

Towards Qualification for Health and Social Care Professionals in the Field of Digital Technologies – the European Project “DDSkills”

Marina Weiland, Barbara Klein, Angela Riccio, Helena Lydon, Foteini Paschou, Maurizio Panzironi, Francesca Schettini, Mariagrazia D’Ippolito, Donatella Mattia, Jennifer Holloway, Aoife McTiernan and Ciara Gunning

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Abstract

The possibilities of digital technologies for people with disabilities or the older population are wide-ranging, but in order for all people to be able to participate in an increasingly „digital world“, it is important to qualify professionals and organizations so that they are able to support, advise and help with potential risks. The article presents results of a survey among health and social care professionals in seven European countries with regard to qualification in this domain and introduces the European Union funded project DDSkills. The project aims to qualify health and social care professionals in areas such as digital Assistive Technologies, Smart Home, Robotics, Virtual and Augmented Reality and Brain-Computer-Interface, as well as their implementation and application, in order to support people with disabilities or functional decline to increase their independence and social participation.

Keywords: Qualification, Digital Technologies, Assistive Technology, Health and Social Care, Professionals



Introduction

Digitalization offers a great potential for elderly, for people with disabilities or functional limitations, as well as for care providers on an informal or formal level. Digital Assistive Technology (AT) can contribute to increase autonomy and participation, as well as to improve quality of care, safety and security (Klein & Oswald, 2020). For relatives and professional groups, AT can relieve physical and mental burden. In addition, many technologies such as tablet-PCs/smartphones or Virtual Reality, whose primary purpose did not target the health or social care system, have been adopted and currently offer new possibilities in the health and social care sector.

In order to be able to offer new digital technologies to clients or to use them in organizations, it is important to know relevant products and systems.

Furthermore, in order to be able to advise and guide clients to properly use AT and to prevent harm, it is important to be informed on the necessary prerequisites and possible consequences (Reichstein, 2016; Mayerle, 2019).

In recent years, initiatives have been formed to establish core competencies in ICT (Information and Communication Technology) and to implement them in the curricula of health and social care degree courses. However, in many European Union (EU) countries, there are still few possibilities for continuing professional development in digital technologies for health and social care workers (Fondazione Santa Lucia, FSL, 2020). In this article, a multinational approach to create a certified qualification on digital technologies for this specific group is presented.

Impact of New Technologies on Care for the Elderly and People with Disabilities

The opportunities offered by digitalization lie in promoting participation in social life, self-determination and independence as the following examples show:

- From early in childhood, digital technologies in form of communication aids with speech output can enable children to communicate with their environment and their peer group and thus lay foundations for a self-determined life and reduce the high risk of „doing disability“ (p. 1088), i.e. the reinforcement of disability from outside (Najemnik & Zorn, 2016).
- Accessible hardware and software solutions increase the possibilities for participation in education and work, as physical and sensory limitations can be compensated. This can secure employment for people with disabilities and so reduce social exclusion (Meisen & Vieritz, 2019)
- In everyday life, smartphone apps can navigate the way for blind people, and people with hearing loss benefit from messaging services in written communication or the possibility of buying or going to the authorities online. In addition, devices such as smart phones, smart watches and tablets do not have the often subjectively experienced stigma of needing help associated with traditional Assistive Technology has (Kreidenweis, 2018). This in turn can change the image of people with disabilities in society and strengthen inclusion.
- Ambient Assisted Living (AAL) applications in form of sensor systems for homes make it possible for older people to remain in their home environment or they can facilitate supported living for people with disabilities. For example, falls can be detected or prevented by lighting systems when leaving the bed, fire and water damage can be prevented by auto-

matic switch-off systems or it can be registered when a person leaves the home and, if necessary, the location can be forwarded to a stored care services or to relatives (Kunze, 2018; Daum, 2017).

- Robotic systems are also likely to have an increasing influence in the area of care. Here, for example, telepresence robots offer opportunities for flexible assistance from caregivers or relatives, or to receive medical care such as video consultation (Klein et al., 2018). For people with mobility restrictions, robotic arms can provide increased autonomy from other people's help (Klein & Baumeister, 2020).

However, there are also dangers of the digital transformation in this field in two major areas in particular: On the one hand, elderly or people with disabilities are likely to be excluded from the progress of the digital transformation and thus, are subject of disadvantage, as everyday applications such as making reservations or buying goods are increasingly shifted to the internet and are therefore more difficult to access for non-users (Pelka, 2018). On the other hand, there is the risk to become a victim of attacks on personal privacy or data or to suffer financial loss due to insufficient digital literacy and limited understanding of technology (Reichstein, 2016).

