



Aalborg Universitet

AALBORG UNIVERSITY
DENMARK

Gap Trailing

Scaffolding and Exploring Situated Knowledge

Øien, Turid Borgestrand; Mathiasen, Nanet; Frandsen, Anne Kathrine

Published in:

Universal Design 2024: Shaping a Sustainable, Equitable and Resilient Future for All

DOI (link to publication from Publisher):

[10.3233/SHTI241010](https://doi.org/10.3233/SHTI241010)

Creative Commons License

CC BY-NC 4.0

Publication date:

2024

Document Version

Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Øien, T. B., Mathiasen, N., & Frandsen, A. K. (2024). Gap Trailing: Scaffolding and Exploring Situated Knowledge . In K. S. Fuglerud, W. V. Leister, & J. C. T. Vidal (Eds.), *Universal Design 2024: Shaping a Sustainable, Equitable and Resilient Future for All: Proceedings of the Seventh International Conference on Universal Design (UD2024)*, Oslo, Norway, 20-22 November 2024 (Vol. 320, pp. 239-246). IOS Press. <https://doi.org/10.3233/SHTI241010>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Gap-Trailing: Scaffolding and Exploring Situated Knowledge

Turid Borgestr nd ØIEN^{a,1} Nanet MATHIASSEN^a, and Anne Kathrine FRANDBSEN^a
^aAalborg University, BUILD

ORCID ID: <https://orcid.org/0000-0003-1163-1038>

Abstract. User knowledge and lived experiences are pivotal in bridging the gaps between the environment and individuals causing disability. Examples of best practices help us refine and develop the theoretical groundings of UD in academia and the practical implementation in design practices. Yet best practices are also needed in our methodological approaches across research and practice concerning how to work with and in the intersection of people and environments. The approach of the researcher is pivotal when facing individuals with diverse physical or cognitive abilities, but also when exploring the role of the environment. Architectural anthropology is one way of combining tools and mindsets that could be useful when studying more complex or nuanced processes, e.g., aging or impairment. In this paper, we focus on the knowledge of people who are experiencing incipient vision loss and the mutual and dynamic interrelation of (dis)abilities between the individual and their (home) environment. In the project entitled “The Role of Lighting When Vision Changes” we explore the phenomenon of vision loss, and in this paper, we provide a critical-reflective perspective on how fieldworks can contribute to this exploration. During the winter season of 2023-24, walk-along interviews were conducted in the homes of 37 participants 55+, including 10 normally sighted and 27 visually impaired (still using their residual vision). Based on transcriptions and fieldnotes, as well as reflective notes from subsequent joint discussions among the researchers, this paper discusses the role of architectural anthropology in the project and how it can scaffold new socio-material explorations as well as critical reflections.

Keywords. Universal Design, Reflective Practitioner, Architectural Anthropology; Incipient vision loss; Domestic Lighting

1. Introduction

Universal Design (UD) holds ideological and strategical foundations to bridge the gaps causing exclusion and disability between individuals and the surrounding physical and social environment [1]. In the 40+ years of UD, the field has spread and cultivated, in functionalistic, pragmatic, positivistic, normative, and critical theoretical applications [2]. In a call to build a more robust theoretical foundation of UD Steinfeld and Maisel [3] stress the practical implementation and use by design practices: “...we need to start with an understanding of the type of information that designers find useful”. User knowledge and -representation have been focal, by encouraging *participation* in and by empathetic design in design practices and design methodologies [4], or more specifically the way user-knowledge represented in narratives can provide insights into everyday life and the

¹ Corresponding Author: Turid Borgestr nd Øien, tuo@build.aau.dk

opportunities and barriers encountered by the users [5]. Moreover, this context-specific knowledge and episodic experiences with users in specific situations act as eye-openers or metaphors to guide and establish a UD mindset in a design process [5]. Yet, when situated user experiences are disseminated [6], knowledge of the physical environment is often underrepresented, and in the fields of design and architecture, there have often been an instrumentality associated to user knowledge, also seen in UD's origin in product design, physical ergonomics, and part of a technical rationality in a problem-solving regime [7]. The instrumentality is also seen in the general understanding of human vision in architecture, as static and neutral. However, this is far from the actual diversity of visual abilities among us: Current data from Denmark show that while only 1% are diagnosed with severe visual impairment or blindness [8], our vision changes through life and 50% use spectacles from the age of 12 years, increasing to 90% from the age of 60 [9]. Designs for the visually impaired have often been provided as special solutions and assistive technologies focusing on the diagnosis and lighting recommendation for the elderly to increase the levels [10, p. 438]. Moreover, the physical environment has been considered a neutral or rather passive parameter in the rehabilitation process of the visual impaired [11].

