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# CENTRAL ASIAN JOURNAL OF ARTS AND DESIGN

Journal homepage: [www. http://cajad.centralasianstudies.org/index.php/CAJAD](http://www.cajad.centralasianstudies.org/index.php/CAJAD)



## Addressing Way-Finding Techniques For Visual Impaired Person in Public Building in Nigeria

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### ABSTRACT

In Nigeria building design, without the users put in to considerations developing spatial design is not considered as one of the most important tasks in the preliminary design stage. In consequence, the final design outcome will be like that of Hang's Holin School of tough which states that "architecture is without a purpose whatsoever you design will have it use". However a building should serve as a machine that fits the reason of it manufacturers. The essence of this study is to review and understanding Nigerian public building architecture "usability" and "accessibility" by visual impaired person and assessment the quality of architecture in- use", by Nigerian and non-Nigerian trained Architects practicing in Nigeria and suggest a possible usability conceptual framework in achieving quality service design, which is an impact from that quality of architecture in-use. This paper will be concentrating on usability key factors; efficiency, effectiveness (accessibility) and users' satisfaction for visual impaired person.

### ARTICLE INFO

#### Article history:

Received 3 Januar 2021

Received in revised form 15 February 2021

Accepted 30 March 2021

Available online 12 April 2021

#### Keywords:

*Way-finding, visual impaired, visual impaired person, and cognitive mapping.*

### 1.1 Background of study

Way finding is a dynamic relationship of space (Huelat, 2007). It is dynamic in that people's movement with their direct sense of orientation to place must be accommodated. Passini & Arthur, (1992) as cited by (Huelat, 2007) describe way finding as a spatial problem-solving process with three specific but interrelated processes, a). Decision Making; b). Decision Execution. c). Information processing; understanding its generic sense as comprising environmental perception and cognition, which in turn, are responsible for the information basis of the two decision-related processes.

According to Hurter, (2010) despite its demonstrated importance to building use and operational efficiency, there are no regulated standards on way-finding and way-finding design.

Microsoft Encarta (2009) refers Blindness as, total or partial inability to see because of disease or disorder of the eye, optic nerve, or brain. The term blindness typically refers to vision loss that is not correctable with eyeglasses or contact lenses. Blindness may not mean a total absence of sight, however. Some people who are considered blind may be able to perceive slowly moving lights or colours. Blindness refers to a vision loss so pronounced that the individual learns best through touch and listening, rather than through sight, even with adaptive aids. Visual impairment is defined as a functional limitation of the eye(s) or visual system and can manifest as reduced visual acuity or contrast sensitivity, visual field loss, photophobia, diplopia, visual distortion, visual perceptual difficulties, or any combination of the above (heath, Amos & Miller 2010).

Looking at the transitional studies on institutional building in Nigeria from far back as early 80's till date, the design and allocation of spaces in institutional buildings pays attention to the individuals who are visually sound without considerations of visually impaired persons or signage (Muhlhausen, 2004); spaces were not designed to cater for this special group of people like them.

Lang (1983) as cited by Lelhaj (2014) Standard environment design which is designed for the people with high physiological capabilities, the deaf, the blind and those with mobility problems causes limitations.

## 1.2 Problem Statement

Allen, (2008) in his book promoting access to the built environment opined that public accommodation, including religious buildings, hotels, motels, and other places of public gathering, to ensure that everyone regardless of disability has an equal opportunity to enjoy their services and facilities.

Wilm (2008) point out, that the importance of including disable into the political agenda is increasingly recognized across the globe. In this way it is possible to pull the disabled into this space and relieve them of seclusion, isolation, depression, feelings of helplessness.

Providing living conditions are of important factors in attracting visualimpaired person in society. Paying attention to the visual impaired person results in their positive presence in the society and their capabilities can be used in different parts of society. As the visual impaired are a stratum of society that has been always in need for others for their daily needs, in this study the researcher wish to produce a model that will serve as architectural template that will make an ordinary blind person felt catered for, and move without being led by any visual abled person in Nigerian public buildings. People (visual impaired) who are considered as users of this space are the central issue in this architectural research, therefore it is essential to understand them before making the design.

## 1.3 Purpose of the Study

The need for promoting greater access as an effective approach to reversing exclusion and enhancing the equalization of opportunities in a sustainable way has been adopted globally through the UN Convention on the Rights of Persons with Disabilities (UNCRPD), which was approved by the General Assembly in December 2006 and entered into force in May 2008. It establishes the legal frame for policy change and actual implementation towards achieving accessibility for all.

A report by World Health Organization (WHO) and International Agency for Prevention of Blindness (IAPB), as cited by Nada, Fakhr, & Seddik, (2014) stated that there are approximately 285 million

persons around the world who are visually impaired, out of which 39 million are completely blind. Africa and other developing countries represent 90% of this statistics.

#### **1.4 Research Questions**

1. What are they different type of visual impaired?
2. What are the techniques employed by visual impaired person to find their way around?

#### **1.5 Methodology**

Research design from a broad perspective refers to the plan, structure and strategy of investigation for solving research problems. It is a blue print for carrying out research and it includes the list of what the researcher will have to do, from hypothesis to data analysis and conclusion (Oshodi, 2007).

