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Methodological considerations in collaborative processes: A case of ethnographic action research

Abstract

Purpose – This paper explores the role and implications of action research (AR) in collaboration and knowledge production between academia and health practices, in a project on lighting and low-vision rehabilitation.

Design/methodology/approach – This ethnographic inquiry has explored the methodological considerations and actions taken in a project collaboration using a framework of co-productive research approaches and the science- and technology-inspired concept of *staging*.

Findings – Three trajectories of inquiry, a roadmap, a theoretical model and a conceptual drawing, are shown to be important elements in the translation, operationalisation and dissemination of knowledge. Beyond creating an extended network, their trajectories reveal a fine-meshed interrelation within the project group that enables spaces for joint reflection, improvisation and resonance. The elasticity of the AR approach supports several smaller iterative processes that expand the frame of innovation and prepare for implementation across the low-vision rehabilitation community.

Research limitations/implications – This research provides insights into the knowledge production of multiple ontologies and epistemologies that are relevant to both social sciences and health sciences.

Practical implications – The research unfolds otherwise hidden processes and implications of knowledge production.

Social implications – This research enables and informs future collaborations to navigate and manage multiple complex realities.

Originality/value – The study provides unique perspectives of the practice of research collaboration and knowledge production that are useful for both academics and practitioners in many professional contexts.

Keywords – Ethnographic action research, Methods assemblage, Interdisciplinary collaboration, Knowledge construction

Paper type – Research paper

Introduction

In the social sciences, methodology and philosophy are seen as mutually dependent elements; that is, research methods are justified by philosophy, and philosophy is justified by knowledge derived from research methods (Carr, 2007). In this sense, methodology is grounded in *a priori* theoretical knowledge (ibid., p. 422). Moreover, within its own system, these components can constitute a long-lasting and stable relationship. However, the complexity of collaborative research projects involving academics, professional practices and laymen can challenge this stability. Crossing ontological and epistemological frameworks, the initial design does not necessarily fit the scope. The findings of a collaborative project, which was originally based on the philosophy of science and technology studies and anthropological and socio-material understandings, show that the limitations of this framework led to the re-design and incorporation of elements from action research (AR) into the approach.

Following an intervention in low-vision services on lighting in rehabilitation, a collaborative study involving health professionals and a researcher in the field of the built environment was conducted. The intervention was used as a case for investigating current and emerging practices in low-vision rehabilitation and focusing on the role of the physical environment in rehabilitation processes. Actor-network theory (ANT) and certain branches of practice theory overcome the *a priori* division of the social and the technical as well as the human and non-human by identifying and following relevant actors as they occur in the empirical offset. In fact, despite the word “theory” appearing in the name, ANT challenges the fixed role of theory and methodology by being neither a theory that is a conceptual representation framing the world nor a method that is a set of steps to be followed to assess it. ANT is, rather, a theoretical *and* methodological approach: it is a way of engaging in the world to gain ethnomethodological insights into it (Bussular, Burtet and Antonello, 2019). However, as these approaches originate from an anthropological and ethnographical context, the role of the researcher is challenged in the collaborative co-design processes. For example, in ANT studies, methods, theories and the realities they are situated are seen as mutually constitutive (ibid.), yet it is the researcher who identifies and describes the interferences, creations and transformation of the observed field by following actors, primarily withdrawn from the empirical field of study. Even if the research is situated within the empirical context from an insider’s perspective, the analysis is conducted in the processing of the empirical material, representations and thick descriptions, giving voice to those involved but not interacting with them dialogically.

The initial research approach informed by science and technology studies and practice theory was based on an expectation that the empirical inquiries into people’s professional and everyday lives would contribute to a broader understanding of low-vision rehabilitation. However, the collaboration with the situated professional practice turned out to be quite different than expected and challenged the approach. Indeed, how can one study a field that is continuously changing and expect it to change as part of collaboration? How can one make space for collaboration so that each part is acknowledged and so that their knowledge is operationalised and put into action? What knowledge is brought to the table by the researcher, through her practice knowledge and embedded in the tools and materials? Initially, the issue of co-design seemed to call for design thinking and iterative processes of testing and retesting; however, in this case, the collaborative research was not directly involved in the design of the lighting assessment despite being associated, in an adjacent project, with the objective of assessing, describing and informing the practice of low-vision rehabilitation. This is why AR soon became an important element in the project.

Compared to the framework and approaches of the medical sciences in low-vision rehabilitation or the natural sciences in lighting, the social-science branches of anthropology, AR and even design thinking might seem identical. However, nuances appear when working with them. The different approaches as well as their concepts and frameworks have an impact on what is made visible and accessible in the field of operation and what openings can be created. This process of making things real as well as pooling and using existing and new knowledge is often scaffolded. The development process of pooling knowledge resources for “the relative existence of an outcome” is directed by tacit foreknowledge of accumulated experience with problem-solving and it is made resourceful by competently mobilising and utilising it in the new context (Kreiner, 2002). Kreiner argues that to handle tacit knowledge as a constructive object of management, we need more tacit ways of managing.

John Law (2004) argues that the traditional academic methods of inquiry in the social sciences do not capture the complex, diffuse and messy nature of reality. He challenges the conventional understandings of knowledge and the norms found in discourses on method. He introduces method assemblages and encourages cognitive knowledge to be supplemented with embodied and emotive knowledge. He also suggests that methods should be adapted to allow studies of the ephemeral, indefinite and irregular. This calls for the exploration of situated and engaging inquiries of knowledge in slow and uncertain methodological processes where multiple realities of flux are made stable momentarily.

The research purpose of this paper is to explore the collaborative processes, including the role of AR in co-creation and management of knowledge. Frameworks from AR literature is used to identify, map and describe the more tacit ways of managing that have been revealed in the empirical material from the project collaboration. The paper is structured as follows: it first highlights the AR theory relevant to methodology of and approach to project collaboration. Then the collaborative research study is described in a case description and the methods and materials are presented in the methodology section. This is followed by a findings section and finally the discussion and conclusion is provided.

Theory

In response to the scientific objectivity of the evidence-driven and practice-distancing positivism that followed Second World War, AR has sought to bridge the gap between research and praxis and its “usefulness, practical outcomes and transformative change” have been widely acknowledged (Lindhult and Axelsson, 2021). AR can support stakeholder involvement but also facilitate the co-creation of knowledge, evaluate and guide professional practices and support change and innovation processes (Svejvig *et al.*, 2021). As a useful meta-methodology AR can enable rehabilitation professionals to better understand their collaborative problem-solving processes and develop and improve service design and delivery (Kiener and Koch, 2009). Facilitating collaborations in dynamic and changing contexts where scope and interest are split between the swampy “lowlands” of project management and the “high-ground” of academia also implies a sharing of the power of knowledge production (Smith, 2021).

An AR project works in cycles: in addition to a major cycle with distinct phases, smaller cycles of action and reflection, as well as cycles of knowledge and theory generation (Coghlan and Shani, 2018). Close inquiry within the empirical field provides unique possibilities to theoretically validate findings, thereby improving the research’s rigour and relevance (Smith, 2021). Innovative projects offer valuable opportunities to investigate collaborative problem-solving processes, where project scholars have sought to address issues as complexity, value creation, conceptualisation and social processes, especially within open-ended, dynamic AR inquiries such as multidisciplinary projects with multiple and changing purposes (Winter *et al.* 2006). Recently, project studies have been occupied with the dynamic and multifaceted nature of projects situated in multiple contexts and engaging multiple forms of knowledge (Gerald and Söderlund, 2016) demonstrated within social processes with a technical core or in processual studies that consider multiple interests and interpretations of value, negotiations and failures or successes. An ethnographic AR methodology supports even closer inquiries into practices and technologies. Hartmann *et al.* (2008) demonstrate how ethnographic action researchers seek to understand how people act, think and feel to customise technology to fit the project team’s culture. This involves paying close attention to the local routines, work, language and artefacts used to create, exchange and communicate information, further informing processes of problem identification, development and implementation.