To scaffold the situated user knowledge so pivotal for the UD researcher, we introduce a method of gap trailing and discuss how to enhance exploration of the dynamic relations and gaps between individuals and their environments.

2. Theoretical framework

Studying both sides of the individual-environment-gap [1], requires input on the situated knowledge. Lived experiences are situated in the bodies of the individuals and in the given time and place [12], as an eye is situated in a specific body and mind, and in a specific social and physical context, the sociotechnical mesh of the everyday life. People are not passive receivers of comfort [7] nor passive receptacle for sensations, but engage in "active and interactive, conscious and unconscious processing" of their environments [12, p.47]. We need to "recognize the sensorial in a way that challenge the static understanding of the 'regular user' and rigid design standards" [13, p. 15]. Yet, as able-bodied people do not know the experiences of the disabled-bodied, the expert knowledge embodied in people of different abilities can enrich our knowledge and understanding regarding the built environment [14]. Tacit knowledge embedded in technologies and environments [15] and embodied in our bodies and everyday practices, can be explored, made explicit and be a source of expertise in social interactions, as seen in situated learning [16] and included in the process of scaffolding that involves what can be achieved by the help of others [17]. In the fieldwork, we also need to acknowledge the knowledge embodied in the researcher and embedded in his/her methods: to become aware of our implicit knowledge a priori, and our tacit knowledge enacted in and resumed to after the fieldwork, as *reflection in and on action* [7]. A re-positioning, not in the high ground problem-solving of technical rationality, but in an exploratory and reflective mode of framing the problems and unveiling the uncertainties of the "swampy lowlands" [7 p. 42]. The "art" of this practice is two-folded, involving both *knowing-in-practice*, "the intuitive judgement and skill, the feeling for phenomena and for action" and the *reflection-in-action*, when phenomena are perceived incongruent with the intuitive understandings of the practitioner, involving "surfacing, criticizing, restructuring, and testing" [7 p. 241]. Furthermore, the in-depth ethnographic trials of the researcher are

animated by the topographies, bodies and lives they cross: “Trials embed the movement which both constitutes them, and which provides a method for their investigation” [18], ethnographic fieldwork embeds and reveals the *navigational skills* of the researcher, allowing sensitivity and improvisation to “assess, position and re-direct its course” [19]. The verb *trailing* means to be drawn along behind someone or something, or to walk or move slowly or wearily [20], and in order to explore big issues it is often necessary to focus, in-depth, in particular and local conditions, “large issues explored in small places” [18]. The specific focus on the built environment in these inquiries can be supported by architectural anthropology, an approach grounded in a phenomenological understanding of space, reflecting a criticality of social relations and meanings materialized in our built environments [21], as well as a general focus on the different temporal and physical engagements enabled by architecture. Architects employing anthropology have been criticized to lack the reflexivity and critique embedded in AA [22], nevertheless, as a mode of inquiry, AA can be a tool to nurture exploratory and self-reflective approaches, conduct fieldwork and critical analysis of the empirical data [23]; a means to *understand* a complex phenomenon, as “a lens for zooming in and out across physical, social and temporal scales” in indoor environments [24]; or for developing rich descriptions as seen in studies of the everyday life of people living dementia [25].

3. Methodology

The project entitled “The Role of Light when Vision Changes” aims to implement elements from low vision rehabilitation, concerning involvement of users as experts in their everyday lives and a flexibility and elasticity of empirical methods, to housing research and lighting design. The first of three work packages (WP1), includes fieldwork exploring the phenomena of vision loss and the role of light, from conversations and observations with participants in their home environment. The findings will later inform the development of guiding principles and design parameters for more inclusive processes and lighting solutions.