Reasons for poorer access to information technologies can be a result of a lack of equipment or of technical assistance systems for the use of devices, which can be caused by limited financial resources or also by skepticism on the part of social institutions towards technical innovations in the sense of a protective/patrimonial attitude towards persons with disabilities (Mayerle, 2015). If appropriate devices are available, a lack of application know-how and the limited availability of accessible services, for example in plain language, are further hurdles (Reichstein, 2016; Bosse & Haage, 2020).

Impact on Social and Health Care Professions

Digitalization promises the professional groups opportunities to save time in their stressful everyday work and to reduce physical strain, for example through electronic documentation systems with mobile devices and technical assistance systems (Daum, 2017). Additionally, avoiding an early exit from work by providing support for physically or mentally difficult tasks can be a measure against the increasing shortage of skilled workers in the health and social care sector (BMAS, 2017). In the near future, this could be achieved through transport robots, exoskeletons to assist with heavy lifting, intelligent lifts that move to the bedside and sensor systems that can detect irregularities in the activity or range of motion of patients or clients (Daum, 2017).

Towards their clients and patients, the professional groups in the health and social care sector are increasingly taking on the role of advisors with regard to new technologies, which requires special competences in education and training (Kuhn et al., 2019). Nurses and therapists need to be able to competently guide the use of software and hardware, but also to identify potentials and risks, which require a basic technical understanding of the technologies. For example, these can be sensor systems in nursing care, rehabilitation robotics in physiotherapy or communication apps in speech therapy.

In the pedagogical field, media education has to be provided for people with little knowledge of information technologies. Therefore, several skills are necessary in order to educate these people about the potentials and dangers of using apps and communication services on the internet, and thus protect them from financial damage and abuse of personal privacy. In addition to technical and

social media skills, knowledge of relevant ethical aspects and data protection as well as the ability to communicate the opportunities and risks of these developments will be needed (Reichstein, 2016; Mayerle 2019). Social work and education sciences, as well as welfare providers, are addressed here to present corresponding concepts and offers (Pelka, 2018; Vilain & Kirchhoff-Kestel, 2018).

Implementation of Digital and Technical Skills

Nursing, therapeutic or educational professions are – at least in Germany – often said to have a low affinity for technology per se and a low level of enthusiasm for new media (Rösler et al., 2018; Najemnik & Zorn, 2016; Ritterfeld & Hastall, 2017). But contrary to this popular opinion, many studies showed a general open-mindedness towards various new technologies (Claßen et al., 2010; Merda et al., 2017; Bräutigam et al., 2017; Rösler et al., 2018). However, this presupposes that technology is not perceived as an instrument of performance control and effectiveness increase and as a reduction of the contact to the person concerned, but as an added value in the quality of care. Additionally, it could also be seen that technologies were evaluated more positively if they were known and could be used properly (Merda et al., 2017).

On the other hand, large gaps in education and training are described (Rößler et al., 2018) and low involvement of the professional user group in the development of digital technologies as well as in the introduction and evaluation at the workplace is criticised (Bräutigam et al., 2017).

To address the issues of low qualification and involvement, several initiatives towards the implementation of ICT knowledge for health and social care staff have been established and competences and skills were specified (Brunner et al., 2018; Hübner

et al., 2017). Within the international TIGER initiative (Technology Informatics Guiding Education Reform) and under the umbrella of the EU Horizon 2020 project ‘EU*US eHealth Work’ the *International Recommendation Framework of Core Competencies in Health Informatics 2.0* was developed (Hübner et al., 2019). The HITComp Database (hit-comp.org), which was a part of the project, now defines more than 1,000 competences for different professional roles in the health sector.

Many universities have started to implement degree programs on ICT for health and social care professionals at Bachelor or Master level. One example is the Master’s degree “Inclusive Design (ID) – Digital Health and Case Management” at Frankfurt University of Applied Sciences which is an interdisciplinary program together with the two other fields “ID – Inclusive Architecture” and “ID – intelligent systems” (Frankfurt UAS, n.d.). To a lesser extent, this seems to be the case for vocational trainings for people already working in their job.