AR inquiries can be divided into first, second and third person, or individual, group and systemic levels, and ideally engage all levels (Chandler and Torbert, 2003; Burns, 2007). Touching upon some of the important social aspects of collaboration within larger systems, Burns introduces methods of improvisation, parallel development and resonance. Improvisations are social openings or spaces of opportunity which emerges “because one thing leads to another, and people join in with the action that is emerging. It does not wait for formal legitimisation or permission to proceed...” (ibid. p. 53). Parallel development is an important alternative to consensus, whereby multiple storylines give rise to multiple possibilities for action and sometimes re-enforce them. Resonance enables sense-making and change; people are energised and motivated by

experiencing interconnectedness and AR facilitators can design spaces to test resonance via events or narratives.

The concept of staging emerged as a research theme within studies of collaborative design and innovation inspired by participatory design and science and technology studies (Clausen *et al.*, 2020) and is a conceptualisation of the dynamic performance of multiple actors and the processes they plan, situate, shape and enact. The dynamic character of staging embeds an “overt and strategic effort”, in which sense-making is an important aspect of navigating the overall process of human and non-human actors; performances, concepts and material artefacts act as sensitising devices “that allow for navigational considerations” in the development of networks and relations (Dorland and Vinck, 2020, p. 7). Emergent openings that allow temporary events and spaces for experimentation and innovation can be enabled by living labs, workshops, design games, mock-ups, prototypes, diagrams, specifications, contracts, statutes, videos, reports and action plans (Dorland and Vinck, 2020). The processes and management in such collaborative projects are often rendered invisible when the project ends and the tacit practice knowledge in project collaboration remains implicit, or at best, embedded within the stakeholders. Both research and practice comprise significant hidden work, which is recognised in the notion of frontstage and backstage activities (Pedersen and Brodersen, 2020): frontstage activities are single events such as workshops and conferences, and backstage activities are the planning, negotiation and preparation that support these activities. In a participatory design process, objects circulated between the backstage and frontstage can act as intermediaries between different contexts and user groups. A sketch in a design process is one such circulating object that can be important in both conceptualisation and learning processes. The sketch can be seen as an externalisation that relieve and support cognitive processes through construction and deconstruction in sequential processes (Newell and Simon, 1972). It can enable perceptual re-interpretations, moving a point of view by connecting different types of knowledge (Schon and Wiggins, 1992), acting as a *modus operandi* for the focus shifts that are crucial for constructive processing (Hmelo-Silver and Barrows, 2006) and working as a didactic grip, connecting action and perception (Bruner 2004).

Burns (2007) argues that AR should be seen as an approach to inquiry that supports many methods to generate insight. On one hand, the contextualised and holistic focus of multiple perspectives allows engagement with more complex problems and on the other hand, AR should ideally contribute to these external contexts by informing and implicating them in return (Coghlan and Shani, 2018). To support the need to balance action and research and to work with distributed, varied, mutual and complementary knowledge, Lindhult and Axelsson (2021) have developed a research methodology framework for co-productive research approaches. In this framework, a research approach is situated in a focal context of stakeholders and their current issues, interests, knowledge and resources. Moreover, the approach is described as a model of four levels. First, a social level of professional practices, practice communities or everyday practices, which are seen as resources to be mobilised as research capacities in co-production. Second, an operative level of research methods, inquiries and fieldwork, with more traditional forms of empirical data collection alongside collaborative knowledge production. Third, a design level of relational and interactional aspects of the approach, such as the positions and roles of the actors and the mode of knowledge production, such as the transformation of existing practice (e.g. by relational models) or the mobilisation and pooling of different expertise and capacities (e.g. by learning models). Forth, a strategic level concern the ontology and epistemology of the approach, as an overall orientation to and understanding of involvement, science and the practical craft of conducting research. As engaging with stakeholders and the focal context will transform the object of study (Fals-Borda, 1979), the strategic level of co-production cannot be built on mere social or positivist logic but must recognise deepened methodological reflection and reflexivity. The intersecting trajectories of reflection and reflexivity across the levels, “tending to disrupt the orderly, analytical structure of the model”, are pivotal to enable interaction, learning and change (Lindhult and Axelsson, 2021, p. 29).

Case description

The postdoc research project *Improving Quality of Life: Development of Evidence-Based Practices for Low Vision Rehabilitation* ran from November 2018 to March 2022. The collaboration with the Center for Special Education, Slagelse (CSU) was structured around a pilot project entitled Better Light Better Living (BLBL) as the main case study and was managed primarily by the researcher, a project group (the researcher and two

visual consultants) and a steering group (the project group, the project leader of CSU and a senior researcher within the field of lighting). As shown in Table 1, the ethnographic AR project (EAR) bridges BLBL and another CSU-initiated project, N-Lited, that focus on implementing the methods further in other low-vision services in Denmark.

	2017				2018				2019				2020				2021				2022				2023			
BLBL (CSU)																												
EAR (AAU+CSU)																												
N-Lited (CSU)																												

Table 1. Overall timeline of BLBL, EAR and N-Lited.

In 2017, the two-year pilot project BLBL, on the use of lighting in low-vision rehabilitation was launched at the Vision Department at CSU. The department provides low-vision services for people with visual impairments and the project aimed to develop and test a new lighting assessment procedure. The project group consisted of two low-vision consultants and a project manager, while an optometrist, a neuropsychologist and a lighting professor constituted an expert group. Knowledge about the role of lighting for visually impaired people had been tacit, individual and experience-based or based on the diagnostic prescriptions of specific lighting levels for different diagnoses. Similarly, lighting assessments were made in the clinic, with the client positioned three metres from a low-vision chart and the low-vision consultant assessing the optimal lighting given the client's visual acuity or in the client's home with the low-vision consultant intuitively testing luminaires or lamps. Both approaches were unstructured and unsystematised. Contrary to the traditional approach, BLBL represented a rehabilitative and recovery-based approach that focused on the client's resilience and motivation to make changes and the close involvement of the client's social and physical context. BLBL included an intervention design (Øien *et al.*, 2021) that combined methods and measures to ensure a systematic procedure comprising three stages: lighting assessment in the home, lighting intervention in the lighting lab and a follow-up, assessing the changes made by the participants based on the recommendations.

As the first round of the intervention showed promising results, efforts were put into mobilising a research project to ensure knowledge translation from the intervention to the community of low-vision services and support the further implementation. Rehabilitation is a healthcare process with extensive scientifically documented effects and outcomes, yet rehabilitative interventions have generally been poorly described (Wade, 2005). Rehabilitation evolved within a medical and positivistic understanding of health, in which "research depends upon methods that minimise bias, increase the likelihood of detecting difference or change and allow generalisation" and which does not acknowledge the nature of the complex processes embedded in an intervention (*ibid.*). A more holistic understanding of rehabilitation has emerged that acknowledges the range and value of different activities and treatments, the diversity of people and their problems and needs and the role of specific contexts, including the theoretical basis embedded in the clinical problem-solving approach. Client-centred approaches aim to support individuals' change and development through their active participation (Juliussen, 2013), client-orientation and involvement (Lund and Hjortbak, 2017), where the physical and social contexts contribute to the rehabilitation process (Imrie and Luck, 2014), in a joint collaborative process (Marselisborg Centret, 2004).

