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CREATIVE METHODS EXPLORING USER EXPERIENCE IN RESEARCH AND DESIGN OF HEALTHCARE ENVIRONMENTS: A SYSTEMATIZED REVIEW PROTOCOL

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Abstract

Increasingly we recognise attempts that explore user experience in healthcare settings both in research and design endeavours. Our primary interest is in identifying *creative research methods* (CRM) that are used to gauge the experience of healthcare environments. We see potential in an active involvement of patients and caregivers as experts, not only relying on their present and past experience, but also through CRM, accessing their latent needs and offering opportunities to formulate their vision of the future. We define the term creative in such a way that includes terminology common in both design and research practice. This protocol outlines the steps taken to systematically investigate what is known from existing literature about CRM exploring user experience in research and architectural design processes in healthcare generally or in cancer care in particular. It relays the search strategy for a database search and an additional search of grey literature. The protocol is expected to be helpful in carrying out reviews in related fields contributing to knowledge synthesis techniques for qualitative research. We furthermore anticipate that the dissemination of design-related research outside of peer-reviewed journals will continue and will require further work to ensure inclusion in processes of knowledge synthesis. The final review will give insight into why, where and how CRM are currently employed and applied to gauge the user experience of healthcare environments.

Keywords: architecture, design, creative research, healthcare, review protocol, user experience

1 INTRODUCTION

In order to realise the inclusion of user perspectives in the design of healthcare environments we see collaborative efforts in research and design fields. The review reported on in this paper intends to investigate what is known from existing literature about *creative research methods* (CRM) exploring user experience in research and architectural design processes in healthcare generally or in cancer care environments in particular. Approaching patients and caregivers as experts, means not only relying on their present and past experience, but also accessing their latent needs and offering opportunities to formulate their vision of the future. Engaging stakeholders in a creative manner can be a way to gain a deeper understanding of experience. Also, co-creating experience in design is common where it concerns product design but this approach is only recently gaining ground in architectural design.

To clarify what we mean with CRM we propose looking at elements of research and design processes according to their *direction-of-fit*, a notion coined by philosopher John Searle [1] and applied to design processes by Heylighen et al. [2]. In our search strategy CRM is one of three criteria that publications need to meet: firstly, the healthcare context as the setting; secondly, spatial experience as a primary interest; and finally CRM as part of the process or project. We go on to introduce our review case by situating it in relation to three related themes in the existing literature. Each of these themes brings

together two of the aforementioned criteria and as such provides relevant terms that are used in the search. These themes are the physical qualities of the health/cancer care environment; the growing interest in ways to make sense of a building from a multisensory perspective and our concern with the communication of the experience of the healthcare environment. Fig. 1 shows the underlying links.

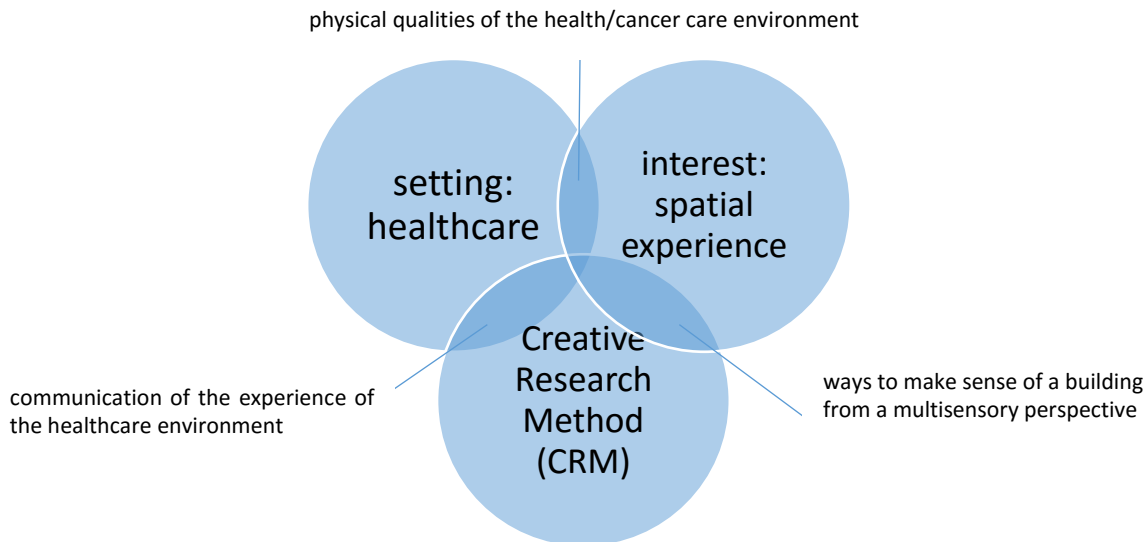


Figure 1 Showing underlying links between search criteria and themes in the literature

By providing a protocol it is our intention to offer a detailed record of the steps taken to identify relevant publications. We limit ourselves to providing descriptive insights regarding the identification and selection process. Additionally the protocol is intended as an invitation to discuss the suitability of systematic reviews in design-related qualitative research.

