

Article

Client Briefing: Eliciting Design Preferences from Building Users with Communication Impairments

Paul Jenkins ^{1,2,*}, Iain Scott ² and Andy Challen ¹

¹ School of the Built Environment, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, UK

² Edinburgh School of Architecture & Landscape Architecture, Edinburgh College of Art, University of Edinburgh, Edinburgh EH3 9DF, UK; E-Mails: iain.scott@ed.ac.uk (I.S.); andrew.challen@btinternet.com (A.C.)

* Author to whom correspondence should be addressed; E-Mail: p.jenkins@hw.ac.uk; Tel.: +44-0-131-451-4186.

Received: 2 February 2012; in revised form: 24 February 2012 / Accepted: 11 April 2012 / Published: 27 April 2012

Abstract: This paper reports on recent experience of engaging with building users who have communication difficulties, as a potential part of client briefing. The users were residents of a specialist Scottish Housing Association (HA) providing social housing and care services; the residents having a wide range of complex needs, predominantly learning difficulties. Many of these residents have communication difficulties, ranging from mild to very severe. The challenge presented was to effectively engage with a representative sample of residents to ascertain how they value their living environment. The researchers' involvement was based on prior research into how different participants engage in the architectural design process.

Keywords: housing and social care; client briefing; innovative communication tools

1. Introduction

1.1. Overview of Activity

The process of designing the built environment is extremely complex—all the more so for clients and designers who work with building users who have complex needs, and this difficulty becomes

compounded when these users have communication difficulties. While architects and contractors have specialist knowledge of the design and construction of the built environment, both typically have limited knowledge of the range and complexity of specialised user requirements and their impact upon designed and built spaces and places. In such circumstances designers need to engage in innovative methods of brief development with the client—and often also with the users themselves. The skills and techniques needed for this form of wider participation in the design process are not often provided to architects during their education, and hence reporting on such cases is an important source of information.

Effective client briefing is now regarded as fundamental to the production of buildings which satisfy not just functional needs but also reflect user preferences in relation to the environmental qualities they create. Also, briefing has become a more involved process due to the increasing complexity of both client organisations and buildings themselves [1]. The desire for end users to have a say in the environments in which they live, work and play became established in the 1960s in the UK largely with reference to social housing projects. During the 1970s and 1980s there were many examples of projects, particularly involving housing co-operatives, of user groups taking on the client role, or being allowed by housing organisations to take part in design decisions [2]. Examination of the development and range of user engagement in the architectural design process, and discussion of the different ways in which the end users of buildings can actively engage in this process has been attempted [3], however effective engagement with users with special needs and communication difficulties is much less studied. The use of projective techniques deriving from Personal Construct Psychology, have been employed in relation to the design of classrooms for children on the autism spectrum [4,5]. This paper reports on the application of a similar technique using a picture based communication exchange system with a set of building users, and discusses its potential for a specific client organisation, as an effective way of obtaining information from communication impaired end users. This is considered of potential relevance to wider use in client brief development, especially with an aging population and the growth of incidence of dementia which can impair communication.

The users in the case reported were residents of a specialist Scottish Housing Association (HA) providing social housing and care services; the residents having a wide range of complex needs, predominantly learning difficulties. Many of these residents have communication difficulties, ranging from mild to very severe. The challenge presented was to effectively engage with a representative sample of residents to ascertain how they value their living environment. This engagement was an integral part of a Knowledge Transfer Partnership, (KTP see below) and was planned as a way of supporting previous research undertaken with the HA, concerning how changes to the built environment impact on specialist care service provision. It also formed part of a process to develop and refine HA briefs for architects and building contractors. A further aim was to assess the effectiveness for the HA of new communication techniques with service users/residents with communication difficulties. The focus of this paper is on the communication process used and its potential usefulness for clients and architects in similar circumstances.

1.2. Summary of Client and Research Team

The Housing Association (HA) client in this study is a UK Registered Social Landlord providing flexible housing in Scotland with the primary role of provision of care services to adults with a range of complex needs, predominately learning difficulties. The HA has more than 40 different housing ‘projects’ in over 10 different local authority areas across Scotland, being either owner or renter of the properties at these projects, a small number being owned by other institutions such as local authorities. At the inception of the KTP [6], the HA provided social care services in more than half of the projects directly, this being sub-contracted in others. Most of this housing is classified as ‘supported living’ projects, where service users have independent accommodation and are supported by care-providing staff that are based off-site. In a much smaller number of projects there is a ‘community house’, which provides for a number of service users, usually in conjunction with accommodation for staff providing twenty-four hour care. The association also has some ‘houses in multiple occupation (HMO)’, where service users share accommodation, with various forms of support. In around half of the projects there is a mix of service and property type, with the HA also having ‘mainstream’ tenants in properties it manages as a normal registered social landlord, in around a third of the projects.

There is a wide range of residents/service users for whom the HA provides care services, (these forms of care being defined by the local authorities which fund the service), and a total of nearly twenty different service users’ needs or conditions which were identified at the time of the KTP, with service users in various cases having more than one condition. By far the most common condition was that of learning difficulties, followed by smaller numbers with Epilepsy, Autistic Spectrum Disorder, challenging behaviour, Down’s Syndrome and physical disabilities, (in declining order of incidence). There were also a number of service users who were classified as having mental health problems, (psychosis, depression or personality disorders) and a small, (but growing) number of service users with Dementia and Cerebral Palsy. Nearly 10% of service users had visual difficulties and a small number of service users had rarer conditions such as Fragile X Syndrome, Asperger Syndrome, forms of brain injury, Prader Wili Syndrome, Tourettes Syndrome, Methicillin-Resistant Staphylococcus Aureus (MRSA) and Obsessive Compulsive Disorder (OCD). Overall, around 60% of the service users were assessed as having adequate mental capacity to deal with their own affairs such as banking *etc.* Whilst there is a concentration in some key areas of need (and hence service provision), there is also a wide and challenging range of services provided by the HA.

The two year Knowledge Transfer Partnership started in 2010 with the primary aim of investigating anecdotal knowledge within the HA, as client, on the positive impact of changes to the built environment on their residents and service users, as well as staff—and embedding the findings within revised HA Design Briefs and other internal and external management activities. The first stage of the partnership focused on gathering the range of existing evidence from the HA’s service managers, which was then bench-marked with international literature of relevance. A set of Key Performance Indicators were then drawn from UK and Scottish policy documents, to be used for assessing the impacts reported. A second phase of knowledge capture then used follow-up, semi structured interviews with managers and focus groups with support staff to confirm, better understand, and assess the nature of the reported impacts. The outcome of this knowledge capture then led to a set of revised client briefing documents for the HA’s future built asset management and development. This primary

activity of the KTP is reported in [7], with this paper examining the issues concerning communicating with users who have communication difficulties.