Although rehabilitation science is a rapidly growing field, research findings have generally been slowly implemented in rehabilitation practice (Morris *et al.*, 2020). The scarce, divergent and often contradictory scientific sources available have often been too incomplete to solve the complex problems in practice. Rehabilitation practices involve a range of activities, concerns and workarounds that are neither structured nor evidence-based; these routines and approaches are shared across the community of practice. The insights needed to explore, challenge and improve these practices could be gathered from the rich descriptions of treatments, subjects and physical environments enabled by meta-analyses, technological analyses, practice guides and databases (Dijkers *et al.*, 2012). Moreover, to understand the implementation of research knowledge into rehabilitation practice, well-reported and rigorously designed studies on knowledge translation strategies in rehabilitation are needed. Implementation is a complex process that requires "well-thought,

diverse strategies specific to the scope of practice, knowledge and values” (Jones *et al.*, 2015). While the application of knowledge and how it is accumulated differ by time, place and culture and each profession has unique “disciplinary perspectives” that affect the understanding of problems and their solutions (Imrie and Luck, 2014). The ethnographically designed research project had the objective to assess, describe and help develop the concept for implementation.

Methodology

The empirical material of the project collaboration assessed in this analysis includes materials and field notes from four workshops, 13 steering group meetings and working seminars, in addition to unstructured conversations and correspondence. Transcripts and field notes from semi-structured interviews with the two associated low-vision consultants based on participatory observation in 15 BLBL consultations during home visits and in the lighting lab and 17 follow-up visits in participants’ homes where the recommended changes were implemented, and were also included. Observations of the consultants focussed on their approach and positioning in the intervention, including identification of distributed or tacit knowledge. Visual artefacts that were used and produced within the project, such as concept sketches, models, frameworks and schemes, were mapped. Furthermore, a personal project log, encompassing field notes from the overall project activities including transcriptions of meetings and workshops that had been audio-recorded, reflective notes from the initial processing of these meetings or notes representing more instant reflections. The log also included notes from different stages of conceptualising or theoretical processing, such as ideas for manuscripts, interviews or sketches to be made.

The material was assessed to identify staging efforts, circulated objects and arenas in the collaborative process and aspects of reflection and reflexivity in our work processes as well as researcher’s positions, emergent inquiries and their development and movement throughout the project (See Appendix 1).

In relation to the first-person position, Hall (1996) encourages the action researcher to demonstrate their role in knowledge production as being “constitutive of both the data and the final research product”, reflecting on empirical and analytical choices in reflexive reporting. Autoethnography support inquiries of the first-person position, as a way of assessing a phenomenon through the researcher’s self-awareness and in conversations with others. This type of reflexive reporting is practiced in the personal project log. Furthermore, as autoethnographic synthesis also can be presented in visual narratives (Wall, 2006) the sketches, diagrams and drawings produced, shared and circulated in the research project are also seen as a source to the cognitive processes.

Second-person positions have been assessed in the relation of the researcher and the low-vision consultants, through observation, description, feed-back and shared reflection in workshops and interviews, but also in the processing of the empirical material, presented in vignettes and narratives for conferences or publications. In pooling and synthesising knowledge, “the boundaries between the roles of academic and non-academic actors may become blurred” (Lindhult and Axelsson, 2021, p. 19), with some even holding multiple and overlapping roles. A way of accessing knowledge on how people “think, act and feel” (Hartmann *et al.*, 2008) has been by inviting the interviewees to elaborate in semi-structured narrative interviews (Stokholm *et al.*, 2016). Since this was a method used in the intervention and therefore known to the project group, the mode of conversation was established from early on.

Third-person positions concern engaging in broader public disseminations and discussions (Brydon-Miller and Coghlan, 2018) and the model of co-productive research approaches (Lindhult and Axelsson, 2021) has been used as a framework to map the multiple contexts of the extended project network. The model has been chosen due to its breath of scale: a framework allowing to zoom out on the focal contexts and to zoom in and position the trajectories of the emerging inquiries.

Three of the emergent inquiries are described in the findings, by following the circulated objects and their trajectories across the framework of the model. They are selected as interesting cases as they represent different staging situations and demonstrate different movements in relation to backstage and frontstage, an in relation to the four levels of the co-productive research approach model.

Findings

AR was not defined as a methodological or theoretical framework initially but arose as the collaboration exceeded the traditional ethnographic study. BLBL was an object of research to understand the field of low-vision rehabilitation and simultaneously, the research project aimed to help develop and change the approaches used in this field. This double relationship indicated a dynamic process of collaboration and co-design and, in the first months of the research project, we turned to AR. In an extended method description from January 2019, AR was included as part of an iterative assessment, improvement and testing process in which a series of workshops and working seminars aimed to support and facilitate reflection.

Three of the lengthier collaborative and dynamic processes, road mapping, conceptualisation and operationalisation, were identified by examining the props and representations produced, shared, translated and transformed throughout the project, and are analysed in the following section.

Road mapping

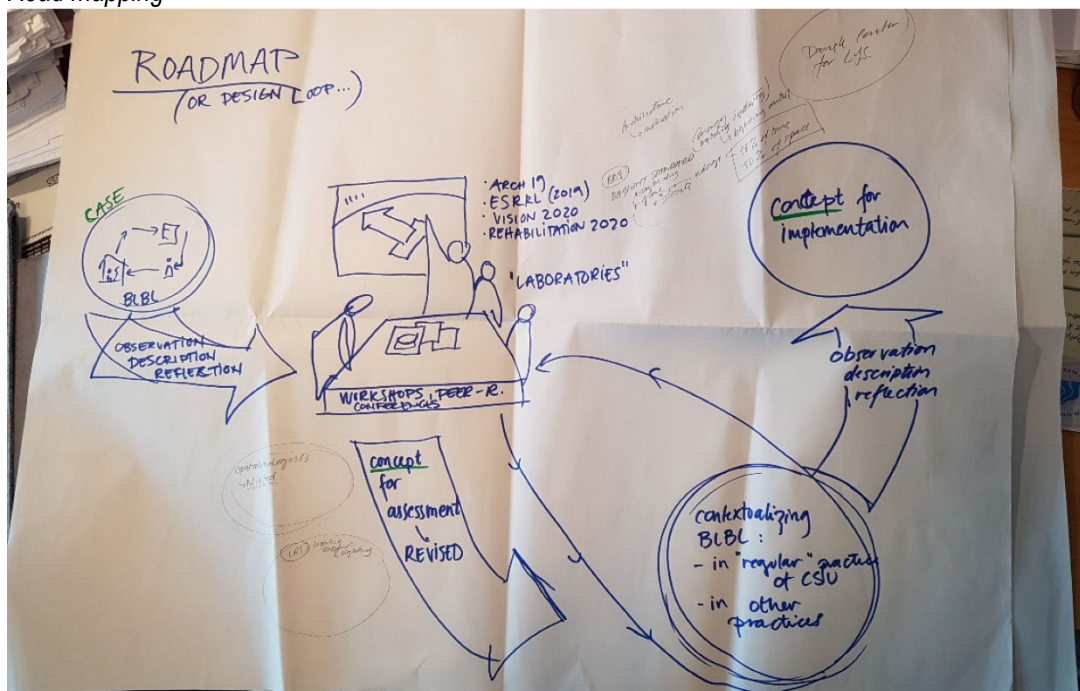


Figure 1. Road mapping - illustrating the process of the research project and the role of BLBL as a case study.

