

USABILITY EVALUATION VIA ACCESSIBILITY DESIGN

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ABSTRACT

This paper provides strategies in evaluating usability via accessibility from the user experience of three replacement hospitals. The methodology refers to a five-stage evaluation process and using the “walk-through journey experience” among patient and visitors. The data analysis was based on thematic analysis principles using NVivo9. The accessibility design issues due to participant disabilities and expectation will build up for usability parameters. The findings indicate that the quality design is the positive user experience feedback on the usability of the physical design environment that fulfils their expectations and the concept of usability and accessibility is to support the user-friendly environment design.

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1.0 INTRODUCTION

This paper presents the relationship between usability evaluations via accessibility design environment criteria. Usability evaluation method determines user experience and it to fill the gaps between ideals and realities. Usability evaluation method determines user experience and it to fill the gaps between ideals and realities.

Hospital is a complex design and its purpose is a value to design quality, which is to satisfy the users on their positive experience by meeting their needs and expectations either by physical or psychological (Ulrich et al., 2004; Haron, Hamid & Talib, 2012). Moreover, its facility interrelates with functions that must accommodate the constant movement of people with physical ability and ease of use. Those factors are the main driver and reflection of effectiveness, efficiency of service delivery as well as contribute to patient health outcomes (Lee, 2011). Therefore, the planning and design of hospitals need to focus on creating spaces and environment for human-based facilities (Nawawi, 2009; Mohamad, 2010). These scenarios show that, the feedbacks from Hospital building occupants or end-users are still needed as the principal source of reference. This is significant because they are the ones who truly understand how well the building suits their needs and their ability in using the facilities. Consequently, in usability studies, experts do not consider usability tests. If the respondents or participants are more experienced than the actual users of the product, and the problems may be missed. However, if the participants are less experienced than the actual users, there will be no changes or improvements for real users because the needs, expectations, and context of use may be different. Furthermore, using real user highlights the users needs rather than the designer's preferences to avoid bias in designing a product (Lawson, 2006; Petrie & Bevan, 2009). Hence, Gupta

and Kant (2005) stress that the hospital designs must represent the local understanding with the heart of the patient, families and visitors.

2.0 USABILITY

The study of usability emerged from a diverse field and based on some views it was first developed in the 1950s in Human Computer Interaction and is widely known within Usability Engineering (UE), User Centered Design (UCD) and user experience (UX), and associated with the friendliness criteria (Fenker, 2008; Gulliksen, 2006). The usability research in built-environment is associated with the International Council for Research and Innovation in Building and Construction (CIB) Task Group 51 “Usability of Buildings 2005”, Workshop W111 – “Usability of Workplaces 2-2008” and “Usability of Workplaces 3-2010”. The CIB group is established to apply usability concepts and provide a better understanding of the user experience in buildings and workplaces. The term usability describes the user experience of service or product, whether or not a product is fit for a specific purpose. It is adopted from the international standard for usability and a part of usability parameters ‘[...] effectiveness, efficiency and satisfaction with a specified set of users can achieve a specified set of tasks in a particular environment’ (ISO,1998) and usability should be addressed to ‘specified users to achieve specified goals’ (Alexander, 2008).

2.1 Usability Throughout Accessibility

The nature of building design shows that the design of a building can be thoughtful and imaginative, but sometimes does not respect the usable design because of the

considerable gaps between what the users say, what they want, and what the designer or architect builds. The design and facilities are less user-friendly because the design does not reflect the users' characteristics that will be using the building (Leaman, 2005; Dickerman, 2008; Carr, 2009; Woon et al. 2013). Consequently, usability attaches to user experience design and it accounted from usability evaluation, which the evaluation requires a deep understanding of users, what they need, what they value, their abilities, and also their limitations. The benefit of usability data or preferences will improve the quality of the user's in-use with their perceptions of current design, facilities or any design related services.