A protocol for WP1 was developed and pilot-tested in the summer of 2023, including an interview guide, a model for mapping the spatial and illuminated environment, and rules of thumb for conducting the walk-along interviews as well as the measurements [26]. The ethnographic inquiry involved the observations and experiences from planning, executing, and resuming the field visits. Reflections in action [7] on how to navigate the interview between the individual, other family members, the overall scope and smaller themes occurring in the conversation - e.g. balancing the narrative of the informant, the observed practices, and the situations within the physical and social context. And reflections on action after the visit on how the elements of the protocol supported the inquiry and any anomalies related to the interview and field visit.

52 participants (22 male), 57-90 years (mean age 70), signed up for WP1. 12 were excluded due to overrepresentation of normal sighted, 2 were assessed to be in too poor a condition to participate, and 2 withdrew of personal reasons. 37 participants (13 male), 57-90 years (mean age 71), 10 reported normal vision and 27 visual impairments. The participants were visited in their homes by one of the researchers and a PhD scholar from October 2023 - March 2024, visits lasted for 1-2 hours. The project has been assessed by the ethical committee as non-invasive and not obliged for further validation. Informed consent has been obtained and the empirical material has been anonymized. The interviews are transcribed and categorized and have together with fieldnotes and

transcriptions from our subsequent shared reflections informed the analysis on the position and contribution from participants and researchers in the fieldwork.

4. Findings

The findings presented below include situations and narratives from the fieldwork representing knowing-in-practice, reflection-in-action, as well as elements identified as part of our posteriori shared reflection.

4.1. *To be present and listening*

“You need to be totally present in the situation, with full focus and all receptions tuned in at once... I guess that's why you're so tired afterwards.” This reflection was shared by one of the researchers in a meeting discussing the fieldwork across our 37 cases. The fieldwork sometimes started before we had entered the home, with participants sharing their views on lighting or their eye condition already in the hallway. The participants had themselves signed up for the project, and therefore knew the theme of vision and light, and, in most cases, had thought of insights they wanted to share in the project. Prior to the visit, we learned about their self-reported visual function (as visual impairments or any issues regarding lighting), sex, age, and address. Before the first visit, they had talked to one of the researchers on the phone to clarify inclusion criteria for participation and to schedule the visit, and we had collected plan drawings from municipal archives or databases. Sometimes a Google maps street view was used to get an impression of the area, and building on these initial mappings, as well as observations from entering the housing area or street, first impressions were layered in the mind. Entering by car, bicycle, and /or public transportation, passing a parking lot, garden, or entering a hallway directly from the street. Yet, the moment the door was opened, another mode was activated. As the experiences of the participants were the main source of knowledge, already the first encounter was important, and we soon experienced that this researcher-role was mainly to follow along, keep all channels open, to observe and to listen.

4.2. *Situatedness*

In addition to the *semi-structured interview guide* - with questions on vision; lighting qualities; lighting practice and workarounds; and outdoor/common areas - the main *tool* for the interview was the physical context we were situated in together. The sensitivity to the physical context is part of the tacit knowledge that we, trained as architects and housing researchers, bring to the field visit. However, in this case it was used to scaffold the contextualized user knowledge, asking in on their visual and multisensorial experience of the environment: “What does your condition mean, in here for example?”, “Do the lines of the floor wobble in here as well?”, “How do you see my face/hand/this photo?”, or “Are you still able to orientate, do you see the things in the adjacent room?”

When moving on to the questions on their domestic lighting, the interview often shifted into a walk-along interview. Prompted by descriptions of activities or encouraged by us to show the situations at stake, we walked around in the house or apartment, exploring the light and their vision further: Leaving the interview guide at the table, and instead using our bodies and a luxmeter to assess the situation. Re-enacting situations, e.g. of knitting or handicrafts, how they were seated, how the light was positioned in

