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ARCHITECTS AND VISUALLY IMPAIRED PEOPLE: ANALYSING TWO WAYS OF TALKING

ABSTRACT
While architects think and work in a visual way, people who are visually impaired pay more attention to other senses and, as a result, are able to appreciate other spatial qualities. Because of this particular ability, our research seeks to explore whether and how visually impaired persons can be involved as expert in a design team. However, the disparity between how architects and visually impaired people talk about the built environment poses major challenges to develop a genuine dialogue. The study reported in this paper aims to gain insights into how to enhance communication between both groups by comparing and contrasting two independent data sets: four in-depth interviews with architects, and four with visually impaired people. Through normative analysis of the spoken word, we identify what common ground exists and what the central differences are between both groups. On this basis, we discuss potential elements that may challenge or facilitate the dialogue between architects and visually impaired people. While the study focuses on architecture and visual impairment, the findings may be transferable to communication between designers and non-designers in general.

Keywords: architectural design, communication, dialogue, user expert, visual impairment

1 INTRODUCTION
The study reported in this paper is part of a larger research project, which explores whether and how dialogue between architects and persons with a disability can improve the multisensory qualities in architecture [1]. Research has shown that architects tend to design their own image and often centralise their own experiences of spaces, marginalising and negating the experiences of others [2]. In our quest to understand dialogue, we are exploring how two groups of people—architects and visually impaired people—talk independently about the built environment. It is speculated that the information gained through this exploration will aid in involving more inclusively the experiences of others in the design process. Ultimately, our goal is to transform one-way communication characterising existing participatory design methods into a genuine dialogue [3], where both parties can learn from each other through extensive and symmetrical interaction. A first step towards this goal is to investigate the challenges of this dialogue on the level of communication.

Architects, like other designers, think and work in a visual way [4], as exemplified by their frequent use of visual means to express themselves (*e.g.*, drawings, models) and their ability to describe artefacts and spaces in detail. Visual dominance is striking and disguises the importance of the other senses. Visually impaired people, on the other hand, must rely on other senses and consequently have learned to pay more attention to haptics and sound [5]. As a result they can appreciate spatial qualities or detect misfits that architects may not be aware of. Generally speaking, because of their specific interaction with spaces, persons with a disability develop experiences and insights that are of potential interest for architectural design. Their specific expertise gained through bodily experience is critical in directing the (re)design of accessible buildings [6]. Furthermore, it is speculated here that this could potentially inspire innovative design concepts. The overall aim of the long-term research project is therefore to investigate whether and how persons with a visual impairment can be involved as expert in a design team.

However, the disparity between how the built environment is spoken about by architects and, on the other hand, by visually impaired people, results in major challenges when they need to communicate. Therefore this paper aims to gain insights into how to enhance communication between architects and visually impaired people. We do this by looking at two data sets: a series of interviews with architects, and a set of interviews with visually impaired people. Through normative analysis of the spoken word we explore what the central differences and common ground are between both groups. We present four data derived themes for each group and identify potential areas that may challenge or aid in creating a genuine dialogue.

2 BACKGROUND

In recent years the design community has evolved towards greater inclusion of other people in designing and creating artefacts and spaces. This means involving others in assessing designed artefacts [7], having anthropologists interpret how people perceive and interact with artefacts [8] designing collaboratively with other people [9], or developing personas based on research into the average user [10]. By way of background for our study, we identify the essential ingredients of dialogue, which provides a backdrop to why and how our study explores ways of talking. This is followed by a review of research on communication between architects and non-architects, and among architects within a design team. Finally, we explore what it means to be visually impaired and speculate on how this may inform a person's way of talking.

2.1 What is dialogue?

Dialogue is a method of exchange that enables sharing and autonomy simultaneously whereby disparate parties explore and unfold without any attempt at changing the other party [11]. Dialogue facilitates a critique of various habitual and material conditions of the particular persons involved. In this way, engaging in dialogue means that the deeply rooted basic nature and worldview of these persons is revealed. Two aspects are worth considering here: making meaningful connections and preserving identities.

When entering into a dialogue, connections are made by engaging collaboratively with people towards a common goal, *e.g.,* a design project. Collaboration is about cross-fertilizing ideas and interweaving activities that involves individuals using their existing knowledge [12]. Mutual respect and genuine concern for others must also be created [13]. In other words, creating dialogue requires symmetry, where all parties are getting to know each other's abilities, perspectives, habits, circumstances and values.