2 BACKGROUND

2.1 Research and design

The boundaries between research and design have long since become blurred. Examples abound of human-centred design research as practiced in the design and development of products and services [3]. Designers find ways to delve into the user's perspective integrating insights to enhance and improve design. This kind of collaborative design, participatory design or co-creation considers the user a partner rather than the subject of study [4]. In a review focussing on co-creation Degnagaard discusses the concept of *dynamic value* and illustrates how, through changing roles in design process, (platforms of collected) user experience can be seen as having potential value. Researchers, designers and users switch and share responsibilities as they shift away from traditional supplier – product relations [5].

We recognise an enriched type of communication in the use of probes [6–8] and design games [9]. Yet others stress the importance of productively combining methods such as in the dialogue-labs approach [10] and hybrid methods [11–13]. Collaborative design initiatives seem to surround us and as an umbrella term it can be considered a true buzzword [14]. Although these initiatives may not always have the exploration of user *experience* as primary goal we consider them methods that are used to creatively produce knowledge and disseminate results whilst emphasising the value of the voice of the user.

In a healthcare and design state-of-the-art review the authors acknowledge the need for CRM in healthcare settings particularly [15]: “Using creative methods to engage people potentially allows the

flattening of hierarchies that abound in the bureaucratic world of health and social care providing a voice to often marginalised stakeholders". They furthermore pinpoint challenges inherent to reviewing literature about healthcare and design research and practice. Where health research focusses on peer reviewed publications, their findings acknowledge that creative practitioners have a more varied approach including exhibition and performance, also using what they call 'journalistic' titles or unique names for research methods.

We also see research endeavours that wield arts-based terminology. There is a widespread understanding that arts-based methods in qualitative research have enabled in-depth access to the lived experiences of participants [16] and are considered particularly helpful in health research [17]. Boydell et al. phrase it as follows [18]: *"The arts in qualitative research were considered an opportunity for enhanced engagement of participants and audiences alike, a way to enrich communication and make research accessible beyond academia, and a method for generating data beyond the scope of most interview-based methods."* At the same time it has become apparent that the generative skills are not always possessed by practitioners who have traditional research backgrounds [19].

Finally there is acknowledgement for the fact that field research results are not finding a way, a suitable format or 'successful representation' (as Diggins and Tolmie call it in [20]) to be communicated to design practice. The data are often there, yet the challenge is to transform them to designerly knowledge [21]. Where it concerns architectural design multiple studies have shown that gathering and/or using data about the situation architects are designing for is not prioritised [22]. There seem to be limited examples of CRM informing spatial or architectural design processes, although Sanders and Stappers recognise an emerging architectural discipline that they refer to as 'design for serving' which takes longer views and larger scopes of inquiry [3].

2.2 Using the term creative

In this review project we attempt to span both arts-based and design research methods, hence the choice for the term *creative*. In the following section we attempt to define a theoretical framework that allows room for both of these, defining what we consider CRM.

Where there is a mental state (a belief, desire, understanding, plan, ...) it is directed at an object. This intentional state can be described as having a directedness. It is Searle who first suggests a "direction of fit" for these intentional states [1]. Applying these ideas to design process Heylighen, Cavallin, and Bianchin [2] identify a distinct difference between design and research. In research the predominant direction of fit is world-to-mind: the better the insights gained in the world match with the truth in the mind, the more success. For the design practice it is rather a mind-to-world direction of fit. There is a search for new or better solutions to problems encountered in everyday living, in the world. Knowledge is created as a by-product of an activity with a different aim. Although there is a risk of over simplifying the matter, it is maybe sufficient to claim here that the majority of elements in a traditional research process have a world-to-mind direction of fit while a design process, aimed at changing a state in the world, has a predominantly mind-to-world direction of fit.