relation to the fabric and their eyes, in order for us to conduct the lux measurement of this specific activity. These inquiries felt most convenient when the situation included or had included some problem-solving and adjustments to find ‘the right setting’, or if they had situations not working for them. Then they were able to describe the situation more in depth and with reflections on the embodied knowledge in the very demonstration. Some of the narratives regarded embodied ways of moving across rooms: “Of course I know my own house well, but I can also feel that there are certain places here... Like, if I go that way [into the living room], I always make a short stop on this doorstep. I don't know why I do it... but somehow, I feel... 'ok, here I am'”, or demonstrated in the situation, as the same participant showing her problem-solving attempts gone wrong in front of the bathroom mirror: “When I put lipstick on, the light shines on the sides of my face and not on my mouth. It is the same with the magnifying lamp and the makeup light, it just adds more light on my ears, and it gets completely dark where I need it... So, I haven't found the solution”.

4.3. *Linking to different times and places*

At times, a conversation starter was needed, and as the number of field visits conducted increased, there was also a range of reference scenarios that could be used to compare to the present field visit. This could also be asking on whether they had experienced something else in other settings or in other places. When they linked these kinds of experiences, the shared *exploration* 1:1 was not possible. However, the examples could illustrate the use and perception of different lamps throughout the day “that lamp provides better guidance of the space from the afternoon on, while during the day the light does not provide any guidance regarding my position in the room”. In these cases the interviewer could try to ask in on the situation: “Because there is too much daylight that interferes?”, where the participant replied: “Yes, then the light comes in from outside and from the lamps and then... [gestures the mix with her hands]... while in the evening I know that the lamp is hanging there, and then I can read the room in a different way” or later the describing the sunset: “When the sun is low and shines into the living room, I can suddenly *see* the colors of our paintings... I prefer to sit with my back to the sun, so the light comes from behind, so it lights up those objects and things that I want to see...”. Other participants referred to public places, work environments, or to the school of the grandchildren, both regarding situations where the lighting situation disabled them, or the opposite where the light was working particularly well for the situation or activity taking place.

4.4. *Navigating: Re-setting or finding the path when lost*

The engagement of the participants varied a lot. Not all participants had reflections or experiences directly related to light and vision, and some needed some help to initiate their considerations on the subject. Our shared mid-way reflection meeting showed that the most challenging interviews were when the participant did not have any comments than “It's ok, it's fine with me” or “I have not thought about that” without any additional reflections. Furthermore, it turned out that we could not in advance know who was experiencing challenges regarding their lighting as there were participants with visual impairment coping well and participants with normal vision (corresponding to their age) that experienced huge frustrations.

In cases like this, snowballing and trying to ask in on things in the surroundings could often guide the conversation. Asking in on their everyday practices, of how they used or perceived their light, or their preferences regarding the specific lamps in the specific space and situation. Our shared mid-way reflection illustrated the episodic accumulation of knowledge that was enabled across the field visits, but also from previous experience: As one of the researchers had conducted more visits than the other two at the time of the meeting and had previous know-how of conducting narrative interviews with visual impaired participants. Sharing her reflections enabled discussions on researcher position and the use of her own perception in supporting the participant in sharing his/her embodied knowledge, e.g. in a situation, describing what she saw and relating it to the narrative of the participant “So, if I see it like this..., for you it is more blurry?”

5. Discussion

Knowing-in-practice and reflection-in-action are motivated by an urge to cultivate more divergent thinking skills and to match the complexity, uncertainty and uniqueness of the real-life situations [7] we are studying in fieldwork. Both in order to scaffold the situated knowledge of the participating individuals, but also to acknowledge and describe the use of our tacit practice knowledge as research practitioners of architectural groundings. One of the places that the incongruencies have been present has been our methodological framework and the tools. It turned out that due to the complexity of interests when positioned between the social and the physical and wanting to embrace the dynamic interaction of the two, we needed to reduce complexity of our methods. First reducing the interview guide to a more basic three question scheme [26], and later focusing in on the walk-along interview and navigating the conversation. In our research design for the fieldwork, we believed that taking the photos would be an important aspect of conducting the observations, but it turned out to be a relief just to be focused on the situatedness accompanying the participants as the experts of their life and attuning to their narratives and demonstration. Photos were taken by our Ph.D. scholar or assistant, and a small pilot conducted by one of the researchers of including a photo-elicitation-element in the interview did not support the trajectory of the sensory and spatial exploration. Even though the photo could potentially have provided a more focused conversation of elements in the space, it felt contrived to make them conduct this limitation, as we were situated in the setting with them and the conversation was developing naturally from a spatial and multisensory interaction, where the photo would reduce this to only the visual.