Dialogue is the vehicle used to filter and transform information while preserving the identity of the different parties involved [14]. This preservation of identity involves respect for and a willingness to be open to differing viewpoints. In order to promote this kind of respect, it is important to understand the parties involved, which is likely to require some level of enculturation for each party [3].

2.2 Talk in general

While dialogue can involve multiple levels of communication; the central medium in dialogue is talk. When different parties enter into a dialogue, making meaningful connections is not trivial: communication and talking is a complex activity connected to a multitude of factors, such as personal and socio-cultural factors, to mention two basic categories.

Personal factors can facilitate or hamper the development of an understanding within a group and/or domain. The more one knows about a topic the more semantically specific language becomes, whereas novices typically use a more descriptive language. In general, the way things are articulated is governed by their cultural capital [15]: that instead of developing a uniform understanding or vocabulary of something, individuals link domain specific language to what they already know. For example, an architect builds upon his/her understanding of the domain throughout time [16]. The personal language category is thus connected to involvement in a specific domain.

Socio-cultural factors include involvement with a subculture or smaller group of people. In natural conversation pairs or groups tend to create a way of talking that can be very specialised or even exclusive. Additionally, the level of semantic specificity and the way words are interpreted may vary depending on how confident each party is with the topic being discussed.

2.3 Architects talking

In order to investigate the particular ways in which architects talk, it is important to understand communication in a design environment in general. Sonnenwald [17] identifies four communication roles in design situations: organizational, task, discipline, and personal. The latter two align directly with our interest in understanding the knowledge of professional architects and other people. Sonnenwald defines the 'intradisciplinary star' that remains within one field of expertise and the 'interdisciplinary star' that interacts with people who possess knowledge belonging to other disciplines. She also identifies the need for an 'interpersonal star', who can facilitate interaction among individuals in the design team by getting to know each other in a more than professional way.

In this way team members are more at ease when discussing subjects that may be uncomfortable or difficult.
Luck and McDonnel [18] investigate the early stages of the design process when architect and client exchange their ideas, vision and desires about a design before making any sketch or drawing. They use the concept of the 'virtual building' [19] to describe the social construction of a design through verbal conversation. This virtual building is a common model that exists in the minds of all parties involved, *c.q.,* architect and client. It is known that people in general draw upon their common virtual model. Luck and McDonnel conclude that architects, through conversational strategies, must activate project participants (*e.g.,* stakeholders such as clients or users) to gain a better common understanding of the design and to raise discussion to a representational rather than purely functional level. Through conversation, they contend, architects need to teach the participants to think and talk more like an architect [18]. Franck and Lepori [20] describe several cases where future users and user committees indeed learned architectural and planning terminology in order to present their wishes and proposals to a professional and political audience. Luck's [21] later work investigates strategies that architects adopt to aid participants in interaction during participatory design situations. To engage participants in design discussion, the architects in her study use the strategy of 'expert facilitation': they encourage a quick understanding about the subject discussed by making it relevant to the participants'. In addition, clues are provided in order to develop skills that others would have acquired over a longer period of time. In Sonnenwald's terms, the more experienced designer is taking up the role of 'interdisciplinary star'.
In investigating design talk, Dong [22] adopts a latent semantic approach to model congruent thinking and distributed knowledge representation in design teams. He states that language and the meaning of words facilitate bridging gaps of knowledge between what individual team members know and the larger body of experience held by the team. In addition, Dong asserts that efficient team dynamics requires a convergence of knowledge characterised by the acquisition of a common semantics. In other words, a shared understanding of the design and designing is crucial if team members are to enter into a dialogue.
Besides spoken language, architects communicate through drawings and sketches, when designing independently or in a team. Van der Lugt [23] reports on the different functions of sketching in design tasks: thinking sketches support the individual thinking process; talking sketches do the same for group discussions; prescriptive sketches communicate design decisions to persons outside the design team; and storing sketches archive design ideas for future reference. Unlike what may be expected, talking sketches do not serve as a medium for dialogue in design, likely because they are highly codified [24]. Interestingly, van der Lugt reports that designers tend not to re-interpret each other's sketches during the design process.
In summary, Sonnenwald's, Luck and McDonnel's, and Luck's studies of communication focus on interaction between people, whereas our study concentrates on the specific use of language. As such, their work is valuable for aiding in constructing dialogue, but less so for understanding semantic nuances. Dong's work looks more closely at language and the meaning of words, and asserts that semantics can be a vehicle to bridging gaps in conversations. Finally, van der Lugt reminds us that design language involves more than just words.

