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Epistemological aspects of participatory design studies conducted in the field of health science

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Abstract

Aim(s): To discuss the methodological aspects of participatory design, arguing for a three-phase approach and the suitability of situating participatory design within a phenomenological–hermeneutical tradition in health science.

Design and methods: Methodological discussion based on participatory design theory, epistemology and research studies.

Results: The epistemological and methodological discussions show how the core values and key elements of participatory design align with the phenomenological–hermeneutical approach. In addition, examples of participatory design studies are provided to illustrate how it can be conducted in health science.

Conclusion: Participatory design is a flexible framework based on genuine participation, defined by three core values: having a say, mutual learning and democratization. The iterative processes allow for adjustments in alignment with the core values and the scientific stance that defines the choice of methods, tools and techniques. A phenomenological–hermeneutic approach in participatory design studies is relevant and aligned with the core values of participatory design. Thus, this paper argues for a close integration between the participatory design methodology and the phenomenological–hermeneutic scientific approach within health science.

Implications for the profession: Participatory design is a powerful methodology with core values that can co-design sustainable health technologies with potential to impact patient care and the clinical practice of nurses. When combined with qualitative research methods, patients' lived experiences serve as the foundation for improving clinical nursing practice. Discussing the epistemological aspects of participatory design provides nurse researchers with a coherent methodological understanding, essential for the continual development of nursing research.

Impact:

- This paper discusses the research methodology of participatory design within health sciences. It aims to address the lack of understanding of the methodology, particularly within a specific scientific stance.

- The main finding is the elaboration on participatory design and the relevance of a phenomenological–hermeneutical approach.
- The paper has the potential to impact researchers, master's and PhD students, as well as others engaged in participatory design or other methodologies related to user involvement within health science.

Reporting method: No available EQUATOR guidelines were applicable to this methodological paper, as no new data were created or analysed.

Patient or public contribution: There was no direct patient or public contribution, as this is a methodological paper.

1 | INTRODUCTION

Participatory design (PD) is both a practice and a research methodology (Simonsen & Robertson, 2012; Spinuzzi, 2005). PD comprises participation and design with the purpose of PD being the active participation of users in the *design* of a future technology. The term design is used in the practice of architecture, where the focus is on both the analysis of needs and opportunities and on the design of functionalities (Bødker & Kensing, 1994). Furthermore, PD takes into consideration both the clinical practice in which the technology will be used and the users' experiences throughout the study (Simonsen & Robertson, 2012). This paper deals with the methodological aspects of PD and argues for situating PD within a phenomenological-hermeneutical tradition in health science.

2 | BACKGROUND

Participatory design emanated from computer science, yet the methodology extends beyond this field and is embraced by interdisciplinary researchers (Kanstrup et al., 2017). Over the past three decades, PD has been applied and developed in the domain of health science to design health information technologies (Pilemalm & Timpka, 2008). Traditionally, PD was carried out in two phases; however, the way PD is conducted has changed into three phases within health science, and even a fourth phase has been suggested (Clemensen et al., 2017). This paper argues for a three-phase approach and the suitability of a phenomenological-hermeneutical approach in the field of health science.

PD derives from action research (AR) and therefore aims to create a new understanding of practice in order to solve social problems (McNiff, 2013). According to AR, the first step in solving a problem is to understand it. Thus, the approach in AR is built on hermeneutic assumptions and critical theory and relies on the conviction that knowledge can only be created through practical and local involvement in research. In that way, AR is interventional and targeted at changing existing practices (McNiff, 2013). Furthermore, AR is widely based on an engaging relationship between the researchers and the participants, In the hope that a democratic research methodology is leading to create an opportunity for the researcher and the participants to achieve a mutual understanding. Action research and PD share many fundamental values and objectives, such as democratization, mutual understanding and empowerment: The main differences lie in the intent and purpose of the research (Foth & Axup, 2006). While AR might be characterized as seeking to act, change, understand and reflect, PD is additionally concerned with involvement and design. In PD, one of the main purposes is to co-design a future technology (Simonsen & Robertson, 2012). The origin of PD is the democratic ideal that those who will be using a technology should be given the right to decide on its design. Users are regarded as experts in their own everyday lives or clinical practices, and their expertise is essential in the design to arrive at a sustainable technological solution (Simonsen & Robertson, 2012). Therefore, the aim of PD is the direct involvement of people and to foster genuine participation, with the intention of equalizing the power between designers and users and, thus, facilitating mutual learning (Bratteteig et al., 2012).

PD advocates for the use of qualitative research methods, such as ethnography, despite their differing perspectives (Blomberg & Karasti, 2012). While PD is interventionist, aiming for change, ethnography views change as neither a necessary goal nor the starting point (Blomberg & Karasti, 2012). Nonetheless, Blomberg et al. argue that ethnography is deeply embedded in PD, given its emphasis on understanding existing practice subject to change (Blomberg & Karasti, 2012; Bødker & Kensing, 1994). PD and ethnography have different epistemological assumptions. However, the phenomenological-hermeneutic tradition provides a common ground for aligning these approaches. Thus, this paper aims to situate PD within a phenomenological-hermeneutical tradition in health science.