One of the first activities was to map the different fields of research that encompassed the research project: beyond low-vision rehabilitation, occupational therapy and lighting research, the theoretical concepts from ANT and science and technology studies that were applied in the first manuscript drafted in early 2019 (Øien, 2021a) positioned the research in relation to a socio-constructivist paradigm, acknowledging the co-production of knowledge and the human environment interaction at stake in BLBL. Mapping this extended network was a way to position BLBL, both in relation to the research project as an interdisciplinary object of research and in the community of practice as an approach to be implemented. The original research design included ethnographic fieldwork observations of the implementation of BLBL in five different centres in Denmark. When implementation was postponed for lack of funding an adjusted approach was designed during the spring of 2019 and illustrated in a flip-over drawing entitled “Roadmap”, shown in Figure 1. This was produced in preparation for a workshop on the findings from the pilot study and depicts BLBL as a point of departure for observation, description and reflection, guided and framed in different laboratories. These laboratories included seminars, workshops, peer review processes or conferences to test the approach in different professional and scientific arenas, and thereby adjust the concept for future implementation. Several design loops initiated to define and describe the concept in different practice contexts: 1) their own regular

practice before the intervention, 2) the intervention, 3) their regular practice post-intervention and d) other lighting practices at other centres.

Due to uncertainty regarding the funding of the further implementation the exploration mode got extended and the “laboratories” cultivated different research and practice perspectives within rehabilitation and lighting. Several of these analyses informed our navigation of the overall management of the project, using concepts as the black boxed knowledge of the intervention: how embedded and embodied knowledge where translated and the different inscriptions constituted mutable and immutable facts, based on the logics of the specific hinterlands (Øien, 2021a). Recognising that the tacit knowledge production within the intervention needed to be made explicit to assess and improve it. The knowledge translation and construction were described in processes of de- and re-contextualising knowledge (Øien, 2022a), where technological frames and boundary objects (Øien, 2021b) formed intermediaries for guiding the implementation of knowledge in laymen and professional practices.

The roadmap was used and discussed in steering group meetings throughout the process and included in nine of the 13 PowerPoint presentations. The work in the laboratories that was initially subordinate to the project implementation moved from a primarily backstage activity to occupy the spotlight.

Conceptualisation

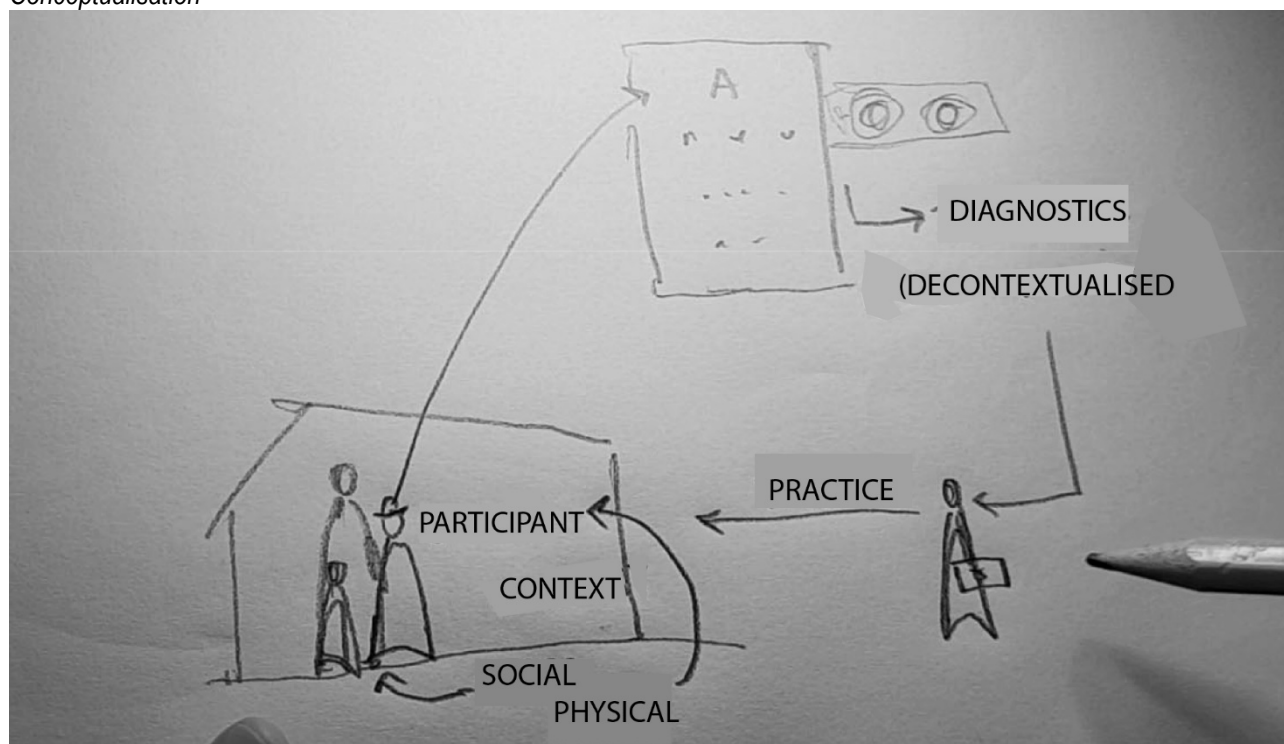


Figure 2. The first conceptualisation of BLBL [vignettes in English have been added for this paper].

Although CSU’s objective with BLBL was “to develop a method that ... supports visually impaired children and adults... to live as independent a life as possible by using more differentiated and targeted lighting” and the title Better Light Better Living were inherently strong narratives, the qualitative and in-depth description of the method and intervention were incomplete. The protocol and the different methods were listed in the project description, but how these were used and what role they played in the process were not mentioned, nor was the collaboration with the visually impaired individual and their relatives or the learning and change process enabled by the intervention.

A series of pencil drawings illustrating BLBL (Figure 2 and Figure 3) were produced, preparing for a PhD course on AR in November 2018. Lighting assessments and interventions had traditionally been based on diagnostics and were conducted in the clinic, while BLBL employed a more holistic understanding of the visually impaired, taking their specific social and physical context as the point of departure. The research

project was highlighted with an orange crayon in some of the drawings, depicting the focus on knowledge translations and processual relations between the home visit, the clinic and returning to the client's home environment. An additional loop illustrated the aggregation of knowledge between the professional and the participants.