2.4 Visually impaired people and talk

Before zooming in on how visually impaired people may talk, it is useful to define what we mean by visual impairment. Visual impairment is a naturally occurring phenomenon one is born with or afflicted with over time. The difference between visually impaired people, blindness or people with low vision is sometimes confusing; however, the term visually impairment refers to people who lost vision during or close to the beginning of their life. In 1977 the World Health Organisation (WHO) established the international standard of visual blindness and visual impairment. WHO distinguishes between persons who have low vision from those who are completely blind. The latter's visual field is 10 degrees or less (the norm being 180°), or their visual acuity amounts to 1/20 or less (*i.e.,* they would have to stand 1 meter from an object to see it with the same degree of clarity as a 'normally' sighted person could from a distance of 20 meters). Another formulation is that any person whose visual acuity is worse than 20/400 in the better eye with best correction or with a visual field of 10° or less is considered legally blind. Low vision, on the other hand, is defined by best-corrected acuity from 20/70 to 20/400 in the better eye with corresponding visual field loss to less than 20º in the better

eye with best possible correction. For example, a person with tunnel vision can have a visual field of 18°, which means s/he still sees parts of the visual field very sharply, while being considered legally blind. In addition, there is a range of visual impairments—either cerebral or eye-physical in nature, caused by either congenital or acquired factors—that further adds to the diversity in visual perception among visually impairment persons. Some have residual vision while others have no vision at all and at the very most can perceive light. The former try to obtain as much information as possible from their remaining visual perception, whereas the latter pay more attention to other sensory information.

Studies in anthropology point out that culture can emerge and sustain itself based on disability [25]. The implications of better understanding a visually impaired way of talking reminds us, first, that because of limits with vision these people may not be able to see visualizations, let alone interpret or comment on them. Second, being part of a specific culture is likely to affect how visually impaired people talk. There is some research on how visually impaired people talk; however, the details are inconclusive and sometimes contradictory. For instance, Hatwell [26] completed a study with congenitally blind children, which reveals how congenitally blind may compensate with language for their lack of vision (*i.e.*, are more verbally articulate than seeing children). However, this was tested by Dimcovic [27] who found that the link between verbal-logical tasks and general verbal competence could only partially be confirmed. Therefore, it is not known whether or not visually impaired people can be considered to have a higher language competence.

How visually impaired people communicate is a topic of considerable interest in research. It is generally considered that people with little or no vision receive visual information differently, making it less important than for seeing people. Amedeo and Speicher [28] explain that visually impaired people are less likely to apprehend non-verbal behaviour (*e.g.*, gestures, body language) to the same detail as sighted individuals. Non-verbal behaviour and typical aspects of interpersonal communication can be unclear or absent for visually impaired people. For instance, seeing people use proximity to reinforce their intentions, relationships, and sometimes purposes of exchange [29]. As a result, how something is communicated by a visually impaired person may differ from how a sighted person communicates. For example, tactile (Braille) and aural sensory information may be used alternately to or in conjunction with verbal talk. And when visually impaired people communicate with seeing people, communication is typically focused on the language itself, because seeing people do not know tactile systems and visually impaired people may not be fully attuned to non-verbal behaviour.

3 RESEARCH APPROACH

To understand the perspectives of architects and persons with a visual impairment, our study looks into the details of how each group expresses themselves, including differences and similarities in how they talk about their impressions of spaces. The following subsections outline our procedures for data collection, the resulting data and how they are analysed.

3.1 Methods & data

Our study is based on comparing two unrelated data sets. The first data set covers a series of 18 interviews with architects/educators completed for the purpose of investigating broad issues in architectural design practice and teaching [15]. The second set is composed of 22 interviews with visually impaired people completed for the purpose of gaining a better understanding of how the built environment is experienced and negotiated [5]. Each data set is collected without the knowledge of the other by researchers who have previous experience in designing and design education.

For both data sets, participant interviewing is adopted as a data collection method to record the impressions and perspectives of the target groups. Participants are asked a range of open-ended questions about their experiences with the built environment. All interviews result in approximately two hours of discussion. The conversations are recorded and transcribed word-for-word, including the interviewees' questions and all participant responses. This data gathering and transcription method yields a detailed representation of the vocal activities whereby original speech is captured.