This paper will introduce the phenomenological-hermeneutic approach and discuss its application within the context of PD in the field of health science. It will delve into the epistemological

and methodological assumptions of PD, accompanied by a discussion on how the core values and key elements of PD align with the phenomenological-hermeneutical approach. Furthermore, examples of conducted PD studies will be provided to illustrate its application in various clinical practice settings.

2.1 | PD within the phenomenological-hermeneutical tradition

Epistemology is the theory of knowledge, how it is acquired and justified, and the different ways in which people understand and interpret the world (Carter & Little, 2007). In the context of PD, epistemology plays a crucial role in shaping how knowledge is generated, shared, and integrated into the design process. However, epistemology in PD moves beyond traditional notions of expertise and authority because it emphasizes collaboration, diverse perspectives, local context and the continuous evolution of knowledge. These considerations shape the way PD processes are structured and the outcomes that are designed (Simonsen & Robertson, 2012).

When designing and developing solutions through PD in health science, the solutions will influence the work of healthcare professionals (HCPs) and, especially, patients, as we are working in fields that are related to participants' everyday lives. The nuanced, in-depth knowledge of the participants' lived lives, gained through a phenomenological-hermeneutic scientific approach, is essential, in order to understand the real-life setting for which the solutions are designed, and the impact they will have on one's lived life (Simonsen & Robertson, 2012). Based on this, we argue for the value of situating PD within a phenomenological-hermeneutical approach. It is not within the scope of this paper to unfold the full philosophical and methodological approaches of phenomenology and hermeneutics. Rather, we attempt to focus on the links between these approaches and PD.

Phenomenology is concerned with studies of phenomena that appear to the consciousness (Ricoeur, 2014). The German philosopher Husserl [1859–1938] is considered the founder of modern phenomenology, which strives towards pure descriptions of the essences of phenomena in the human lifeworld. The term lifeworld is introduced by Husserl to describe experienced phenomena that we take for granted in everyday life, but which are not readily available to us (Husserl & Moran, 2012). According to Husserl, phenomenological reduction is required to grasp the meaning of these phenomena, by setting aside preconceptions, concerns and judgements (epoché). Thus, according to Husserl, describing the essential meaning of phenomena requires bracketing out all influences (Husserl & Moran, 2012; Ricoeur, 2014).

Heidegger, a German philosopher and student of Husserl, developed polar opposite of Husserl's bracketing (epoché) (Heidegger, 2010; Smythe & Spence, 2020). Heidegger expanded the concept of lifeworld to encompass the contextual understanding of experiences, acknowledging how culture and past experiences influence the descriptions and understanding of new experiences

and situations. This recognition elucidates why individuals perceive similar experiences differently, based on their unique backgrounds (Heidegger, 2010; Smythe & Spence, 2020). Thus, Heidegger's thinking transcends pure descriptions by exploring the understanding of the nature of being, which can be characterized as interpretive phenomenology. When conducting a PD study in health science, the interpretive phenomenological approach is a suitable option. This ensures an open approach to obtain descriptions of the investigated field and thus creates knowledge of the participants' experiences about their being in the world. Qualitative research methods are a way to achieve this, for example, applied by participant observation of a relevant clinical context (e.g. a hospital setting). This can provide descriptions of the experiences of both patients and HCPs, in line with the interpretive phenomenological approach, which seeks to describe their experience and understanding of 'being-in-the World' (dasein) (Heidegger, 2010; Ricoeur, 2014).

Hermeneutics is the theory and methodology of interpretation. The German philosopher Gadamer, a student of Heidegger, situated his thinking within philosophical hermeneutics (Gadamer, 2013). Gadamer argues that prejudices are an element of our understanding. Prejudice is constituted by preconceptions, including expectations, opinions and traditions, which shape the horizon through which we interpret the world. Prejudice is unavoidable, yet we should actively engage in dialogues to challenge and strive for mutual understanding through a process of horizonal fusion (Gadamer, 2013; Ricoeur, 2014). Thus, hermeneutics is a philosophical approach that guides us in understanding the process of interpretation. In a PD study in health science, the hermeneutic approach can be applied in several ways. The researchers are involved in ongoing iterative, hermeneutical processes. They seek the meaning of the whole by iteration, through conversations and interactions with others. Reality is explored and an agreement is reached that represents a new understanding of the whole (Gadamer, 2013). Therefore, when applied to PD in health science, hermeneutics can offer valuable insights into how HCPs' and patients' interpretations, experiences and perspectives shape the design process and its outcomes. Incorporating hermeneutics into PD can lead to more holistic, contextually grounded and culturally sensitive design outcomes. It acknowledges the complexity of human interpretation and highlights the importance of actively engaging with users and stakeholders to create meaningful and relevant solutions.