The usability and accessibility are a twin concept, and the relationship between these two criteria is the degree of usability indicates the level of adjustments made due to accessibility reasons in any situation with individual independently use the particular space or built environments and how that can make their experience pleasant emotions (Afacan & Erbug, 2009; Fronczek-Munter, 2011; Andersson, 2014). Where, the usability means designing a user interface that is effective, efficient, and satisfying. Whereas, accessibility make sure the user interface is designed to be affective, efficient, and satisfying for every person, where can be used or friendly by various categories of users, including people with disability problems, age factors and psychological (Preiser 2001; Voordt & Wegen, 2005; Rahim & Samad, 2010; Afacan & Demirkan, 2011).

This aligned to the accessibility design principles consist of design that equitable use, flexibility in-use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, size and space for approach and use. Where, concerning how the product, system, facility, service, environment or design can be used to the maximum by every category of user (The Center for Accessibility design, 1997 in Afacan & Erbug, 2009; Petrie & Bevan, 2009). This scenario

shows that the accessibility design is not just for people with special needs, but leads to a better design for everyone in order to avoid a danger situation, smooth, meaningful and valuable journey experience to them (Lindwell et al., 2003; Mitchell, 2006).

3.0 USABILITY EVALUATION: 5 STEPS

This usability research starts with a philosophy associated with the idea of fulfilling the users' needs and focusing on providing an outstanding user experience (context of use) in the healthcare environment. The results are representative of the interpretations of those experiencing the phenomenon under research. It is not the aim to make any vast generalizations from the empirical data, but to describe the experiences of the patients and visitors as they are the main actors of the hospitals. Moreover, the philosophy is related to a particular methodology that produces the real goal of usability. It is aligned to the social constructionism and the constraints of the phenomenological paradigm that is related to the meaning of a phenomenon through a better understanding of users' experience in producing an in-depth understanding and developing a theoretical perspective (Yin, 2003; Creswell, 2012). For the purposed of this research, the social constructionism has merit as it attempts to understand each of individual experience in constructing the realities that exist based on their feedback to their situation, surrounding and the hospital environment that influences accessibility trough usability and quality environment.

This research was divided into five stages of the mapping process of data collection as shown in Figure 1.1. This reflected in the usability evaluation processes that derived and developed from the usability evaluation method

known as “USEtool” introduced by Hansen et al. (2011) and the usability mapping tool by Blakstad (2010).