The Project DDSkills

To address the issue of low qualification measures in the field of digital technologies in the health and social care sector, the European research project DDSkills¹ was formed by a consortium of 12 partners from 7 EU countries (table 1).

Need for Qualification

To gain an insight into the needs of health and social care staff in Europe concerning specific technologies, the partners of the Erasmus+ project DDSkills, conducted a web research on the offer of qualification courses in their countries (Cyprus, Germany, Greece, Ireland, Italy and Lithuania) and asked health care professionals for their opinion.

Web Research for Training Courses

The web research was carried out in six countries: Greece, Lithuania, Ireland, Germany, Italy and Cyprus) (FSL, 2020). The following keywords were selected for the research:

¹ DDSkills – Cutting-Edge Digital Skills for Professional Caregivers of Persons with Disabilities and Mental Health Problems, funded by the European Union’s Erasmus+ Programme (Grant: 612655-EPP-1-2019-1-EL-EPPKA2-SSA), 2020-2022

Country	Partner
Greece	<ul style="list-style-type: none"> • Sillogos goneon ke kidemonon atomon me anapiria TO ERGASTIRI • THEOFANIS ALEXANDRIDIS KAI SIA EE (OMEGATECH) • SenseWorks LTD
Ireland	<ul style="list-style-type: none"> • National University of Ireland Galway (NUIG)
Germany	<ul style="list-style-type: none"> • Frankfurt University of Applied Sciences (Frankfurt UAS)
Italy	<ul style="list-style-type: none"> • Fondazione Santa Lucia (FSL) • TANDEM SOCIETA COOPERATIVA SOCIALE INTEGRATA (TANDEM)
Lithuania	<ul style="list-style-type: none"> • Jaunuoliu dienos centras (JDC)
Cyprus	<ul style="list-style-type: none"> • M.M.C Management Center Limited (MMC) • Cyprus Certification Company (CCC)
Belgium	<ul style="list-style-type: none"> • European Association of Service providers for Persons with Disabilities (EASPD) • Federation of European Social Employers (Social Employers)

Table 1: DDSkills Partners (authors figure)

- Digital skills (topics): Robotics, Virtual Reality (VR) / Augmented Reality (AR), Smart Home, Ambient Assisted Living (AAL), eHealth, Assistive Technology / Devices (AT), Augmentative and Alternative Communication (AAC), Brain-Computer Interface (BCI), Telemedicine, Sensors
- Professionals (multidisciplinary team): Occupational Therapists, Psychologists, Social Workers, Nurses, Special Education Teachers, Gerontologists, Physical Therapists, Curative Educators, Speech and Language Therapists
- Population (persons in need): Intellectual Disability, Cognitive Disability, Mental Health Disorders, Old Aged, Functional Loss, Motor Disability

The web research took place in spring 2020, before the Covid19 pandemic, so it was not influenced by course cancellations.

The research resulted in 91 courses in the named six countries, with 25 courses in Germany, 20 courses in Ireland, 19 in Cyprus, 18 in Italy, 9 in Greece and no courses in Lithuania. 52 courses were offered in face to face modality, 32 were online courses, and 8 courses were offered in blended learning, which means a mixture of online- and face-to-face parts. Most courses were on the topic of Assistive Technology (30%), which is a broad topic containing multiple subtopics, followed by Telemedicine and eHealth (15% each), Augmentative and Alternative Communication (11%), Ambient Assisted Living (7%), Smart Home (7%), Virtual & Augmented Reality (6%) and courses in other areas. Courses on emerging fields such as robotics and BCI were hardly available. VR and AR courses could not be found in Germany and Italy.

The courses addressed all professions, but especially therapists and nurses. Course contents – when specified – mainly focused on people with motor

disability, functional loss (mobility, communication, self-care), people with intellectual and cognitive disabilities, and elderly people (FSL, 2020).

Focus Groups / Survey with Professionals

To understand the current situation regarding digitalization and the need for qualification, focus groups were planned in all the participating countries. Due to the beginning of the Covid19 pandemic, they had to be conducted as written only survey in some countries (Italy, Germany, Lithuania, Cyprus) and as online focus groups in others (Ireland, Greece).

68 professionals from different fields such as nursing and geriatric care, neurorehabilitation, special education for children with disabilities, social care work, or rehabilitation took part (FSL, 2020). The number of participants was not representative, but meant to give some insights into current practice.