2.2 | PD in health science

The application of PD implies undertaking a commitment to adherence to the core principles of participation and the understanding of clinical practice. However, it does not imply that rigorous rules must be followed and strict definitions of methods applied. It is a methodology, a framework, which can be used differently in relation to each unique study while complying with the core values of PD in the best possible way (Simonsen & Robertson, 2012). Therefore, principles of participation and collaboration in co-design processes towards

creating technologies, services or organizational changes are user-centred and aligned with real-world needs. The combination of PD and a phenomenological-hermeneutic approach fosters a nuanced and holistic understanding of the users' perspectives, as the focus of this scientific tradition is to gain knowledge of lived experiences and the essential meaning of lifeworld phenomena (Gadamer, 2013; Husserl & Moran, 2012; Ricoeur, 2014).

2.2.1 | Core values in PD

Genuine participation is fundamental to PD and can be defined by three core values: having a say, mutual learning and democratization (Bratteteig et al., 2012; Kensing & Greenbaum, 2012). This aligns with the phenomenological-hermeneutic approach, as elaborated below. In PD, the users are not merely informants; they are acknowledged as co-designers with equal influence on the design and development (Bratteteig et al., 2012). Users can influence the design and development through participation in, for example, co-design workshops and tests. This is related to the core value of *having a say*. Furthermore, ethnographic fieldwork can provide new knowledge and understanding of the users' experiences, and these findings can guide decision-making in the design and development of technology. Thus, having a say means users are given a voice to affect the outcome throughout the PD process (Bratteteig et al., 2012; Kensing & Greenbaum, 2012). The application of a phenomenological-hermeneutic approach provides knowledge of the participants' experiences and perspectives that can be of significant importance to the PD process. The approach gives the participants a voice, not only explicitly, but also through in-depth insights into their everyday lives.

The intent of PD is to facilitate *mutual learning*. The researchers need to have knowledge of users' needs in their daily lives, while users need to have knowledge of the technological and professional potentials and options. Through this mutual learning, a shared understanding between researchers and users can be achieved, and it provides the basis for the design and development of a solid technology (Kushniruk & Nøhr, 2016). Thus, the users' involvement in design means that their competences and experiences can be utilized in the development and evaluation of the design. This supports shared experimentation and reflection, as essential elements of the design process (Kensing & Greenbaum, 2012; Kushniruk & Nøhr, 2016). This aligns with the phenomenological-hermeneutic understanding of how meaning emerges in an ongoing dynamic iterative process. The goal is the fusion of horizons, to obtain a new understanding (Gadamer, 2013). This is similar to the concept of mutual learning where the exchange of knowledge between the participants contributes to shared learning and a deeper understanding of the investigated field.

Democratization is about the importance of including diverse perspectives in the PD process, to create user-centred solutions (Bratteteig et al., 2012; Kensing & Greenbaum, 2012). The users, representatives of future end-users, have a say in the design and development of technology because in the end, it will affect their daily lives. This forms the basis for developing solutions adapted to the users' needs and their practice. Thus, the recognition of practice is significant in order to understand technologies in their actual setting (Kensing & Greenbaum, 2012; Kushniruk & Nøhr, 2016). Acquired knowledge of the practice is essential and the users' voices can guide decision-making in the design and development of a sustainable technology. This emphasis on the imagined future is a prominent trait of PD. The idea of allowing people to participate in the development of technology that they would later encounter in their daily lives affords PD an intrinsic future-oriented perspective. The desired focus on end-users throughout the design process is effectively addressed by actively involving users, their needs and preferences in the design process (Kensing & Greenbaum, 2012). The describing and understanding of their clinical practice and daily life are in focus on the development of technology, which argues for the relevance of a phenomenological-hermeneutic approach.

2.3 | The three phases of PD in health science

As previously mentioned, we argue for the PD process conducted in three phases in the field of health science (Clemensen et al., 2007). In *phase one* of a PD study, the focus is on identifying and assessing the needs of the users (Clemensen et al., 2007). This involves exploring users' experiences, facilitated by the use of ethnographic methods. To gain knowledge, patients' everyday life experiences, such as living with illness, and HCPs' experiences of clinical practice are explored. Through this exploration, valuable insights and knowledge are gained, leading to the identification of needs within the studied practice. In addition, understanding existing practice is essential in PD, to enable people to take advantage of a new health technology, reorganized workflow or other emerging designs (Simonsen & Robertson, 2012).

In *phase two*, the primary focus is on designing and developing a solution that addresses the identified needs through the genuine participation of users in a collaborative design process (Clemensen et al., 2007). This phase involves engaging in creative hands-on activities, beginning with a broad idea-generation process that emphasizes the imagined future. It then progresses to the creation of prototypes, tools or visual products, which are materialized into a mock-up solution. Towards the end of this second phase, the mock-up undergoes refinement. Laboratory tests are conducted to assess the solution's functionalities (alpha testing) and maturity (beta testing), in a setting resembling clinical practice (Hai-Jew & Hai-Jew, 2019). The result is a prototype solution ready for testing in clinical practice. Thus, a solution is designed, developed and tailored to practice by involving stakeholders and end-users throughout the entire process, allowing them to express themselves through creative processes. This approach fosters a nuanced understanding of the participants' needs, their situations and the context of clinical practice (Brandt et al., 2012).