1.3. Background to the Experimental Knowledge Capture Process

As noted above, the initial stages of the KTP investigated various changes to the built environment instituted by the HA which were seen as having resulted in positive impacts for residents/service users. These impacts included: improved privacy; increased activities and development of new skills; as well as the reduction of incidents, anxiety and challenging behaviour. In addition changes to the built environment also benefited working conditions for staff, helping improve the quality of care provision, facilitating assistance and reducing support time. Most of the changes made to the built environment were found to have taken place in the bathrooms, primarily for residents with limited mobility. While the majority of the changes had positive impacts, staff respondents also discussed some negative impacts of the built environment, most of which took place at purpose-built homes for adults with complex autistic tendencies and challenging behaviour [7].

As the first stages of knowledge capture did not provide first-hand information from HA's service users about the impact of the built environment it was decided to undertake a final form of knowledge capture to attempt to assess residents/service users' perception of their current environment. While some its service users can communicate readily, there are a significant number of residents who have communication difficulties. Such communicative barriers mean that the HA finds it difficult to measure the impact of the built environment from a full range of residents' perspectives. However, techniques have recently been developed to help people with communication difficulties think about issues pertinent to them, and provide them with a way to effectively express their opinions. These usually take the form of Picture Exchange Communication Systems, (PECS).

One such technique developed by the Alternative and Augmentative Communication (AAC) Research Unit at the University of Stirling in Scotland is called Talking Mats. Talking Mats is a low-tech communication framework which uses a mat with pictured symbols attached to it, as the basis for communication on a pre-defined set of issues. This was the basis for the final stage of knowledge capture in the KTP, undertaken in parallel with a separate semi-structured questionnaire, in order to gain an understanding of what service users believe to be important to them about their current living environments. The questionnaire explored service users' concerns about their living environment while Talking Mats provided satisfaction ratings for aspects of this environment. Both methods were used as a way of communicating with a sample of service users who displayed a full range of communication abilities. The secondary objective here was to widen ARK's understanding of appropriate participatory techniques and enhance its on-going reflection on its service provision in general. This paper details this third phase of new knowledge production.

1.4. Background to Methods Used: Talking Mats and Semi-Structured Questionnaire

Talking Mats was developed in 1998 at the University of Stirling by Joan Murphy, who at this time was studying the interactions of people with cerebral palsy using high-tech communication aids. When talking to users about their systems and interactions, it was found that they did not have the vocabulary they needed and so the researchers began drawing and cutting up symbols. Talking Mats developed

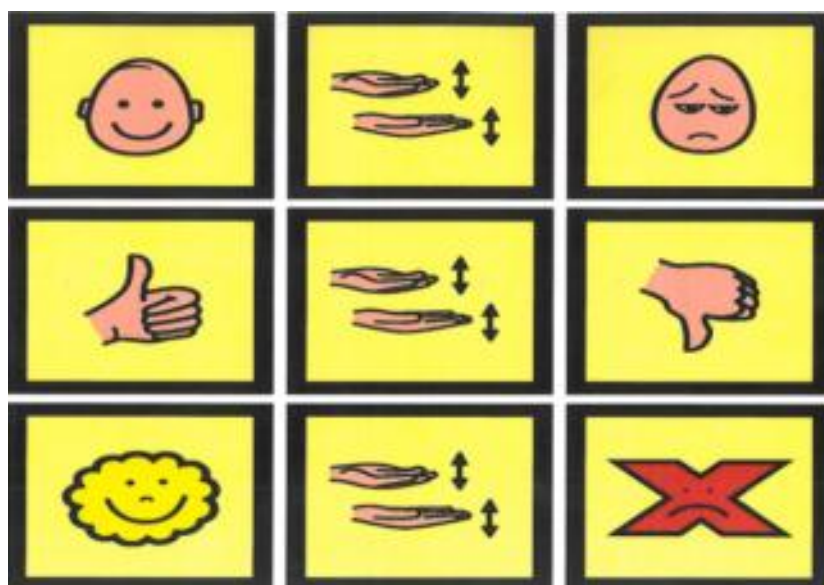
from this simple start to help people think about issues and communicate more effectively [8]. Presently there are a number of visual and auditory aids to communication in use such as electronic communication pads, symbol systems and voice output communication aids. What made Talking Mats attractive to the researchers in this case was its broad applicability as a low-tech communication tool, in being capable of use across a broad range of special needs, communication deficits and cognitive functioning—and the fact that the participation officer in the HA had recently been trained in the technique and was considering using it in her work. The technique uses a system of picture symbols placed on a textured (45 mm by 30 mm) mat that allows the user to indicate their feelings about various *options* within a *topic* by placing relevant images on a *visual scale*.

This *visual scale* can be used as either a three point scale, (1-3-5) or a five point scale, (1-2-3-4-5) of satisfaction. Satisfaction ratings are as follows:

- (1) *Satisfied*
- (2) *Quite satisfied*
- (3) *Ambivalent*
- (4) *Quite dissatisfied*
- (5) *Dissatisfied*

Participants respond either by placing the pre-defined symbols in the three main positions—*i.e.*, a three point scale, (see Figure 1 below), or can be encouraged to place symbols in intermediate positions between the extremes and central ‘Ambivalent’ rating, thus creating a 5 point scale. Whether the user uses the three or five point scale is dependent on their cognitive understand of such an undertaking. A user with mild learning difficulties, and possibly higher cognitive functioning, will have a greater likelihood of understanding a five point scale. The visual scale is always placed at the top of the mat, an example of the three main symbols used to represent the visual scale can be seen in Figure 1 below.

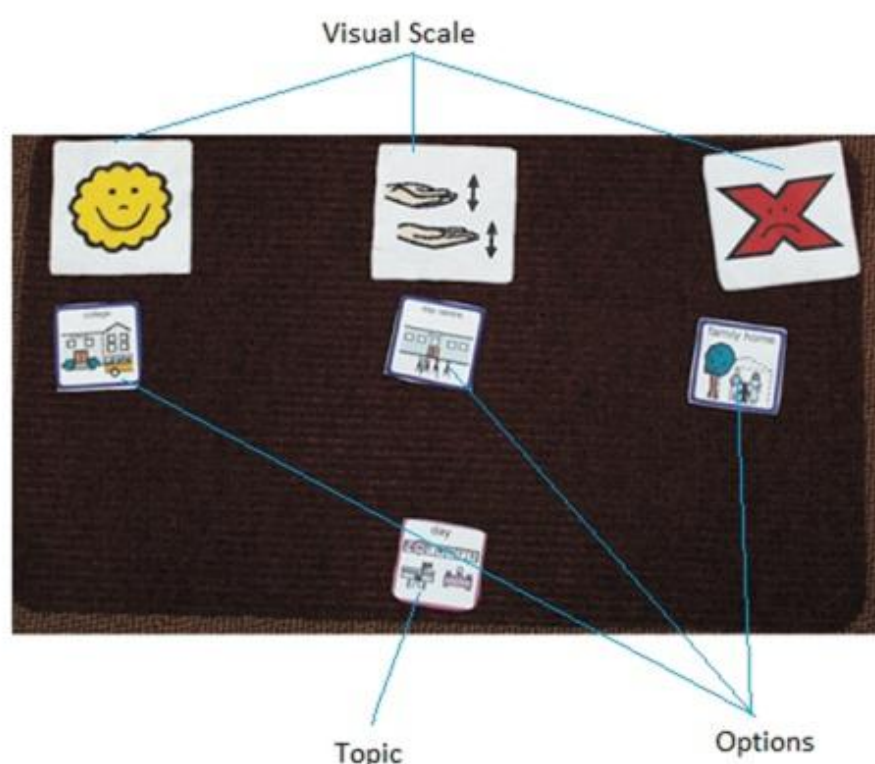
Figure 1. Symbols used for the Talking Mat visual scale—1 is chosen for use. The Picture Communication Symbols ©1981–2012 Dynavox Mayer Johnson are used with permission. All rights reserved worldwide.