The resulting data are reflective of the participants' rather than the interviewers' interests because of the queries' general nature. The discussions in the interviews focuses on the built environment and not on the notion of communication *per se*, the resulting data represent naturally occurring talk, suited to exploring language, communication and talk in general. The normative analysis of talk in this study

investigates the characteristics of conversation that are explicitly stated, information that is directly revealed rather than tacit and latent references or inferences that may be made by the participants.

3.2 Data analysis

To investigate the normative contributions of the participants, statements and words are analysed using a thematic approach where the central topics are clustered and identified [30]. This approach is iterative and involves multiple ways of reducing and displaying the data. The themes are based on the transcripts' content, and thus strictly data driven. It is the information presented by the participant rather than the researcher's judgement that makes up the data.

The analysis for this study begins with two researchers reading the transcripts independently and continues with joint discussions regarding the significant segments of the conversations. The stages of analysis involve reviewing the interviews separately looking for:

- evidence of vocabulary linked to knowledge, references;
- experiences and attitudes linked to ways of knowing;
- references and background linked to cultural/personal capital;
- basic forms of communication (*i.e.*, descriptive, domain-specific, word- and phrase-use).

Following this the wording of the interview questions and the interviewers' reactions is cross-referenced with participant responses. This is significant in order to ensure that word and phrase usage is coming directly from the participant, not the interviewer. The information is then reduced by clustering significant phrases and words in bubble charts for each interview, followed by a single bubble chart for each group.

Interview transcripts are revisited iteratively and consecutively in the same manner across all interviews. Concepts are isolated and each transcript is reviewed in detail, for example, focusing on how the interviewees talked about the built environment (*e.g.*, words, descriptions). Upon reviewing the transcripts in detail from different perspectives, multiple times a matrix is created for each group. These extensive matrices derive directly from the data, and include various themes for each group. Finally, these themes are cross-linked across the data allowing for contrasts and comparisons.

4 ARCHITECTS

The backgrounds of the participating architects and the data resulting from our interviews are presented here. The data reveal information about designing and teaching and about the participants' perceptions around the domain of architectural design. Our goal is not to derive generalisations about the nature of design talk, but to identify ways of talking, word and phrase usage, and themes that may be common to this group in order to compare them with those of the visually impaired people. Of the 12 themes identified the four most relevant for our study are outlined here: design language & ways of knowing, talking around transformation, exclusive vocabulary, and communication aids.

4.1 Participants

The data for the group of architects are collected from separate conversations between participants and two different interviewers. Four conversations are explored in detail. These interviews took place in the architects' offices in two countries (Canada, Belgium). The four participants have been selected from the larger data set because they represent seasoned designers/teachers with a significant level of experience in architectural design, and because they have both practiced and taught architecture. These participants are assumed to be more articulate and spontaneous in expressing themselves as professionals within architecture because of their extensive experience. Table 1 provides an overview of the selected participants. Each participant is well versed in architectural pedagogy, principles and practice. Even so, the focus of the individuals' expertise and interests vary; for example, A3 seems particularly interested in function and structures whereas A1 is more interested in form and spatiality.

4.2 Design language & ways of knowing

The most apparent theme is the use of design language, including words and phrases learned during basic design education [31]. The participants commonly employ the elements and principles of design; such as "*figure-ground relationships"*, "*focal point"*, "*scale"*, "*structure"*, "*visual dominance"* and "*hierarchical aspects in space"*. In addition, designers are trained to visualise and to think about how things look. They use a variety of terms, such as "*aesthetics"* (A1), "*shape* and *shaping"* (A4), and "*style"* (A2 and A3). Talk about known design concepts is also common: A1 talks about "*more is*

less", A1 and A4 mention "*context as ground"* referring to figure-ground relationships. History and art forms, experiences of designed artefacts and spaces, and lectures attended are also common topics for discussion. In addition, the participants note designers, architectural projects, design icons and past projects spontaneously within conversation.