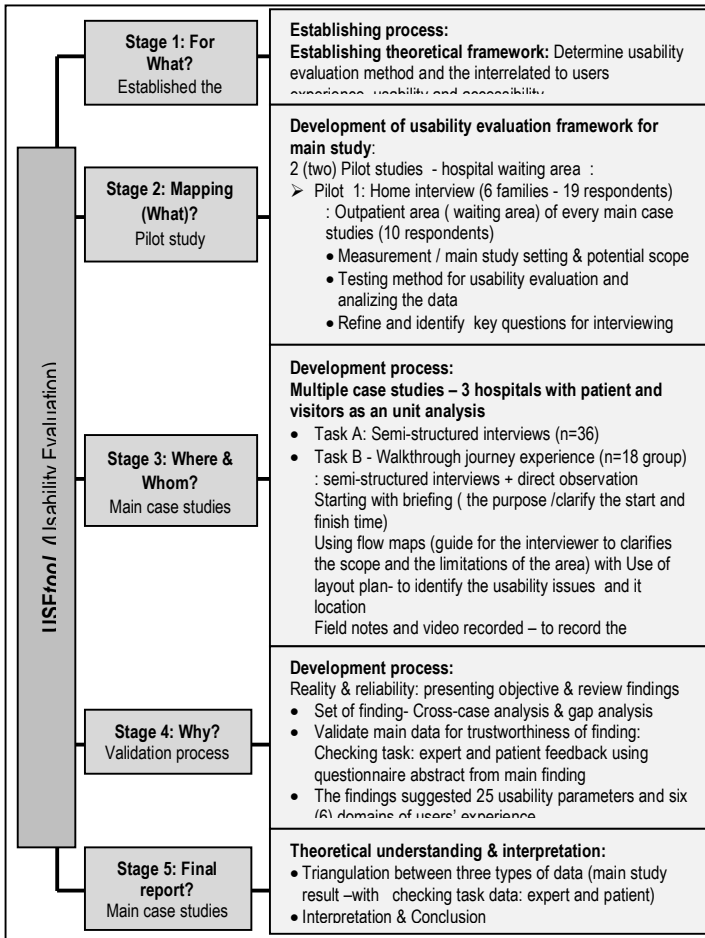


Figure 1: Application of USEtool: Five stage evaluation process
(Source : Haron., et al. 2011)

4.0 RESULTS AND FINDINGS

The overall understanding of the findings, it was found that the usability criteria results are also being influenced by the collision between various characteristics of users, cultures, and situations that influence their expectations besides the interpretation of meaning in determining the effectiveness and efficiency. The result from three hospitals shows that usability with accessibility criteria refers two (2) parameters as (i) Physical accessibility and (ii) psychological accessibility as explain and interpreted by the participants and respondents in Table 1.1.

Table 1: Accessibility Parameters

	Attributes	The domain
Physical accessibility	<p>User-friendly & universal design: Reachability of main entrance from any access. Legibility of lift from the outpatient entrance to the specialist clinic Place to rest or pit stop (long walking distance)</p> <ul style="list-style-type: none"> • Seating areas near the entrance and exit to rest and wait • Provide wall guard or handrail <p>Attach to more open space</p> <ul style="list-style-type: none"> • Easy to monitor their children from the waiting area • Outdoor / indoor activities can be seen from the waiting area <p>Accessible of walking distance</p> <ul style="list-style-type: none"> • Provide a hand railing or wall guard • The layout is easy, understandable and the distance between the service area • Seating unit along the journey as a pit stop <p>Easy to use and learn the purpose of the facilities such as an E - Map Accessibility-position or location Ability to use for every user some of design Need a huge effort to reach</p>	<ul style="list-style-type: none"> • Personal experience • Social experience • Age appropriateness • Physical ability • Frequently visiting • Waiting time
	<p>Accessible of Facilities: Diversity in Choices: More seating units - to meet the visitors demand</p> <ul style="list-style-type: none"> • Specialist clinic & ICU waiting area • More seating area seating area in the lobby and hospital entrance <p>Access to alternative facilities or activities Access to entertainment/Internet access (Wi-Fi) / Community center / reading area Access to children's area & activities</p>	

	<ul style="list-style-type: none"> • More children's facilities/area /relaxing area/outdoor activities with Shade and shadow Access to interactive and latest / Current information about health and education Access to withdraw and utility billing facility	
Psychological Accessibility	Sense of Welcoming <ul style="list-style-type: none"> • Lack of tactile and visual indicators for entrance and exits Impression designed • Pleasant and convenience place -The ambience of interior design looks familiar and cheerful • Sense of safety and privacy • Separation between men and women 	

5.0 CONCLUSION

The research findings confirmed that the usability evaluation is an effective approach for tracking quality in-use by exploring the usability problems or design weakness that is not noticed by designers through the involvement of actual users. The most important factors that affect the usability criteria are how the design can be adapted and manipulated by the society so that they can adjust the hospital environment, according to the needs of the patients, their families, and friends. Hence, from the exploratory study of the usability parameters, the researcher found that all domains influenced each of the usability criteria and that all six domains are also interrelated. Furthermore, the most important point in designing a hospital is to serve and give benefit to the community or specifically their local people. All criteria are mutually interdependent to produce effective and efficient facilities and a physical design environment that can satisfy the users. However, usability also was influenced by how their experience meets their expectations before they visited the hospital. This relates to an individual's interest concerning the physical environment to bring that environment more friendly and support their and family needs. The usability evaluation has given an added value in assessing the experiences among patients and visitors, quality

design assessment, designing, constructing, and managing the hospital. Hence, this study should help organizations to understand the needs of end-users.

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