Universal Design, Camps & Consultation

What are the best practice methods for consulting with users to implement universal design?

A literature review

Architecture & Access

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## Glossary of Terms

The following is a list of the definitions of the common terms used throughout this report.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessible</td>
<td>Pertains to access for people with disabilities to products, services or the built environment.</td>
</tr>
<tr>
<td>Consultation</td>
<td>The process of engaging users to get their opinions, feedback or analysis of a design.</td>
</tr>
<tr>
<td>Designer</td>
<td>A person that designs products, services or the built environment. Designers of large buildings are usually architects.</td>
</tr>
<tr>
<td>Disability</td>
<td>A disability is any condition that restricts a person’s mental, sensory or mobility functions. It could be caused by accident, trauma, genetics or disease. A disability may be temporary or permanent, total or partial, lifelong or acquired, visible or invisible.</td>
</tr>
<tr>
<td>Design for all</td>
<td>Design by people for all people, which allows for human diversity, social inclusion and equity (European Institute for Design and Disability 2004).</td>
</tr>
<tr>
<td>Inclusive design</td>
<td>Design of mainstream products/services that are usable by many without the need for adaptation (Steinfeld &amp; Maisel 2012).</td>
</tr>
<tr>
<td>Participation</td>
<td>The involvement of users in the design process by providing feedback, opinions and design advice. Note: participation and consultation are used interchangeably throughout this document.</td>
</tr>
<tr>
<td>Participatory Design</td>
<td>Participatory design recognises that design ideas develop in collaboration with participants from diverse backgrounds (Sanoff 2007).</td>
</tr>
<tr>
<td>Product</td>
<td>An appliance or piece of equipment.</td>
</tr>
<tr>
<td>Program/Service</td>
<td>A process ensuring delivery of articles, commodities, activities etc…</td>
</tr>
<tr>
<td>Universal design</td>
<td>A process of creating designs (of the built environment, products or equipment and services) that are usable by people with a wide range of abilities, within a wide range of contexts (Vanderheiden 1996).</td>
</tr>
<tr>
<td>User-centred design</td>
<td>A design process that takes into account users of a product, service or built environment (Earth, Johne &amp; Bevan 2001).</td>
</tr>
</tbody>
</table>
Abstract

This report presents findings from the literature regarding the best practice methods for consulting with users to implement universal design. This is part of a larger body of work to assist the Sport and Recreation Victoria (SRV) to implement universal design across their recreation camps with the aim of increasing the participation of a wider range of users. Universal design is a design process that aims to ensure that products, services and the built environment are useable by the widest range of users (Vanderheiden 1996). It is not only about people with disabilities but full participation for all.

How to achieve universal design is not well understood. This literature review captured articles about projects that attempted to achieve universal design or user-centred design by consulting with users throughout the design process. The studies were predominantly qualitative case studies, in which a variety of different methods were used to consult with users. These techniques included the full participation of users in the design process, the use of hidden cameras, observation, focus groups, scaled cardboard models and 3-D virtual environments. Some important considerations for consulting with users are raised in the literature. These include: careful selection of users to ensure a representative sample that includes a wide range of users; the use of multiple methods to consult with users to enable the full participation of all users; and finally that users are consulted throughout the design process. To assist SRV camps to implement these findings, it is recommended that they are provided with education and training on consultation techniques, and that strategies are developed to document the selection of participants and to track the decisions made throughout the consultation and design process. Finally it is recommended that further research is conducted into developing a model or defined steps to guide designers in the process of universal design.
FIGURE 1
Location of SRV Camps

- Lady Northcote Rowsley
- Anglesea Recreation Camp
- Mt Evelyn Recreation Camp
- Howmans Gap Alpine Centre, Falls Creek
- Camp Manyung Mt Eliza
Introduction

The aim of this report is to determine the best practice methods for consulting with users to implement universal design (UD). This literature review is part of a larger project for the Victorian Department of Transport, Planning and Local Infrastructure to implement universal design into all of their programs. A division of this department, Sport and Recreation Victoria (SRV), owns five recreation camp sites across Victoria (Figure 1). The camps are open to all sectors of the community to come and enjoy the surrounding environments (snow fields, beaches, rainforest) and recreation activities including high ropes courses, mountain biking, canoeing, skiing, camp fires etc. Within the constraints of the camp environments and facilities, each group using the camps is able to tailor the camp program to their needs.

The Victorian Government has a commitment to the National Disability Strategy and one of the policy directives within the strategy is to:

“improve access and increase participation of people with disability in sporting, recreational, social, religious and cultural activities whether as participants, spectators, organisers, staff or volunteers” (Council of Australian Governments 2011, p. 31).

SRV have written this into the lease agreement with the camps, as one of the target objectives for the camps is to increase the participation of people with disabilities,
Victorian aboriginal people, the elderly and women (Sport and Recreation Camps Committee of Management Incorporated 2005). SRV have identified that one strategy to achieve this objective is to implement universal design in the built environment, the programs they offer and in the products or equipment/activities that they use at the camps. A universal design approach aims to ensure that products, services and the built environment can be used by the widest range of possible users without the need for specialised services or adaptations made to equipment. Hence most people with a range of abilities at the camp should not require specialised equipment or treatment or be segregated from the main group. With this goal in mind, how should the SRV camps consult with users to implement universal design? A literature review is proposed to answer this question by researching the current practice of consulting with users during the universal design process. The method of literature review was selected as it allows a wide range of examples to be analysed and common findings to be determined.

Universal design

Universal design comes from a premise that we are not all the same: some of us are elderly, children; some are pregnant or use a walking stick; some are short or tall; some have use of only one arm or are just trying to carry luggage to the airport. All of these factors contribute to how we can function and use a space or product at any one time. However designers often design to what they know, i.e. design to suit themselves, their own likes/dislikes and abilities/disabilities (Goodman-Deane, Langdon & Clarkson 2010). This can lead to the exclusion of others with differing abilities (Vavik & Gheerawo 2009).

The term universal design was first documented in the US by architect Ronald Mace in 1985 (Vavik & Gheerawo 2009). He is also the founder of the Centre for Universal Design in North Carolina State University (Vavik & Gheerawo 2009). In his last public lecture in 1996, Mace presented his definition of universal design as a consumer market driven issue, noting that the focus should not be on people with disabilities but on all people, as we all have differing abilities (Center for Universal Design 2008). He also highlights that no-one is immune from aging, frailty or disability (Center for Universal Design 2008). He adds that no environment is ever fully universally designed as we can always make everything more useable (Center for Universal Design 2008). While Mace alludes to this non-static nature of universal design, it is more clearly emphasised in Vanderheiden’s definition:
“Universal design is the process of creating products (devices, environments, systems and processes) which are usable by people with the widest possible range of abilities, operating within the widest possible range of situations” (Vanderheiden 1996, p. 1).

This definition makes explicit that universal design is a process, not a product, and makes a shift towards the concept of user-centred design whilst recognising that users have different needs.

The recent definition by Steinfeld and Maisel (2012) also highlights that universal design is a process and, in addition, links it to health and social participation.

“Universal design is a process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation” (Steinfeld & Maisel 2012, p. 29).

It should be noted that, whilst universal design is becoming the dominant term around the world, other countries still use the alternate terms “inclusive design” and “design for all.” Inclusive design originates from the United Kingdom (UK) and within the European Union “design-for-all” is commonly used (Steinfeld & Maisel 2012; Vavik & Gheerawo 2009). Both of these terms promote the inclusion of all and especially people with disabilities in the design of products, services and the
User-centred design

User-centred design (UCD) emerged around the same time as universal design. It was first cited in 1986 and has its origins in human-computer interaction (Keinonen 2010). It puts the user at the centre and aims to develop products and services that are more user-friendly (Björk 2009a; Kok, Slegers & Vink 2012). UCD aims to do this by consulting with users early in the design process rather than leaving it to later stages of design where the design is more advanced and changes from users’ input are more difficult to implement (Björk 2009a). There is also recognition that there are different users of products, including primary and secondary users. The primary user of a rubbish bin is person disposing of rubbish; however the secondary user is the cleaner emptying the bin. Both users are important in ensuring the product is user-friendly (Björk 2009b). However the focus of UCD is on “ordinary” users rather than on the diversity of users including people with disabilities, culturally and linguistically diverse groups etc.