Table 1. Architect participants

	gender	level of education	current profession	training	areas of practice	years of experience
A1	male	MDes	professor in industrial design & product designer	architecture & industrial design	electronic products	2 yrs teaching 15 yrs practice
A2	female	MA	architect & university teacher	architecture	housing public buildings public spaces	10 yrs practice 5 yrs teaching
A3	male	MSc	architect & university teacher	engineering architecture & building technologies	housing fireproofing building law	32 yrs practice 31 yrs teaching
A4	male	PhD	professor in architecture & architect	engineering architecture	housing schools exhibition design	35 yrs teaching 10 yrs practice

4.3 Talking about transformation

Although not prompted to do so, the architects often focus their attention on design processes and the role of the designer. Each participant talks about the complexity of design processes such as innovation, procedures, processes of concept development and more. Much of this talk is centred on the notion of transformation. This theme also seems to be connected to an innate sense of curiosity about how things could be, a type of future gazing. That is, there seems to be a natural propensity for the architects to be searching and learning through first "*looking"* at the world around them (A2) and "*studying the everyday"* (A3). This also indicates that analysis is a natural part of designing whereby design projects are "*visual questions"* (A1) and problems to be solved. The notion of problem solving and how a design is transformed as a result of this process is common among all our participants. The exact phrase "*problem solving"* is present in each transcript and refers to actual and student projects, particular parts of a building (*e.g.*, corridors), detailed specifications, communication, conflicts with clients, financial issues. Finally, processes of transformation, such as sketching and modelling, are also a large part of what the architects talk about. Talk around transformation demonstrates a particular way of seeing and engaging with artefacts. That is, participants only focus on discussing how something can change or be transformed and never discuss overall experiences within spaces.

4.4 Exclusive vocabulary

Although the majority of the participants' talk relates most directly to a visual or specialised language relating to design, there is also an indication of exclusive vocabulary. This is similar to a personally constructed or invented language; yet, it is deeper in that the words and phrases are clearly symbolic and understood by others as well. For example, A1 uses the idea of "*ships and boats"* to describe complexity and A2 openly states that she is "*designing a new language"* in her expression of the built environment.

Interestingly, all participants use exclusive vocabulary and assume that others can understand the specifics of this talk. For example, A1 refers to "*ant farm"*, "*Dickensonian sentences"* and "*biomimicry*" without stopping to define what these mean until prompted. At the same time, each interviewee expresses concern about being understood, particularly by those outside of the domain but part of the business of design (*e.g.*, clients or manufacturers). The use of exclusive language,

especially extensively, is an indication of an individual being immersed in a local culture. That is, exclusive talk is likened to having an inside joke with a group of friends, it provides a sense of belonging and indicates a particular know-how. The participants not only use an inside language, they seem to be aware of it and can be extremely exclusive, but this nonetheless does not prevent them from using it. This exclusiveness becomes clear when communicating with other persons not encultured in the discipline of architecture.

4.5 Communication aids

Our final theme relates to devices that participants use to aid in communicating. To begin, during several interviews there seems to be a basic need to draw or sketch. A4, in particular, draws consistently throughout the interview to explain his ideas. Sketching, drawing and visualization in general, are topics of interest discussed by all four. A1 describes sketching as a "*means of communicating with self and others"* and A4 states that it is a "*necessity to learn how to draw"*. Additionally, when articulating ideas the participants imagine visual materials and describe these as if they are present. They speak in detail about previous projects and about building materials in a sophisticated and advanced way, often deconstructing them into minute parts. This attention to absent things is another way of using aids to support communication.

4.6 Architects' talk summarised

The consistent use of design language is not surprising since it makes up the common knowledge of the architectural design community and is central to the professionalisation of a given domain. In addition, the focus on specific ways of talking about designed things and transformation confirms that designers have a particular language capital relating to their way of knowing [31] while relying on their personal backgrounds and use sketches and descriptive language to help others understand them.

5 VISUALY IMPAIRED PEOPLE

Having looked in detail at our interviews with architects, we now turn to the visually impaired participants and the resulting data. These data reveal information about how people with little or no vision talk about how they negotiate, engage, experience and perceive the built environment. Four themes are identified and explored here: level of semantic specificity, repetition, invented language, and interpretation within conversation.

5.1 Participants

The data for the group of visually impaired people are collected from four separate conversations between four participants and one interviewer. Each conversation occurred in the individual's homes. The four participants are selected from the larger data set for several reasons: they represent a range of different abilities to articulate aspects of the built environment, they differ in terms of their visual impairment; and they have been visually impaired for some time. Table 2 provides an overview of the selected participants.