The results can be summarized as follows: Asked for technology the participants use, almost all of the participants said they used digital devices such as a PC or tablet at work. Low-tech Assistive Technology (switches, joysticks, motorised wheelchairs; remark: mid-tech AT was included here) and Assistive Technology software (mobile Apps, Augmentative and Alternative Communication software) was also common. The least used technologies were Virtual and Augmented Reality, robotics, Smart Home technology, Ambient Assisted Living (AAL) technology, and Brain-Computer-Interface. Regarding professional trainings, 60% reported not to attend regular courses (no training per year). Reasons were the lack of interesting courses, followed by the lack of time and expansive costs. Nevertheless, all participants agreed that digital and technology skills should be taught in their workplace because it would offer them additional and



Figure 1: Not very common yet: The telepresence robot TEMI and the small companion robot NAO (M. Weiland)

better options for their job (76%). More than half of the participants (56%) also specified that better digital skills would speed up their daily activities. When asked which technology would be most effective for their job or which one they would like to learn, the participants listed in order of preference: Digital devices, AT software, VR/AR, robotics, low tech AT devices, high tech AT devices, and Brain-Computer-Interface.

When asked about their preferred modality, most people chose preferred a blended-learning approach. Improving practical skills was expressed to be the prior goal of training, followed by general knowledge about existing digital tools and theoretical notions (FSL, 2020).



Figure 2: Person wearing VR glasses (M. Schmidt)

MOOCS on Digital Technologies

A recent trend for self-learning are so called MOOCs (Massive Open Online Courses). These are free video-based online courses, which are worldwide available for asynchronous learning on online platforms. The courses are often offered by universities or experts on specific fields, most students attending them have an academic background (Baturay, 2015).

In spring 2020, 15 courses on relevant skills could be identified by the DDSkills project partners on nine platforms: Coursera, edX, FutureLearn, Udemy, UrAbility, HomeMentors.com, Springboard courses, OnlineTherapyInstitute and AAC Institute. The courses were all in English and covered the topics Virtual Reality (3 courses), robotics (3), smart home (1), eHealth (1), Assistive Technology (1), AAC (1), BCI (1), and Artificial Intelligence (1) (FSL, 2020). None of the courses apparently linked multiple technologies.

The DDSkills Curriculum

The project DDSkills aims to develop a certified training course for professional caregivers to teach them competences and skills in new technologies and services.

Field of new technology:	
Assistive Technologies and Aids	Starting with an overview and explanations of terms and concepts, devices and applications for people with specific disabilities are presented and related concepts such as Digital Health are described. Furthermore, additional factors to improve acceptance and usability are addressed.
Smart Home	The technology behind building automation and smart devices is explained and specific applications are presented which can support people in old age or with disabilities to stay safe and healthy in their home.
Robotics	Information on three areas of application of robotic systems are given: rehabilitation, robotics to support caregivers and other staff and robotics for support at home. Advantages and possible issues are addressed.
Virtual and Augmented Reality	Skills training with VR and AR is presented and research evidence and recommendations for providing a supportive and beneficial learning experience for individuals with Autism Spectrum Disorder and Intellectual Disabilities are outlined.
Brain-Computer-Interface (BCI)	Brain-computer interfaces (BCIs) is described as a possibility to intentionally modulate brain activity, to train specific brain functions, and to control prosthetic devices, so that lost functions such as communication and control of the external environment can be enabled in persons with severe diseases and motor impairment

Table 2: Digital Technologies covered in the DDSkills Curriculum (authors figure)

Content of the Curriculum

The topics in the curriculum will be varied, covering the broad field of Assistive Technologies, explaining smart home technologies, describing robotics in health and social care and skills training with VR and AR as well as explaining Brain-Computer-Interface (descriptions in table 2).

Additionally, application knowledge and methods (Social network development, Therapeutic Role Playing) will be provided to bring technologies into practice. Aspects such as ethical considerations, self-advocacy and acceptance as well as ecological sustainability issues are also included to promote decision-making in caregivers working with people with disabilities and mental health problems.

Professionals addressed are especially occupational therapists, psychologists, social workers, special education teachers, nurses, gerontologists, and rehabilitation experts. The developed course curricula, contents, methods, and tools will be evaluated in piloting trainings with members of different professional groups from six countries (Cyprus, Germany, Greece, Ireland, Italy, Lithuania).

