

Author(s) (2020): ECSCW 2020 Exploratory Papers Instructions. In: Proceedings of the 18th European Conference on Computer-Supported Cooperative Work: The International Venue on Practice-centred Computing on the Design of Cooperation Technologies - Exploratory Papers, Reports of the European Society for Socially Embedded Technologies (ISSN XXX-XXXX), DOI: 10.18420/ecscw2019-to-be-added

Envisioning Social Assistive Robotics in Long-term Care Settings: Insights and Challenges arising within a PRAXLAB

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Abstract. In this work, we report our early insights from a three-years research project “ROBUST” that is focussed on designing and implementing social assistive robotics in care-settings to promote health prevention, foster activity for care-residents and support workflows for professional caregivers. In ROBUST we adapted the PRAXLAB methodology as holistic, human-centred long-term co-design research infrastructures in real-life environments (four care-facilities) and, therefore, involved actors to identify the existing practices and the associated challenges.

Introduction

Physical activity and mental activity have multiple positive health effects on diseases and limitations, which increase with age (Reiner et al., 2013). However, at the same time physical activity declines - especially with increasing age. As a

result, regular physical activity is particularly crucial for promoting individual mobility, social interaction, quality of life, and life satisfaction (Kümpers & Alisch, 2018; Becker et al., 2018; Cirkel & Juchelka 2009). While the need for professional and institutional care is increasing, the number of qualified professional caregivers is declining (Rothgang et al., 2012). In line with broader developments, digitalization in the healthcare sector is progressing exponentially (Bhavnani et al., 2016). Governments and society-at-large have a pressing interest in innovative concepts and solutions that can support professional care activities and the independence of people in need of care. Information and communication technologies (ICT) have the potential to deliver such support. A crucial factor in this process is about successful appropriation of new technologies, which is often determined by an early involvement of people's personal and inter-personal needs and their expectations.

ROBUST: Objectives and methodological approach

The objectives in Robust are focused on two main subjects: the individual behavior of the residents and the circumstances in the care facilities. Activating and health-promoting robotic-based group trainings for residents will be developed and implemented in the daily routine of the care facility.

Within the framework of "Robust" we conceptualized our PRAXLAB as a research infrastructure where technologies can be introduced, tested, co-developed, and modified in a user-centred and participative way to shape technology design over the long term. We decided to use this praxeological approach to develop ICT-based systems founded directly on practical impressions, experiences and emotions from care-residents and professionals and their social care networks. This work is part of a three-year interdisciplinary research project that involves three different research phases: (1) develop an understanding of people's experiences, needs, and expectations, to (2) iteratively design, evaluate and re-design the prototype, and (3) to assess in a multi-centred evaluation study how participants and caregivers used our system. We established the research infrastructure for long-term user involvement in 4 care facilities with 415 residents. For the establishment and implementation of the PRAXLABS framework in the care facilities, several part-time positions are created, which are financed by the project "ROBUST" and in the following referred as "PRAXLAB practitioner". These PRAXLAB practitioner ensure a continuous evaluation of the robotic system in the real-life environment of the care facility (cf. Meurer et al., 2021). This research and development project for health prevention is supported by a German umbrella association of several health insurances called "Verband der Ersatzkassen e.V. (vdek)" and takes place in a network of several partners.

RESEARCH: Approach and Methods in Robust

Emerging from a meta-comparison of different projects in the Living Lab tradition, Ogonowski et al. (2018) developed the infrastructural, analytical, and methodological 'PRAXLABS framework.' The framework comprises four essential spaces: the user space, creative space, methodological space, and management space. In the following, we describe our activities to set up and maintain our Lab, using the four spaces of the PRAXLABS framework.

FINDINGS: Preliminary Insights

In the following, we focus on early Lab work insights, enriching them with statements from a first group discussion of the PRAXLAB practitioners which allows us to convey our participants' perspectives. From four PRAXLAB practitioners, three were able to participate in the group discussion, the other one was unable to join due to a covid-19 outbreak at the inpatient care facility. We again refer to the PRAXLABS frameworks dimensions, this time using it as an analytical hook.

Creative and Management Space: Regular Meetings and Mutual Exchange

The PRAXLAB practitioner in ROBUST are co-responsible for the conception and implementation of the human-robotic-based interventions for the residents and the day-to-day operation of the PRAXLABS in the care facilities. This is done in continuous dialog with the employees and other specialists (e.g. physiotherapists, occupational therapists, etc.), considering the actual needs and abilities of the residents. The members of the PRAXLAB will supervise and observe the regular use of the robotic system "Pepper" in the everyday life of the care facility.