One participant (VI1) has experienced blindness from birth, while the others became visually impaired in later stages of their life. Limited vision does not necessarily imply lack of understanding towards design, architecture and spatial issues. For example, VI2 and VI4 are more experienced when talking about architecture and the built environment: VI2 is educated as an interior architect and practiced until a few years after becoming visually impaired; VI4 reports that he has always had an interest in history, building materials and architecture in general. VI4 states that his attention to materials grew as a result of his impairment because it taught him to experience his surroundings in a more multi-sensory way—hearing, touching and smelling combined with his limited sight.

5.2 Level of semantic specificity

The ways that the visually impaired participants talk about the built environment represent different levels of semantic specificity. Some have a more developed vocabulary, in the sense that they are articulate in describing the visual realm. Others openly struggle in finding ways to describe even the smallest daily interactions taking place within familiar spaces. With the exception of VI2, the blind interior architect, the visually impaired participants have difficulty explaining what spaces means to them. For example, there is evidence of faltering by use of pauses and breaks, and a clear searching for words. VI4 states several times that he "*has not thought of it before and that he has to search for his*

words". Yet each participant speaks more fluently and easily when discussing topics around their personal profession or hobbies. VI2 speaks fluently about the built environment and architectural concepts, whereas VI4 has a larger vocabulary concerning building materials and experiences with his surroundings. VI1 links his understanding of materials (wood) by connecting this to something he is very experienced with, pianos.

When asked about their experiences in spaces, there are distinct variations in the interviewees' ability to explain ideas and experiences. VI2, the blind interior architect, is able to express himself well, especially when the topic concerns the meaning of different objects or elements that make up architectural qualities. For instance he "*likes to demarcate zones"* by making use of "*walls, small poles, a plateau, a lamp, colours*." Another example is his use of a metaphor to describe a building feature, "*stairs being the spine of the house*." Although VI4 has a more sophisticated understanding of architecture, his language around architecture is descriptive and not overtly specialised. When asked about the most pleasant space in his house he mentions the attic because of "*the inclination, the beams, the woodwork following that slope*." This is, for him, an "*architectonic experience"* in contrast to "*spaces with a banal, common horizontal ceiling*." For VI3 the built environment and the people and objects within form one unity. He concentrates on way finding and orientation when talking about space, which he has likely learned to talk about. He likes "*simple buildings with a simple structure"* and compares two railway stations as an explanation. One is a "*good building"* with "*two subterranean hallways, not to large and a flow in this direction* [points] *and in this direction* [points]" opposed to the other station which is "*one big space full of stuff (…) where flows occur in all sorts of directions*." Of the four participants, VI1 employs the most basic language use. He uses very generic words like "*large"*, "*wide"* and *"small"* to characterise spaces and struggles when trying to describe the form of a particular (urban) space. He describes a city square as,

> *"a house with a roof on. So you have a rectangle and err with a short side and two long sides and instead of that the other side is a short side, two long sides are inclined and then you have here a short side. But those both corners of that straight line who turn over slantingly, those are both free*."

Table 2. Visually impaired participants

	gender	onset visual impairment	duration of visual impairment	profession/ career	hobbies/ interests	environment	type of visual impairment
VI1	male	birth	30 years	employee in telecom company	piano & band	seeing family, girl friend VI friends	Lebers congintal amourosis
VI2	male	23 years	17 years	music recording & interior architect	art & music	seeing wife and kids friends	car accident: lost eye nerves
VI3	male	birth	53 years	unemployed but trained as agricultural engineer	TV	VI father, VI sister, seeing wife and kids, VI friends	Retinitis Pigmentosa
VI4	male	21	24 years	government employee & city tour guide	history & architecture	seeing wife and kids	neurological toxoplasmosis

5.3 Repetition

In some interviews, the repetition of words and phrases indicates that the participant is having trouble with explanations, is trying to emphasise a particular point, or is particularly interested in a theme. In addition, the repetition of words sometimes echoes phrasing from the original query. One example of