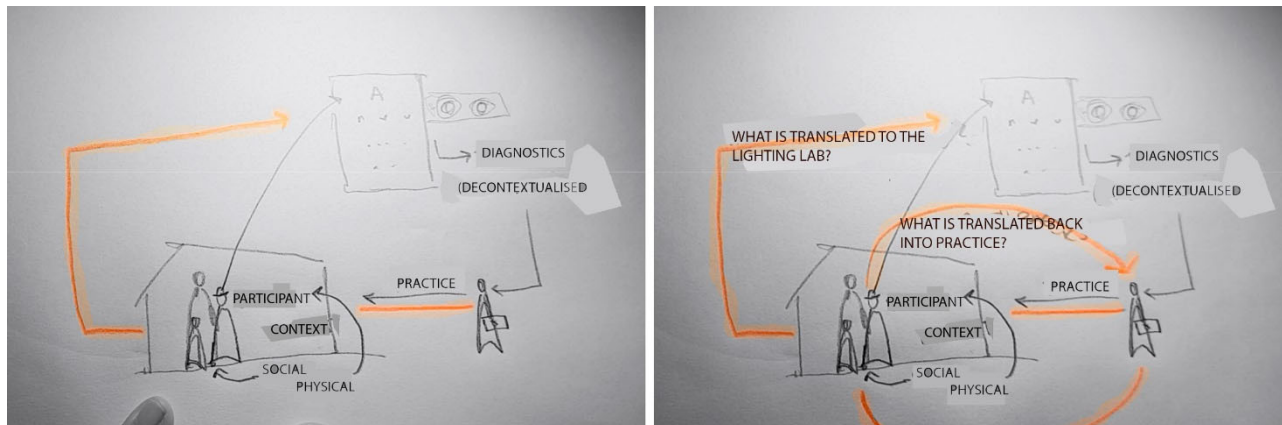


Figure 3. Sequential images illustrating BLBL and the focus of this research project, produced as presentations for an AR course [vignettes in English have been added for this paper].

The narrative of this movement from the expert-space to the lived-space illustrated both the traditional practice that BLBL's approach shifted and the three-sequence process perspective: the home visit, the lighting lab and the follow-up home visit. The drawings framed many of our initial discussions of the conceptual take of BLBL, but also framed the focus of the research, as the orange lines depicted the translations between the different phases. This was processed in the first analysis describing different types of knowledge and how these were identified, operationalised and translated. What types of knowledge did moving the assessment and intervention into the homes of the clients enable? Furthermore, which relevant human and non-human actors could be identified from participant–consultant interactions? The illustrations were also included in several meetings and later versions of the stills (mainly collages that retained the original drawings but translated the original Danish text to English) were presented in poster and oral presentations at research conferences in subsequent months. In parallel to the qualitative inquiry on BLBL and as a consequence of the postponed implementation, a mapping of the other low-vision services in Denmark were conducted, and framed the pilot project in relation to aspects of recovery and rehabilitation was a way of contextualising BLBL in relation to the overall community of practice.

From March 2020 until June 2021, saw the COVID-19 pandemic complicate further fieldwork. However, it also allowed us to explore extended academic networks as these, unlike the practices, were available from home. One of the extended arenas that were investigated was the field of Universal Design (UD). Teaching a master's class in UD created an opportunity to use BLBL as a case for discussing collaborative and interdisciplinary approaches to more inclusive environments, focusing on abilities rather than disabilities. This line of inquiry further led to an invitation to join a research network for young researchers in UD in November 2020. Subsequently, an invitation to a science talk from one of the fellow researchers framed a discussion of UD, interdisciplinary collaboration and collaboration between researchers, practitioners and fellow citizens. The conceptual collage was used to discuss BLBL's approach to lighting, the relationship between rehabilitation and UD and new common grounds for collaboration and re-conceptualisation.

Operationalisation

The project group's work on conference papers and poster presentations was enacted in different modes and at different levels of collaboration, depending on the scope of the conference, current project focus and the time available. The first conference, which promoted collaborative innovation processes in architecture and urban design for care and health, addressed BLBL's holistic and interdisciplinary approach (Øien, 2021a). The abstract was discussed in the project group and the manuscript was drafted on the first observations of

BLBL, shared in the project group and used as a basis for an interview further exploring and discussing the different types of knowledge observed. One of the aspects discussed in the interview was an anomaly that arose from working with the empirical material: during the seven months of developing the research project and in their descriptions of BLBL, the low-vision consultants had never presented themselves as occupational therapists. This was interesting, as field observations of them revealed that their professional background was distinctively enacted through their practice – in their focus on activities and the individual's relationship with their physical and social context. To unfold the observations of the profession, concepts and models from occupational therapy, including the person-environment-occupation (PEO) model, were brought into our conversations, first to facilitate the interview and later explored in the paper. Beyond their practice knowledge (as represented in the model), the findings included the embodied and embedded knowledge of the participants and their home environments, related this to the three spheres of the PEO. The trajectory embedded in the model was used to illustrate the intervention process, seen in Figure 4 as a trajectory where the home visit, the lighting lab and the follow-up visit are represented as three sequences. One of the main findings of this analysis was that “by framing the visual impairment in terms of light and occupation, the consultants enabled a space for discussing challenges and testing possibilities regarding the citizens’ physical and social context and to co-create the most relevant knowledge” (Øien, 2021a). In this co-creation, the consultants’ open and sensitive approach was pivotal to contextualising and individualising the assessment and guided the intervention to a specific context – although their schemas and protocols constituted rigid facts (diagnostics and lux measures), their employment and collaboration required a more open and elastic approach to coordinate these with the individual’s process, their state and available resources. The narrative interview was identified as an important opening to the participants, however it was at times difficult to ask in on the feelings and motivations and we discussed an alternative to access the interview guide as a shared task: “It sometimes just gets really uncomfortable and embarrassing... I think putting it to the table will be good, so it is not just me, alone with my questions - I will try this tomorrow”.

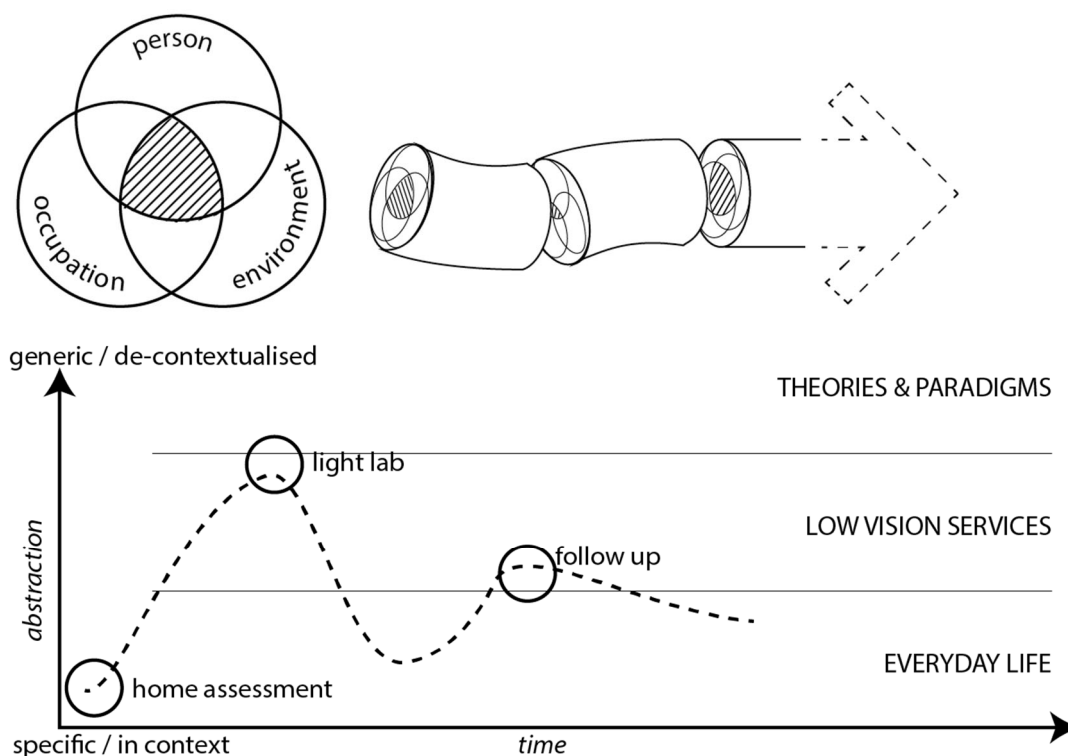


Figure 4. The PEO model employed to analyse the intervention (Øien, 2021a).