The *topic* is the subject of conversation for the user and is always placed at the bottom centre of the mat. The user then places under the relevant scale of satisfaction how he or she feels about the *options* in relation to the topic. The *options* are the symbols that represent how the user feels in relation to the topic.

For example Figure 2 is a photo of a Talking Mat where the *topic* used in the Talking Mat picture is ‘day’ and the user has placed the *option* ‘family home’ under the visual scale - *dissatisfied*.

Figure 2. Example of a Talking Mat. The Picture Communication Symbols ©1981–2012 Dynavox Mayer Johnson are used with permission. All rights reserved worldwide.



Talking Mats is a relatively new communication technique, therefore published literature using this communication framework is as yet relatively sparse, however there is a growing body of literature that supports its effectiveness. This includes analyses of how Talking Mats has been used to help people with a variety of communication difficulties including: people with dementia [9–12]; people with learning disabilities [13] and mental health needs [14], as well as people with Aphasia, an impairment of language ability [15]. Talking Mats has also been used to help aid speech and language therapy [16,17].

A characteristic that many Picture Exchange Communication systems share is a pre-determined set of topics and vocabulary for expressing preferences and this can be limiting to a study aiming to elicit core concerns and preferences in relation to environment. [18] investigated the involvement of peer informants in the vocabulary selection process for a TM application but this was not completely successful, and ‘*did not result in any great modifications to the vocabulary set developed*’. The author comments further, ‘*There is always a danger of ‘putting words into their mouths’ when it comes to interviewing people with learning disabilities; this is likely to be all the more acute for people unable to speak, if they rely on words being selected for them beforehand.*’ It was therefore decided to employ

an augmentative method of eliciting core user preferences which might exist alongside the developed Talking Mats vocabulary with the parallel use of a semi-structured questionnaire. The questionnaire used for this study was based on Personal Construct Psychology, PCP [19].

Architectural interest in PCP originated in the 1970s when [20,21] explored the end user's perception of shopping centre environments using the technique. Subsequently [22] used the technique in an interior design study, with [23] using the technique as a way of uncovering children's ideas about place, as part of a design project to design a small garden. Use of the method involving people with special needs is limited, however a project undertaken by [5] utilized PCP based questionnaires as a way of eliciting design preferences of autistic children in relation to their classroom environments. PCP attempts to elicit wishes and desires that may exist at a subconscious level in relation to the experience of places and environments. The basic premise of PCP is that our perceptions of the world are processed through a system of individual constructions as opposed to a first-hand interpretation of reality as found. Such reality constructions mediate our understanding of the world and form the basis of our subsequent decision making. Each person uses their own 'construct system' to filter and interpret what they perceive, which draws on their background and personal life experience. Kelly's theory outlines the properties of the construct system and its attendant repertory grid methodology, which allows for an individual's constructs to be identified and measured. Repertory grid methodology is a widely used set of techniques for studying personal and interpersonal systems of meaning. In attempting to elicit someone's 'system of constructs' the key terms are *elements and constructs*. Elements are the objects, situations or people upon which our constructs operate. The constructs are the features or qualities which distinguish elements from one another.

For the purpose of this study three key terms were used to help elicit respondents' system of constructs, including: *aspects of place experience*; *elements*; and *activities*. The benefit of this qualitative method was that it allowed the researchers to access service users' desires and concerns which may exist at a sub-conscious level whilst at no point suggesting alternatives. Used in combination with the analysis of responses from 'Talking Mats' this overall methodology allowed the researchers to 'score' responses in relation to 'Talking Mats' *options* and to assess how well these mapped to the concerns of the users as expressed through the questionnaire.

In order to successfully use Talking Mats to interview the selected service users in the KTP, the two interviewers undertook training on the technique, during which a set of bespoke symbols (Options and Topics as explained above) were developed which the service users could place on the Talking Mat. Symbols for the Topics were created for the most clearly identifiable locations where changes to the built environment have taken place including the *living room*; *kitchen*; *bathroom*; and *garden*. Due to the complexity of changes over time, and communication difficulties of service users, it was decided that asking questions about specific changes within each location would be too difficult for them to interpret and respond adequately without excessive interpretation. The bedroom was also excluded as a possible topic for ethical reasons, being considered as too personal and (due to the interviewees low communication skills), it was considered by the HA and researchers as being potentially discomforting to ask about activities within this location. In addition, the *entrance* and *throughout* were also excluded as locations for examination, as they were considered to be too abstract. Figure 3 shows the four Topic symbols used for the Talking Mat interviews.

Figure 3. Symbols used for the four Topics. The Picture Communication Symbols ©1981–2012 Dynavox Mayer Johnson are used with permission. All rights reserved worldwide.



Symbols for the Options were created based on the various daily activities residents might engage in and were organised around the three key terms used in the questionnaire to help elicit respondents' system of constructs, including: *aspects of place experience*; *elements*; and *activities*. Pictures of the selected symbols for each of the three key terms can be seen below in Figures 4 to 6.

Figure 4. Talking Mat symbols (Options) for Aspects of Place Experience. The Picture Communication Symbols ©1981–2012 Dynavox Mayer Johnson are used with permission. All rights reserved worldwide.

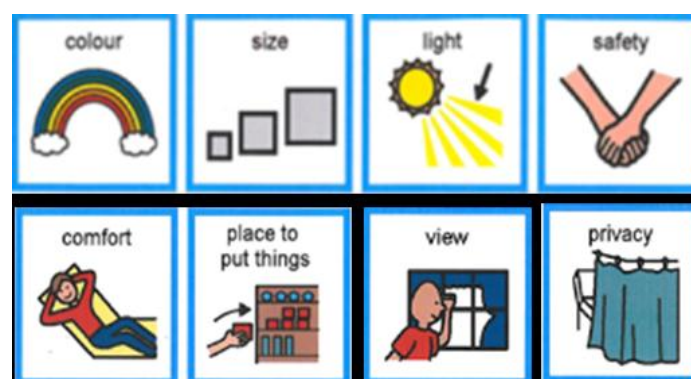


Figure 5. Talking Mat symbols (Options) for Elements. The Picture Communication Symbols ©1981–2012 Dynavox Mayer Johnson are used with permission. All rights reserved worldwide.



Figure 6. Talking Mat symbols (Options) for Activities. The Picture Communication Symbols ©1981–2012 Dynavox Mayer Johnson are used with permission. All rights reserved worldwide.