Universal design, health and disability

Universal design aims to make life easier, healthier and friendlier (Steinfeld & Maisel 2012). Social inclusion is central to the concept of universal design (Steinfeld & Maisel 2012). People with disabilities are often excluded due to the design of the built environment, products and services. However Australia and the other one hundred and fifty-eight countries who have signed the United Nations Convention on the Rights of People with Disabilities, (CRPD) as of May 2014, have an obligation to ensure “that all persons with all types of disabilities must enjoy all human rights and fundamental freedoms” (United Nations 2014b, 2014c). At least two of the guiding principles of the Convention are relevant to the design of the built environment, products and services. These are “accessibility” and “full and effective participation in society” and Article 9 of the Convention specifically relates to ensuring that access is provided to the built environment, services and products (United Nations 2014a, 2014c). These principles also link with the known determinants of health. The determinants of health include social exclusion, unemployment and poor access to transport which are all associated with poorer health and are more likely to affect people with disabilities (Wilkinson & Marmot 2003). Many countries including Australia have taken the UNCRPD seriously and
have developed policies such as the National Disability Strategy and have even legislated for accessibility, though the Disability Discrimination Act 1996 and the Disability (Access to Buildings – Premises) Standard, 2010 (Council of Australian Governments 2011). Legislation, however, can create minimum standards that designers must attain, and does not guarantee full participation for people with disabilities. By contrast universal design provides an opportunity to design innovative solutions that incorporate the needs of the widest range of users. It should not be regulatory process but a participatory process where a wide range of stakeholders and end users are consulted (Buhler 2001; Steinfeld & Maisel 2012).

Sanford, Story and Ringholz (1998) also discuss the secondary benefits of consulting to users, including the personal growth of the user, the experience empowers them as they have helped to shape the world in which they live, have learnt from others, developed skills in communicating and providing feedback and many more.

Consultation and participation

User participation allows those who are likely to be affected by a decision to be involved in the decision-making or in the case of this report the design process (Buhler 2001). Those involved can have different degrees of power over the design process or the decisions made. Arnstein (1969) described a ladder of participation where at the bottom is non-participation, then tokenistic participation which includes “informing” and “consultation.” The top rungs of the ladder are described as degrees of citizen power, where citizens have a share of the decision making power (Arnstein 1969). Farrell, Melin and Stacey (1975) also describe levels of participation extending from non-participation to forms of citizen control. More recently the International Association for Public Participation Australasia have developed a participation spectrum (2014) (refer Figure 2). These models assist in clarifying the intention of the participation, the degree of control to be afforded to the users and subsequently in determining which techniques to use to consult with users.

For the purposes of this report the terms consultation and participation will be used interchangeably and refer to the many different methods of consulting and involving users in the design process.

Universal design presents as an exciting opportunity to engage users in the design process to ensure that products, services and the built environment are accessible and user-friendly to the widest range of users.
However, there is a lack of clear evidence regarding how best to achieve this, including how best to consult with a wide range of users. This literature review aims to identify the best practice methods for consulting with users to achieve universal design.

INCREASING LEVEL OF PUBLIC IMPACT

INFORM
- Provide information
  - Fact Sheets
  - Websites
  - Open Houses

CONSULT
- Obtain feedback on alternatives or decisions
  - Focus Groups
  - Public Meetings
  - Surveys

INVOLVE
- Work directly with the public throughout process
  - Workshops

COLLABORATE
- To partner with the public in decision making
  - Participatory decision-making

EMPOWER
- Decision-making power rests with the public
  - Delegated decisions

FIGURE 2
IAP2 Public Participation Spectrum (adapted) (International Association for Public Participation Australasia, 2014)
<table>
<thead>
<tr>
<th>Subject</th>
<th>Platform</th>
<th>Databases Searched</th>
<th>Search Terms and Searches</th>
<th>Limiters</th>
<th>Date: 2004-2014 Peer Reviewed Journals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>Informit accessed via Deakin University Library</td>
<td>Australian Architectural Database</td>
<td>Consult* Participat* &quot;universal design&quot; &quot;inclusive design&quot; &quot;design for all&quot; &quot;user centered design&quot; &quot;user centred design&quot; Camp* Architect*</td>
<td>Date: 2004-2014 Peer Reviewed Journals</td>
<td></td>
</tr>
<tr>
<td>Architecture</td>
<td>ScienceDirect accessed via Deakin University Library</td>
<td>ScienceDirect</td>
<td>Consult* Participat* &quot;universal design&quot; &quot;inclusive design&quot; &quot;design for all&quot; &quot;user centered design&quot; &quot;user centred design&quot; Camp* Architect*</td>
<td>Date: 2004-2014 Peer Reviewed Journals</td>
<td></td>
</tr>
</tbody>
</table>
Methods

A literature review was conducted to identify articles where users were consulted in the design of a product, service or the built environment. This was to identify the consultation strategies that were used. Online databases were searched via Deakin University including EBSCOHost (refer Table 1, for a full list of the databases within EBSCO that were searched), ScienceDirect and Informit. Only peer-reviewed journal articles, English language articles and articles from 2004 to 2014 were included, to ensure that the articles were current.

In different parts of the world universal design has different names, so the search terms included “universal design”, “inclusive design”, “design for all” and “user centred design” (and centred spelt “centered”). Search terms “consultation” and “participation” (and variations of these words) were used to capture studies that had involved consultation with users. “Architect” and “camp” were used to capture articles that included the built environment and recreation camps. Health and architecture related databases were searched. These search terms generated many hundreds of articles. Abstracts were reviewed online against the following inclusion/exclusion criteria:

- Articles must describe the participation of or consultation with users during the development of a product, service or the built environment. Hence articles that described only consultation with users afterwards such as post-occupancy evaluation were not included.

*Rationale: Consulting with users after a product or building is built does not allow the user to have any impact on the design of that product.*

- Universal design of, or consultation with users in the development of, information technology including computer software, mobile phone technologies and websites was excluded.

*Rationale: There is much research in human-computer interaction using a user-centred design process; however it was considered that the processes used to develop software would be different to the design of a physical product, service or built environment and not relevant to the SRV recreation camps.*

- Articles that described the application of universal design in learning and education were not included.

*Rationale: Universal design in learning and education is a developing body of knowledge and due to the limitations of time this area was excluded from the review.*

Following review of the abstracts online, 97 articles were identified to be potentially relevant. Hard copies of these articles were then reviewed more closely against the inclusion/exclusion criteria (refer Figure 3 for summary of search strategy). Articles that could not be accessed
through the Deakin University library were not included due to time constraints. Once the inclusion/exclusion criteria were applied, the result was that 18 articles were included in the literature review (refer Appendix 1 for a summary table of all articles included in literature review). The Critical Appraisal Skills Program (CASP) guide for analysing qualitative literature was used to assist in reviewing the articles (refer Appendix 2) (CASP UK 2013).
The aim of this study was to determine the best practice methods for consulting with users to implement universal design. The articles included in this review are mostly qualitative case studies where users were engaged in the design of a product, service or built environment. One study used a mixed methods approach, where users were given two means of visualising the modification to an outdoor park (3D computer models and 2D printed drawings) (Schaik 2010). In this study, statistical analysis was used to determine the preferred visualisation technique and qualitative data from a focus group was used to further explore the merits of the different visualisation techniques.

Study quality

Even though most of the studies were qualitative, study quality is important to ensure that the reader can judge the trustworthiness of the results. Sample sizes were found to be generally very small, with only three studies using a sample size of fifty or over (Amiri, Dezfooli & Mortezaei 2012; Brooks et al. 2012; Schaik 2010). This is appropriate for qualitative studies where more in depth information is required, as opposed to quantitative studies where large sample sizes are required to ensure that results can be generalised (Aveyard 2014). Of concern, however, is that seven articles did not clearly detail the number of users consulted (Bullinger et al. 2010; Goodman-Deane, Langdon & Clarkson 2010; Gossett et al. 2009; Oygur & McCoy 2011; Parnell & Patsarika 2011; Seim & Broberg 2010; Staeger-Wilson et al. 2012).

Most articles provided little evidence on how the sample was selected. Only five articles stated the methods used to identify or select participants (Korhonen et al. 2011; Milligan, Nieuwenhuijsen & Grawi 2014; Oygur & McCoy 2011; Schaik 2010; Siu 2011). Oygur and McCoy (2011) and Schaik (2010) both used advertising to recruit local residents as participants. This has the potential for bias, as usually more motivated, well educated people are likely to read and respond to advertising for a study. This potential for bias was not mentioned in these studies. Milligan, Nieuwenhuijsen and Grawi (2014), in a study on making arts and cultural events more accessible for people with disabilities, explicitly stated that they used purposive and snowballing sampling methods. These techniques are known sampling techniques used in qualitative studies and aim to provide appropriate samples that will provide rich data (Aveyard 2014).