We consider all CRM as having components with a mind-to-world direction of fit and an attempt is made to position them on a continuum (fig. 2). At the one extreme we see research that – in the interaction with users - generates artefacts, new or adapted materials that contribute to meaning making in combination with more traditional techniques. The predominant direction of fit is world-to-mind with mind-to-world elements. At the other extreme we see a design that is realised with the involvement of stakeholders through collaborative design activities. Here we speak of design activities with predominantly mind-to-world directions of fit. In the middle we see for example a case where traditional research methods inform a design process. It is expected that only a limited number of

studies include research methods with a mind-to-world direction of fit, as well as a process description of these data being utilised to inform an actual design.

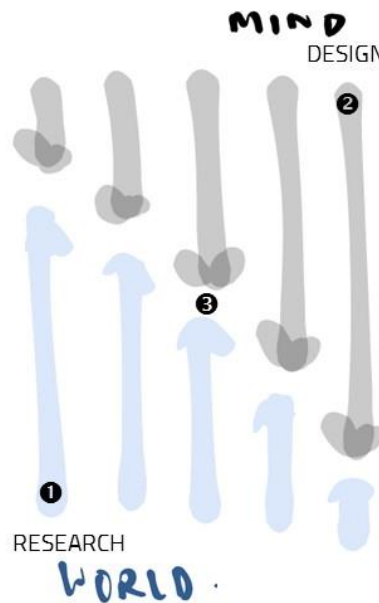


Figure 2 Positioning creative research methods on the basis of direction of fit.

- ❶ predominantly world-to-mind with mind-to-world elements
- ❷ predominantly mind-to-world with world-to-mind elements
- ❸ both mind-to-world and world-to-mind direction of fit

2.3 Introducing the review case

2.3.1 Physical qualities of the cancer care environment

A growing body of research indicates that the physical healthcare environment has a considerable impact on patients' recovery and satisfaction [23,24]. For people in cancer care facilities the emotional and physical challenges are substantial and studies have already shown that a building design that takes into account the emotional needs of the user, can indeed play a supportive role [22,25]. A significant focus in the current design of healthcare facilities has been on outcomes that incorporate research and practical knowledge in evidence-based design. It does seem however that isolated factors of the built environment that have proven, positive clinical effects are rarely considered in a holistic way [23] or are even found to be in direct conflict with each other when compared [21].

Contemporary cancer care in academic hospitals encompasses a complexity and flow that patients become a part of, increasingly as outpatients [26], expected to travel to and fro for consultation and treatment, integrating a variety of new spaces into their lives. These centres generally have a scale that stands in stark contrast to the individual experience. Furthermore, little seems to be known regarding the particular characteristics or additional sensitivities of people affected by cancer when it comes to their experience of the built environment.

2.3.2 Sensing and making sense of the building

The question of how one experiences a building is not a new one and a consideration that architects and 'users' have held in mind throughout history. However, it is in the late 20th century that an interdisciplinary shift takes place in an attempt to embrace and understand multisensory experience. We consider this 'corporeal turn' an influential concept that allows us to set a timeframe. Paterson for example recognises a return to the senses in social research from the early 1990s onwards [27]. In reviewing the evidence on the importance of sensory design for intelligent buildings Kerr states that it

is through the senses and through the application of sensory design that buildings come to life affording value to occupants [28]. He states that the expectations of stakeholders have simultaneously changed with respect to how buildings should react, interact and adapt to the natural environment and to the needs of the occupants.

Alongside the focus on the sensory we see a clear emphasis on *place* in research methods. Sarah Pink emphasises the importance of place in sensory ethnography. The place allows access to an intersubjective space that is co-created with participants [29]. Other studies also recognise the importance of experiencing place together to access knowledge, embodied knowledge that may not otherwise become apparent [30,31].

This goes hand in hand with development of tools that assist gauging or mapping the experience of the built environment such as a notation system for the senses [32] or layered scenario mapping [20]. The latter is a detailed scenario concerning spatial use over time and technical demands of a ship's bridge. The author (and practicing designer) claims the technique could also prove valuable in other professional, designed settings "*... such as hospitals where health care professionals collaborate on treating patients over time in different locations*" [20].

2.3.3 Communicating about the experience of the healthcare environment

For the patient the experience of the healthcare environment is intertwined with the healthcare service experience. To understand patients' experience it is vital to gather information about what they feel, sense and think and to facilitate a reflection on the experience [33]. There are examples of patients being creatively involved in designing the interface between user and service [34,35]. Where this includes a broad understanding of the subjective experience - physical, sensual, cognitive, emotional, kinetic and aesthetic – we have to acknowledge that it may be challenging to distinguish spatial aspects from service-related aspects. In a study of two day surgery centres findings suggest that managerial and spatial organisation are intertwined [36]. The designed environment communicates and implicitly conveys or conflicts with the hospital's care vision. Both affect patients' experience.