Not all symbols were appropriate or relevant for each of the four topics, and the chosen symbols for each location used a mixture that represented aspects of place experience, elements and activities. Respondents were uninformed of this representation and were simply asked to place the related symbols on the Talking Mat with respect to the visual scale of satisfaction.

As noted previously, the questionnaire was based on PCP and designed to elicit responses in relation to the participant's perceptions of the world via their 'construct system'. Each service user's 'constructs' can be identified and quantified by categorising their responses in relation to: *aspects of place experience*; *elements*; and *activities*. Four separate questions were asked and repeated for each of the four locations (living room; kitchen; bathroom; and garden). Questions included:

- (1) Name 3 things you **like** about your: living room; kitchen; bathroom; garden
- (2) Name 3 things you **don't like** about your: living room; kitchen; bathroom; garden
- (3) Name 3 things you **would like to have** in your: living room; kitchen; bathroom; garden
- (4) Name 3 things you **like to do** in your: living room; kitchen; bathroom; garden

Participants could give a total of 45 possible responses to the four questions for each of the four locations (as question four was removed from the bathroom questionnaire for ethical reasons, once

again considered as too personal). The responses to each of the four questions were then categorised in relation to *aspects of place experience*; *elements*; and *activities*. Within these categories responses could then be sub-categorised in relation to the Key Performance Indicators (KPIs) which were used in Phase two of the KTP Knowledge Capture. This was to see how responses concerning the living spaces that are provided relate to current social care policy outcomes and principles, including: the National Care Standards, Care Commission Grades and Scottish Government National Outcomes. Table 1 below shows the KPIs in relation to policy.

Table 1. Key Performance Indicators related to current health and social care policy.

National Care Standards	Care Commission Grades	UDSET toolkit for Service Users	UDSET toolkit for Carers	Scottish Government National Outcomes
Dignity	Quality of Care and Support	Feeling Safe	Maintaining Health and Well-being	Improved Health
Privacy	Quality of Environment	Having Things To Do	Life of their Own	Improved Well-being
Choice	Quality of Staffing	Seeing People	Positive Relationship with Service User	Social Inclusion
Safety	Quality of Management and Leadership	Staying Well		Independence and Responsibility
Equality & Diversity		Living Life As You Want		
Realising Potential		Living Life As You Want		
		Dealing with Stigma		

2. Results and Discussion: Knowledge Capture

2.1. Sample of Participants and Research Implementation

Participants were systematically selected for this process based on three principal criteria, including:

- (1) Representation across the previous knowledge capture sample in the KTP, taking into consideration the most commonly cited impacts concerning changes to the built environment and their locations.
- (2) Degree of communication difficulty.
- (3) Project geographical location.

Concerning the first criterion, it was important that this final, new knowledge capture from service users fitted within the work undertaken to that point in the KTP, and hence the selection was to occur within the 16 sites selected for previous examination, which were structured around two principal criteria: the location and nature of the physical change to the built environment; and the nature of the impact reported initially on service users and staff. Prospective participants were considered from within these 16 sites.

Concerning a representative sample vis-à-vis communication levels, it was important that service users selected for new knowledge production were representative of the HA's overall sample of service users—a total of 242 residents with 17 different conditions. As noted above, the most common

types of conditions were: learning difficulties (201 residents affected); epilepsy (29); Autism Spectrum Disorder (ASD); (26) challenging behaviour/ Down's syndrome (26) and various residents with physical difficulties (26). Residents with these conditions have a range of verbal communication skills. Those with learning difficulties encompass varying degrees of severity ranging from mild through moderate to severe. Those with moderate to severe learning difficulties often suffer from impaired communicative skills, while residents with milder forms of learning difficulties are generally more able to express themselves. Therefore residents with mild learning difficulties were expected to respond better to the questionnaire while those with more severe learning difficulties were expected to respond better to Talking Mats. Also, as previously mentioned, 10% of ARKs overall population of service users has visual difficulties, however none of the interviewees selected for this research had this impairment [24].

Finally, given the one week time frame provided to interview service users, the distance to the locations was critical with most—but not all—of the projects located in or near Edinburgh, within the two prior criteria. The final 10 service users selected for new knowledge production, based on the above criteria, can be seen in Table 2.

Table 2. Participants used for new knowledge production interviews.

Service Users	S/U: Level of communication difficulty					S/U Condition	Scale applied			
	low	medium low	medium	medium high	high		Living Room	kitchen	bathroom	garden
3	1					Mild learning difficulties	5	5	5	5
4	1					Cerebral palsy and mild learning difficulties	3	3	3	3
1		1				Moderate learning difficulties	5	5	5	5
9		1				Moderate learning difficulties	3	3	3	3
7			1			Cerebral palsy and mild learning difficulties	5	5	5	5
8			1			Moderate learning difficulties	3	3	3	3
5				1		Severe learning difficulties	3	5	3	3
6				1		Severe learning difficulties	3	n/a	3	3
2					1	Down's syndrome and severe learning difficulties	3	3	3	3
10					1	Severe learning and physical difficulties	3	3	3	3
Total	2	2	2	2	2					

All of the ten service users selected for this form of knowledge production were interviewed at the service user's place of residence over a four day period. The duration of each of the interviews varied,

with an average of around 1 hour. Interviews took place in different locations within the residence, depending on the type of home in which the resident lived. A total of seven homes were visited to interview the ten service users. Three homes were projects where service users have their own individual flat while four were community homes. Within individual flats residents have self-contained accommodation including their own living room, kitchen, bathroom, bedroom and, in some cases, their own garden. Residents who live in community homes have their own bedroom but share the living room, kitchen and bathroom. Interviews with residents living in their own individual flat took place in the resident's living room while interviews with residents living in community homes took place in shared rooms. Whenever possible, or appropriate, residents would go into the location being discussed to aid their memory.

Seven of the ten service users were accompanied by a staff member during their interviews to help residents feel more at ease and to help interpret what residents were trying to say or what interviewers were asking. Interviews started with an introduction by the interviewers, briefly discussing the background to the research and detailing why they wanted to interview the resident and what the interview would entail. Interviewers were careful to provide the basic rationale as to the proceedings and note that the interview would take no longer than an hour and would start with the questionnaire and follow with the Talking Mats. With reference to ethical issues, consent forms had been signed previously by the interviewees [25]. If a participant seemed to be struggling in understanding a question then the interviewers would expand on the question and if needed would receive assistance from staff to ensure the resident understood the question.