Finally, in *phase three*, the focus shifts to testing and evaluating the developed solution within clinical practice (Clemensen et al., 2007). Every health technological solution should be subject to formal evaluation, and the extent of evaluation varies based on the specific study. This ranges from a standard assessment of

technology usability to a health economic evaluation incorporating the technology and its impacts. As a reflection of the epistemological position of PD, it is optimal to define evaluations at a stage when users' needs have been identified, either by the end of phase one or during the second phase when the prototype is under development (Bossen et al., 2016). The three phases are illustrated in Figure 1.

The activities and outcomes across these three phases are inter-related. The findings from phase one guide the activities planned in phase two, and findings from phase two, in turn, guide the activities planned in phase three (Clemensen et al., 2007; Simonsen & Robertson, 2012). Likewise, there are continuous reflections *in* and *on* action, in iterative cycles throughout the entire research process. This allows for revision of initial plans in a systematic process. Reflection *in* action focuses on the present and the immediate, including the ability to reflect on one's actions in real-time and to adjust actions accordingly. Reflection *on* action focuses on the past and the future. Thus, reflection *on* action involves the ability to reflect on past actions after their completion, evaluate them and consider their implications for the outcomes (Blomberg & Karasti, 2012; Schön, 2017). Thus, the PD process unfolds in progressive and iterative cycles, similar to an AR process, which consists of the elements plan, act, observe and reflect (Kemmis et al., 2014). The iterative cycles within and between the three phases of PD are illustrated in Figure 2.

In any research process, literature studies play a significant role in advocating for the research needs and knowledge gaps or to synthesize existing scientific knowledge in a specific field of interest. The formats of PD literature studies are diverse, given that they are carried out continuously across the three phases as part of the process of understanding and mutual learning, for example, to get an overview of the research field, to deepen understanding and knowledge of the identified needs and to identify pre-existing solutions (Clemensen et al., 2017).

2.4 | Key elements of PD processes

The collaborative design process is based on various practices of participation, to ensure that the diverse perspectives of stakeholders, researchers and end-users are considered and involved in the PD process. To achieve this, tools and techniques that engage telling, making and enacting are applied in the PD process (Brandt et al., 2012). The three elements, telling, making and enacting, illustrated in Figure 3, are interconnected and used iteratively throughout the PD process. The goal is to create mutual learning and be able to gain knowledge directly from the people and practices impacted by design (Brandt et al., 2012; Clemensen et al., 2017). *Telling* activities are about providing descriptions to contribute to information, experiences and insights between the participants. This allows them to express their perspectives (Brandt et al., 2012; Matos-Castaño et al., 2020). *Making* includes hands-on activities, which encourage the participant to express their ideas in a more concrete form that transcends verbal communication. Thus, these activities can turn abstract concepts into concrete and more tangible objects, evoking discussions and allowing the involvement of multiple perspectives. In addition, this establishes a shared point of reference for further discussions (Brandt et al., 2012; Sanders & Stappers, 2014).*Enacting* involves putting ideas into action, by acting out future real-world scenarios or testing the developed design in practice to explore the solution's feasibility and how it impacts the users and the clinical practice (Brandt et al., 2012). In connection to the three phases of PD, there is no predefined requirement that specific activities must occur in a particular phase of a PD study. All activities could potentially be present in each phase. However, the emphasis on *telling* is most noticeable in the first phase, *making* takes precedence in the second phase, and finally, the third phase is characterized by the prevalence of *enacting* in PD studies within the field of health science (Brandt et al., 2012; Clemensen et al., 2017).

2.5 | Phenomenological-hermeneutical approach in the three phases of PD

In the following, we will present examples from four PD research studies in which a phenomenological-hermeneutical approach was applied. For further information or details on the studies, see Table 1.
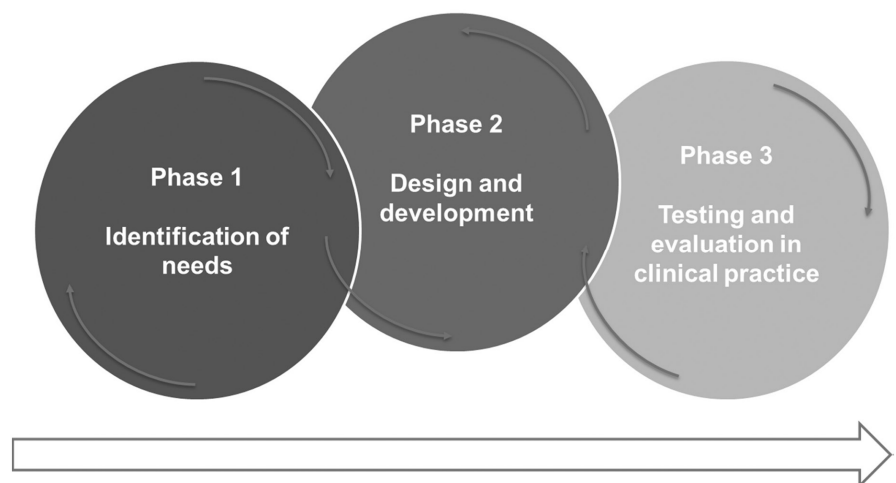