Structure of the DDSkills Course

Attending professionals will be able to complete the course in two ways as described in figure 1. Pathway 1 will be the face-to-face approach with the handbook for self-directed learning and classroom teaching. Pathway 2 is an asynchronous approach with also the handbook for self-directed learning

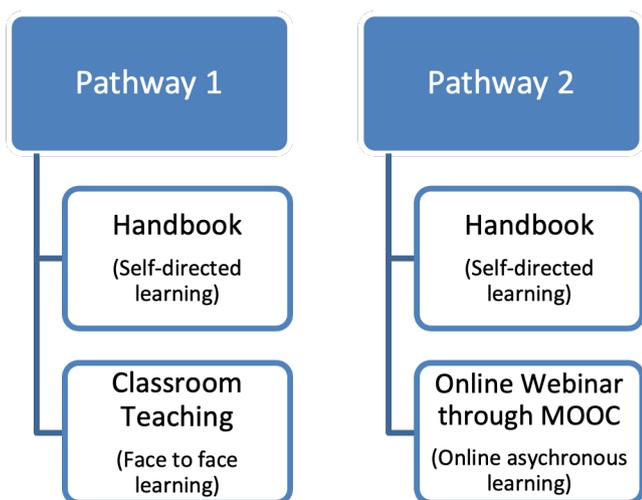


Figure 3: The two learning pathways of the DDSkills qualification approach (DDSkills Course Plan, 2021)

and an online webinar in the form of a MOOC. A final assessment consisting of multiple choice questions has to be passed to receive a certificate.

Furthermore, a toolkit will be provided to facilitate practical learning in the face to face condition. The toolkit will contain:

- A VR application offering social skills training to individuals with autism
- An AR application for people with mental disabilities promoting self-advocacy through role playing
- A telepresence robot that will be connected to a smart home toolkit

The applications will be open-source so that anyone with corresponding hardware can use them in self-directed learning as well. They will be for Android as well as for iOS.

Qualification

The course will contain 180 hours of learning material and will provide ECVET points (European Credit system for Vocational Education and Training, European Commission, n.d.) with the certificate.

The qualification will refer to EQF level 5, within the European Qualification Framework (EQF), “an 8-level learning outcomes-based framework for all

types of qualifications that serves as a translation tool between different national qualifications frameworks” (Europass European Union, n.d.)

Perspectives

During the Covid19 pandemic many organizations, institutions, and companies started to produce webinars on topics of new digital technologies for people with disabilities or of old age, because conferences, further education trainings and fairs could not take place. Through to these, knowledge about new technologies was spread on an international level and new innovations were made more known. However, these webinars are often in English language and it is more than questionable whether relevant professional groups, especially from non-academic professions and in direct patient care, are reached.

As experiences from the partner countries of the DDSkills project showed, many digital technologies are not well known within the profession groups and are not common in institutions. Therefore, there is often no reason for the employees to attend further training in this area. However, this in turn means that products that are already on the market do not reach the people who can benefit from them, and moreover, that technologies are then not further developed to meet the needs of these people and the professionals.

This “vicious circle” can be interrupted by organizations that put digitalisation on their agenda and enable their employees to become familiar with new technologies. The DDSkills curricula will offer opportunities to become acquainted with digital technologies in the field of health and social care and to be able to develop perspectives for people with disabilities, in old age or with chronic diseases.

References:

