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The Characteristic Elements of Wayfinding Aids for Hospitals: Challenges and Barriers in Wayfinding

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Abstract – Hospitals have a complex environment setting which may cause confusion amongst visitors and the tendency of them getting lost is possibly high. This article aims to highlight the wayfinding aids used by visitors in hospitals. However, there are barriers and challenges that may affect the success of wayfinding experience amongst hospital visitors. Three targeted factors, namely poor and unfriendly signage; inconsistent utilisation of the numbering system; and difficulty in navigating the hospital premise have been identified to be improved. Therefore, by incorporating these factors with a constant stimuli method with fixed images in an indoor public hospital environment, this may improve visitors' experiences when navigating in a hospital.

Keywords: Graphic Design, Healthcare Environment, Hospital, Signage, Wayfinding aids

Introduction

Wayfinding in hospitals is useful tools for visitors when navigating to the desired premise. In this environment, visitors would aim to find their ways to the emergency department, outpatient clinics, visiting patients in wards or sim Shah Alam, Selangor, ply to find their way to a restroom. However, a complex environment of the hospital setting with poor and unfriendly signage, inconsistent utilisation of the numbering system; and difficulty in navigating to and from the desired destination may result in confusion and frustration of the visitor if the search fails (Maqbool et al., 2016). Nowadays, healthcare settings have increased the utilisation of pictograms compared to text signs in helping visitors to find their ways (Rousek & Hallbeck, 2011a). This article highlights the wayfinding aids in a public hospital including the inconsistencies of the wayfinding aids design and placement. Challenges and barriers of wayfinding are being discussed together, and the characteristics of suitable wayfinding aids are also outlined. In a study by Hughes et al., (2015) explained a concept of assessing wayfinding experience is introduced, which are organized into five themes: The 'Impact' of poor navigation, 'Barriers' to effective navigation, 'Enhancers' for effective navigation, 'Types of Navigation Aids' and user groups with 'Specific Navigational Needs'. However, these potential themes may not work effectively on the existing wayfinding information, but it takes time as the environment evolve continuously.

Wayfinding Aids for Hospitals

This section describes the types of wayfinding aids used to ease visitors' experiences when navigating in an indoor premise and complex environment, including in hospitals. Based on prior studies, several issues regarding the development of wayfinding aids over the years have also been identified. Technologies of navigation have emerged that have made wayfinding an easy task for users. In achieving effective wayfinding experience, increased visual information and interaction level has been

said to be able to improve the results dispersion (Vilar et al., 2018). In a hospital environment, in order to provide the best for visitors, it is crucial to contribute to a family-friendly environment by reviewing the current situation and developing signages to improve wayfinding and convey essential information to hospital users, such as, to parents, caregivers and patients (Leonard et al., 2014). There is also a need to improve public hospital signages due to the ineffectiveness of signage systems available in government hospitals (Basri & Sulaiman, 2013). There have been extensive studies that suggest various methods and aids improve wayfinding in hospitals. These include indoor navigation mobile application, which was said to be necessary for hospital visitors to ease their wayfinding. However, before developing the indoor navigation mobile applications, it is emphasised that it should be based on navigational needs and requirements of people (Anagnostpoulos et al., 2017). In addition, thematic maps could also improve information retrieval (Hornbæk & Frøkjær, 1999). Based on an investigation by Hurst and Clough (2013), the preference and suitability of paper maps in a digital age may improve navigation. There are necessary conditions to be fulfilled in developing cartographic communication and navigation with guide maps. It consists of a suitable type of content and representation of the guide maps are chosen for a better and effective wayfinding experience (Wakabayashi, 2007).

A design of a hospital interactive wayfinding system for users in Malaysia have also been introduced where an application using simplified pictograph symbols for wayfinding in a public hospital was developed to provide a beneficial and sustainable accessibility to the public in a built environment (Sivaji et al., 2015). Additionally, Leonard et al., (2014), highlighted that a new template and new signs were developed and used to replace old signage, which is attractive and are easily understandable by the visitors of the hospital. The importance of an ergonomics signage in hospitals may impact the users' time, smoothness in wayfinding and may reduce confusion (Basri & Sulaiman, 2013). The current wayfinding aids that are being generally developed as well as specifically, for hospitals have been based on various factors and considerations. Hurst and Clough (2013), claimed that a higher geographic skilled person (expert) prefers paper maps while a lower geographic skilled person (non-expert) prefers digital maps. However, it has been argued that based on a comparison between a command language interface and a visual information retrieval interface (VIRI) on thematic maps, there is no improvement in the quality of retrieval of documents (Hornbæk & Frøkjær, 1999). This study emphasised the necessary conditions for geographic information communication and navigation using guide maps. When the map specified unfamiliar places, respondents' spatial abilities have affected their performance.