The overall objective to understand the complex phenomena of the GAP [1], yet in this paper to assess what methods to be used to do this, resemble Knowles' notion of exploring large issues in small places [18]. All in all, the small and safe character of the home turned out to be a good site for exploring the large issue of vision changes. An impairment or problem was in many cases a key to explore situational knowledge, yet a causal relationship between visual impairment and lighting issues was partly disproved, as needs and preferences varied, and some of the visual impaired experienced much less frustrations and challenges regarding light than some of the normal-sighted participants. These insights would not have been discovered had we only involved one of the groups. In collaboration with the participants, we are interested in the situated knowledge of their social and sensory everyday lives. Beyond being situated in a specific body with specific abilities, the participants personal narratives show that the relation between the

individual and their environments, are dynamic and changing, they are much more than passive receivers of indoor comfort and their environments are more than neutral backgrounds to their lives. Thus, for many, it is only when the changes and issues arise that they notice the actual role of light.

One could argue that we are not very precise instruments for measuring the social nor the physical environment, as we are shifting focus from the one to the other. On the contrary, as we are not in the problem-solving technical-rationality-mode, but trying to understand a more complex phenomena, we are reflective instruments attuned at scaffolding the embedded and embodied knowledge, measuring the interaction, and to critically assess and discuss what could be understood situationally regarding vision and light. In this situatedness, the informants are key to parts of our own sensory knowledge that we have not yet experienced bodily or developed a vocabulary to describe. Their narratives enrich our understanding of more complex workings of our vision and different versions and roles of lighting in people's everyday lives. Eye-opening narratives that become part of our knowledge [5] – in our case on the multiple and dynamic visual perception. An eye-opening shared with some of the normal sighted participants, where the sensory perception of their vision and its relation to lighting, task, and use, until this project participation was a more or less unarticulated and unconscious mechanism. Accordingly, we are still novices in combining methods for studying both the social and the material aspects of the field. We are not anthropologists, and we are re-positioning as architects, yet architectural anthropology has helped us navigate in our field visits and critically assess the empirical investigations [24] individually in each of our cases, as well as across the experiences of the three individual practices. As the output of the inquiry is dependent on the engagement and openness of the participant, the fieldwork requires attention and navigational skills on positioning, scaffolding, listening, and navigating – trailing the trajectory of the field visit.

The issues and complex socio-material phenomena situated in the GAP between individuals and their environments, require small-place studies [18] that allow critically assessment and adjustment of the methods for scaffolding situated knowledge. The situated knowledge will in the further analysis be combined with quantitative data of light measurements, luminaire mappings, and vision assessments, that can enable comparison across cases and results that can be translated to other studies, but we will keep insisting on the important situated learning and knowledge. For this specific project, we hope that we can help qualify and challenge existing design parameters with a more diverse understanding of vision and light and be an eye-opener for other practitioners across the traditional building process, from clients, designers, and manufacturers.

6. Conclusion

In this paper we have introduced the method of gap trailing, as a way to scaffold situated user knowledge and to enhance exploration of the dynamic relations and gaps between individuals and their environments. The phenomena of vision loss and following changing preferences and demands for lighting have proved to be a fruitful case for gap trailing, where issues regarding light or vision enabled participants to explore and unfold their abilities and experiences in relation to their everyday environment. Also, the researcher's tacit embodied knowledge is engaged in these inquiries, and the shared reflections posteriori accumulated knowledge across the cases and across the researchers. Articulating one's own experiences and reflections as well as tuning in on the other

colleague's narratives adds to the lens of investigation. As we move from novel to more experienced gap-trailers, we slowly build a practice knowledge that we hope to be cultivated and shared across the field of UD researchers.