Four studies reported the use of third-parties to select participants. Sui (2011) and Siu and Wong (2013) used social workers to recruit elderly participants and people with a vision impairment, respectively. In two examples
of design in schools, a third party was used. In one study, the deputy head selected teachers and, in the other article, teachers selected students (Luck 2007; Parnell & Patsarika 2011). The use of third parties has the potential to bias the sample selected, as the Parnell and Patsarika (2011) reported that one teacher commented that she chose only her “star pupils” to be involved in the consultation process. The school hierarchy is acting as a “gatekeeper”, which is likely to have limited the impact and power that the students had to influence the design.

Most studies (n=11) used multiple methods of data collection and the reporting of how data was collected was generally good. The most common methods of data analysis mentioned in the articles were thematic analysis or coding and triangulation (n=6). These are appropriate methods for analysing qualitative data (Aveyard 2014). Worryingly, half (n=9) of the articles did not report how they analysed their data. This makes it difficult for the reader to evaluate the study and determine the trustworthiness of the results.

**Types of product, service or built environment**

Most studies (n=10) involved the design of new, or modification to, buildings, outdoor spaces or a transport vehicle. Six studies involved the design of a product or
piece of equipment and most of these products were for a specific user group, eg. a night stand for elderly/people with a disability living at home, a bathing device for a person with hemiplegia and backpacks for school children. Only one study involved the design of a service. This study aimed to make arts and cultural events in a region of the United States (US) more accessible for people with disabilities (Milligan, Nieuwenhuijsen & Grawi 2014).

**Types of users consulted**

In total twelve of the studies consulted with people with disabilities or a specific target group that is likely to have special needs such as the elderly or children. The other major group of users studied were employees (n=9). Among these studies, a wide range of workplaces and industries were represented including factory workers, office workers, teachers and researchers. Eight studies selected more than one type of user, and in one study the users crossed over two categories of user: people with disabilities and employees (Gossett et al. 2009). In this study the users were the employees of Access Living the majority of whom have disabilities (Gossett et al. 2009). Brooks et al. (2012) consulted the widest range of users - people likely to be the end users of a nightstand, which included patients of a rehabilitation hospital and community-dwelling older people. Secondary end users were also consulted which included a wide range of employees of a rehabilitation facility where this nightstand would be likely to be used. Another product design article consulted both end users and secondary users (Duschenes et al. 2012). The product was a new office workstation. Both end users, employees working in the information technology department of a company, and the manufacturers and installers of the workstation were consulted (Duschenes et al. 2012). The aim was to ensure that the workstation met the needs of the end user and was easier for secondary users to assemble/disassemble and install (Duschenes et al. 2012).

**Key terms used**

A variety of key words were used by the articles to describe the process of consulting with users during the design process, including: collaborative design, universal design, user-centred design, inclusive design, user participation, participatory design, collaboration, disability, and disability awareness. Interestingly, although included as a search term for this literature review, no studies used the term design for all. Three of the seven articles using “universal design” or “inclusive design” or “inclusion” in their key words were based on studies that did involve consultation with more
than one user group (Brooks et al. 2012; Gossett et al. 2009; Staeger-Wilson et al. 2012). However five articles that did not mention “universal design,” “inclusive design” or “inclusion” consulted with more than one type of user (Duschenes et al. 2012; Korhonen et al. 2011; Milligan, Nieuwenhuijsen & Grawi 2014; Oygur & McCoy 2011; Seim & Broberg 2010). Hence there was no trend evident that the use of the key word “universal design” (or other associated term) predicted consultation with a wider with a range of users.

Methods of participation/consultation

A variety of different techniques were used to consult with, gain data from or engage the participation of users to enhance design (Refer Table 2). Ten studies used multiple techniques to consult with users. Importantly however, the type of technique provides only one part of the picture, as techniques can be employed in different ways and may achieve very different outcomes. The name of some techniques may infer full and open consultation with users, however, for example, a focus group where one person dominates is not likely to achieve full and open participation of all users. Hence it is essential that studies clearly explain, or refer to supporting documentation that describes how the techniques were implemented to ensure that the reader can fully understand the techniques used, and compare techniques between studies.

<table>
<thead>
<tr>
<th>Technique used</th>
<th>Number of studies</th>
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<tbody>
<tr>
<td>Design workshops</td>
<td>8</td>
</tr>
<tr>
<td>Interview</td>
<td>8</td>
</tr>
<tr>
<td>Computer models, prototypes, scaled down and full scale models</td>
<td>5</td>
</tr>
<tr>
<td>Field trips</td>
<td>4</td>
</tr>
<tr>
<td>Observation/assessment of user</td>
<td>4</td>
</tr>
<tr>
<td>Focus groups</td>
<td>2</td>
</tr>
<tr>
<td>Satisfaction surveys</td>
<td>2</td>
</tr>
<tr>
<td>Users presenting to design students</td>
<td>2</td>
</tr>
<tr>
<td>Open forums</td>
<td>2</td>
</tr>
<tr>
<td>Workbooks to log issues with current workplace</td>
<td>1</td>
</tr>
<tr>
<td>Diaries</td>
<td>1</td>
</tr>
</tbody>
</table>

Role of designer/facilitator

Both Siu (2011) and Demirbilek and Demirkan (2004) comment on the role of the designer in the consultation with users. Demirbilek and Demirkan (2004) consulted with elderly users to design user-friendly domestic door handles and doors. Siu (2011) also used a group of
elderly people in the review of the design of public buses. To achieve active participation of the elderly users, the authors report that the project team ‘stepped back,’ they did not provide design solutions and encouraged elderly users to openly express their opinions and suggest design solutions (Siu 2011). The authors report that the elderly users actively participated in design sessions and showed great initiative in organising extra sessions, including a press conference at the final stage (Siu 2011). Demirbilek and Demirkan (2004) also advise that the designer acted as a facilitator and did not present designs in the first meeting but was there to encourage the users to suggest solutions and allow users to take control of the design process.

The influence of the designer on user responses is reported in the article by Luck (2007). The interactions between architect and building user in the very first meeting before a design brief or any drawings were formulated are analysed. In the four interviews studied between an architect and school teacher (user), it was found that users frequently discussed the functional or structural attributes of the space. There was less discussion regarding the experience of the space or the symbolic meaning of the space. The article comments that the architect in the study did not challenge or
question the user and so did not overly influence the responses. It is postulated that more prompting by the architect may have encouraged the user to think about the other domains, such as the perception of the space and the symbolic meaning of the space. The article discusses some other influencing factors such as the presence of the deputy head teacher in all the interviews and that users were requested to generate a wish-list for the proposed refurbished spaces. The exact effect of these factors cannot be quantified, however these are useful considerations for future researchers.

**User characteristics**

In the articles reviewed, some gave a rationale for the selection of the methods of consultation which was often related to the specific type of users involved. The special needs of elderly users are highlighted by Demirbilek and Demirkan (2004). They describe that, because of the known difficulties in extracting information from elderly users, multiple techniques were used during the design workshops (Demirbilek & Demirkan, 2004). Multiple methods of consultation with users were also employed by Korhonen et al. (2011). Their pilot study involved children with special needs in the design and manufacture their own electronic push-button device.
Their study found that children with special needs may need multiple methods of presenting information, including playful methods.

How consultation sessions are facilitated is also explored by some articles that engage specific user groups. Siu (2011, p. 300) used social workers to maintain “good communication with them (elderly users) during the workshops”. This article also makes reference to the difficulties of facilitating workshops so that all participants are heard, people are motivated to contribute and ensuring that “no arguments broke out” (Siu 2011, p. 307). These issues are not solely related to elderly people but are common considerations in the facilitation of any focus group (Sanoff 2000). The role of the social worker is not further explored in the article, so it is difficult for the reader to judge their effectiveness in maintaining a good level of interaction in the focus groups.

Siu and Wong (2013) also used social workers to assist in communicating with their participants. This study consulted with a group of people with visual impairments regarding the design of public toilets. They emphasise that, due to the nature of the disability experienced by the participants, more experiential consultation techniques were used including: field trips, full scale models, scaled down models and three-dimensional tactile maps. The article commented on the need for researchers to establish a good relationship with the visually impaired participants (VIPS) prior to beginning the more in-depth research and design process. The use of small groups versus individual sessions reportedly made the VIPS feel at ease and provided an opportunity for interaction and the generation of more creative ideas (Siu & Wong 2013). Although all of these strategies appear reasonable, the article provides little detail regarding data collection and analysis and so it cannot substantiate these claims regarding the methods and process of consulting with users.