In a current virtual reality experiment by Vilar et al., (2018), an approach by comparing three stimulus presentation types to human wayfinding behavior was tested during emergency situations such as (i) constant stimuli method with fixed images; (ii) constant stimuli method with movies; and (iii) virtual reality simulation of a real environment. These approaches are for human wayfinding behavior within buildings by considering the detection of visual stimuli. Although as previously stated that an interactive wayfinding system via an application using pictograph symbols has been developed, the results of users are only based on the West Malaysian population, and still have yet to test its effectiveness in the East of Malaysian population (Sivaji et al., 2015). Moreover, the introduction of indoor navigation mobile applications at hospitals also has its limitations, whereby it may not guarantee privacy protection, good accuracy in estimating the users' position, and displays their position and the direction instructions on a map (Anagnostopoulos et al., 2017).

Meanwhile, Basri and Sulaiman (2013), also claimed in their studies that some of the common issues raised by the public to the management of the hospitals during wayfinding in the premises are incomplete information and confusion of the signages provided. In a complex indoor environment, a comparison using paper maps and digital maps in wayfinding is not being tested (Hurst & Clough, 2013). Wakabayashi (2007), has stated in his study that it is necessary to provide guide maps for an indoor environment by considering the complex environment situation. The previous study by Hornbæk and Frøkjær (1999) argued that a longer time was taken when using thematic map, compared to the Boolean interface map and there is lack of empirical studies confirming that thematic map improves information retrieval.

Challenges and Barriers in Wayfinding

Challenges and barriers during wayfinding in a complex environment may contribute to visitors' disappointment, frustration and confusion, particularly in a hospital environment where visitors are those seeking for medical treatment which normally is in a state of anxiety. This may cause the perception of a lack of good service provided by a hospital. It is vital for a good hospital to provide a positive experience to visitors. The factors that contribute to patients' dissatisfactions and anxiety are; poor and unfriendly signage; inconsistent utilisation of the numbering system; and difficulty in navigating the premise. From these identified factors, there is a possible implementation of patient-friendly signage, as well as improving patient flow directors (Maqbool et al., 2016).

Performing wayfinding may seem a generally simple concept. However, it is a complex process (Farr et al., 2012). This is because, human sense of direction and wayfinding varies from one another (Cornell et al., 2003). Under normal circumstances, when new navigational approaches, technological or otherwise are developed and introduced, challenges would occur and would have an impact on the users during wayfinding (Hughes et al., 2015). This contributed to the 'real' navigational issues in a large hospital. Therefore, a more integrated approach should be undertaken to resolve wayfinding problems that are linked to healthcare outcomes (Rooke et al., 2009).

Several studies have been undertaken to identify wayfinding design insufficiencies, factors that contribute to the lack of effectiveness of wayfinding by visitors as well as the challenges that they present. In a complex indoor environment, like hospitals, a visitor may experience anxiety when wayfinding in an unfamiliar destination (Chang, 2013). Moreover, information retrievals in hospitals have such overwhelming amounts for a visitor to digest. One example is a study conducted at an orthopaedic and plastics clinic of Gulshan & Nanji Orthopaedic and Plastics Center at the North York General Hospital, Canada which described that patient-centred signages and navigation guides are imperative aids of wayfinding (Maqbool et al., 2016). In another study by Chang (2013), normally, wayfinding strategies are planned before navigating to an unfamiliar destination, as unfamiliar destinations could result in feelings of apprehension amongst first timers. In this wayfinding situation, it was discovered that females and independent travellers without a travel experience had a higher anxiety level compared to males and experienced independent overseas travellers (Chang, 2013). Then, Bosch and Gharaveis (2017) stated that when traveling alone, older adults experience a visual or cognitive decline due to normal aging processes such as illness or deteriorating condition. As a result, this decreases their enthusiasm given such circumstances and ill conditions.

