemund 2015). It should be borne in mind that research and development are always embedded in a normative framework. This also includes tacitly technology-optimistic assumptions that need to be examined (Mast et al. 2014). This results in a kind of signpost function for future age-related technology developments. A first normative prerequisite results from the fact that people up to an advanced age are cooperative beings, even with limitations. Another fundamental insight is that age itself is not yet a predictor of technological readiness or rejection (Erdmann et al.). In this respect, technical innovations make sense for the purpose of compensating for various socially or biologically induced limitations or disadvantages. However, a fixation on deficits should be avoided. Rather, even at an advanced age, stimulable activation and creativity potentials should be constructively taken up. The guiding aim is to enable people to participate in social life processes and, under these conditions, to lead a meaningful, good life. This would bring ethical-normative requirements to bear, for example, in the "Capability Approaches" established by Nussbaum (2011). Technologically, it is about functionalities that address the individual in his/her potentiality, in his/her tendency towards self-updating, in short: In his/her adaptibility (Kruse and Schmitt 2010).

13.7 Paradigm Shift in Health Policy Innovations

Development potential and vulnerability belong in different forms to the psychophysical constitution of older people. These facts, which vary greatly from person to person, must be met within the framework of nursing interventions. In view of the worsening problems, especially in nursing care, the question arises: Must social solution strategies be found that are primarily tailored to those social problems that are caused by demographic and socio-structural change? It goes without saying that

improvements in the production of material goods and their distribution aim at precisely this instrumental level of production and distribution as a rationalization approach. Improvements in the living conditions of older people, especially their care, must be based on completely different constitutional conditions, i. e. social life processes must be distinguished from technical production processes *par excellence*. The attempt to solve nursing care problems caused by a growing shortage of personnel through technological replacement strategies with low and differentiated effectiveness is illusory in nature. The fact that the world in which older, often frail people live is quite different from the technical world of industrial production and logistic distribution, which forms a secret framework for the development of geronto technologies, is misjudged. Both worlds obey completely incomparable laws, because they are incommensurable. They are, therefore, only, if at all, transformable into each other in a very limited way.

This is finally demonstrated by the example of a technical, in this case, robotic support of rehabilitative care. At the same time, this example serves as a kind of contrast foil in comparison to the guidance and support provided exclusively by personnel in early post-stroke gait training.

We chose the recently developed robot ROREAS as an example. As already mentioned, ROREAS belongs to the genus of therapy robots. It serves patients by supporting gait training in rehabilitation facilities and, at the same time, as a reminder and navigation aid. For demonstration purposes, we relied on a five-minute video that is strongly focused on product advertising. The video begins with a telephone call from the robot, which signals its presence in front of the door at the patient's room and invites him to a training session. The robot greets the patient on the ward corridor. The clinic manager is then shown, who praises the advantages of using robots against the background of a "tightly knit" therapy plan for staff shortages. According to his statements, the robot should not replace therapists or nursing staff. Rather, it is intended to encourage independent training in phases in which therapists or nurses are involved with other tasks. A social scientist accompanying the robot development emphasizes the patient-fair operation of the robot, which is, therefore, also suitable for humans with or without cognitive impairments. It can be experienced intuitively and also gives pleasure. The robot now navigates the patient through numerous intersecting ward corridors and tells him the route. A faded-in technology developer praises the orientation ability of the robot which recognizes existing or emerging obstacles. The robot can also cope with difficult tasks, for example, by recognizing people with walking aids. The robot is able to communicate the current whereabouts on the ward corridor. It waits for the patient to take the necessary personal breaks. A representative of a health insurance company, who was once again shown on the screen, emphasized that this completed development project was intended to actively involve patients in technical innovations in the health care system. By technically combining different functions, it would be possible for patients to walk faster and become mobile faster, not only with the help of people but also with technology. In the meantime, the

robot's monitor shows how many gait meters the patient has managed in which time. Finally, another technology developer emphasizes the many years of experience of his institution in the development of service robotics in retail and industry.