We see attempts to understand temporal and embodied experience of the healthcare environment [29,37,38] and examples of methods employed with people living with cognitive or sensory impairments [39]. Elements concerning the experience of the healthcare environment are also touched upon in a systematic review of the patient perspective on the quality of care [40].

3 METHODS

3.1 Objectives and research questions

As the use of CRM methods gains popularity so will the need for overviews of available literature. The objectives of this systematized review are therefore to: 1) carryout a systematic search to identify both research and design related publications using CRM; 2) examine and compare the features of the found methods; and 3) synthesise and summarise findings. On the basis of this review we intend to make an informed decision with regards to fitting methods for future research. It will therefore be crucial to include a quality assessment in a final stage [41,42].

Many key characteristics of scoping reviews are applicable to our approach however it is the intent to include an appraisal [43]. "*Simply producing a short summary or profile of each study does not guarantee helping those readers who might have to make important decisions based on the study findings*" (Pawson in [44]). As a final step of the review we will attempt to describe to what extent the chosen method of interaction with (potential) users or stakeholders is effective considering the purpose of the study or project described.

3.2 Technical details

3.2.1 Eligibility criteria

To be selected publications have to contain terms included in three search strings. The PICO and SPIDER search strategies for qualitative research as described by Cooke, Smith and Booth (2012) were used as a guideline in deciding on number and focus of search strings. These were defined as follows: (1) Setting: Healthcare Context (2) Interest: Spatial Experience (3) Design/ method: Creative Research. The study population or stakeholders were not specified although by including the term *patient* in search string 1 the population could be a deciding facet in meeting the Healthcare Context selection criteria. Search terms refer to a wide variety of care facilities. The MeSH term *delivery of care* was included here too.

The Spatial Experience string (2) ensures inclusion of studies relating to the design of the building or its interior. The aim is to find research that has been conducted to explore what happens to 'products' when they are used by people in the real world. The product being space, the architectural environment. This is also intended to include yet-to-be realised built environments. MeSH search terms *cancer care facilities*, *hospital design and construction*, *interior design and furnishings* were included here.

For the Creative Research string (3) the aim is to bring to the forefront all creative approaches or research methods where active involvement of stakeholders is emphasized. As previously described we define this based on a mind-to-world direction of fit. Due to the nature of our research and a commitment to engage with participants to gain understanding of both their unique and their common experiences, it is with this search string that we aim to incorporate studies that explicitly aim to give voice to the user. Techniques adopted in user-centered (design) research imply an active involvement and/or contribution that offers insights into their personal experience, however this alone does not imply inclusion as the mind-to-world direction of fit is the determining criteria here.

3.2.2 Information sources

Together with an information retrieval specialist decisions were made concerning the databases to search: Scopus, Web of Science, Ebsco, ProQuest, PubMed and Cochrane. To supplement the database findings a search of grey literature was conducted. The sources were chosen in consultation with all researchers. This search involved scanning titles in the following conference proceedings: Design4Health European Conference; Arts-based Research and Artistic Research Conference; Design & Emotion Conference; Include Conference; CWUAAT and The European Academy of Design. The content lists of the following journals were also scanned: Health Environments Research & Design Journal; CoDesign; The Design Journal and Qualitative Health Research. The timespan searched was 1990 –June 2016 (or inception). For practical reasons the publications have to be written in English.

3.2.3 Search strategy

Key terms are listed for the three search strings. Compiling a comprehensive list involves searching for commonly used terms in the literature. Particularly for search string three this requires an extensive and iterative process to define what terms meet the requirements of CRM as formulated in the background of this review. For every database the search is adjusted during an initial iterative process of trial and error. Searches are fine-tuned taking into account database-specific use of Boolean operators and wildcards. Fig. 3 shows an example of the search strings as they are used in the Scopus Database Search.