Key issues regarding the interpretation of interviewee responses throughout the process were dealt with as follows:

- (1) There was an inevitable pre-determination of key issues by the research team in the selection of some Talking Mats symbols. Given the nature of Talking Mats this is unavoidable but this initial use of the mats has led to recommendations (see Section 5—key conclusions and recommendations) on a revised set of symbols. Methods of vocabulary selection in using Talking Mats can be based on literature searches [18] but also conversations with staff [26,27] and focus group interviews [28]. All of these methods were employed in the previous stage of the KTP, with which all the researchers were involved;
- (2) In asking the questions/presenting Talking Mat symbols, the two interviewers were careful to do this in as neutral a manner as possible, albeit expanding upon issues when this seemed necessary to ensure interviewee understanding;
- (3) Any assistance from staff members to the service users in helping the latter understand the questions was noted, given the communication difficulties in each case, and care taken to avoid added interpretation as best as possible;
- (4) When noting responses to the questions asked, the research team also attempted to record as accurately as possible the response in a short sentence, as close as possible to the actual verbal response. It is recognized that in each of the 4 instances above some form of interpretation of service users' understanding was involved—however the team endeavored to avoid this skewing results. In practice it would be ideal to undertake the exercise more than once to see if the responses vary—and if they do vary, attempt to understand why. Also, inevitably the first

use of a system such as this may elicit unusual responses. Some of these issues could be reduced by a regular program of service user interaction using the same techniques over time.

Each participant was given a separate mat for each of the four locations, with the *topics* of discussion being: the living room; kitchen; bathroom; and garden. Participants were asked to place on the mat each of the allocated symbols in relation to the visual scale. Participants used either a three or a five point scale, with two thirds favouring the former. As predicted, residents at the higher end of the communicative spectrum (*i.e.*, low and medium/low levels of communication difficulty), were more able to use the five point scale.

Given that some interviewees used a 3 point and others a 5 point scale, to analyse both scales collectively, and ensure that both scales successfully map on to one another, there were three options available. However each option resulted in either a caveat or a degree of subjective interpretation of the scores. The three options were:

- (1) *Only use a three point scale*—ignoring the smaller number of respondents who used a five point scale and putting all responses on a three point scale; (1 satisfied; 2 ambiguous; 3 dissatisfied);
- (2) *Use a three and a five point scale*—map the three point scale on to the five point scale assuming the greatest variation; (1 satisfied; 3 ambiguous; 5 dissatisfied);
- (3) *Use a three and a five point scale*—map the three point scales onto the five point scales assuming the lowest variation; (2 quite satisfied; 3 ambiguous; 4 quite dissatisfied).

The caveat for option one was that in putting all responses on a three point scale this excludes the respondent's scores that successfully employed the five point scale and thus 'dumbs down' the outcome. For options two and three there was inevitably a degree of interpretation in the scores for participants who used a three point scale, in that the scores are either 'stretched' to the extreme ends—or 'reduced' to the intermediate rating of the satisfaction scale. After careful deliberation it was decided that the data would be analysed using option two as it was clear that those residents who used a three point scale were either satisfied (1) or dissatisfied (5) and did not appear to see their responses in more nuanced terms.

Once the participants had finished placing the allocated symbols for each of the four mats, each mat was photographed to provide visual evidence of where participants placed the related options on the visual scale of satisfaction. As a means for analysis, numerical scores between one and five were given to the participants' Talking Mat outcomes, the lower the score the more satisfied a service user is with the related option, scores are interpreted as follows:

- (1) *Satisfied*
- (2) *Quite satisfied*
- (3) *Ambiguous*
- (4) *Quite dissatisfied*
- (5) *Dissatisfied*

Each participant was asked the same four questions from the questionnaire for each of the four locations and responses were noted by both interviewees so as to compare notes at a later date. Participants' responses to each of the four questions were then categorised in relation to *aspects of*

place experience; elements; and activities. Within these categories responses were then sub-categorised in relation to the KPIs used in phase two Knowledge Capture (see Table 2). KPIs include: *dignity; improved health; privacy; quality of environment; improved well being; choice; social inclusion; safety; independence; responsibility; equality and diversity; and realising potential.*

2.2. Method for Analysis of Responses

The responses are examined in two parts, the first section focusing on Talking Mat findings while the second section examines the findings for the questionnaires.

Four analyses were applied to Talking Mat findings to maximise the significance of the results. These were based on the overall average scores attributed to the responses for each of the Mats and include:

- (1) Identifying the three options service users were most satisfied with and the three options service users were least satisfied with, for each location. (E.g, *living room; kitchen; bathroom; and garden*).
- (2) Analysing respondents' overall combined Talking Mat scores for *all four locations*.
- (3) Comparing respondents' overall combined Talking Mat scores for all four locations for participants living in *community homes*, (six in number) with participants living in *individual homes* (four).
- (4) Comparing respondents' overall combined Talking Mat scores for all four locations in relation to *levels of communication difficulty*. (E.g, *low/medium low; medium and high/medium high* levels of communication).

The first analysis provides useful knowledge as to what service users were most and least satisfied with within each of the four different locations. Such knowledge is useful for the HA to better understand and address service user concerns. The second analysis showed the overall findings of what service users were satisfied and/or dissatisfied with throughout all four locations. This provided the HA with useful knowledge as to what service user's primary concerns are overall. The third analysis provided an understanding of how residents' concerns about the environment relate to the two types of homes they live in: *individual flats* and *community homes*. The fourth analysis compared Talking Mat scores with respondents' three levels of communication difficulty to identify any disparity in scores between low/medium low; medium and medium high/high levels of communication difficulty. Such knowledge was directed to enable the HA to have a clear idea of resident's satisfaction scores at either end of the communicative spectrum and help confirm whether Talking Mats is a technique they might use in the future.

Responses to the semi-structured questionnaire were categorized into *aspects of place experience; elements* and *activities*, after which responses were sub-categorized in relation to the Project KPIs shown in Table 1. Finally, the findings of both Talking Mat and questionnaire responses were compared, discussing any pertinent correlations and/or differences. Comparable findings were examined using two approaches: the first approach looked at general comparisons to ascertain how Talking Mats and questionnaire data reliably matched each other; and the second compared Talking

Mat and questionnaire responses in relation to individual context (for all ten participants), to discover contextual information including the influence of dwelling location.

As noted above, qualitative responses gathered from the Talking Mats were analysed by assigning numerical values to the responses and then averaging across the ‘universe’ of respondents and locations. Although a qualitative analysis technique of key words, *etc.* could have been an alternative, this approach was used partly due to its potential simplicity—taking into account possible replication within the HA in future. While the simplifying of the qualitative data into averaged quantities can lend itself to generalisation, great care has been taken not to extrapolate from these unduly, and to avoid any double counting.

3. Experimental Section: Findings

3.1. Findings from Talking Mats

Privacy, *relaxing* and *being with people* were the only three options that service users were most satisfied with in more than one location. *Privacy* achieved the highest satisfaction rating for the *bathroom* and was third highest for the *garden*. *Relaxing* had the third highest satisfaction rating for the *living room* and second highest for the *bathroom*. Finally *being with people* was the option service users were most satisfied with in the *garden* and the second most satisfied with in the *kitchen*.

Being alone was the only option service users were least satisfied with in all four locations (*i.e.*, they did not like being alone). This generated the lowest satisfaction score for the *living room* and *garden* and was second lowest for the *kitchen* and *bathroom*. Service users considered room *size* to be the least satisfying option in two separate locations. *Size* was the least satisfying for the *kitchen* and *garden* and the third least for the *living room*. Service users considered *playing games*, *plants*, and *listening to music* to be among the least satisfying options in two separate locations. *Playing games* was the option with the second least overall satisfaction rating for both the *living room* and *garden*.