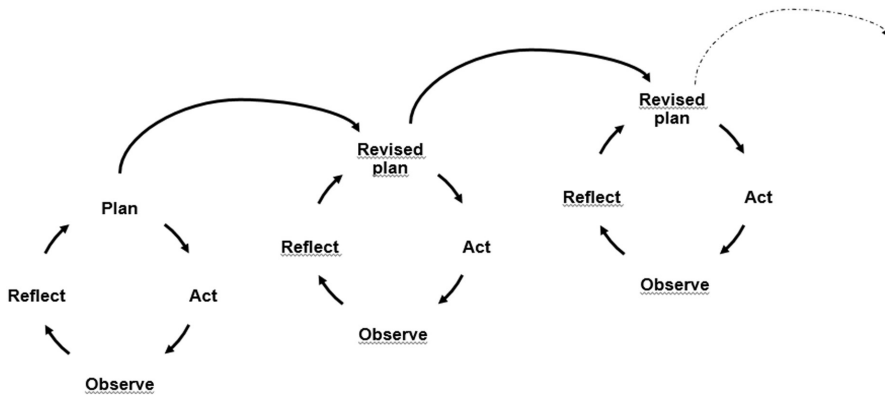**FIGURE 1** The three phases in a participatory design study within health science (Nielsen et al., 2020b).

FIGURE 2 The iterative processes in participatory design are based on the element plan, act, observe and reflect (Kemmis et al., 2014).
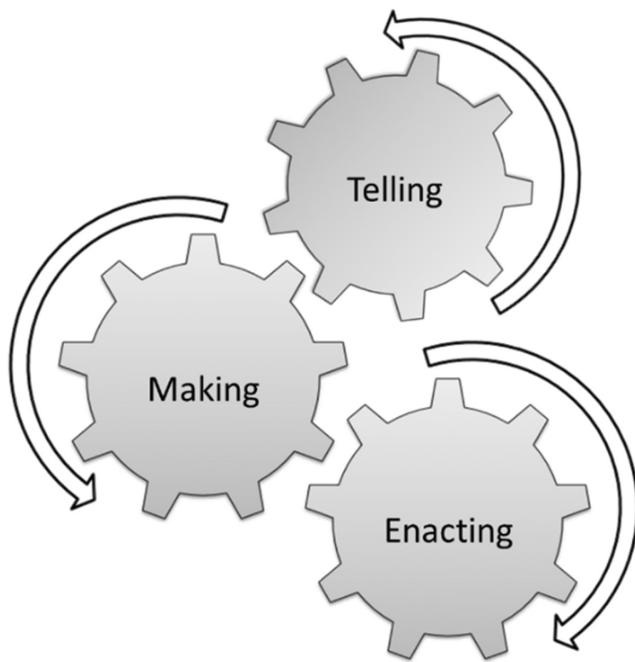
FIGURE 3 Illustration of the key elements: telling, making and enacting (Brandt et al., 2012).

2.5.1 | Phase 1

In phase one of the psoriasis study, to identify needs, the authors applied a phenomenological approach, with the aim of creating an open approach and to obtain descriptions. This created an insight into patients' individual experiences about their 'being in the world' through the use of semi-structured interviews. In addition, the phenomenological approach was applied by way of participant observations of follow-up consultations, which captured the description of the experiences of both HCPs and patients (Trettin et al., 2020). The participant observation provided knowledge about the interaction, communication and issues discussed at the consultations and made it possible to grasp a sense of the lived experiences of patients. Furthermore, it provided important descriptions of the clinical practice in which the teledermatological solution should be implemented

(Trettin et al., 2021a). In phase one, the hermeneutical approach was applied when analysing the data, in order to obtain a deeper understanding of patients' lived experiences and an understanding of the consultations and thus, clinical practice.

In phase one of the kidney transplantation study by Nielsen et al., the aim was to investigate clinical practice and explore patients' and HCPs' experiences of the transplantation process. Data triangulation, with participant observations, individual semi-structured interviews and a focus group, provided a rich data material (Nielsen, Agerskov, et al., 2019; Nielsen, Clemensen, et al., 2019). The participant observations provided insights into the context of the transplantation process and created descriptions of how meaning emerged, whereas interviews and the focus group provided insights into the participants' own descriptions of their experiences. This triangulation led to nuanced, in-depth knowledge of the transplantation process, based on various descriptions using a phenomenological approach. New understandings emerged in the hermeneutic interpretation of data, and new knowledge of the participants' needs was identified (Simonÿ et al., 2018). This led to the development of new ways to involve kidney recipients in the process supported by health technology.