String 1 Healthcare Context	String 2 Spatial Experience	String 3 Creative Research		String 4 Search
patient OR wellbeing OR "well-being" OR hospital OR healthcare OR "health care" OR "health-care" OR "healing environment" OR "care design" OR hospice OR clinic* OR infirmar* OR "palliative care" OR "nursing home" OR cancer OR oncology OR Maggie* OR "social welfare" OR "hospice care" OR "delivery of health care"	"physical environment" OR "healing environment" OR "built environment" OR "interior design" OR "interior architecture" OR "spatial experience" OR "building experience" OR "physical surrounding" OR "building appearance" OR (building w/6 hospital) OR (physical w/6 architecture) OR (built w/6 architecture) OR "cancer care center" OR "cancer care centre" OR "cancer caring" OR "health* environment" OR "cancer care facilities" OR "hospital design and construction" OR "interior design and furnishings"	"co-creation" OR "co creation" OR cocreation OR "co-design" OR "co design" OR codesign OR "collaborative design" OR "arts-based" OR "arts based" OR "art-based" OR "art based" OR "co-research" OR "co research" OR coresearch OR "collaborative research" OR "arts-informed" OR "arts informed" OR "design inquiry" OR "context mapping" OR "design probe" OR "cultural probe" OR "empathy probe" OR "creative research" OR "creative practice" OR	"generative toolkit" OR "generative techniques" OR "mobile diary" OR "design charrette" OR "participatory design" OR "co-production" OR coproduction OR "co production" OR "user-centered design" OR "user centered design" OR "user-centred design" OR "user centred design" OR "design team" OR "critical design" OR "design workshop" OR "design lab" OR "critical artefact*" OR "critical artifact*" OR "people centred design" OR "people centered design" OR "human centred design" OR "human centered design" OR "multi*sensory ethnography"	#1 AND #2 AND #3

Figure 3 Search strings (as used in the Scopus Database Search)

3.2.4 Study records

The first researcher carries out all initial searches and coordinates the management of the data. A logbook is used to keep a record of every search. Each search is given an identifying code and this same code is used as a tag for the retrieved publications. These are saved to a reference manager for future reference.

3.2.5 Selection process

Duplicates are removed and abstracts, with accompanying bibliographic information are collected in a MS Word/ Excel table. These are screened independently by two researchers. Disagreements are resolved in consultation. An item is given the benefit of the doubt and included when - due to a limited amount of information - it remains unclear whether a publication meets the selection criteria. Fig. 4 is a schematic representation of the search process including the number of publications selected at each step. Abstracts retrieved from the database search are added to those selected in the grey literature search. These are selected by scanning titles only. Here too the abstracts are screened independently by two reviewers.

3.2.6 Data collection

In the first step of assessment full texts are collected where possible. Authors of the identified publications are approached when items are not available through library and online resources. We exclude reviews, theoretical and opinion papers as well as PhD dissertations. An initial data extraction overview is made while reading the first full publications. This extraction describes the following core features of the project or process described: why, what, who, where and when

A data extraction template is then made in MS Excel allowing a second researcher to extract data in an identical tabular and systematic manner. This includes an assessment regarding the effectiveness of the method.