The composition of focus groups is also highlighted in the study by Milligan, Nieuwenhuijsen and Grawi (2014) as an important factor for people with disabilities. They used focus groups to consult with a wide range of stakeholders involved with arts and cultural events in a region of the US. The need was expressed by people with disabilities on a steering committee for this project, that their voice be heard, independent of others. Hence, separate focus groups were held with the different types of stakeholders. The focus groups were facilitated by a trained member of the steering committee; open-ended questions were used to stimulate discussion; and it is reported that all participants engaged in discussions. The article reports that the different focus groups had “very different levels of understanding regarding the complex issues surrounding disability” (Milligan, Nieuwenhuijsen
& Grawi 2014, p. 111). It is likely the composition of focus groups will have an impact on how safe participants feel to fully express their opinions and perhaps this difference of opinions would not have been so apparent had the groups been mixed together. Schaik (2010) separates the genders in their focus groups. The reasoning given for this is that male participants in a mixed group would be likely to dominate female participants.

Consultation techniques

Field trips

Field trips were used to expose the elderly users in the Siu (2011) study to the current design of public buses. Design workshops were then held to propose solutions to the issues identified. On these field trips, the designers were able to observe the physical difficulties that elderly users experience in getting on/off the bus, the lack of armrests on the seating etc. Similarly, Staeger-Wilson et al. (2012) report the use of a field trip with students with a disability and the design team to inspect a newly constructed recreation centre. The article comments that this allowed the students with a disability to demonstrate difficulties in accessing a similar facility. No detail is provided regarding how information was collected on these field trips. Siu and Wong (2013) and Gossett et al. (2009) also report the use of field trips.

Games

A game was one of the methods employed by Seim and Broberg (2010) to facilitate participation of users, which included a wide range of employees at a manufacturing workplace. The game board was the proposed layout of the new plant equipment and the game pieces were the surrounding structures and rooms. The study concluded that the visual nature of the game was easy for all users to understand. The use of playful techniques is also discussed in a study with children (Korhonen et al. 2011).

Interviews

Overall eight studies used interviews to consult with users. Interviews can be highly structured, semi-structured or very unstructured and free-flowing. In a study by Goodman-Deane, Langdon and Clarkson (2010) designers were given the opportunity to consult with users that had a disability during a two hour session that was part of a design competition. The authors also interviewed two expert designers with experience in inclusive design and conducted a literature review around the involvement of users in the design process. They observed from the case studies that designers tended to use informal discussions with users. The experts and their literature search concurred that user
research by designers tends to be informal, using very small sample sizes and with users who are easily accessible or provided by the client (person commissioning the work).

Interviews have been used in different ways and at different times within the design process. Amiri, Dezfooli and Mortezaei (2012) used interviews with students first to determine user requirements and later to evaluate the design of the prototype and final version of the student backpack. Duschenes et al. (2012) and Ma, Wu and Chang (2007) used post-experience interviews to evaluate user satisfaction with the new bathing device. Schaik (2010) interviewed users to get their opinions on the two different visualisation techniques used. The articles reporting these studies provided limited information on the structure of the interviews.

**Observation**

Observation is a very passive way of collecting information on users. Like the use of interviews, the use of observation in the design process varies. Amiri, Dezfooli and Mortezaei (2012) used personal observation and hidden videos to observe and assess school children wearing backpacks. The primary method of consulting with users of office furniture, and the manufacturers and installers of this furniture in the study by Duschenes et al. (2012) was via observation. Seim and Broberg (2010)
also used observation of factory workers to develop an understanding of existing work practices. However they went on to use many more interactive techniques to involve employees in the redesign of the factory floor.

A study completed by Ma, Wu and Chang (2007) involved the design of an assistive bathing device. The sample was one woman with hemiplegia. The method of collecting information about the user’s issues with using the current design was via assessment of perceptual and physical abilities, task analysis and environment analysis, observation of user trials and then interview with the user to determine level of satisfaction with the product. These techniques are all very passive, and would be considered “therapy” - a form of non-participation according to Arnstein (1969). Using such methods, the user has no direct input into the design of the product. Observation may provide insights into how a product or built environment is used; however there is also potential for observer bias, especially if observations are not clarified with the participants.

Open forums
Staeger-Wilson et al. (2012) involved two students with a disability in all stages of the design process of a new recreation facility. This included participating in design meetings and attending a field trip, where they could demonstrate their experience of access to similar built
environments. Open forums were used to capture the opinions of the whole student population. However, no details are provided on how these forums or the other consultation methods were formatted, the data collected, or how it was used to influence the design. Open forums are more likely to be useful to inform users of what is happening rather than being a good method of collecting information from users (International Association for Public Participation 2014; Sanoff 2000).

Models for design and participation

To achieve universal design, it is incumbent upon designers to engage users in the design process. This involves selecting users, developing and implementing consultation techniques, collecting and analysing information from the consultation sessions and imputing this into the proposed design. This is a complex process and requires many different skill sets that go beyond the usual design and construction process that designers are trained in. The following sections draw on the literature to highlight models which provide some guidance to designers for integrating user input into the design process.

Product

A model to guide designers in user centred design, especially in the area of human-computer interaction, is available and is published in an international standard, ISO 13407: Human-centred design processes for interactive systems. Amiri, Dezfooli and Mortezaei (2012); and Ma, Wu and Chang (2007) refer to this standard, ISO 13407 (now superseded by ISO 9241-210) in their developments respectively of a bathing device and a backpack for school children (International Organization for Standards 1999, 2010) (refer to Figure 4 for the stages of UCD). Whilst this standard recommends that users should be “involved” at all stages, the depth of involvement is not evident in the wording used in the steps of the model (refer Figure 4). The user in this model appears to be used as a source of information, especially at the early stages, and does not have direct involvement in the design decisions. This gives the power to the designer to use and interpret the information that the user provides and ultimately they make all design decisions. Only the later step “evaluate designs against user” advocates the direct participation of users, in user testing and providing feedback on prototypes, so that the designer can use this information to optimise the design (Amiri, Dezfooli & Mortezaei 2012). Amiri, Dezfooli and Mortezaei (2012) used this model in the development of a backpack for 7-9 year
olds. They did not involve or actively consult the users in the first phase, as passive forms of consultation including hidden videos were used to observe the school children. Ma, Wu and Chang (2007) also used passive techniques to assess and determine users' abilities. Both studies used this information to develop a prototype. Amiri, Dezfooli and Mortezaei (2012) then allowed the users to test and evaluate the prototype. Following this, a whole new design was formulated to meet the needs of the users (Amiri, Dezfooli & Mortezaei 2012). Had the users been more actively consulted in the initial stages of the design, a redesign may not have been required. Ma, Wu and Chang (2007) used an interview consisting of five questions to consult with the user about the prototype. Little information was obtained and no information was solicited regarding how the user would suggest modifying the prototype. The authors conclude, however, that the user has a “high” level of satisfaction with the product (Ma, Wu & Chang 2007). Both studies use passive involvement of the user/s in the early stages to determine user requirements. This information is then used to develop a prototype and, as is seen in the Amiri, Dezfooli and Mortezaei (2012) study, the prototype requires full redevelopment.

Whereas the above studies used the UCD model that requires only passive user involvement in the early
stages, Demirbilek and Demirkan (2004) tried to use active consultation strategies with users in the early stages. In their study of older people regarding doors and door hardware, Demirbilek and Demirkan (2004) developed a participatory design model (Usability Safety Attractiveness Participatory, USAP) and emphasised that the designer, at this early concept development stage, is there to elicit user needs and proposals. The designer does not present any designs at this first stage and encourages the users to develop design solutions. A complex matrix is used to collect and analyse the information that users provide and this informs the proposed designs. In the second phase, concept refinement, the designer presents some sketches. The users are again consulted and encouraged to draw over the proposed designs and critique them. Only after this stage is a prototype developed for user trial. Prototype development and testing, and the subsequent stages of this model were not included in this study.

**Built environment**

In the UCD model and participatory design model above, prototype development is used to test users’ reactions to the product. For the design of buildings, it is usually not possible to produce a life size prototype, and this precludes the user from being able to experience and evaluate the exact design of spaces in advance of their construction. Architectural plans and elevations can be difficult for in-experienced users to read and understand (Schaik 2010). However, the articles reviewed reported on two studies which tested out an alternative, the use of 3D virtual environment models. Schaik (2010) compared the use of 3D and 2D visualisation techniques for the proposed changes to an outdoor park environment, with local residents. Schaik (2010) found that most users preferred the 3D virtual environment visualisation technique. A study by Bullinger et al. (2010) also used a 3D virtual environment model of a proposed building to consult with users of the proposed building. Their 3D modeling software enabled immediate manipulation of the design to allow users to see the changes that they proposed. Bullinger et al. (2010) suggest that the 3D model can act as the prototype used in the UCD model. They also claim that, as the 3D model can be manipulated immediately following instruction from a user, it is a useful tool in a participatory design model. They propose a fusion of these two models: participatory design and UCD. This study concludes, from their observations that all users responded well to this 3D model. It must be noted that the end users were researchers in the field of virtual engineering, hence were familiar with this type of visualisation tool (Bullinger et al. 2010). It appears that 3D computer modeling may be a useful tool for consulting users to visualise and
experience the built environments and is becoming a more prevalent technique for documenting large architectural projects.