To gain a practical understanding of traditional lighting assessments, part of the fieldwork included a lighting course arranged by the Institute for the Blind and Partially Sighted in the summer of 2019. Beyond the insights in the current curricula, the participating low-vision consultants gave additional insights into their use

of lighting within their services. The input from the lighting course enabled conversations in the project group regarding knowledge on lighting, recognising differences from the status quo and realising that BLBL needed further descriptions of how they interpreted and used light. Particularly, the individually perceived and socially negotiated aspects of light were discussed when preparing two manuscripts the following autumn, one addressing the lighting approach within the frameworks of UD and rehabilitation (Øien, 2021b) and the other exploring climatic and cultural aspects of lighting in the Nordic context (Øien, 2022b).

During the winter of 2019–2020, participants who had made changes during the pilot study were visited for follow-up interviews and for the researcher to test the usability of the protocol for lighting assessments. The following spring we discussed methodological shortcomings to prepare BLBL for further implementation across the community of practice. The elasticity of the method was framed by mapping all potential aspects, specifications and attributes of lighting into the model shown in Figure 5.

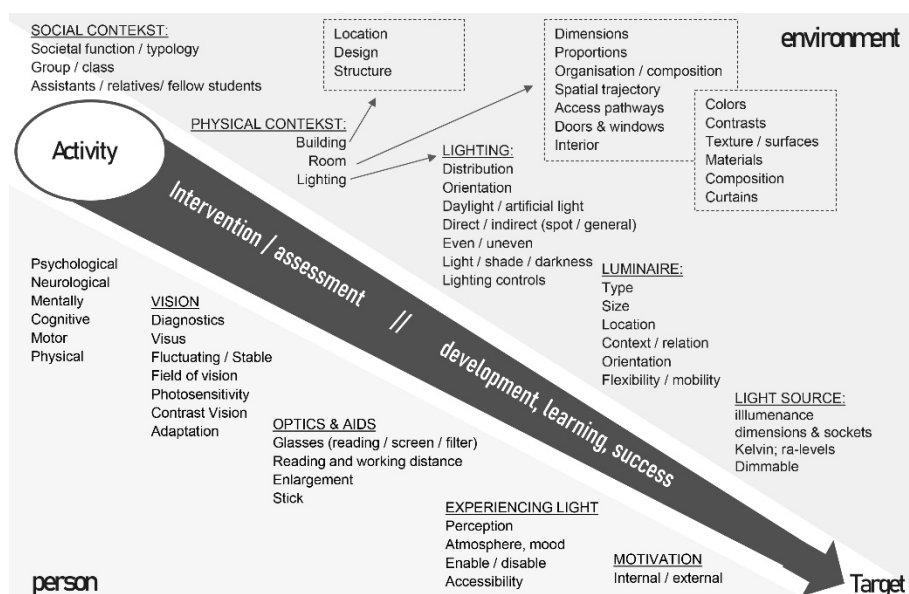


Figure 5. The PEO-inspired model of the lighting assessment and intervention developed from the initial studies of BLBL and used to explore and discuss the relevant knowledge and competencies needed to implement the approach [the model have been translated to English for this paper].

The model was inspired by the PEO including the personal, occupational and environmental aspects, as well as a change or learning process. The different elements at stake in the interaction between the participant, the specific social and physical context and the movement of the rehabilitation process towards a set target, with lighting as the parameter to be assessed, adjusted and tested. In this sense, lighting was not a detached, neutral parameter, but held different properties in relation to different aspects of the scenario and different stages of the process. Discussing the many layers of knowledge at stake clarified that knowledge of lighting in this framework was much broader than the traditional approach in low-vision services. The curriculum of the current course included lighting physics and techniques for measuring light, combined with recommendations and guidelines for the most common ophthalmic diagnoses to guide expert recommendations. The qualitative aspects of the perception of light, as well as relational aspects of the used, the perceived and the experienced light were added in the model. The qualitative versus quantitative aspects of lighting had been an issue discussed in lighting design practice the last century (Øien, 2022a): Situated between hard science and soft science, an argument was that the quantitative aspects of lighting research and practice needed to be combined with the qualitative act of seeing and experiencing light. Beyond mere mapping, the model worked as a framework for discussing the possible trajectories of a given assessment and intervention. The model centred on the activity and the citizen's learning process, depicted as a top-left to bottom-right diagonal arrow, from activity to goal. On either side of the diagonal, personal and environmental aspects were listed, while to the left included aspects of the personal, motivational, embodied (visual/impairment) and positional

use and experience of light (perception, atmosphere and ambience) were listed. On the right, aspects of the environmental, social and physical contexts, which were further unfolded as building, space and lighting.

The model was discussed in a workshop with other low-vision consultants and the feedback involved suggesting "social acknowledgement of disability", "economy" and "service level" as part of the contextual parameters, and "accessibility team" and "alignment of expectations" as ways to secure a holistic effort. A modified and translated version of Figure 5 was used to illustrate the consultants' process of linking the personal and environmental factors throughout the intervention. Contributing with new perspectives to the holistic turn in rehabilitation and challenging the understanding of the physical environment as a neutral and passive parameter, the visual narrative illustrated its dynamic role in BLBL (Øien, 2022c).

The main features from the three inquiries are listed in Table 2 as trajectory, function and action.

Circulated object	Trajectory and function	Action
Roadmap	Back stage only Setting the stage for cross-fertilisation between practice and academia (action <i>and</i> research)	Mapping Navigating Project management
Conceptualisation	Back stage to front stage Narrative embracing the situated, tacit and processual knowledge within the intervention	Focusing Unfolding Mobilising
Operationalisation	Front stage to backstage Using models to scaffold the dissemination of co-created knowledge – preparing for further implementation	Positioning Pooling Optimising

Table 2. Features of the three circulated objects and their trajectories within the project.

The framework of co-productive approaches

Mapping the three trajectories in relation to the model of co-productive research approaches, the roadmap (Figure 1) emerges on a strategic level and proves to be useful for manoeuvring through the changes in the local context while awaiting the next stage. It then moves to a design level as a relational model of the pilot project, academia, regular local practice and the community of practice. It is also a processual model, showing the trajectory of the AR project from the pilot project to preparing and translating BLBL into a concept to be implemented within the community of practice. In communicating this process to the larger community, the roadmap constituted yet another branch of inquiry at an operative and practice level outside the project group, expanding from a second-person to a third-person, mobilising and extending the project network (ibid.).

The conceptualisation (Figure 2) emerges from a first-person inquiry, the researcher's interpretation made explicit in the drawing, into the initial re-interpretation of the pilot study as a case for the AR project, when the drawing was discussed and adjusted in the project group. As a relational and processual model, it is positioned within the design level and its primary orientation concern dissemination within the project group, the communication of the project to the focal low-vision rehabilitation community of practice, the organisational context of CSU and popular science dissemination. The visual narrative creates a perceptual re-interpretation of the situation that allowed us to combine different types of knowledge. The externalisation of the visual narrative in sequential processes, as in Figure 3, can support cognitive processes (Newell and Simon, 1972) by acting as a *modus operandi* for a shift in focus. Thus, it is more a descriptive and navigational tool than a tool of inquiry. However, multiple notions can be read within the simple visual narrative. First, the ontological move from the medical to the more holistic biopsychosocial is illustrated in how the approach is extended beyond the traditional Snellen chart and diagnosis depicted at the top of the model by situating the assessment and intervention in the client's social and physical context, represented by the inhabited house. Second, the arrows linking the different contexts represent the BLBL processes. Third, in the later versions of the narrative, the knowledge production is depicted as translations constituting the de- and re-contextualisation of knowledge, moving from the home of the participants to the lighting lab and back home again. The narratives embed theoretical inquiries from academic works translated into lines and words and combine them

with similar representations of the empirical object of study and they were used for oral dissemination in several external contexts throughout the project.