No personal address of the patient is recognizable in the cinematic demonstration of ROREAS. The patient appears to be depressed throughout, slightly indifferent, which could possibly be interpreted as a reaction to his (possibly stroke-related) reduced mobility. The patient is only able to respond to the one-sided response by the robot by standardized response specifications in the form of key commands. The patient reacts to further requests from the robot regarding the extent to which he (the patient) has understood information or wishes to receive further information without any internal movement. According to the gestural expression, the behavior can be interpreted as a reaction to standardized information or requests that is rather "obligatory." There is no communication with the following or leading therapy robot, rather it is reduced to purely reactive behavior. It is not clear whether and to what extent therapeutically highly significant instructions, support and aid are given in the process of the ultimately wordless gait training. The robotically staged training reflects a mute mode of relationship that reifies the patient as the pure addressee of instructions (Rosa 2016). A mood of indifference, of apathy dominates the scene. The patient does not receive any attention as a personality. What is missing is what is also indispensable for a therapeutic space: A resonance space created by situational concessions, consideration, encouragement and enhancement.

The situation is completely different in the scenic space of a rehabilitative training with personal guidance and support using the example of walking exercises using a stick (see figure 13.3).

Fig. 13.3: Walking with a stick.

Patient and therapist form a rehabilitative unit at the basal level of physical cooperation. In this immediate cooperation, the learning of trunk stability through physically controlled movements is fed back directly to repetitions of ontogenetic experiences, i. e. to elementary sensations of touching and being touched, feeling and being felt. The motor regaining of gait and, thus, balance security is coupled to the physical presence of a cooperation partner who perceptibly follows one's own movements. The reappropriation of motor skills takes place in the manner of an indispensable resonating behavior of a partner. The sensory stimulations produced in this way ('autobiographical' feeling) are coupled with cognitive training during accompanying communication. The physical balance work, which takes place and can be guaranteed in the form of a dyad alone, cannot be achieved at all without that intrapsychic correlate, a mental balance that is simultaneously established. It is this direct physical cooperation that enables the very elementary experience of self-efficacy. Not only much more stable but also more lasting effects of interpersonal-based gait training can be expected precisely because of a far more effective emotional experience.

13.8 Quintessence

Attempts at a technical substitution of therapeutic-rehabilitative measures to regain basic possibilities of movement, by means of which physical stability and security of balance are established, are based on abstractions; ultimately on a disregard for the fact that humans exist as bodily beings constituting themselves through mutually intertwined self-perceptions and external perceptions; that as such bodily beings they develop relationships with one another in a "physical and social space" which, depending on the quality of the relationship, is characterized by certain moods (Rosa 2016). The quality of the relationship, and this is highly significant for the therapeutic space, is measured, so to speak, by the degree of intensity of the resonance of the individuals included, participating in and addressed by this space. To a certain degree, interpersonal and, as such, controlled mergers cannot only be used therapeutically, but can also be of essential importance in exercises of rehabilitative reappropriation of autonomous abilities.

Responsivity, understood precisely also as resonance, forms the structural basis for a relationship between people in which the other communicating in some way represents an elementary prerequisite of self-experience and self-interpretation (Rosa 2016). The social anthropological foundation of inalienable resonance relationships, which are constituted in a bodily sphere of personal self-experience and interpersonal self-interpretations, draws very narrow limits regarding the possibilities of their technical substitutability, especially in therapeutic-rehabilitative and nursing contexts. The current discussion about the technical possibilities of supporting older people, including those in need of care, is based mostly on the results of methodologically conventional needs and feasibility studies. However, they are on a theoretically

subcomplex level. There is a great lack of clarity regarding the physical situation and vulnerability of the (above all elderly) person; a lack of understanding of the relationship of the inner and outer behavior conveyed by all senses in the case of physical and mental losses, homeostasis, an "adaptive fluid equilibrium" (Bertalanffy); ultimately: Sovereignty can be maintained (Claessens 1980). The maintenance of homeostasis is, so to speak, tied to the activation of an evolutionary mechanism: to the caring behavior of a human being who, in active services of support, which may include symbiotic acts of fusion in the sense of physical reciprocity (body to body, side by side), passes on "his own homeostasis" to a "next being" (Claessens 1980)

Utopias of technical feasibility, on the other hand, live from abstractions and associated distancing, which are external to the processes of self-stabilization and self-assurance that take place through reciprocity. This would also mark the limits of the use of autonomous assistance technologies to support older people and their carers: They result from social-anthropological facts of a human striving for balance that is dependent in elementary areas on physical presence, which, with increasing age, requires special attention of the social environment as a personal shelter.

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