Gossett et al. (2009) raise another issue regarding how universal design decisions are documented and tracked throughout the life of a large project which could extend to five or more years. They note that designing a building is a complex task and involves a multitude of decisions, often with competing demands; so how to capture all opinions and document the decision making process is a challenge. Gossett et al. (2009) present a case study with the aspiration of illustrating the design of a building that is universally designed, accessible (meets accessibility standards) and is sustainable. The particular building was to house a disability organisation, and the staff (many with a disability) were involved in design meetings and consulted throughout the process of design. Gossett et al. (2009) devised a “classification framework” to identify key building elements and systematically document the decisions made during the design process. This could then be shared with a wider audience and provides lasting evidence of design decisions. This is important as there is no one ideal solution to providing universal design and, as was explained in the article, often there are trade-offs.
between the needs of different groups of users, providing greater access/amenity for one over the other.

Oygur and McCoy (2011) propose a user-centred integrated design process (User-centred IDP) where the user is involved at all stages of the design process. Their study was of interior design students who were required to use this model to consult with users to develop an interactive interior representing the history of a rural town. The users consulted included residents from the town. The study focuses on the “integration” phase of this design process (refer Figure 5), where knowledge about the user is integrated into the design. The study found that the students relied on user knowledge more in the early stages, ie. data collection. However, the authors observe that the use fluctuates between being a “constraint” and a creative “inspiration”. When students were focused on a deadline or detailed documentation, the overall focus on the user diminished and the user as constraint was more evident at this stage. The authors surmise that this is because inspirational information may have led to delays in finalising their submission. The limitations of the study are explored in the article, including that this is a single case study with a small number of students using a passive form of consultation with users, suggesting that the use of more active methods to engage with users may have led to different results.

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**FIGURE 5**
User-Centred Integrated Design Process
(Oygur and McCoy 2011)
**Service**

Milligan, Nieuwenhuijsen and Grawi (2014) use a model developed by the World Health Organization (WHO) for community-based health problems called the “Strategic Approach to Strengthening Sexual and Reproductive Health Policies and Programmes” (World Health Organisation 2007). This approach unites public health and social management concepts and involves three stages (refer Figure 6). This study involved only the first stage, “strategic assessment”, where multiple users/stakeholders were consulted regarding the issues of access to arts and cultural events. Recommendations for future action were developed from this consultation. The model suggests consultation with users throughout all stages. Interestingly, testing of the new policies and programmes is recommended through the implementation of a scaled down or pilot programme, much like the prototype used in the UCD model. The pilot program can then be evaluated to determine if the new strategies do actually improve service provision.

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**Figure 6**

Strategic Approach to Strengthening Sexual and Reproductive Health Policies and Programmes (adapted)

(World Health Organization 2007)
Discussion

The SRV camps have an obligation to ensure that people with a wide range of abilities can fully and effectively participate at their camps. The camps consist of built environments, activities/equipment and the individual programs or the composition of the camp’s activities which are specifically designed for each group that attends the camp. All of these work together and must each support the participation of all campers. SRV recognises that universal design is a strategy that will assist camps to achieve this goal. This literature review is part of the process to begin to implement universal design across the camps. The research question was formulated so as to explore the best ways of consulting with users, as this is a major tenet of universal design. The type of research literature in this area is predominantly individual case studies of a qualitative nature. The quality of reporting of research methods was found to be mixed, making it difficult for the reader to judge the trustworthiness of the results. Given this, three themes began to emerge: (i) the selection of users; (ii) the need for different and multiple consultation techniques to engage a wide range of users; (iii) the need for a methodology that includes users throughout the design process and practices that clearly document design decisions to track the influence of users input.

Users

A central tenet of universal design is that design should meet the needs of the widest possible range of users. SRV camps must, under the lease agreement, encourage the participation of a wide range of people within our community. To gain an understanding of the needs of a wide range of users, it follows that a wide range of users should be consulted. It is obviously impossible to consult with all users of the camps, so the careful selection of users is an important consideration. There is a case for potential users (users that currently do not attend the camps) to be identified and involved in consultation. The studies often only consulted with a small number of users, mostly under 50 and one study consulted with only one user. The studies, however, did consult with different types of users: end users and secondary users. The need for this is also relevant for the camps: end users are the campers, but there is also the staff and management at the camp. They should also be consulted as they will have much knowledge to share. Conversely, they can also learn from other users. There is also a need to consult with family members of children that attend the camp, and carers of people with a disability that attend the camp. These secondary users will also add a depth to the knowledge that can be generated about camp experiences.
The number and type of users consulted is important, but also the method of selecting users is critical, as this has the potential to bias the outcome of any consultation process. As seen in some articles, third parties were used to assist in selecting users. In one study, teachers decided which students could participate in the consultation sessions. This has the potential to bias the outcomes of the consultation. Two studies used advertising to recruit users, which also has the potential for bias as people must be able to read the advertising and be motivated to attend. Hence such methods are less likely to recruit people from non-English speaking backgrounds or those who cannot read or write. Overall, the number, type and selection method of participants are important factors, as each will influence the outcomes of the consultation process. Selection methods must be transparent and the number and type of users should be representative of the wide range of current users and non-users of the camps.

Different and multiple consultation techniques

Universal design is about recognising that we are all different, so it makes sense that different consultation techniques will be required to encourage the participation of different users. Some of the articles align this with the "special needs" of the users consulted; however we all have different preferences for taking information in and the methods in which we feel comfortable voicing our opinions. Hence, if we are aiming to consult with a wide range of users, then the consultation methods must be universally designed. They must meet the needs and preferences of a wide range of users.

The way information is presented, the role of the facilitator, the composition of focus groups, the use of physical and virtual models, field trips and games were some of the techniques and considerations outlined in the studies. Seim and Broberg (2010) reported that the visual nature of a game was easy for all participants to understand, whilst Bullinger et al. (2010) and Schaik (2010) found that a 3D virtual model was useful for participants to be able to visualise a new built environment. Field trips were useful for people with disabilities to demonstrate issues with existing built environments. Observation and assessment of users were used in some studies. This is a more passive form of collecting information on the user and is open to observer bias, especially if the information is not verified with the user. The facilitator in all forms of consultation has an important role in ensuring that all participants are included, have an opportunity to express themselves and listen to others (Sanoff 2000). There are many and varied methods of consultation as was found in the studies.
reported in these articles and many more are documented in the wider literature. However, it is important that the selection of methods will ensure participation of a wide range of users and achieve the goals of the consultation. Sources such as Sanoff (2000), IAP2 (International Association for Public Participation 2014) and (Department of Sustainability and Environment 2005) are good resources to assist in guiding the techniques selected.

For the SRV camps to effectively engage a wide range of users in a consultation process, careful planning is required regarding the selection of techniques and how these are implemented.

Model

Some studies reported the use of existing models for integrating user consultation into the design process and other studies developed their own models. Across each of the types of built environment, products and programs, different models were used. This perhaps suggests that here is no single method of integrating users in the universal design process. All of the models claimed that consultation with users is important throughout the process of design; however the articles using the UCD model used only passive forms of consultation in the early stages, which can potentially lead to the requirement of expensive redesign of
prototypes. Only one study involved the modification to a service; this study used a model that recommended consulting with users at all stages to help develop consensus (Milligan, Nieuwenhuijsen & Grawi 2014). This model was adapted from the WHO “Strategic Approach to Strengthening Sexual and Reproductive Health Policies and Programmes” and uses pilot programs to test and refine proposed changes to the service or program.

The design of the built environment poses different issues from those posed in the design of products and services as full scale models or pilot programs cannot be developed for users to experience the design of a building before completion. It is very difficult and expensive to move concrete walls once they have been constructed. The literature review included articles which looked at virtual 3D models which are becoming a more common architectural tool and even more so since these articles were written.