- Baturay, M. H. (2015): An Overview of the World of MOOCs. *Procedia- Social and Behavioral Sciences*, 174, 427-433. <https://doi.org/10.1016/j.sbspro.2015.01.685>
- Bräutigam, C., Enste, P., Evans, M., Hilbert, J., Merkel, S. & Öz, F. (2017): Digitalisierung im Krankenhaus. Mehr Technik – bessere Arbeit? Hans Böckler Stiftung, Nr. 364. Accessible online: https://www.boeckler.de/pdf/p_study_hbs_364.pdf. (05.08.2021).
- Bosse, I.K. & Haage, A. (2020): Digitalisierung in der Behindertenhilfe. In: Kutscher, N., Ley, T., Seelmeyer, U., Siller, F., Tillmann, A. & Zorn, I. (Ed.): *Handbuch Soziale Arbeit und Digitalisierung*. Weinheim: Beltz Juventa, 529-539
- Brunner, M., McGregor, D., Keep, M., Janssen, A., Spallek, H., Quinn, D., (...) & Shaw, T. (2018): An eHealth Capabilities Framework for Graduates and Health Professionals: Mixed-Methods Study. *Journal of Medical Internet Research*, 20 (5): e10229. <https://doi.org/10.2196/10229>
- Bundesministerium für Arbeit und Soziales (BMAS), Abteilung Grundsatzfragen des Sozialstaats, der Arbeitswelt und der sozialen Marktwirtschaft (2017): *Weißbuch Arbeiten 4.0*. Accessible online: https://www.bmas.de/SharedDocs/Downloads/DE/Publikationen/a883-weissbuch.pdf;jsessionid=06F70E0C1B2D4C67F5FA4489520AC728.delivery1-replication?__blob=publicationFile&v=1. (05.08.2021).
- Claßen, K., Oswald, F., Wahl, H.-W., Heusel, C., Antfang, P. & Becker, C. (2010): Bewertung neuerer Technologien durch Bewohner und Pflegemitarbeiter im institutionellen Kontext. *Zeitschrift für Gerontologie und Geriatrie*, 43 (4), 210-218. <https://doi.org/10.1007/s00391-010-0126-5>
- Daum, M. (2017): Digitalisierung und Technisierung der Pflege in Deutschland. Aktuelle Trends und ihre Folgewirkungen auf Arbeitsorganisation, Beschäftigung und Qualifizierung. Hamburg: DAA-Stiftung Bildung und Beruf. Accessible online: https://www.daa-stiftung.de/fileadmin/user_upload/digitalisierung_und_technisierung_der_pflege_2.pdf. (05.08.2021).
- DDSkills – Cutting-edge Digital Skills for Professional Caregivers of Persons with Disabilities and Mental Health Problems (2021): Course plan DDSkills. EQF Level 5. [unpublished].
- European Commission (n.d.): The European Credit system for Vocational Education and Training (ECVET). https://ec.europa.eu/education/resources-and-tools/the-european-credit-system-for-vocational-education-and-training-ecvet_en. (05.08.2021).
- Europass European Union (n.d.): The European Qualifications Framework. <https://europa.eu/europass/en/european-qualifications-framework-efq>. (05.08.2021).
- Fondazione Santa Lucia (2020). WP3: Study on existing courses offered in the Health and Social Care Sector. Deliverable within the project DDSkills – Cutting-Edge Digital Skills for Professional Caregivers of Persons with Disabilities and Mental Health Problems. http://www.ddskills.eu/Portals/0/D3_1_final%20version_10_07_20.pdf. (05.08.2021).
- Frankfurt UAS (2021): Inclusive Design (ID). <https://www.frankfurt-university.de/de/studium/master-studiengange/inclusive-design-id-msc/>. (05.08.2021).
- Hübner, U., Egbert, N., Hackl, W., Lysser, M., Schulte, G., (...) & Ammenwerth, E. (2017): Welche Kernkompetenzen in Pflegeinformatik benötigen

Angehörige von Pflegeberufen in den D-A-CH-Ländern? Eine Empfehlung der GMDS, der ÖGPI und der IGPI. *GMS Medizinische Informatik, Biometrie und Epidemiologie*, 13 (1), 1-9

Hübner, U. (2019): Bedarf an Kernkompetenzen für digitale Technik in der professionellen Pflege. In: *ZQP-Report. Pflege und digitale Technik*, 68-75. Accessible online: <https://www.zqp.de/wp-content/uploads/ZQP-Report-Technik-Pflege.pdf>. (05.08.2021).

Klein B. & Baumeister A. (2020): Robotische Assistenz bei den Aktivitäten des täglichen Lebens am Beispiel der Nahrungsaufnahme. In: *Zeitschrift für Gerontologie und Geriatrie*, 53 (7), 615-619. <https://doi.org/10.1007/s00391-020-01785-4>

Klein, B. & Oswald, F. (2020): Möglichkeiten und Herausforderungen der Implementierung von Technologien im Alltag von älteren Menschen. Expertise zum Achten Altersbericht der Bundesregierung. C. Hagen, C. Endter & F. Berner (Ed.). Berlin: Deutsches Zentrum für Altersfragen. <https://doi.org/10.13140/RG.2.2.11502.23363>

Klein, B., Graf, B., Schlömer, I.F., Roßberg, H., Röhrich, K., Baumgarten, S., Stiftung Münch (Ed.) (2018): *Robotik in der Gesundheitswirtschaft*. Heidelberg: medhochzwei Verlag.