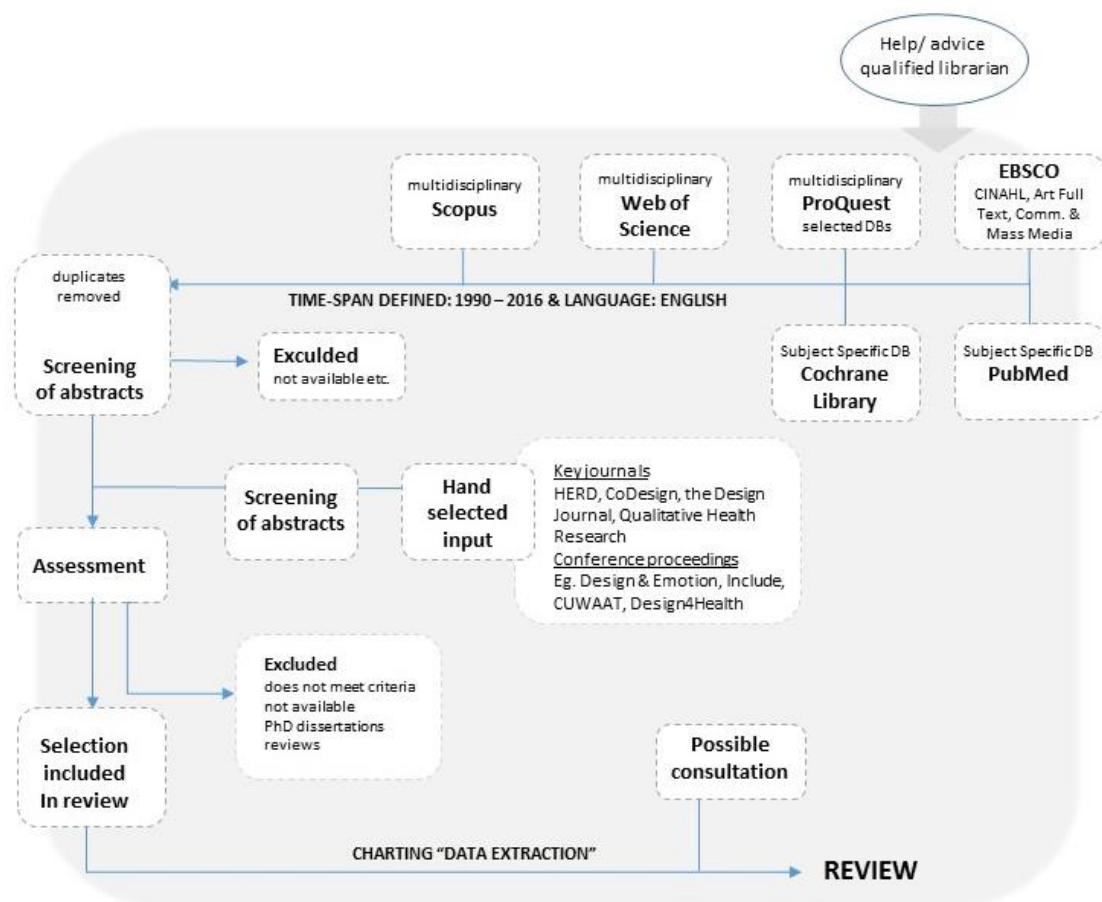


Figure 4 Schematic representation of the systematized review

4 DISCUSSION

A review protocol can potentially assist other researchers who embark on a similar review project. This protocol is the result of an iterative process that took place as we prepared our own review. As the research is ongoing we will briefly discuss some of its limitations.

The list of search terms was completed when a point of saturation was reached. However, it could be debated whether this process was indeed exhaustive. In cases it was challenging to decide whether a particular method is considered an umbrella term and is as such used as a keyword, or whether it is labelled and included through an with a general keyword such as *art-based methods*. In the case of *photovoice* and *photo-document* for example it was decided to exclude these. In particular database searches this changed the number of hits considerably. If one would decide to include as search terms specific methods the number of retrieved publications could increase considerably. At the same time it would be near impossible to then achieve an exhaustive list. It is important to keep in mind what Bettany-Saltikov says that "... the validity (truthfulness) of the review results is directly related to the thoroughness of the search and its ability to identify all the relevant studies" [46].

As Chamberlain et al. found, the use of *unique identifiers* is something that can make design projects hard to find [15]. Rather than using keywords that indicate commonality, creative practices often generate a unique name for a design method, product or project. We found that design games and methods that are developed over the course of time in different contexts especially confirmed this finding.

In the search for grey literature it is challenging to assess inclusion on the basis of the title only which implies that the manual search is sensitive to bias. For example, we realise that one item selected in the search of the grey literature would most likely not have been retrieved on the basis of our search strings (even) if it had been indexed in a database. We are also aware of the language bias introduced by limiting the search to English language results. No geographic region was specified, however the choice of databases will result in a geographical bias. In the Medline database (including PubMed) for example, approximately half of all publications originate in the United States [46].

In the initial screening of abstracts it was found that the description available was sometimes missing or inadequate to determine whether the publication falls within the scope. When researchers both indicated doubt it could well be that at this stage, due to a lack of information provided in the formal abstract relevant publications were excluded. In a few cases texts were found to not meet the criteria only once the full text had been retrieved. Assisted living for older people was a common theme that did not meet our healthcare setting criteria. There was also a case that described a process of co-design with stakeholders in such a general manner that no type of CRM could be extracted.

5 CONCLUDING REMARKS

Where in healthcare it is common practice to disseminate studies through peer reviewed journals we realise that limiting our search of grey literature to key journals and conference proceedings may not capture all relevant design-related dissemination. Doing a more extensive search of exhibitions and journalistic publications or requesting contributions from an expert group could provide additional and valuable contributions. Lastly, we are aware that our ambition is to include a broadness with relation to the source while at the same time extracting examples of a very specific nature on the basis of the CRM definition. After selecting and screening systematically, extracting the data and conducting the necessary assessment in the next step of our review project will be key.

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