Another study conducted was to undertake a comparison between a normal sighted and visually impaired person (Rousek & Hallbeck, 2011). Enhancing wayfinding for the most highly visually impacted individuals may also improve wayfinding for those with normal vision via a universal design. In another study by Rooke et al., (2009), it is advisable to embed forms of knowledge that would make it easier for people to find their way with little need for signs. This study emphasised several design elements involving signage, paths, target sites, lighting and flooring that created wayfinding issues for both experimental conditions. The hospital design flaws identified by this study provide key areas and elements for further research studies to analyse more comprehensively and ultimately, provide sound design recommendations to enhance effective wayfinding (Rousek & Hallbeck, 2011b). The study developed by Rooke et al., (2009) claimed that the traditional use of signs has failed to overcome the problem of wayfinding in hospitals and potential current technology in wayfinding is more useful for users. However, unlike Bosch and Gharaveis (2017), they believed that traditional approaches are greatly relied upon in certain situations even though technologies on wayfinding aids are easily accessible and useful among users. In addition, not all wayfinding elements can be applied universally to all environments; several wayfinding elements are specific to the type of industry being considered.

Prior to previous studies on wayfinding on a sense of direction, Cornell et al., (2003) highlighted that one's wayfinding efforts are based on their familiarity with features of particular environments of successful or failures memories, sense of direction and self-evaluation of the way finder. However, it is a different case for studies on transportation wayfinding. It involves challenges faced in transportation centers, and related factors and principles in a complex process of wayfinding (Farr et al., 2012).

Generally, in wayfinding, Cornell et al., (2003) discovered that the results of males proved to be faster in their sense of direction compared to females. These are based on their self-evaluation and self-assessment of a sense of direction and wayfinding tasks.

The Characteristic Elements of Wayfinding Aids

The characteristics elements of wayfinding aids play an important role in providing effective wayfinding experience. In designing signage systems as a wayfinding aid for visitors' ease, it is crucial to consider simplicity and ease of navigation by taking into consideration design principles that include consistent appearance, location, distinctiveness, simplicity, standardised images, reassurance about the current route and isolation from other elements of the environment. According to Soh and Smith-Jackson (2004) wayfinding performance is affected by map design, individual differences and environmental cues in an outdoor recreational area. The characteristics elements that have been explored and studied in the public domain include an application using simplified pictograph symbols for wayfinding in hospitals which is beneficial for users to navigate (Sivaji et al., 2015). Standardised signage in a healthcare setting is also useful to speed up wayfinding (Rousek & Hallbeck, 2011a). In addition, Vilar et al., (2018) emphasised that results dispersion of information during an emergency will increase when interaction level and visual information are increased. In a study by Leonard et al., (2014), a proposed new template of 44 new signs were developed and used to replace old signages in hospital environments. These new signs looked attractive and were easily understandable by users.

An investigation was also conducted to identify issues on wayfinding of hospital design flaws by Rousek and Hallbeck (2011b), emphasising on several design elements involving signage, paths, target sites, lighting and flooring. This investigation has resulted in enhanced wayfinding for the most highly visually impacted individuals and has been said to be able to improve wayfinding for those with normal vision via universal design. In order to have a good wayfinding system, it is necessary to improve sign design that comprises the design principles for older adults with visual attention difficulties when navigating (Mishler & Neider, 2017). It has also been emphasised that there is a need to include directional information on 'You-Are-Here' maps even though predictions on the field and self-reported wayfinding skills was a success (Liben et al., 2010). Hornbæk and Frøkjær (1999) highlighted a longer time was taken when using thematic map comparing to Boolean interface map. This evidence showed a lack of empirical studies emphasising the thematic map which improves information retrieval.

Conclusion

In conclusion, this article illustrated that signages are among the wayfinding aids which need to be developed to improve wayfinding in hospitals for visitors. The signage in wayfinding mentioned in this article is based on simplified pictograph design process which must take into account privacy protection, accuracy in estimating the users' position, which displays their position and the direction instructions on a map. This article also focuses on current issues involved in the visitors' familiarity in navigating large hospitals by targeting three factors such as poor and unfriendly signage; inconsistent utilisation of the numbering system; and difficulty navigating in the premise, to ensure a successful and improved visitors' experience in a complex environment, such as hospitals. Significantly, signage in the hospital is one of the effective information retrievals. This article emphasises on a complete process for an interactive wayfinding design system comprises design principle by considering simplicity and ease of navigation by taking into consideration that includes consistent appearance, location, distinctiveness, simplicity, standardised images, reassurance about the current route and isolation from other elements of the environment. However, when technology develops, simplified pictograph symbols are to be applied to the wayfinding application. In addition, by using the signage system of constant stimuli method with fixed images in an indoor public hospital environment may improve visitors' experience and satisfaction when navigating in a hospital.

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