Concerning satisfaction scores for all participants in all locations, only options that were appropriate and could be used in all four locations were averaged. These included: *Size*; *Safety*; *Privacy*; *Plants*; *Being alone*; and *Listening to music*. The overall, average satisfaction scores for these six options include: *privacy* (1.5); *safety* (1.9); *listening to music* (2.2); *plants* (2.5); *size* (2.8); *being alone* (3.5)—the lower the value the higher the satisfaction.

Concerning findings across the different house types, the overall average satisfaction scores for the six participants living in community homes (service users 3,4,6,7,8&9) include: *privacy* 1.7; *safety* 1.9; *size* 2.4; *listening to music* 2.7; *plants* 2.9; *being alone* 3.4. The four sampled residents living in individual flats scored as follows: *privacy* 1.1; *listening to music* 1.5; *safety* 1.8; *plants* 1.9; *size* 3.5; *being alone* 3.6. In conclusion, there were limited differences between the two types of location concerning the aspects residents were most satisfied with, namely privacy and safety.

Concerning communication skills, the four sampled service users with low and medium/ low levels of communication difficulty provided satisfaction ratings using Talking Mats of: *privacy* 1.7; *safety* 2.0; *listening to music* 2.1; *plants* 2.3; *being alone* 3.1; *size* 3.3. The two service users with medium levels of communication difficulty provided satisfaction ratings using Talking Mats of: *size* 1.8; *safety* 2; *privacy* 2.1; *listening to music* 3; *plants* 3.2; *being alone* 3.2. The four service users with

medium to high levels of communication difficulty provided satisfaction ratings using Talking Mats of: *safety* 1.6; *listening to music* 2; *plants* 2.2; *size* 2.9; *privacy* 3.5; *being alone* 4.0. In conclusion, residents at either end of the communication spectrum (*i.e.*, low and medium/ low levels vs. high and medium/ high levels of communication difficulty), were generally not as satisfied with the size of their living spaces and would prefer a larger living environment. In addition residents with lower communication difficulty were generally more satisfied with privacy compared to residents with higher communication difficulty.

3.2. Findings from the Questionnaire

Questionnaire responses were categorised into *aspects of place experience; elements and activities*. In each case the response from the interviewee was recorded and a short descriptive statement allocated, allowing comparable responses to be linked. Within each category responses were then sub-categorised in relation to the KPIs reported in Table 1. Sub-categorisation was achieved by going through each questionnaire and matching each response with the appropriate KPI. Categorising questionnaire responses into the three initial categories was relatively straight forward. However sub-categorising responses into the relevant KPIs required a degree of subjective interpretation as each response could be inferred as belonging to one or more KPI. For example ‘spaciousness’ was sub-categorised as being related to ‘dignity’ however spaciousness could also be sub-categorised as being related to ‘well being’. In order to help control the ambiguity of interpretation both interviewers collectively selected how responses should be sub-categorised to the relevant KPIs. The questionnaire responses that were collectively sub-categorised into KPIs for all four locations included, *well being* (93 sub-categorisations); *quality of environment* (43); *dignity* (34); *choice* (30); *independence and responsibility* (14); *safety* (10); *privacy* (5); *social inclusion* (2) and *health* (1). A breakdown of how questionnaire responses were categorised and sub-categorised can be seen in Appendices A-C.

Questionnaire responses were intended to illustrate residents concerns of the ‘overall environment’ in relation to KPIs and not concerns relating to ‘specific locations’—e.g., living room, kitchen, bathroom and garden. The benefit of applying this method was that a universal overview of service users concerns was captured. A detailed collection of questionnaire responses relating to specific locations, as used for Talking Mat responses, was useful but potentially reduces the sample size and validity of the findings.

The three main ‘aspects of place experience’ cited through the questionnaire were *daylight/sunshine* (8 responses); *decoration* and *safety* (both 6 responses); and *access to garden* and *spaciousness* (both 5). Preferred activities were *watching TV* (13), followed by *eating and drinking* (12). Responses relating to *well being* were by far the most common (total 93).

3.3. Comparing Findings

This section looks at the general comparisons between Talking Mat and questionnaire responses, to identify how well the two sets of findings matched each other. The number of talking Mat responses that reliably matched questionnaire responses was reasonably high overall. Table 3 shows the number of questionnaire responses for each service user in relation to their level of communication difficulty. Column eight shows the number of answers participants gave out of a possible 45, while columns nine

and ten show how many of those questionnaire answers could be matched to the responses by the same interviewee, achieved through the Talking Mats technique—a total of 75%. The last column shows the relatively few situations, (15% of questionnaire answers), where no clear option was found for relating the questionnaire answer with a Talking Mats response. The difference between these, (10% of questionnaire responses), reflects where conflicts appeared. This proportion, (10%) is small in relation to aligned responses, (75%). As such Talking Mats appears to provide a reasonably accurate approach, albeit one with much less nuanced outcomes.

Table 3. Questionnaire responses for each service user in relation to their level of communication difficulty.

Service User	S/U: Level of communication difficulty					Number of questions	Number of responses	Corresponding option	No appropriate option
	low	medium low	medium	medium high	high				
3	1					45	26	21	3
9		1				45	23	18	5
1		1				45	22	18	4
4	1					45	21	15	4
6			1			45	20	14	1
8				1		45	18	13	2
5				1		45	15	10	3
7			1			45	15	9	2
10					1	45	15	12	3
2					1	45	8	8	0
Total	2	2	2	2	2	450	183	138	27
Percentage								75%	15%

3.4. Overall Findings

This section summarises the overall questionnaire and Talking Mats responses in relation to the previous phase of knowledge capture in the KTP—interviews with managers and focus groups with staff about the impact of the built environment on their work. In this final phase of knowledge capture with residents, they were least satisfied with the size of the kitchen in that they would like their kitchen to be bigger. During the previous phase of knowledge capture HA support staff also discussed the benefits of larger kitchens. Mutually combining qualitative evidence from staff, along with residents satisfaction rating of kitchen size provides useful information for the HA about future accommodation, particularly for community homes.

Similarly, using Talking Mats, residents were most satisfied with *privacy* in the bathroom, which was also the most commonly cited impact of the built environment from focus groups in the previous phase of the KTP. Furthermore from the questionnaire responses, the most important element in the bathroom in most cases was the shower, with a total of 8 responses. In the previous phase, focus groups of staff discussed changes to the bathroom as being the most commonly cited location of changes to the built environment which had positive impacts. Moreover bathroom changes, (e.g., tracking hoists; walk-in baths/showers *etc.*) were considered by staff to have the biggest improvement

in terms of privacy. Staff felt that such changes improved resident's *independence* which *reduced staff support* and ultimately *improved privacy*.