In the hip fracture study by Jensen et al., field observations were conducted in three different hospitals. Furthermore, interviews and field observations were conducted in patients' homes (Jensen et al., 2017). The applied approach focused on specific lifeworld close descriptions as experienced by patients with a hip fracture with the focus on the patients' progress on how they were prepared for life after discharge. This led to descriptions and understanding of patients' needs and wishes in pathways with short time stays in the hospital (Jensen et al., 2017). Describing the essence and meaning and implication of a hip fracture in individuals' lifeworld were founded in the phenomenological and hermeneutical philosophy, *Reflective Lifeworld Research* (Dahlberg, 2006). The goal in all lifeworld research is to discover, analyse, clarify and describe meaning (Karin et al., 2007). In describing and understanding perspectives of a hip fracture and its consequences, it was found that having a hip fracture was a traumatic experience, not just physiologically but also from a psycho-social perspective (Jensen et al., 2017).

TABLE 1 Overview of the participatory design studies in the presented examples.

Study	Title	Author	Aim	Methods
The psoriasis study	Improving management of psoriasis: a participatory design study	Trettin et al. (2020)	To explore, identify and develop patient-centred teledermatology approaches to health care for patients with psoriasis	Participant observation Semi-structured interviews Focus group interviews Workshops Prototype test
The kidney transplantation study	The kidney transplantation process—a participatory design study to explore patient involvement and how telehealth can support kidney recipients	Nielsen, Clemensen, et al. (2019)	To explore how telehealth supports patients' needs and thus strengthen their involvement in the kidney transplant process	Participant observation Semi-structured interviews Focus group interviews Workshops
The hip fracture study	Telehealth for patients with hip fracture	Jensen et al. (2017)	To explore how treatment of patients with osteoporotic hip fracture can be promoted by telehealth	Participant observation Focus group interviews Interviews Face-to-face workshops
The oral care study	Oral care an essential part of nursing practice—a participatory design study exploring how to support self-care and empowerment	Rasmussen et al. (2023)	To improve oral care among hospitalized patients	Participant observation Semi-structured interviews Focus group Workshops

2.5.2 | Phase 2

In phase two, Trettin et al. conducted several workshops, mock-up workshops and a prototype test. This was a process of several iterations, where the aim was to design a technology that suited the needs of patients, HCPs and clinical practice (Trettin et al., 2021a). During the workshops, the authors had in mind the importance of fostering a collaborative interpretative environment. Through group discussions and guided reflections, the participants could learn from each other's perspectives. Furthermore, the authors adapted the activities based on the emerging themes and needs of the participants (Trettin et al., 2021a). This included elements of the phenomenological approach such as exploration and openness. The hermeneutical approach was applied because there was a need for an ongoing interpretation of meaning to continually adjust to the next step. Thus, the phenomenological-hermeneutical approach enabled shared experiences and perspectives and allowed participants to have their say. In addition, it facilitated mutual learning because it created a common ground for everyone involved.

In the study by Nielsen et al., the knowledge from the first phase became the foundation for the design and development of new technologies to improve the transplantation process in phase two (Nielsen et al., 2020b). The technologies were developed in workshops and laboratory tests, where participants represented the different groups involved in the transplantation process. The scientific approach created the basis for activities that facilitated shared understanding and mutual learning between the participants, leading to the co-creation of technologies to improve the transplantation process. The authors facilitated activities to give the participants insights into each other's perspectives. Discussions led to shared knowledge and prototypes were designed to accommodate the different needs in the transplantation process. During these shared activities, mutual learning emerged and the iterative workshops led to the design and development of the final solution (Nielsen et al., 2020b).

In the study by Jensen et al., separate face-to-face workshops were conducted repeatedly with patients and relatives in their homes, to enable a lifeworld description (Jensen et al., 2018). Each face-to-face workshop was initiated with a summary of findings from prior face-to-face workshops. As such, the researcher acted as a facilitator of shared understanding and enabled all users to have a say. In addition, at the end of each workshop, an initial validation was conducted by summarizing the processes, contents and maturation of the prototype, to enable mutual learning (Jensen et al., 2018).

In the oral care study by Rasmussen et al., the aim in phase 2 was to design and develop solutions to overcome the identified barriers (Rasmussen et al., 2023). Due to the lack of time in clinical practice, separate workshops were conducted with HCPs and patients, respectively. In the workshops, a phenomenological-hermeneutic approach was applied, leading to discussions of the identified barriers. These new insights allowed them to come up with ideas about how to overcome the barriers and increase focus on oral care. The researchers acted as facilitators between the

workshops, to transfer descriptions and knowledge between the participants in the different workshops. This was to facilitate the fusion of horizons towards a new understanding between the participants, despite the distance between them. Thus, mutual learning and co-design emerged in a PD process across workshops. Finally, one joint workshop was conducted together with the different representatives of end-users and stakeholders, to design and develop the final solution.

2.5.3 | Phase 3

In phase three of the psoriasis study, Trettin et al. conducted semi-structured interviews and focus group interviews. The aim was to conduct an evaluation of the tele dermatological solution—an mHealth app—with the focus on exploring patients' experiences and perspectives, HCPs' experiences and adaptation of the technology in clinical practice (Trettin et al., 2021b). The semi-structured interviews sought to explore how the solution was experienced in everyday life and how patients experienced consultations when they were based on the mHealth app. Because consultations changed when based on the mHealth app, for example, switching to video consultations or giving patients the power to decide the agenda of the consultations, clinical practice had changed (Trettin et al., 2021b). Therefore, it was essential to explore how HCPs experienced this new approach. Thus, focus group interviews generated group-level data based on interactions, norms and interpretation of HCPs. Furthermore, it gave HCPs the opportunity to comment on each other's experiences and understandings based on their contextual preconception (Kitzinger, 1994). This approach fostered a nuanced and holistic understanding of all end users' perspectives, and the phenomenological-hermeneutic approach ensured that knowledge of lived experiences and the essential meaning of lifeworld phenomena was generated.