The design of a building is a very complex process and the tracking of decisions and verification of user input into the final design is a difficult task (Gossett et al. 2009). Gossett et al. (2009) did not develop a model for participation in the design process but a tool for recording design issues and decisions made. This provides evidence of the information considered and decisions made whilst consulting with users.

For SRV camps to fully implement universal design, they will need to consider the built environment, activities/equipment (synonymous with products) and the design of their programs. It appears from the literature reviewed that there are specific issues and different methods that will be required for each of these areas. A common theme is the involvement of users throughout the design process and especially early on. In addition, the testing of potential solutions is part of all the models; however how this is done may need to be different for each type of design area. Finally, given the complex nature of design and the multiple considerations, tracking decision making is important for future reference.
Conclusion

Australia has an obligation under the UNCRPD to promote the inclusion of people with disabilities, this translates down to the SRV camps, as under their lease agreement with the Victorian Government have an obligation to encourage the participation of all sectors of the community (Sport and Recreation Camps Committee of Management Incorporated 2005; United Nations 2014c). Social inclusion is a determinant of health and by consulting with a wide range of users including those with a disability SRV camps are more likely to design environments, activities and programs that more inclusive. Universal design presents as an exciting methodology to achieve this aim. As yet there are no guidelines or models to guide the selection and implementation of consultation strategies to support universal design. However this literature review has highlighted some important considerations. These include the selection of users, the use of multiple techniques to ensure the participation of all and ensuring that users are consulted throughout all stages of the design process, especially at the beginning. Other considerations include the role of the facilitator and the use of models, pilot programs or prototypes to test out proposed solutions before full implementation, and the need for recording the decision-making process.

The findings of this literature review should be considered within the context of the limitations of this study. Only a relatively small number of articles were reviewed. This was due in part to the search terms used, inclusion/exclusion criteria and also to the limited number of articles available in the literature regarding the implementation of universal design (Gossett et al. 2009). Broadening the scope to include articles on universal design in learning and the literature on consultation in human-computer interaction may have produced different results. The literature on universal design in learning may be particularly relevant to the types and methods of consulting with users and presenting information, especially to children.

Due to the limitations of the research question and time, further exploration of the body of knowledge on consultation/participation of users was not possible. It is recommended that further work is conducted with the SRV camps to begin to explore this literature to gain an understanding of techniques and how best to use them.

In conclusion, there is no single best practice method for consulting with users to implement universal design. However, this literature review does shed some light on the best practice methods for consulting with users which are congruent with the aspirations of universal design – the use of a wide range of users and the use of different consultation techniques that will suit a wide range of users.
Recommendations

*Education* - To support the SRV camps to achieve universal design it is recommended that camp staff are provided with education to assist them to develop the skills to plan and implement consultation techniques.

*Documentation of user selection, and design decisions* - In order to track design decisions and the selection of participants, it is recommended that the camps have clear strategies to document these areas. This will ensure transparency by providing evidence of the influence of users on the design which can be reviewed at a later date and by a wider audience.

*Universal design model* – There are currently no guidelines or models for implementing universal design. As picked up in the articles reviewed, other bodies of knowledge such as human-computer interaction, UCD, participatory design and the development of service/program improvements have available to them models to guide designers on how to engage users in the design process. As universal design crosses over many areas of design, a single model may be too restrictive; however this area is worthy of further research.
Consultation Strategy

This consultation strategy is developed for the SRV Camps to assist in the implementation of universal design in all aspects of the camp programs, activities and built environment. The consultation strategy includes recommendations regarding how to embed universal design into the overall philosophy and policies of the camps and secondly provides recommendations on how to consult with users to achieve universal design.

Universal design a philosophy

Although not named, universal design is a requirement of the lease agreement between SRV and the camps (Sport and Recreation Camps Committee of Management Incorporated 2005). The camps must promote the inclusion of people with disabilities, the elderly, aboriginal people and women. To achieve this it is recommended that universal design becomes an overarching philosophy of the camps. Universal design should be a part of all policies, procedures, activities, programs that the camps conduct. To achieve this all staff must understand the concept of universal design.

Recommendation:

Education of all staff at camps, this to include kitchen staff, cleaning, maintenance etc... regarding universal design.

Consultation with users

An important tenet of universal design is consulting users to achieve a design that is useable by the widest range of users. From the literature review many factors must be considered to ensure that consultation itself is universally designed (refer Figure 7). These include:

Sample – The sample must be universally designed ie: broad range of users should be included in the sample. How the sample is selected and who is selected will have an impact on the consultation outcomes. For the SRV camps a broad range of users may include: include staff, people that have attended the camps, people that perhaps have not attended the camps, specialists such as occupational therapists, ropes designers etc…

Techniques – The techniques or methods used to consult with users must also be universally designed. This will include the consideration how information is presented and the same information may need to be presented in a number of different formats. A variety of consultation techniques should be used to ensure that all can participate; some techniques may be more hands on, some more visual. Other considerations such as the location, venue and timing of consultation should be considered.
Data collection and analysis – To ensure that the consultation process is open and transparent the outcomes of consultation and decision making should be recorded. Video/audio recording can allow for review of the consultation sessions to ensure that no information is missed and themes of discussion can be analysed. Observer note-taking during a consultation session may also work, these notes should be verified and circulated to participants.

FIGURE 7
Universal Design an Overall Philosophy
Camps and consultation

Three phases of consultation are suggested to begin to implement universal design across the camps. These include at the strategic planning stage where priorities for works can be planned over the next 3-5 years, at the project level where a project has come out of the strategic planning and is now in the more detailed planning phase. Finally, at the day-to-day level, where campers provide immediate feedback on their camp experience. There will be overlap of information that can be shared throughout these phases (refer Figure 8).
### Strategic

Universal design should be a part of strategic planning. To do this consultation with users must be a part of this planning phase. The aim of consultation at this stage is to gather information from a broad range of users to inform long term planning for camps, and potentially give decision-making power to users regarding the works that will be undertaken to the camp in the next 5 years.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Techniques</th>
<th>Data collection &amp; analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>The sample should include a broad range of users covering all ages, abilities, representation from a variety of organisations that use camp and staff. An analysis is also recommended of who does not attend the camp, or who used to attend the camp but has not done so for a while. They may have important information to contribute that will influence their decision to attend the camp. Selection: • Mass email to all users that have attended the camp in the last 12 months • Identify and email potential users • Include a broad range of staff</td>
<td>Consider use of facilitator Visioning Focus groups Delphi Studies Electronic Democracy Future Search Conference</td>
<td>Video/audio recording of sessions and then use of thematic analysis. Note takers</td>
</tr>
</tbody>
</table>

### Project specific

This stage refers to the consultation required to ensure that a specific project is universally designed. The strategic plan will identify a series of specific projects, they might be a new building, upgrade to existing area of the camp or new activity for the camp. The project should continue to follow universal design where users are now consulted on the more detailed aspects of the project.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Techniques</th>
<th>Data collection &amp; analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad range of users Specialists (ropes course consultant, access consultant, occupational therapist, architect,)</td>
<td>Consider a trial, prototype development or 3D computer model of proposals. USD approach – involve users early in design process – get users to initially generate solutions. Sequential focus groups/design workshops</td>
<td>Track decision making – detailed minutes. Video/audio recording of sessions. Verify minutes.</td>
</tr>
<tr>
<td>Stage</td>
<td>Sample</td>
<td>Techniques</td>
</tr>
<tr>
<td>---------------</td>
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</tr>
</tbody>
</table>
| **Day-to-day**| Ongoing collection of information from participants to assist in the day to day planning of activities, programs. This information will also feed into the other areas of planning. | All camp participants  
Specialists  
Staff | One-on-one interviews (informal)  
Satisfaction survey  
Group activity / review of camp experience  
Staff forums/meetings | Interview data collection sheets  
Satisfaction survey  
Work sheets from group activity  
The importance that the data collected is reviewed and tallied in a meaningful way to ensure that it is easily accessible and can provide evidence that will feed into the Project Specific and Strategic Planning phases. |
Conclusion