Being with people was generally high on resident's satisfaction scores for all four locations and was the most satisfying score for the *garden*, while *being alone* was the least satisfying score for the *garden*. Such findings provide an interesting correlation, with four participants' questionnaire responses relating to *safety* in the *garden*. These participants expressed concerns around *safety* in the *garden*, including *sun burn*; *vandalism*; *windy or inclement weather*; *insect stings*; or simply having more *security*. The Talking Mat responses provided a visual representation of '*how residents feel*' about being in the *garden*, in that they did not like to be alone there and liked to *be with people*. Questionnaire responses seemed to flesh out the reasons as to '*why participants feel*' this way about being in the *garden*, in that they have previously suffered an insect sting, sun-burn or have heard about vandalism in the area. Support staff would undoubtedly have concerns over service users being alone outside due to the possibility of residents absconding or suffering injury. This form of first hand evidence from residents of how they feel about being in the *garden* is thus useful for the HA in gaining an understanding of how their residents feel about the outside environment.

The most interesting disparity in Talking Mat scores came from the analysis of scores by level of communication difficulty, in particular residents' feelings about the size of their environment. Residents with low and medium low levels of communication difficulty were least satisfied with the *size* of their environments, however residents with medium levels of communication difficulty were most satisfied with the *size* of their environments, and residents with high and medium high levels of communication difficulty thought that the *size* of their environment was the fourth most satisfying option. The reason for residents with better communication skills feeling less satisfied with the size of their environment could be due to a number of issues. Participants with better communication skills have a higher cognitive understanding of the process and are aware that there are no repercussions in saying they are dissatisfied with the size of their dwelling. Also greater cognitive awareness tends to carry with it a greater engagement with different forms of activity, especially socialising, placing greater pressure on available space.

4. Conclusions

4.1. Findings of Relevance to the Specific Case Study

The use of Talking Mats, alongside parallel semi-structured interviews, with residents/service users with communication difficulties, provided a raft of information on residents' feelings about their living environments and is considered as beneficial to HA for two main reasons. Firstly it provides valuable information regarding general and specific service user concerns about their environments and can ultimately help inform how such concerns can be addressed. Secondly it was a unique opportunity to test and confirm the effectiveness of Talking Mats in combination with PCT based questionnaires and assess whether this would be a technique the organisation might wish to use in future.

Regarding the first benefit, Talking Mat findings overall suggest that participants are generally quite satisfied with the environment provided by the HA. The combined averaged satisfaction score ranged from 1.1 to 4.08 with 80% of scores below the score of 3.0—*i.e.*, in the satisfied/quite satisfied

range. This is a high level of general satisfaction. Excluding the options that were not appropriate for all four locations, residents were most satisfied with *privacy*, (in that residents liked privacy—at least the privacy they have) and were least satisfied with *being alone*, (where residents disliked *being alone*). It is thus important to note that residents need both privacy and social engagement in different ways and in different spaces, particularly the kitchen and garden.

Regarding the second benefit, there are some recommendations about the application of Talking Mats that could be applied in the future. First of all the selection process of symbols (options) would be more thorough than the process used here for new knowledge production, which was an initial and experimental use of the technique. Ideally symbol selection would involve pre-interview investigation in order to find out what service users find crucial within the four locations. This would ultimately determine the option symbols to be used for the four locations. In this instance some prior assumptions were made as to the relevant options for each location, though from the responses gathered from the questionnaires these appear to have broadly mapped to the relevant concerns.

Considering the potential future use of Talking Mats in similar circumstances, if interviewers are using more than one mat, (topic) per interview then it is strongly advised to use an equal number of the same symbols, (options) for each mat. Using the same symbols for each mat makes it easier to compare the scores from other interviews as there is no chance of affecting the results with symbols which are only appropriate for one mat. In the case reported above not all of the options were suitable for each of the four mats, (e.g., the option ‘kitchen units’ could only be used for the kitchen). As a result, in order to avoid skewing the findings, only options that were appropriate and could be used for all four locations were compared (e.g., *size*; *safety*; *privacy*; *plants*; *being alone*; *listening to music*). This issue could have been avoided if there were an equal number of symbols for each topic, pre-determined via collective exploration of user’s generic activities for all locations.

In conclusion, this experience has provided the HA with useful firsthand knowledge of how residents feel about their current living environment, from a sample which is representative of the overall population of ARK service users in terms of communication skills. In addition, mutually combining the findings with the qualitative evidence from the HA’s management and staff given during the previous part of the study reported in [7], makes this evidence more robust. Finally an important new technique has been trialed by the HA for future use and the possible integration of this in a wider participation policy in the organization is under discussion.

4.2. Findings of Wider Relevance

This paper has the objective not only of adding to the (critical) literature concerning the use of Talking Mats as a technique for communication, in a specific client briefing process, but of assessing the potential this may have of wider interest for architects and clients who wish to engage with users who have similar communication difficulties. Key constraints have been identified above—concerning the potential exclusion of users who have visual impairment, the necessary prior definition of pictorial symbols, the issues around the levels of cognition and possible responses (3 or 5 options) *etc.* Nevertheless, the researchers believe that this technique can have a wider application, within the above constraints. That said, however, it is recommended that the technique cannot be utilized without a prior understanding of the potential factors which require discussion, and adequate pictorial representation

of these factors. In addition, while assisting some users with severe communication difficulties to communicate, intermediate interpretation is still required. As such the technique needs to be used in conjunction with information derived from other areas of the client or user group, and needs to probably retain a monitoring system through parallel interviews and /or focus groups.

Some of the above issues may be diminished through time if the technique is repeated and subjects become more accustomed to the ‘language’ involved. Hence periodic use over time could show more depth of response. Additionally, prior experience with the technique and its potential and constraints would be ideal—and this paper hopes to provide this to potential users. In general, of course, not all users are accessible to those who are designing future buildings, and hence reporting on findings permits the ‘secondary’ form of participation discussed in [3], where experience is shared through literature and other media and is the basis for informed discussion of typical needs and desires. Clients and architects need to play an important role in this process, as do researchers, in not only undertaking such research, (which should include post-occupancy assessments), but in making these publically available. In this way indirect participation permits better client briefing and design.

References and Notes

1. Kelly, J.R.; MacPherson, S.; Male, S. *The Briefing Process: A Review and Critique*; RICS: London, UK, 1992.
2. Tweed, C.; Wooley, T. User participation in design; Techniques for dialogue. *Arch. Comport./Arch. Behav.* **1992**, *8*, 253–264.
3. Jenkins, P. Forsyth, L. *Architecture, Participation and Society*; Routledge: London, UK, 2010.
4. Scott, I. Designing learning spaces for children on the autism spectrum. *GAP J.* **2009**, *10*, 36–51.
5. Scott, I. Analysis of a project to design the ideal classroom undertaken by a group of children on the autism spectrum and students of architecture. *Good Autism Pract.* **2011**, *1*, 13–25.
6. Knowledge Transfer Projects (KTP)s are one to three year projects funded by the UK Government and other relevant research agencies and are set up between a company and a university, aiming to facilitate the transfer of knowledge and/or technology and the spread of technical and business skills to the company.
7. Jenkins, P.; Smith, H.; Pereira, M.; Challen, A. Underpinning reflective practice in social care and housing provision through collaborative knowledge exchange. *J. Hous. Built. Environ.* **2012**, (forthcoming).
8. Murphy, J.; Cameron, L. The effectiveness of talking mats for people with intellectual disability. *Br. J. Learn. Disabil.* **2008**, *36*, 232–241.
9. Oliver, T.M.; Murphy, J.; Cox, S. ‘She can see how much I actually do!’ Talking Mats®: Helping people with dementia and family carers to discuss managing daily living. *J. Hous. Care Support* **2011a**, *13*, 27–35.
10. Oliver, T.M.; Murphy, J.; Cox, S. See what I think. *J. Dement. Care* **2011b**, *19*, 39.
11. Macer, J. Talking Mats: Training for care home staff. *J. Dement. Care* **2011**, *19*, 37–39.
12. Murphy, J.; Gray, C.M.; Cox, S.; van Achterberg, T.; Wyke, S. The effectiveness of the Talking Mats Framework with People with Dementia. *Dement. Int. J. Soc. Res. Pract.* **2010**, *9*, 454–472.