In the kidney transplantation study, the solution to involve the kidney recipients in the transplantation process was an app and a new workflow for outpatient visits after transplantation (Nielsen et al., 2020b). The aim of the third phase of the study was to evaluate how the solution worked, and how it impacted everyday life and clinical practice, based on patients' and HCPs' experiences. A phenomenological-hermeneutic approach was suitable, in order to provide descriptions of how the practice was established. Interviews with patients and focus groups with the HCPs provided knowledge and led to an understanding and evaluation of how the solution was experienced in daily life at the hospital and in the patients' everyday lives (Nielsen et al., 2020a).

3 | DISCUSSION

This paper argues for the relevance of adopting a phenomenological-hermeneutical approach in PD studies, demonstrating the alignment of the scientific stance with the core values of PD. Additionally, the paper provides examples of PD studies, to illustrate how methods, tools and techniques based on a phenomenological-hermeneutic approach can be applied in the three phases of PD studies within health science.

PD methodology emphasizes the essential aspects required to actively involve and understand users, ensuring that the developed solutions are pertinent and tailored to real-life settings. This process advances through iterative cycles and could be described as a process of learning and understanding (Simonsen & Robertson, 2012). Similarly, the phenomenological-hermeneutic approach focuses on understanding lived experiences. Description and interpretation unfold in movements between the parts and the whole within the hermeneutic spiral, leading to a renewed understanding of the investigated phenomenon (Ricoeur, 2014). In essence, both PD and the phenomenological-hermeneutic approach share a common thread in their emphasis on active engagement, nuanced understanding and iterative processes, to gain deeper insights and transformative understanding.

The phenomenological-hermeneutic approach offers a distinctive and invaluable contribution to the PD process, and its significance becomes pronounced in the context of health science, where the designs extend beyond the confines of workplaces and impact everyday life for patients in vulnerable situations who are dependent on health services (Simonsen & Robertson, 2012). There are many aspects and dimensions to the various ways in which patients and HCPs interact and deal with illness. The phenomenological-hermeneutic approach (Ricoeur, 2014), with its focus on understanding lived experiences, provides a nuanced approach to understanding the unique experiences, perspectives and challenges faced by individuals' everyday lives in a healthcare setting. Thus, the phenomenological-hermeneutic exploration of participants' experiences can play a fundamental role in the elucidation of significant meanings within the clinical field, which the PD study aims to change and improve. Through this exploration, knowledge is derived, enabling the identification of needs in the first phase of a PD study or during the evaluation of experiences with the solution in the third phase, involving both the participant group and the overall setting (Simonsen & Robertson, 2012). The participants may express their needs or experiences explicitly, but they can also be rooted in their lived experiences, some of which may not be consciously acknowledged, but which can emerge in the course of conducting field studies (Simonÿ et al., 2018). As a result, this phenomenological-hermeneutic approach brings important knowledge for the identification of needs and evaluation of the developed solution in a PD study.

Genuine participation is the core of PD, and the PD process and the developed solutions are highly dependent on the users who participate in the studies (Kensing & Greenbaum, 2012; Simonsen & Robertson, 2012). The phenomenological-hermeneutic approach has the potential to enhance the voices of multiple users. In the kidney transplantation study cited above, a phenomenological-hermeneutic approach was employed (Nielsen, Clemensen, et al., 2019). Patients lacked the resources to engage during the transplantation period. As an alternative, data were collected through participant observations, and interviews were postponed

until 1-month post-transplantation. The data analysis involved field notes from participant observations and transcripts from the interviews, which together provided a comprehensive exploration of experiences during the transplantation period (Nielsen, Clemensen, et al., 2019). This approach gave patients a voice, despite their limited resources. Additionally, observations added nuances to the descriptions obtained from interviews, capturing episodes that patients could not recall after a month or experiences that evolved over time. Thus, the phenomenological-hermeneutic approach, combined with method triangulation, enhanced the patients' voices and facilitated their active participation in the first phase of the PD study. Similarly, immediately following transplantation, patients were unable to attend workshops for the design and development of a solution (Nielsen et al., 2020b). Nonetheless, their input was integrated into this process through the emerging findings from the first phase. This inclusion provided them with a voice to influence and participate in the design and development of a solution to improve the patient pathway during the transplantation process, even though they were not present at the workshops due to the phenomenological-hermeneutic exploration of their experiences in the transplantation period (Nielsen et al., 2020b). This illustrates that ethical reflections represent an ongoing consideration in PD studies. User involvement and genuine participation involve continuous ethical reflections on the principles and values that guide the interactions among researchers and end-users. By grounding these reflections in ethical guidelines, such as ethical principles for medical research in the Declaration of Helsinki and Ethical Guidelines for Nursing Research in the Nordic Countries, researchers are guided to uphold their ethical responsibility, consider the needs of the end-users and ensure the overall quality of the research process and results (NNF, 2003; WMA, 2013). Thus, conducting research within the PD methodology presents an ongoing challenge in balancing genuine participation and the core values of PD. Reflective engagement throughout the research process is essential to avoid tokenism, where intentions to involve the users fail to be accomplished. Another potential challenge lies in recruitment to ensure the inclusion of representative users. This could become a limitation if only users with a strong voice are included, potentially resulting in solutions tailored solely to a narrow group of users who are able to make themselves heard.