References

- [1] Lid IM. Developing the theoretical content in universal design. *Scand J Disabil Res.* 2013 15:203–15.
- [2] Heylighen A, Van der Linden V, Van Steenwinkel I. Ten questions concerning inclusive design of the built environment. *Build Environ.* 2017 114:507-517.
- [3] Steinfeld E, Maisel J. *Universal design: Creating inclusive environments.* Hoboken: John Wiley & Sons. 2012.
- [4] Sanford JA. *Universal design as a rehabilitation strategy: Design for the ages.* New York: Springer Publishing Company. 2012.
- [5] Grangaard S. Øjenåbnere og erfaring i universelt design. *Nord J Archit Res.* 2016 28(2):59-81.
- [6] Lid IM, Solvang PK. (Dis)ability and the experience of accessibility in the urban environment *ALTER Eur J Disability Res.* 2016 10:181–194.
- [7] Schön DA. *The reflective practitioner: How professionals think in action.* New York: Basic Books 1983.
- [8] Øjenforeningen. Hvor mange svagsynede og blinde er der i Danmark? <https://ojenforeningen.dk/artikler/hvor-mange-svagsynede-blinde-er-danmark>. December 2014, Accessed 10.06.2024.
- [9] Louis Nielsen. Hvor mange bruger briller? <https://www.louisnielsen.dk/stillede-sporgsmaal/hvor-mange-bruger-briller>. Accessed 10.06.2024.
- [10] Hansen EP. *SBI-anvisning 272. Anvisning om Bygningsreglementet.* København: Statens Byggeforskningsinstitut. Aalborg Universitet. 2018.
- [11] Øien TB. A study of environmental factors in low vision rehabilitation. *Frontiers in Rehabilitation Sciences.* 2022 16(3):829903.
- [12] Øien TB, Grangaard S, Lygum VL. Exploring the dynamics of architecture with the concept of affordance. *Philosophical Psychology.* 2023: 1-20.
- [13] Goldhagen SW *Welcome to your world. How the built environment shapes our lives.* New York: HarperCollins. 2017.
- [14] Heylighen, A, Van Doren C, Vermeersch P-W. Enriching our understanding of architecture through disability experience. *Open House International.* 2013 38(1):7-19.
- [15] Fors V, Bäckström Å, Pink S. Multisensory Emplaced learning: Resituating situated learning in a moving world. *Mind, Culture, and Activity.* 2013 20(2):170–183.
- [16] Lave J, Wenger E. *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press. 1991.
- [17] Vygotsky L. *Mind in society: the development of higher psychological processes.* Cambridge: Harvard University Press. 1978.
- [18] Knowles C. *Flip-flop: a journey through globalisation's backroads.* London: Pluto Press, 2014.
- [19] Øien TB. Methodological considerations in collaborative processes: A case of ethnographic action research. *J Proj Manag.* 2023 16(1):165-184.
- [20] Oxford Languages <https://languages.oup.com/google-dictionary-en/>, accessed 10.06.2024.
- [21] Campos-Urbe A, Lacomba-Montes P. Embodiment takes command: re-enacting Aldo and Hannie van Eyck's homelife. *J Archit.* 2023 28(3):482-509.
- [22] Ingold T. Foreword. In: Stender M, Bech-Danielsen C, Hagen AL, editors. *Architectural Anthropology: Exploring Lived Space.* Oxon: Routledge, 2022:xiii-xviii.
- [23] Stender M. Towards an Architectural Anthropology-What Architects can Learn from Anthropology and vice versa, *Archit Theory Rev.* 2017 21(1):27-43.
- [24] Øien TB, Rasmussen MK. Mould, microbes, and microscales of architecture: An anthropological approach to indoor environments. In: Stender M, Bech-Danielsen C, Hagen AL editors. *Architectural Anthropology: Exploring Lived Space.* Oxon: Routledge, 2022:62-75.
- [25] Van Steenwinkel I, Van Audenhove C, Heylighen, A. Offering architects insights into experiences of living with dementia: A case study on orientation in space, time, and identity. *Dementia.* 2019 18(2):742-756.
- [26] Øien TB, Frandsen AK, Mathiasen N, Ruohonen SM, Bredmose A *Situating the light: Methodology for sensory and spatial fieldwork.* IOP Conference Series: Earth and Environmental Science 1320, 2024 012030.