13. The term ‘learning disability’ has been used in literature quoted in this paper, although the term ‘learning difficulty’ is preferred, the former is used here only when referring to its use by others.
14. Macer, J.; Fox, P. The use of a low tech communication framework to facilitate annual GP health screening consultations: Supporting people with learning disabilities and mental health needs to express their views. *Learn. Disabil. Pract.* **2010**, *13*, 22–24.
15. Gillespie, A.; Murphy, J.; Place, M. Divergences of perspective between people with aphasia and their family caregivers. *Aphasiology*. **2010**, *24*, 1559–1575.
16. Boa, S.; Murphy, J. The Scottish—Chinese connection speech and language therapy bulletin. *Learn. Disabil. Pract.* **2010**, *13*, 22–24.
17. Cameron, L. Yes we can: Reflections on the speech and language therapy profession in Kenya. *Speech and Language Therapy in Practice*. **2010**, *summer*, 19–21.
18. Brewster, S. Putting words into their mouths? Interviewing people with learning disabilities and little/no speech. *Br. J. Learn. Disabil.* **2004**, *32*, 166–169.
19. Kelly, G.A. *The Psychology of Personal Constructs*; Norton: New York, NY, USA, 1955.
20. Stringer, P. Architecture, psychology the games the same. In *Architecture, Psychology*; Canter, D., Ed.; RIBA: London, UK, 1970.
21. Stringer, P. Repertory grids in the study of environmental perception. In *Explorations in Interpersonal Space*; Slater, P., Ed.; Wiley: New York, NY, USA, 1976.
22. Honickman, B. Construct theory as an approach to architectural and environmental design. In *Explorations in Interpersonal Space*; Slater, P., Ed.; Wiley: New York, NY, USA, 1976.
23. Aspinall, P.; Ujam, F. A projective approach to designing with children. *Landsc. Res.* **1992**, *17*, 124–131.
24. It would obviously be impossible to use a visual-based technique such as Talking mats with those with severe visual impairment, however this issue was not a key focus on the study which was to test TM as an innovative technique for possible use by the HA with the majority of its service users/residents.
25. The researchers involved in the study worked under the research ethical guidance of their institutions. In addition the Housing Association had its own ethical guidance for staff and people accessing residents/service users, which were also complied with in the study.
26. Cameron, L.; Murphy, J. Views of young adults at the time of transition. *Communication Matters J.* **2001**, *15*, 31–32.
27. Cameron, L.; Murphy, J. Enabling young people with a learning disability to make choices at a time of transition. *Br. J. Learn. Disabil.* **2002**, *30*, 105–112.
28. Cameron, L.; Watson, J.; Murphy, J. Talking Mats: A focus group tool for people with learning disability. *Communication Matters J.* **2004**, *18*, 33–35.

Appendices

Appendix A

Table 4. Questionnaire responses related to *aspects of place experience* ranked by frequency.

	Aspects of Place Experience	KPI	Frequency
1	Sunny/ daylight	Health & Well-Being	8
2	Decoration	Quality of Environment (QOE)	6
3	Safety	Safety	6
4	Access to garden	Choice	5
5	Spaciousness	Dignity	5
6	Peace & Quiet	Dignity	4
7	Privacy	Privacy	4
8	Modern Design	QOE	4
9	View of Garden	Well-Being	3
10	Noise	Dignity	3
11	Tidiness	Dignity	3
12	Cleanliness	Dignity	3
13	Internal access	Dignity	3
14	Garden Quality	QOE	3
15	Comfort	Well-Being	2
16	Fresh air	Well-Being	2
17	Wildlife	Well-Being	1
18	Wind & Rain	Well-Being	1
19	Vandalism	Dignity	1
20	Normality	Dignity	1
21	Insects in garden	Safety	1
22	Vehicle access	Independence	1
23	Personal care	Dignity	1

Appendix B

Table 5. Questionnaire responses related to *elements* ranked by frequency.

	Elements	KPI	Frequency
1	Shower	Health & Well-Being	8
2	Seating	Well-Being	5
3	Bath	Health & Well-Being	5
4	Planting indoors	QOE	5
5	Pictures	Choice	4
6	BBQ	Choice	4
7	Garden Furniture	Well-Being	4
8	Chair lift/ hoist	Well-Being	4
9	Kitchen cupboards	QOE	3
10	Kettle	Well-Being	3
11	Lights	QOE	3
12	Tables	Well-Being	3
13	Decking	QOE	3
14	Garden planting	QOE	3
15	Broken elements (TV/ Window)	QOE	3
16	Flooring	QOE	2
17	Windows	QOE	2
18	Toilet facilities	QOE	2
19	Hanging flower baskets	QOE	2
20	Kitchen sink (good size)	QOE	2
21	Grab rails	Safety	2
22	Curtains	Privacy	1
23	Rug	QOE	1
24	Cooker	QOE	1
25	Microwave	Choice	1
26	WC	Health & Well-Being	1
27	Cushions	QOE	1
28	Washing line	Independence	1
29	Old fashioned design	QOE	1
30	Anti-slip mats	Safety	1
31	Book case	QOE	1
32	Light cord switch	QOE	1
33	Window blinds	Well-Being	1

Appendix C

Table 6. Questionnaire responses related to *activities* ranked by frequency.

	Activities	KPI	Frequency
1	Watching TV/ DVD	Choice	13
2	Eating// Drinking	Well-Being	12
3	Listening to music	Well-Being	10
4	Cooking/ Baking	Independence	10
5	Cleaning	Dignity	9
6	Sitting in the garden	Well-Being	7
7	Having a BBQ	Well-Being	5
8	Relaxing	Well-Being	4
9	Arts & Crafts	Well-Being	4
10	Singing/ Dancing	Well-Being	2
11	Computer Games	Choice	2
12	Talking to Friends	Social Inclusion	2
13	Not watching TV	Choice	1
14	Going to bed	Health & Well-Being	1
15	Loading dishwasher	Dignity	1
16	Dining	Health & Well-Being	1
17	Exercise	Health	1
18	Sewing	Independence & Responsibility	1
19	Gardening	Independence & Responsibility	1

© 2012 by the authors; licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).