Ensuring that a wide range of users can access and participate in the SRV camps is an essential objective of the camps. To achieve this universal design must be embedded into the overall strategic planning of the camps, within each project that the camp undertakes and into the day-to-day operation of the camp programs. A fundamental requirement of universal design is consulting with users, hence this consultation strategy proposed how this can be achieved at each of the phases of camp operation. From the literature review a number of essential components of consultation were identified including the sample selection, techniques used and data collection and analysis. The consultation strategy provides recommendations for addressing each of these components. Further work is required with the camps to begin to implement these recommendations and to initiate consultation with users to ensure that SRV camps are actively encouraging the participation of a wide range of users.
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Appendix 1: Summary of Articles
<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Key words</th>
<th>Product, Service or Built Environment</th>
<th>Type of Study</th>
<th>Study question/Aim of research</th>
<th>Model of design and/or consultation process</th>
<th>Consultation/Participation Methods</th>
<th>User Group</th>
<th>Main Findings Conclusions</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amiri, Dezfooli and Mortezaei</td>
<td>Designing an ergonomics backpack for student aged 7-9 with user centred design approach</td>
<td>User-Centred Design</td>
<td>Backpack for school children</td>
<td>Qualitative</td>
<td>To design a backpack for 7-9 year olds that decreases load on shoulders, neck and waist. UCD used so that outcome is more acceptable to children.</td>
<td>ISO 13407 Human-centred Design Processes for Interactive Systems - User centred design cycle. Methods of consultation as cited in Maguire (2001).</td>
<td>Diaries Hidden videos Interviews Brainstorming Satisfaction questionnaires</td>
<td>7-9 year old school children n=120</td>
<td>Involving the users in the design process along with ergonomics can produce a result that satisfies users.</td>
<td>Poor detail on data collected from consultation with users. Little evidence on how data analysed. No ethical issues raised regarding use of children in study.</td>
</tr>
<tr>
<td>Brooks et al. (2012)</td>
<td>Group differences in preferences for a novel nightstand</td>
<td>Universal Design</td>
<td>Nightstand</td>
<td>Qualitative</td>
<td>To determine the desired characteristics of different novel nightstand designs from a range of different users.</td>
<td></td>
<td>Full-scale cardboard prototypes with limited functionality were created. Groups of 2-8 and participants asked questions regarding preference for certain characteristics of nightstand design. Answers: Forced Choice &amp; Likert Scale</td>
<td>Community dwelling older adults (n=39) University students (n=12) Employees at rehabilitation facility (n=31) Patients at rehabilitation facility (n=10)</td>
<td>Study contributes to the development of a nightstand that is more useable by a wider range of users.</td>
<td>Limited detail on how sample recruited.</td>
</tr>
<tr>
<td>Bullinger et al. (2010)</td>
<td>Towards user centred design (UCD) in architecture based on immersive virtual environments</td>
<td>User-Centred Design</td>
<td>New building for researchers in IT</td>
<td>Qualitative</td>
<td>Use of virtual environment 3D technology with users to improve the architectural design process. Developed new model a fusion of use-centred design and participatory design, 3D-models used in design meeting and can be updated immediately as design decisions are made.</td>
<td></td>
<td>Researchers that will work in future building: n=?</td>
<td>Virtual environments as a tool to consult with users was well accepted by the users.</td>
<td>No details of data collection methods or analysis. No details provided on sample. Overall poor study design. Tries to develop new model but this is not fully developed in study.</td>
<td></td>
</tr>
<tr>
<td>Demirkalek and Demirkan</td>
<td>Universal product design involving elderly users a participatory design model</td>
<td>Universal Design Participatory Design</td>
<td>Domestic doors and door handles</td>
<td>Qualitative</td>
<td>To test the concept design phase of a proposed user participation model in the design of doors and door hardware. A participatory design model is proposed: Usability, Safety, Attractiveness, Participatory.</td>
<td>Small group participatory design sessions including: brainstorming, scenario building, unstructured interviews with written and oral parts, sketches or gestures.</td>
<td>Elderly users n=13</td>
<td>Users enhanced design Users gained satisfaction from participation in design process.</td>
<td>Study doesn't justify the need for a new model of user participation. Doesn't compare model to other models of user participation in design. Considers user group and how to engage them. Only users older adults. Uses complex matrix that is not well explained to analyse feedback</td>
<td></td>
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<tr>
<td>Authors</td>
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<tr>
<td>Duschenes et al.</td>
<td>The importance of user centred design methods applied to the design of a new workstation: a case study</td>
<td>User-Centred Design</td>
<td>Product: Workstation</td>
<td>Qualitative</td>
<td>The application of user centred design in the development of a new office workstation.</td>
<td>Four phases of case study described.</td>
<td>Observation of end users, Observation of assembly workers and installers</td>
<td>End users: n=6</td>
<td>User observation can positively influence design outcome. Company to expand use of user centred design to other products.</td>
<td>Observation and interview the main method of collecting information on users - users not actively involved in design. Data analysis not made clear.</td>
</tr>
<tr>
<td>Goodman-Deane, Langdon and Clarkson</td>
<td>Key influences on the user centred design process</td>
<td>User-Centred Design Inclusive Design</td>
<td>Product: Case studies, expert interviews and literature review</td>
<td>Qualitative</td>
<td>How are users needs commonly considered in design? What influences the uptake of methods and tools in design?</td>
<td>One outcome of the study was the development of online toolkit for inclusive design.</td>
<td>Need to educate clients on the value of inclusive design. Educating designers on methods of collecting user information. Authors have begun to develop online toolkit for inclusive design.</td>
<td></td>
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<td>Limited details on users consulted in design competition.</td>
</tr>
<tr>
<td>Gossett et al.</td>
<td>Beyond access: A case study of the intersection between accessibility, sustainability, and universal design.</td>
<td>Universal Design</td>
<td>Built Environment: New building for disability organisation</td>
<td>Qualitative</td>
<td>What is the interaction between universal design and accessibility? What are the challenges to designing for the widest range of possible users? What tools can be developed for analysis and replication of similar projects in the future?</td>
<td>Disability organisation (client) worked collaboratively with design team.</td>
<td>Not evident how many and who from disability organisation (user and client) participated: n=7</td>
<td>Development of tools to inform and evaluate the design decisions was useful. Complex interaction between accessibility, universal design and sustainability.</td>
<td>Limited detail provided on sample of users. Limitations of study listed.</td>
<td></td>
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<tr>
<td>Korhonen et al.</td>
<td>Children as designers and manufacturers of an operational DIY push-button</td>
<td>Participation Action Research Design Research</td>
<td>Product: Electronic push button</td>
<td>Qualitative</td>
<td>How did children and teachers experience designing and making a push-button?</td>
<td>Children assisted to design and make their own push-button.</td>
<td>EsTech Children with special needs: n=11 Parents: n=10 SciFest Children attending: n=69 Teachers n=7</td>
<td>Children are capable of designing and make a push-button.</td>
<td>Sample size small and no detail provided on types of disabilities. Limitations of study listed.</td>
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<tr>
<td>Luck and McDonnell</td>
<td>Architect and user interaction the spoken representation of form and functional meaning in early design conversations</td>
<td>Collaborative Design</td>
<td>Built Environment: Redevelopment of school rooms - workplace</td>
<td>Qualitative</td>
<td>An investigation of the information and ideas exchanged between architect and user in the first meeting.</td>
<td>Meeting between architect and teacher.</td>
<td></td>
<td>Teachers (n=4)</td>
<td>Deputy Head (n=1)</td>
<td>Most users were focused on the functional and structural nature of design.</td>
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<tr>
<td>Ma, Wu and Chang</td>
<td>A new design approach of user-centred design on a personal assistive bathing device for hemiplegia</td>
<td>User-Centred Design</td>
<td>Product: Bathing device</td>
<td>Qualitative</td>
<td>To develop a new design method for developing assistive equipment.</td>
<td>Assistive Device: Design Process A new model is developed.</td>
<td>Assessment of user interview of user</td>
<td>Women with hemiplegia n=1</td>
<td></td>
<td>The design of assistive devices requires a unique design procedure.</td>
</tr>
<tr>
<td>Milligan, Nieuwenhuissen and Grawi</td>
<td>Using a participatory action strategic approach to enhance accessibility and participation in the arts and cultural events: results of four focus groups</td>
<td>Disability awareness</td>
<td>Service: Arts and cultural events</td>
<td>Qualitative</td>
<td>To investigate the level of awareness about the accessibility of arts and cultural events as part of a participatory action strategy to strengthen community participation in a mid-western town.</td>
<td>World Health Organisation (WHO) &quot;Strategic Approach to Strengthening Sexual and Reproductive health policies and Programmes&quot;</td>
<td>Focus groups of separate user groups</td>
<td>Steering committee included representatives from two disability organisation: n=2 Users with a disability: n=13 Caregivers: n=9 Managers of events: n=8 City leaders and other: n=9</td>
<td>The importance of raising awareness about disability issues, inclusive policies and information to support access for people with disabilities to arts/cultural events.</td>
<td>Focus groups of different types of users separated – limited sharing of ideas/issues.</td>
</tr>
<tr>
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<td>Oygur and McCoy (2011) (USA)</td>
<td>User: inspiration or constraint</td>
<td>User-Centred Design</td>
<td>Built Environment: Design of interactive structure representing history of rural town</td>
<td>Qualitative</td>
<td>To understand the role of the user and user involvement in the interior design process.</td>
<td>User-centered Integrated Design Process (user-centered IDP) Four Dimensions of user-centered IDP: user involvement, knowledge generation, integration and assessment of design features.</td>
<td>Users presented history of town Users interviewed by students. Field trip to town.</td>
<td>Local residents, community leaders and potential visitors to the town (n=?)</td>
<td>User’s roles included both inspiration and constraint.</td>
<td>No detail on sample size or characteristics. Discuss limitations and makes recommendations for further study.</td>
</tr>
<tr>
<td>Parnell and M. (2001) (UK)</td>
<td>Young people's participation in school design: exploring diversity and power in a UK government policy case-study</td>
<td>Children's and young people's participation Inclusion</td>
<td>Built Environment: Design of school buildings</td>
<td>Qualitative</td>
<td>To lay out some critical implications for young people's participation from the study of the Building Schools of the Future government program.</td>
<td>Themes emerged from review of large scale policy directive to involve school children in design of schools. No clear data on techniques used.</td>
<td>School children n=? School community n=?</td>
<td>Power of participants to affect the design is important but in large scale project often difficult to identify. Different cultures (designers, educators, children, and business) makes communication difficult. Schools acted as “gate-keepers” selecting users/children to be consulted.</td>
<td>Limited detail on sample. No recommendations made for future policy development.</td>
<td></td>
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<tr>
<td>Schak (2010) (UK)</td>
<td>Using interactive 3-D visualisation for public consultation</td>
<td>Public consultation</td>
<td>Built Environment: Indoor and outdoor environments</td>
<td>Mixed methods</td>
<td>3D and 2D models of visualisation techniques compared.</td>
<td>Individual test 3D model of park, users made comments on design and questionnaire Static visualisation including plans of park presented, users asked to make comments and questionnaire Interview Focus group – regarding different techniques</td>
<td>Users of park: n=50</td>
<td>The method of consulting with users using a 3D visualisation is found to be a useful technique.</td>
<td>Limited detail provided on users consulted.</td>
<td></td>
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<tr>
<td>Seim and Broberg</td>
<td>Participatory workspace design: a new approach for ergonomics</td>
<td>Participatory design</td>
<td>Participatory design</td>
<td>Qualitative</td>
<td>To describe and test a new model for workplace design.</td>
<td>Space Organisation Finance Technology model</td>
<td>Observation of current work practices and environment Workbook that all employees could contribute to Workshops – various techniques used including, scenarios, scaled models, layout game, incident cards.</td>
<td>Employees Safety representatives Quality and environment coordinator Production manager Consultant design engineer Contracting engineer Production planner n=7</td>
<td>By consulting with a wide range of users and consultants and by using a collaborative design process a better outcome was achieved.</td>
<td>Data analysis unclear. Single case study, further research required on this model.</td>
</tr>
<tr>
<td>Siu (2011)</td>
<td>Right and participation: participatory universal design of public bus for older persons</td>
<td>Universal Design</td>
<td>Built Environment: Public bus</td>
<td>Qualitative</td>
<td>Describes a process of participatory design involving older people as active participants in the design process.</td>
<td>Design workshops Visits to review different types of buses In-depth interviews of individuals and small groups of older people</td>
<td>Interviews with government officials, designers and management companies. Users participated in research and design workshops involving interviews and field trips, scaled down and full scale models used, and tactile maps.</td>
<td>Older users n=30</td>
<td>Older people actively participated in reviewing existing designs and suggesting improvements.</td>
<td>Only one type of user group consulted. Poor explanation of data collection and analysis.</td>
</tr>
<tr>
<td>Siu and Wong</td>
<td>Promotion of health public living environment: participatory design of public toilets with visually impaired persons.</td>
<td>User Participation</td>
<td>Built Environment: Public toilets</td>
<td>Qualitative</td>
<td>To explore the concerns of visually impaired people regarding access to public toilets for improvement.</td>
<td>Plain-Line-Point Framework Plan – all supporting information and networks within the city to support access to the public toilet Line – physical network and information close to the public toilet Point – inside the public toilet</td>
<td>Interviews with government officials, designers and management companies. Users participated in research and design workshops involving interviews and field trips, scaled down and full scale models used, and tactile maps.</td>
<td>Visually impaired persons n=38</td>
<td>Users provided good information on how to make public toilets more accessible for people with disabilities. Consideration of the types of consultation techniques important for this group of people.</td>
<td>Limited detail on type of vision loss experienced by users and assistive devices used. Selection of participants not detailed. Poor explanation of data collection and analysis. Limitations of study discussed.</td>
</tr>
<tr>
<td>Staeger-Wilson et al.</td>
<td>Planning for an inclusive campus recreation facility and program</td>
<td>Disability, design, inclusion, universal, collaboration</td>
<td>Built Environment: University recreation facility</td>
<td>Qualitative</td>
<td>To highlight the collaborative work among a disability resources professional, a university architect, campus recreation professionals and students with disabilities to create a campus recreation centre with universal design features and considerations for students with disabilities.</td>
<td>Collaborating with design team Field trip to another recreation facility Open forums.</td>
<td>Collaborating with and including people with disabilities in the design of this facility it helped to change the way the university perceives disability and increased understanding of the impact of design on disabled people.</td>
<td>Two students with a disability (n=2) Disability representative bodies at the university (n=7) Whole student population (n=7)</td>
<td>By collaborating with and including people with disabilities in the design of this facility it helped to change the way the university perceives disability and increased understanding of the impact of design on disabled people.</td>
<td>Limited detail on sample. Poor explanation of data collection and analysis.</td>
</tr>
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</table>
Appendix 2: Critical Appraisal Skills Program
10 questions to help you make sense of qualitative research