repetition in general is that VI1 talks about a certain spaces in terms of "*short sides"* and "*long sides"* without further specification or description, making it challenging to understand what he is saying. VI1 and VI3 talked a few times of a "*structural building"* (VI3) and "*having a structural view on a building"* to explain what spaces they like as well as how they find their way in or move through space. Another word that is present throughout the interviews is "*obstacles"* and is sometimes used with a space being "*a mess*." This notion of obstacles or a mess is in reference to things, fixed or not, such as benches, stairs and other people— anything that might hinder movement within an area. For those who still have residual vision the words "*light"* and "*sun"* are used and referred to more often than one might expect. Whatever vision is present is highly valued and thus worthy of expression whenever possible. All participants except VI2, who is trained as interior architect, refer to their own body to describe spaces. Dimensions of a space are estimated and evaluated based on their personal physical dimensions. For example, VI1 counts his steps to help determine his current location, "*the street is so many steps wide. If your foot stands here, then you know fore sure I will go so many steps forward*." Interestingly, only one participant (VI2) does not repeat words, phrases or themes at the same frequency of the others. He does not search for words and is systematic and consistent in how he answers questions. For instance, he can explain his thoughts clearly including his descriptions of architecture.

5.4 Invented language

Another common theme among the visually impaired participants is that they use a basic language with some invented words or phrases when talking about the built environment. Invented words pop up when experiential aspects of artefacts or spaces are being articulated. VI3 describes his experience of sitting in his veranda as having a "*misty feeling"*, while VI1 tells us that he appreciates spaces with a "*wooden cosiness*." Other creative vocabulary-use includes VI1 describing curvilinear forms as "*turned forms"* and "*slow curves"*, which seems to relate more distinctly to experiences rather than to how they are viewed. Along with using an invented language, sometimes the participants feel the need to provide a lengthy description to define what they mean. These descriptions are personal and experientially focussed and give the interviewer a better understanding of the meanings. When VI1 talks about "*turned forms"* he describes them as "*creating the idea that you walk straight forward while you in fact are turning around*." In some instances the interviewer enters into a conversation and negotiation of sorts, when an invented word or phrase is not understood. For instance, when VI1 provides an example of materials he likes because of their "*smoothness"* he talks about "*tile tables"*, which the interviewer in turn guesses as being "*the tables in wood with inlayed tiles*."

5.5 Interpretation within conversation

Besides the introduction of completely new words, there is ambiguity around how words and phrases are interpreted. When people use their own invented words that are unconnected to a domain or specialisation, others are able to ask for clarification. However, when specialised words are interpreted generically or vice versa this can easily lead to a misunderstanding without the conversational partners knowing.

During our interviews, visually impaired people use words and phrases to describe the built environment but their interpretation is more personal, naturally connected to their interactions within spaces. For instance, VI1 talks about a "*tactile-aesthetic"* and VI2 says "*it has to look good"* when referring to the aesthetics; yet, it is not entirely clear what is meant by these descriptions. Interestingly, VI2 and VI4 use the word "*profiles"* to discuss architectural detail; however, VI2 seems to think of these as structural elements contributing to the visual aesthetics of artefacts/spaces whereas VI4 talks about appreciating profiles for their tactile richness as opposed to flat surfaces.

It is also interesting to note that a single participant sometimes interprets a word in multiple ways. For example, when explaining the design of his house VI2 uses the word "*line"* in two different contexts with different meanings: as a "*guideline to help him with his orientation"* (aspect of blindness and mobility) and as a conceptual element of the design, "*the axis of the design"* (architectural aspect).

The only indication of a specialised language of the visually impaired relates to orientation and way-finding systems. Even so, the usage of words and phrases specific to this are also interpreted differently. For VI3 a building with a "*simple structure"* is a building with "*clear flows of people"* where he can quickly gain a "*good overview"*. The meaning of structure for this participant is

completely different from its meaning in architecture, where the term is primarily used to refer to a building's load bearing structure.

5.5 Visually impaired persons' talk summarised

In their speech, the participating visually impaired people emphasise the experiential more explicitly. This leads to newly invented and re-interpreted words to meet their needs when talking about the experiential aspects of the environment and aspects of way finding. Next to being visually impaired their vocabulary about spaces is further influenced by their affiliation with architecture. The language used within and part of each interview varies considerably. Sometimes it is generic and descriptive, other times it is over-descriptive and/or includes discipline-specific words, or in other instances it is semantically efficient. The participants easily fall back on themes they seem to have thought about in advance or already know. Furthermore, the better they understand architecture, the more nuanced their answers become because they know the interviewer's background involves architectural design. The central topic that the visually impaired participants are articulate about is way finding. It is clear that negotiating their environments is a form of problem solving, especially when it involves places they have not been before.