According to Ogonowski et al. (2018) a constant and reliable contact person for questions, problems, suggestions and further feedback of the residents and professionals is helpful to implement a PRAXLAB. During "Robust" this function is carried out by the PRAXLAB practitioners in the care facilities, who in a bridging function pass on the suggestions from residents and co-workers to the responsible positions from research and development and vice versa. In addition, the researchers regularly visit the care facilities for technical and research related support. The researchers also function as contact persons - specially to support the PRAXLAB positions. Daily virtual meetings of PRAXLAB practitioners and the responsible staff members from research and development take place for a low-threshold exchange between practice, research and development. In addition,

regular meetings of the other partners from practice, research and development are planned to adequately meet the needs and expectations of the stakeholders.

The three participating members of the PRAXLABs named regular meetings for joint exchange several times as enabling factors. They found it helpful to talk to each other about individual and shared experiences. Due to the geographical situation and because of Covid-19, the meetings mostly took place as video conferences. Two PRAXLAB practitioners highlighted PRAXLAB practitioner a face-to-face meeting, with one staff member visiting at another cooperating inpatient care facility. The PRAXLABS staff members reported, that extensive information about the project contributed to the implementation. They mentioned the importance of reliable and easily accessible contact persons in research and development. Talked to a member of the research group about difficult situations with co-workers in the care homes in association with the robot and described these conversations as supportive.¹ In addition, mutual sympathy among the participating PRAXLAB-members was reported as helpful.

User and Methodological Space: Expectations, Challenges and Information needs

Several of the PRAXLAB positions reported insecurities about their tasks and activities in the context of the PRAXLABS at the beginning. One employee found it difficult that the management of one care-institutions was not sufficiently informed about the project. Therefore, the expectations of the actual possibilities of the human-robotic system are too high and there is a need for further information. Two PRAXLAB practitioners described the interest and commitment of the facility managers in the care facilities as enabling factors. The one employee who was newly hired for “ROBUST” at the care facility found it helpful to go along with staff members to watch their interaction with residents. One PRAXLAB practitioner described that she is pleased to have the opportunity to implement her own ideas in the care facility through the project.

All three participating PRAXLAB practitioner described a hierarchy between nursing and social-assistive care as a potential barrier. Some of the nursing staff members would “smile” at the work of the socio-assistive caregivers. One PRAXLAB position found it difficult that the robot could do “almost nothing” at the beginning. At the same time, there was the idea in the care facility that the robot would be fully operational immediately. According to the employee of the PRAXLABS-position, these expectations would create a field of tension with the actual human-robotic-interventions.

The implementation of a PRAXLAB in the care facilities by a staff member itself provides the opportunity for short and low-threshold feedback to the technical

¹ bias: the member of the research group initiated and hold the group discussion

development. Due to the auto-ethnographic access of the PRAXLAB practitioners, they can gain insights into social practices that cannot be gained by outsiders. The PPRAXLAB practitioners characterized the role of research in their own activities differently. One PPRAXLAB practitioner reported that she is currently engaged in taking ethno-graphic field notes and logging her observations. Another practice position (an original staff member of the social-assistive care) explained that she has not had any previous contact with research in her life, but that she is curious and looking forward to the project. She said her children were proud of her for pursuing such an activity. The third practitioner drew parallels to her everyday work, explaining that she would “always observe during her work and thinking about what it does to the residents”.

DISCUSSION

The fact that one PRAXLAB-member was unable to participate due to a Covid19-outbreak may indicate a characteristic of the work in the care facilities: The care and the well-being of the residents is a priority. If there is due to extraordinary circumstances such as a Covid19-outbreak a conflict of interest the primary research related tasks are temporary neglected to ensure that the residents basic needs are met.

The initial findings about the role of supervisors and co-workers as a potential enabling factor for the implementation of a PRAXLAB in the care facilities are partly undermined by previous findings on conditions in social and health care jobs, where support from supervisors and co-workers contributes significantly to job satisfaction (Webb & Carpenter 2012). The importance of a reliable and constant contact persons from research and development matches with previous experiences from other PRAXLAB based design case studies (Ogonowski et al., 2018).

In the further course of the project “ROBUST”, it will be particularly interesting to see how the PRAXLABS in the care facilities are continued, how they could open a new hybrid space of mutual learning for science and practice.

Acknowledgments

This research and development project for preventive health care for people in inpatient care homes is supported and financed by “Verband der Ersatzkassen e.V. (vdek)”, a german umbrella association of several health insurances called.

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