Participatory design is a methodology, a flexible framework where the aim is to conduct each study effectively according to the core values of PD (Simonsen & Robertson, 2012). Thus, given that each study is unique, the ways to accomplish the objectives can be diverse, and are dependent on, for example, the users, the clinical practice and the solution to be developed. Although we argue, here, for a phenomenological-hermeneutic approach, other scientific approaches and methods, tools and techniques can also be applied in PD studies, which also contribute to important knowledge of the users, the clinical practice and ways to evaluate the solution following the test period.

In the first phase of a PD study on early mobilization among patients in intensive care units (ICU), Lehmkuhl et al. applied a prospective observational approach (Lehmkuhl, Olsen, et al., 2023). Accelerometers were employed to measure physical activity, providing an objective and specified description of physical activity levels during admission (Lehmkuhl, Olsen, et al., 2023). Together with qualitative studies of mobilization in the ICU, this led to the identification of a need to improve clinical routines to encourage active mobilization throughout the day (Lehmkuhl, Dreyer, et al., 2023). In addition, Trettin et al. conducted a PD study on self-test technology for chlamydia, applying an alternative approach to identifying needs. They conducted a literature review, basing the identification of needs on previous research results (Trettin et al., 2023). Similarly, examples of alternative approaches are also found in the final phase of PD studies. In a PD study of neonatal tele-homecare, Holm et al. used an observational study to monitor rates of breastfeeding and growth during neonatal tele-homecare (Holm et al., 2019). Data were compared against retrospective data of pre-term infants who received standard care in the neonatal ICU. This quantitative approach contributed valuable knowledge for an assessment of the appropriateness and safety of the neonatal tele-homecare solution. The assessment was complemented by a qualitative evaluation involving semi-structured interviews with parents whose pre-term infants had received neonatal tele-homecare. The interviews revealed that the solution proved to be a valuable way to support families in their homes (Garne Holm et al., 2019). Thus, the integration of knowledge from different scientific approaches provided a nuanced and valuable evaluation. Additionally, Østervang et al. aimed to improve pathways for patients expected to be discharged within 24 h in a PD study conducted in an emergency department (Østervang et al., 2022). The authors designed and developed an information system, which was subsequently tested and evaluated among patients and family members. The phase three evaluation included the system usability scale questionnaire and semi-structured interviews (Østervang et al., 2023). This mixed method approach revealed that the perceived overall usability of the information system ranged from good to excellent, and patients and family members received the necessary information, enabling them to stay in control during their stay in the emergency department. The integration of two different scientific perspectives resulted in an enriched understanding of patients' and family members' perceptions and experiences of the information system (Østervang et al., 2023). Hence, alternative scientific approaches can offer valuable insights into PD studies, introducing new perspectives and knowledge. Applied together with a phenomenological-hermeneutic approach mixed-method studies contribute to knowledge of significant value. Through the integration of knowledge from different scientific approaches, an enriched understanding of the whole and nuanced insight can be achieved. As a research methodology, PD is relatively new within health science. Therefore, there is a need for methodological papers and research to further develop the methodology. This research could encompass both the overarching methodology and more specific studies regarding the tools and techniques to be applied in PD research.

4 | CONCLUSION

In this paper, we have explored the PD methodology within the field of health science, arguing for PD as a flexible framework based on genuine participation, defined by three core values: having a say, mutual learning and democratization. The PD process is not predefined; rather, the process is adapted to comply with the core values in the best possible way. The iterative processes allow for adjustments in alignment with the core values and scientific stance that defines the choice of methods, tools and techniques. The central focus has been on arguing for the appropriateness of applying a phenomenological-hermeneutic approach in PD studies and demonstrating its alignment with the core values of PD. We have described a PD process consisting of three phases and illustrated how this can be conducted in various ways based on a phenomenological-hermeneutic approach in the research process. Furthermore, we discussed how other, alternative scientific approaches can also contribute valuable knowledge to PD studies. However, we would argue for a close integration between the PD methodology and the phenomenological-hermeneutic scientific approach within health science.

AUTHOR CONTRIBUTIONS

The three authors contributed to all aspects of the paper, fulfilling the journal's criteria for authorship through direct participation in the planning, analysis and discussion. Furthermore, all authors have thoroughly reviewed and approved the final submitted version.

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DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this paper as no new data were created or analysed.

ETHICS STATEMENT

The data utilized in the paper are all references from published studies.

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