The PEO model (Figure 3) and its trajectories in different versions emerges from the first-person inquiry of the researcher into the tacit practice knowledge of low-vision consultants and represent a design level as the models from the field of occupational therapy are implemented. As the model embeds an ontology focusing on the collaboration between the client and the professional and acknowledges both of their tacit knowledge, it also supports the overall research approach on a strategic level. The model supports several inquiries throughout the project. First, a mapping of the different types of knowledge in the intervention, supported by the three spheres of person, environment and occupation. Second, an analysis of the translations, coordination and co-creation of knowledge in the collaborative process of the home assessment, lighting lab and follow-up visit. Third, the unfolding of the multiple aspects of lighting at stake throughout the rehabilitation process. All these inquiries are directly drawn from the empirical context at the social and practice level and operationalised at the operative level; however, the analyses are also located at the design level as the different works operationalise the empirical findings using theoretical concepts from science and technology studies and ANT and discuss the case in relation to related fields of knowledge, such as rehabilitation and health science, lighting design and UD. The inquiries concern both the mobilisation and pooling of different forms of expertise and capacities, the existing locally situated knowledge of the consultants, the intervention and several external fields of knowledge. The processes of inquiry involve both the project group's processing, producing and disseminating the academic work and the different external fields of research and practice in review processes and oral and written discussions, moving the inquiry from the first to the second and third person.

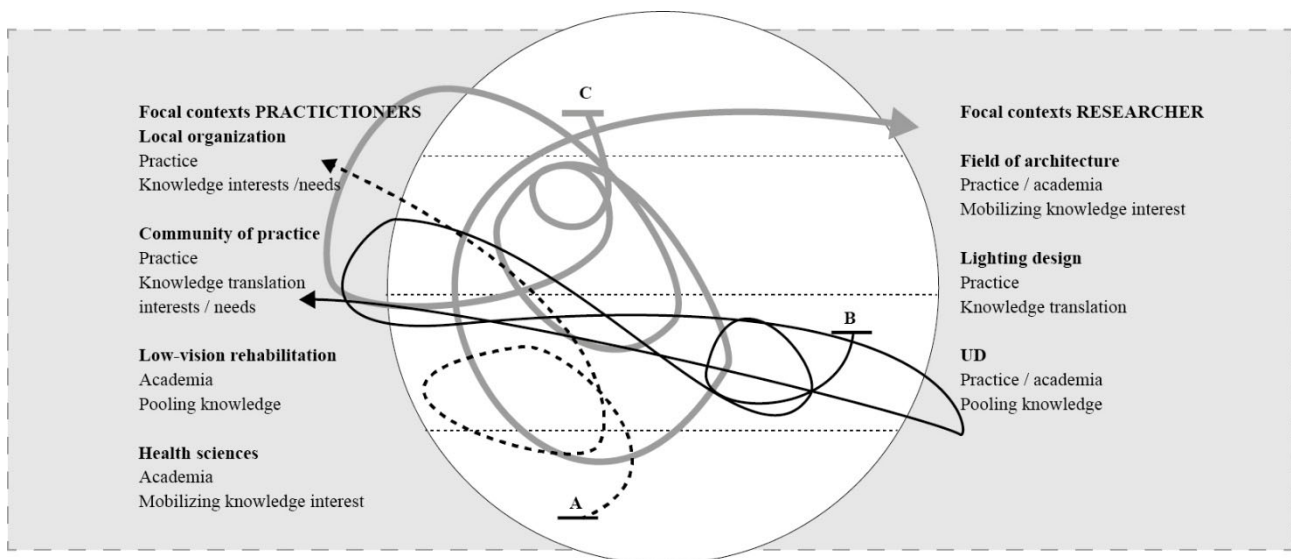


Figure 6. The trajectories of the three emerging inquiries, A: the roadmap, B: the conceptualisation and C: the operationalisation, moving across levels and bridging multiple academic and practice-based contexts.

Figure 6 shows the positions and trajectories of the emerging inquiries and the different external fields and contexts interlinked by the inscriptions explored in this study. In an AR collaboration, the scope and interest are split between the researcher, the host organisation and the scholars in the domain of interest (Smith, 2021), which means that the power of knowledge production is shared and distributed. The circulating objects help link these actors and anchor the project to different fields of both research and practice. This kind of extended network does not fit within neatly constructed contexts, scales and levels but works across them. The circulating objects have, in the backstage collaborative processes, been used as tools to focus on aspects or issues in the empirical material, supporting cognitive processes of re-conceptualisation or to view that material in relation to other contexts of research and practice, connecting different types of knowledge (Schon and Wiggins, 1992). Navigating between the backstage and frontstage, some of the visual narratives worked

as didactic grips that enabled reflection and learning by connecting action and perception (Bruner 2004) and scaffolded a collaborative knowledge process. This was enacted through several parallel tracks and in several iterative loops through sequential processes of construction and deconstruction (Newell & Simon, 1972). Demonstrating the disruptive nature of the inquiries, “tending to disrupt the orderly, analytical structure of the model” (Lindhult and Axelsson, 2021, p. 29).

Some of the models and visual representations were adjusted and transformed in relation to a specific inquiry – for example, the PEO (Figure 4 and Figure 5) has taken many shapes and roles. This elasticity allows it to serve different roles within the overall project, being operationalised in analysis or implemented in a specific context (Øien, 2021a) and being contextualised in different fields of research and practice.

The visual narratives were actively included in our project meetings and discussions, but also tested in the community of practice and different fields of academia, overall, framing the “iterative process of continuously shifting between frontstage and backstage activities” (Pedersen and Brodersen, 2020, p. 73). In this way, the circulated visual narratives contain and sustain our shared empirical and theoretical knowledge and allow it to be translated and coordinated between different inquiries.

Discussion

Using Lindhult and Axelsson’s (2021) model to map the findings instigates some alterations. Where the original model has a clear direction from the social to the operative, design and strategic levels, the associated inquiries and reflection/reflexivity reveals a much less directional relation between the levels; inquiries emerge at different layers and moves across layers in different modes and directions, such that the layers are intertwined and inextricably linked across the trajectories. The inquiries are interrelated but distributed in time and space, at times overlapping and interacting. It is difficult to determine whether it is the flat ontology of ANT that have affected the trajectories, or the reading of them in retrospect, but their movement renders visible in relation to the layered structure. Furthermore, the focal context in this study is composed of several different academic, professional and everyday contexts that affect and are affected by the project. In relation to the knowledge management, following the trajectory of the three interrelated emergent inquiries that were staged and enacted by three visual narratives enables an analysis of both the relational and processual aspects of the collaborative practice. Above all, the three positions outlined in the operative layer are central in the mobilisation and co-creation of knowledge: Pooling of knowledge in experiential learning by second-person inquiries, mobilisation of networks in third-persons inquiries and “reflections, action and interaction” of first-person inquiries (ibid., p. 27).