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a qualitative research:

- Are the results of the review valid?
- What are the results?
- Will the results help locally?

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is “yes”, it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a “yes”, “no” or “can’t tell” to most of the questions. A number of prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

There will not be time in the small groups to answer them all in detail!

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Screening Questions

1. Was there a clear statement of the aims of the research?
   - Yes
   - Can’t tell
   - No

HINT: Consider
- What was the goal of the research?
- Why it was thought important?
- Its relevance

2. Is a qualitative methodology appropriate?
   - Yes
   - Can’t tell
   - No

HINT: Consider
- If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
- Is qualitative research the right methodology for addressing the research goal?

Is it worth continuing?
Detailed questions

3. Was the research design appropriate to address the aims of the research?

☐ Yes  ☐ Can’t tell  ☐ No

HINT: Consider
- If the researcher has justified the research design (e.g. have they discussed how they decided which method to use)?

4. Was the recruitment strategy appropriate to the aims of the research?

☐ Yes  ☐ Can’t tell  ☐ No

HINT: Consider
- If the researcher has explained how the participants were selected
- If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study
- If there are any discussions around recruitment (e.g. why some people chose not to take part)
5. Was the data collected in a way that addressed the research issue?

HINT: Consider
- If the setting for data collection was justified
- If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)
- If the researcher has justified the methods chosen
- If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews were conducted, or did they use a topic guide)?
- If methods were modified during the study. If so, has the researcher explained how and why?
- If the form of data is clear (e.g. tape recordings, video material, notes etc)
- If the researcher has discussed saturation of data

6. Has the relationship between researcher and participants been adequately considered?

HINT: Consider
- If the researcher critically examined their own role, potential bias and influence during
  (a) Formulation of the research questions
  (b) Data collection, including sample recruitment and choice of location
- How the researcher responded to events during the study and whether they considered the implications of any changes in the research design
7. Have ethical issues been taken into consideration?  

Yes ☐  Can’t tell ☐  No ☐

HINT: Consider

- If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained
- If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)
- If approval has been sought from the ethics committee

8. Was the data analysis sufficiently rigorous?  

Yes ☐  Can’t tell ☐  No ☐

HINT: Consider

- If there is an in-depth description of the analysis process
- If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data?
- Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process
- If sufficient data are presented to support the findings
- To what extent contradictory data are taken into account
- Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation
9. Is there a clear statement of findings?

HINT: Consider

- If the findings are explicit
- If there is adequate discussion of the evidence both for and against the researchers arguments
- If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)
- If the findings are discussed in relation to the original research question

10. How valuable is the research?

HINT: Consider

- If the researcher discusses the contribution the study makes to existing knowledge or understanding e.g. do they consider the findings in relation to current practice or policy?, or relevant research-based literature?
- If they identify new areas where research is necessary
- If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used