6 DISCUSSION

In order to develop a real dialogue between architects and visually impaired people, this paper asserts that language convergence and shared understanding are desirable. Furthermore, it pinpoints the need to first explore how the parties involved talk about the built environment. The findings of our study reveal significant differences and some overlaps between both groups of participants.

Morrow [2] asserts that architects are trained to focus on formal and visual elements within buildings, while laypeople have a more implicit relationship with space and experiences within; this understanding is also present in our analysis. Because the interviews focus on the built environment, it seems logical that the participating architects are more confident and talk fluently, whereas the participants with a visual impairment describe spaces in more experiential ways. The architects' talk focuses on the transformation of concepts, artefacts and spaces. Luck and McDonnel [18] assert that design conversations are the central medium for exchanging knowledge and information that is used during designing. She continues by stating that talk is an externalisation of creating that acts as social mechanisms of interaction to mediate creative activity. The focus on transformation we found in architects' way of talking about the built environment is in line with Luck and McDonnel's findings; what is significant, however, is that it differs considerably from the focus on bodily experiences in visually impaired people's talk. According to anthropologists, laypeople experience the built environment through the body, including the sense of touch [32] and through their hands and feet [33]. Furthermore, Kirsh [34] indicates that people, in general, are spatially located creatures who—often unknowingly—behave and manage the built environment in a highly sophisticated way. These profound differences in understanding the built environment could lead to misunderstanding because of specialised language, exclusive even to individuals and personal interpretation. But if both parties acknowledge this, these discrepancies become the primary generators for the dialogue. Starting from what may seem at first hand banal discussions, both parties can start to learn from each other thus revealing deeper insights. From then on, architects and visually impaired people can start up their dialogue around their newly acquired common semantics.

Not all of our results indicate differences between the two groups of participants. One significant commonality is that both groups discuss problem solving as a means to transforming or encountering the built environment. In the design realm, the notion of problem solving is part of designing whereas visually impaired people describe their need to constantly seek new ways of coping with everyday life and, particularly, to seek new or alternate ways of negotiating the built environment.

The implications of these results on developing dialogue between these two groups are multi-layered. First, architects need to reflect on and be attentive to how they use design language and communication aids, things that are unknown to visually impaired people. In addition, architects need to be reminded that the experience of spaces is a dynamic, interactive process that evokes associational terms and responses to meaning [12]; based on our study, these elements are not at the forefront of trained architects' backgrounds/experiences. Second, although architecture may not have a common language of general significance [16], recognising that architects' language capital is linked to personal and socio-cultural factors (*e.g.*, training, ways of knowing) is a valuable first step. The

awareness of having a specific language capital opens up different ways of talking and listening. Third, a genuine dialogue needs to be based on a basic vocabulary that allows personal and socio-cultural aspects to emerge. This means that engaging into dialogue requires time in order to explore invented words and to define words that either group may take for granted. Last but not least, because problem solving is common between the two groups, this subject can be used to create common ground in order to develop a foundation for enhanced communication.
In both the differences and common ground between the two groups are seeds, ready to grow into dialogue. The precondition however is that both parties be aware of the presence of these differences and overlapping interests. We don't claim to have identified all the possible obstacles, but rather have presented potential as a result of recognising their presence.

7 FUTURE RESEARCH & CONCLUSION

In this study we focus on how the built environment is described and articulated by two groups of people. Through multiple levels of analysis we demonstrate that four architects and four visually impaired people have a particular way of talking. Their specific expertise gained through training, professional, personal and/or bodily experience are identified characteristics that can be learned from, complement and potentially enhance the design process. To this end, a vision of some of the components of dialogue is explored in order to involve others as experts in a design team.
Interesting as our results might be, it is obvious that they respond by no means to all our research interests. We are inundated with questions about the differences between designers and other people and especially about nuances around visual impairment. Moreover, we recognize that this study is part of a continued exploration into dialogue and communication between architects and non-architects. Future work will therefore continue to explore differences and similarities between two groups: by submitting interviews with more participants to analysis, by employing different methods for data collection (*e.g.*, recording conversations between architects and visually impaired people, recording gesture and bodily movements along with conversation), and by operationalising dialogue through involving visually impaired people in a real-time design situation.
Awaiting the results of this future work, recognizing that all people talk with their personal and socio-cultural language capital is already an important step towards a broader understanding of how designers can engage into dialogue with people from outside of their domain. Finally, by revealing that two disparate groups such as architects and visually impaired people have common ground is a reminder that people can always find ways to make meaningful connections.

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