Project management in collaborative knowledge production

Along with the trajectories of inquiry, other spaces for joint reflection were staged within the project. More informal conversations before or after a consultation constituted spaces for common reflection within the project group. When we had established this joint metacognitive level, the process of generating seemed to reach another intensity – the instant room for reflection helped calibrate the relevance of the activities, made the group members take ownership to further participate and engage in the process. Although we did not share offices and sometimes went months without seeing each other during the pandemic, I was often met with reflections from a recent home visit as soon as I entered their office. We had established a mode of listening, assessing and common reflecting that had initially taken time to set in motion and then became natural. This phenomenon resembles Burns’ (2007) notion of improvisation, which discusses spaces of opportunity where people join in with actions. This space of reflection is sometimes more than the meeting or sequence of individual reflection; it is a space of creative reaction within the ongoing sharing and receiving of information. Burns describes this as resonance or the energising and motivating experience of interconnect-edness that enables sense-making.

These occasions seem to be linked to our physical meetings, as they disappeared during the long period in which we solely communicated virtually due to COVID-19. Steering group meetings every third month offered some structure, with small intercalary deadlines for project management and worked as a semi-structured space for joint reflection. Continuity was supported with artefacts such as minutes, PowerPoint presen-

tations and recurring bulletins and the visual narratives were circulated in these spaces and acted as intermediaries within the project. These spaces were to some extent able to bridge and scaffold the project during the period of online communication; however, their more rigid form and structure did not enable the same level of reflection as the explorative laboratories where we met physically. Considering the time and focus required to tune in both individually and socially to improvise or reach a state of resonance, the process needs a safe environment, in this project enabled by the small group and an openness and curiosity of the participants.

The exploration of methodology unfolded in the project resembles what John Law describes as a method assemblage (Law, 2004). Within the project framework, the ethnographic sensibility help recognise, describe and insist on the value of tacit knowledge, making the practical knowledge of the consultants, the embedded knowledge of technologies and the embodied knowledge of the participants explicit through comprehensive description and thematic analysis. The AR approach supports the interaction and expands and links the different orientations, alternating between being in the foreground and the background during a given experiment, and recognising the situatedness and the possibilities for action in social, operational, design and strategic concerns. As part of an overall methods assemblage, AR and ANT supports each other: theoretical concepts are used to explore the empirical material and empirical narratives are used to refine those theoretical concepts. Throughout the different analyses, the problems, opportunities and problem-solving processes enrich the understanding of the object of research: zooming in and out from measures, dialogues and learning processes, future roadmaps and structural barriers for further implementation revealed the extended network of ethnographic AR in low-vision rehabilitation innovation. Far from being an, transparent and easy-to-describe process, with a knowledge translation defined by a “well-thought, diverse strategy” (Jones *et al.* 2015), this work does however represent a well-reported and rigorously designed study, providing insights to explore, challenge and improve practices (Dijkers *et al.*, 2012), both rehabilitation and social science practices. The learnings from the project collaboration and more specifically this study of the role of the AR approach will help improve future staging processes in similar contexts.

Implications

Empirical studies of knowledge production, translation and implementation are needed in both research and practice, particularly within the fields of rehabilitation, AR and project studies. This exploration of the multiple perspectives at stake within the pilot project, the community of practice and academia demonstrate a methodological reflexivity and willingness to adapt that is needed in co-productive research approaches; as a way of calibrating an ongoing study, and thereby bridging the gap between theory and practice. The concepts and paradigms of the focal contexts were not seen as dichotomies but as equally important parts of the extended network wherein both professional and research practices are situated. This study contributes to project studies, embracing the nature of multiplicity embedded in projects (Geraldi and Söderlund, 2016). Multiplicity, methods assemblage and network analogies add valuable perspectives to collaboration in project studies as well as the holistic approaches of UD and other branches of rehabilitation, as frameworks that provide space for different types of knowledge.

Limitations

The AR research approach has some limitations: No statistical analysis was performed in this study and no quantifiable significant impact was measured to specify how AR worked as a research approach and whether it was successful. However, this study was not designed to be replicable but to enable descriptive and explorative analysis to establish a deeper understanding of the role of the AR approach and emergent inquiries in project collaboration.

The study can be rightly accused of bias. However, transparency is sought by explaining the process, with a risk of dynamically interpreting this retrospective narrative. There is always room to improve descriptions of practice and practice knowledge and for practising ethnographic action researchers.

In contrast to a fixed intervention design, the AR approach allowed us to be sensitive and improvise during the process. This elasticity simultaneously increases the navigational demands of project management,

requiring the group to assess, position and re-direct its course along the way. In recognition of the social construction of knowledge, the richness of this study is contextual and as the application of knowledge and how it is accumulated differ by time, place, culture and disciplinary perspectives (Imrie and Luck, 2014) generalisation to other contexts is limited. Nevertheless, the lessons from this case can inform and inspire other collaborations between research and practice and efforts to mobilise local and extended networks in knowledge production.

Conclusion

This paper analyses the methodological considerations and actions taken in a collaborative project between research and practice. The research approach was first guided by the socio-constructivist framework of following the actors but limitations in this approach to involve practice in real time made me turn to AR. AR helped guide different staging efforts in the project of pooling different kinds of knowledge and staging collaboration on lighting and low-vision rehabilitation. The theoretical concepts established a meta-level of understanding the intervention, the professional practice and rehabilitation processes. Several of these concepts allowed us to articulate, compare and synthesise knowledge and resources. Particularly, the visual narratives worked as joint maps for navigating, conceptualising and operationalising.

The analysis shows that the sensitivity and elasticity of the AR approach supported a range of smaller iterative processes that gradually developed and tuned the project, and with it, the project group. An important contribution of the AR approach has been its ability to establish and mobilise both the relations within the project group and an extended network, addressing and mobilising communities of practice and fields of research. The dynamic process of multidirectional and overlapping inquiries and the nature and roles of the extended collaboration could not have been designed and planned from the start but show that the trajectory of a project does not necessarily follow the structure and directions of our textbooks. The ethnographic AR enables a framework for improvisation needed for co-creation: A navigational and dialogic approach that demands the researcher to relinquishing some control of the research process, however the shared responsibility and mutual trust can build a larger space for action and strengthen its impact and scope.

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Appendix	QUALITATIVE ANALYSIS PROCESS	
Stage 1 +2	Material sourcing + transcription	
	EMPIRICAL MATERIAL - DATA	magnitude
	15 consultations (observations, transcriptions and field notes)	54 pages
	17 follow-up visits (observations, transcriptions and field notes)	37 pages
	Mapping of 23 centres and their low-vision consultants' approach to light (phone interviews and transcriptions)	56 pages
	Meetings and workshops (transcriptions, minutes and materials)	113 pages
	Drawings / diagrams	22 entities
	Project log (personal reflective reports, field notes and summaries)	260 pages
Stage 3	Unitisation	
Stage 4	Categorisation	
	Categories: Dialogue, collaboration, interaction, knowledge production, staging and anomalies	
Stage 5	Coding	
	Mapping of actors, activities, explicit knowledge, tacit knowledge, problem identification, reflection, conceptualisation, de-contextualisation/generalising, re-contextualisation/specifying, type of positions and inquiries (1 st , 2 nd , and 3 rd person)]	
Stage 6	Basis for analysis	
	TRAJECTORIES [identifying and following the emergent inquiries mapped into the AR framework of levels and focal contexts]	
	KNOWLEDGE PROCESSES [cognitive, embodied, emotive]	
	PATTERNS [what the emerging inquiries do/enable]	