Kreidenweis, H. (2018): Digitalisierung ändert nichts – außer alles. Chancen und Risiken für Einrichtungen der Behindertenhilfe. *Teilhabe*, 57 (3), 122-125

Kuhn, S., Ammann, D., Cichon, I., Ehlers, J., Gutormsen, S., Hüsken-Giesler, (...) & Wilbacher, I. (2019): *Careum Working Paper 8 – long version: Wie revolutioniert die digitale Zukunft die Bildung der Berufe im Gesundheitswesen?* Accessible online: <https://www.careum.ch/documents/20181/75972/Careum+Working+Paper+8+%28deutsch%29.pdf>. (05.08.2021).

Kunze, C. (2018): Technische Assistenzsysteme in der Sozialwirtschaft – aus der Forschung in die digitale Praxis? In: Kreidenweis, H. (Ed.). *Digitaler Wandel in der Sozialwirtschaft. Grundlagen – Strategien – Praxis*. Baden-Baden: Nomos, 163- 178

Mayerle, M. (2015): „Woher hat er die Idee?“ Selbstbestimmte Teilhabe von Menschen mit Lernschwierigkeiten durch Mediennutzung (Abschlussbericht der Begleitforschung im PIKSL-Labor). Siegen: universi. Accessible online: https://dspace.uni-siegen.de/bitstream/ubsi/948/1/Michael_Mayerle.pdf. (05.08.2021).

Mayerle, M. (2019): Berufsfeld Tagesförderung/Wohneinrichtungen. In: Bosse, I., Schluchter, J.-R. & Zorn, I. (Ed.). *Handbuch Inklusion und Medienbildung*. Weinheim/Basel: Beltz Juventa, 170-180

Meisen, T. & Vieritz, H. (2019): Rehabilitation 4.0: Chancen und Herausforderungen der digitalen Transformation in den Rehabilitationswissenschaften. In: Pfannstiel, M.A., Da-Cruz, P. & Mehlich, H. (Hrsg.). *Digitale Transformation von Dienstleistungen im Gesundheitswesen V. Impulse für die Rehabilitation*. Wiesbaden: Gabler, 3-21

Merda, M., Schmidt, K., Kähler, B. (2017): *Pflege 4.0 – Einsatz moderner Technologien aus der Sicht professionell Pflegender* (Forschungsbericht). Hamburg: Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW). Accessible online: https://www.bgw-online.de/SharedDocs/Downloads/DE/Medientypen/BGW%20Broschueren/BGW09-14-002-Pflege-4-0-Einsatz-moderner-Technologien_Download.pdf?__blob=publication-file. (05.08.2021).

Najemnik, N. & Zorn, I. (2016): Digitale Teilhabe statt Doing Disability: Assistive Technologien für inklusive Medienbildung im Kindergarten. In: Mayr, H.C. & Pinzger, M. (Ed.): *Informatik 2016*. Bonn: Gesellschaft für Informatik e.V., 1087-1096

Pelka, B. (2018): Digitale Teilhabe: Aufgaben der Verbände und Einrichtungen der Wohlfahrtspflege. In: Kreidenweis, H. (Ed.). Digitaler Wandel in der Sozialwirtschaft. Grundlagen – Strategien – Praxis. Baden-Baden: Nomos, 57-78

Reichstein, M. F. (2016): Teilhabe an der digitalen Gesellschaft? Über (vorgelagerte) Barrieren bei/in der Nutzung digitaler Medien durch Menschen mit einer sogenannten geistigen Behinderung. Teilhabe, 55, 80-85

Ritterfeld & Hastall (2017): Begrifflichkeiten, Systematik, Akzeptanzfaktoren und Innovationen. In: Bilda, K., Mühlhaus, J. & Ritterfeld, U. (Ed.): Neue Technologien in der Sprachtherapie. Stuttgart: Georg Thieme Verlag, 35-43

Rösler, U., Schmidt, K., Merda, M. & Melzer, M. (2018): Digitalisierung in der Pflege. Wie intelligente Technologien die Arbeit professionell Pflegenden verändern. Berlin: Geschäftsstelle der Initiative Neue Qualität der Arbeit. Bundesanstalt für Arbeitsschutz und Arbeitsmedizin. Accessible online: <https://www.fachportal-paedagogik.de/literatur/vollanzeige.html?Fid=1163029>. (05.08.2021).

Vilain, M. & Kirchhoff-Kestel, S. (2018): Digitale Herausforderungen in der Freien Wohlfahrtspflege. Verbands-Management, 44 (2), 20-30