There are various means of conducting research in field of science, applied science, behavioural science, and several others all is accepted provide that the research follow a logical arrival to portray logical data collections, analysis of the collected result, presentations of result and subsequently, systematically conclusions. However, opined by Aina (2001) as cited by Shittu, (2015) the following methods are identified. For these research purposive sampling will be adopted, where equal opportunity will be given to each sample for independent chance to be selected Awolola, (2000). Questionnaire will be distributed to the visual impaired students, Burgess et al, (2003) it can be used to gain insights into people's attitudes, beliefs, motivations and behaviours especially where the sample frame is not known and it is fast considering the time frame. Based on Shittu, (2015) opinion if the study population is homogeneous it yields a very accurate result.

The instruments to be used for collection of data for the research are: Questionnaire, visual observations, series of interview with the visual impair student, case study photographs, sketches and notes.

However, it is evident that the entire visual impaired person cannot read the questionnaire so, the questionnaire is being translated to braille for easy read and fill of the questions, as a result the data were collected in the form of type writer print out. In some cases interviewer assisted is also employed to enable the researcher get a viable responses.

The information of this research proposal will be obtained from the following procedure for data collection.

Visual survey: This will be done by looking and identifying elements on and around the existing schools.

Case study: This involves the physical visitation of the two schools by the researcher and these factors are put to considerations: 1). Site planning and landscape. 2). Special organisations. 3) Building form and expression. 4). Building technology and materials. 5). Building services.

An outcome, especially the final score of the study will then be graded. Something that follows as a consequence of another action, thus, data gathered from the field survey would be collated and analysed. Subsequently results will be presented with the aid of charts; (bar chart, and pie charts), graphs, tables, figures and plates.

#### **1.6 Review of Related Literature**

##### **Way-finding**

Lynch (1960) is credited with coining the term way-finding in 'The Image of the City', where he referred to maps, street numbers, directional signs and other elements as 'way-finding devices'. The terminology has developed into five main architectural way-finding elements

1) Paths and circulation 2) Landmarks or markers 3). Nodes 4). Edges 5). Zones or districts (Lynch, 1960)

### **Tactile Ground Surface Indicator (TGSI)**

According to Durdin & Hughes, (2003) TGSI are textured surface features built into or applied to walking surfaces. They provide blind and vision-impaired pedestrians with visual information and sensory information underfoot. The two types of TGSI are Warning Indicators and Directional Indicators.



Source: Road and traffic guidelines RTS 14 Guidelines for facilities for blind and vision-impaired pedestrians 2nd edition 2007

### **SENSE OF TOUCH OR HAPTIC INFORMATION**

In addition, haptic information appears to be essential for appropriate spatial performance. Haptics is defined in the Webster dictionary (Webster, 1983) as: 'of, or relating to, the sense of touch.' Fritz, Way and Barner (1996) define haptics as follows: 'tactile refers to the sense of touch, while the broader haptics encompasses touch as well as kinetic information, or a sense of position, motion and force.' For the blind, haptic information is highly important.

Research by Glenn & Chignell, (1992) has suggested that landmarks may be particularly visual or cognitive, and that these functions are intricately tied as parts of a symbol system.

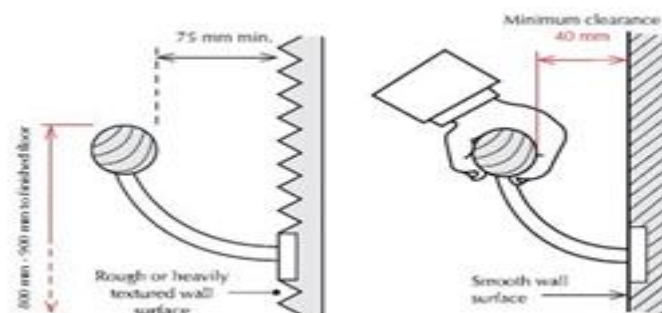


Figure: Haptic tools

Source: City Of Toronto accessibility Design Guidelines

### Use of Animals for way-finding

The common mobility aid for a blind or vision-impaired person is a guide dog. A guide dog is trained to lead its owner around obstructions and to stop at distinct changes of level however guide dogs are generally unable to respond to changes in texture or colour underfoot (Durdin & Hughes, 2003).



Figure: Use of Animal for way-finding

Source: City Of Toronto accessibility Design Guidelines

### Visual Impaired Person

A report by World Health Organization (WHO) and International Agency for Prevention of Blindness (IAPB), as cited by Nada, Fakhr, & Seddik, (2014) stated that there are approximately 285 million persons around the world who are visually impaired, out of which 39 million are completely blind. Africa and other developing countries represent 90% of this statistics.

According to Fakhr, & Seddik, (2014) the number of blind people will increase worldwide to reach the double by 2020. According to world health organization, (2007) Over 75% of the people in the world who are legally blind have some residual vision, 11.5 million people have some degree of visual impairment. According to world health organization, (2011) predictably, disability is not randomly distributed across the population.

Regardless of loss of vision or being visually impaired, obtaining information from the environment through which navigation is performed is important for commuters and would be a prerequisite for them (Afrooz, Hanaee, & Parolin, 2012).



Plate: visual impaired

The Nigeria national blindness and visual impairment survey 2005-2007

## Categories of Visual Impaired

World Health Organization categories of vision loss were used to define blindness and severe visual impairment, allowing international comparisons to be made.

Blindness: A presenting VA (with glasses for distance if normally worn or unaided if glasses for distance not worn) of 3/60 in the better eye.

Severe Visual Impairment (SVI): A presenting VA of 6/60 to 3/60 in the better eye.

Moderate Visual Impairment (Mod VI): A presenting VA of 6/18 to 6/60 in the better eye.

Mild Visual Impairment (Mild VI): A presenting VA of 6/12 to 6/18 in the better eye.

Normal (N): A presenting VA of 6/12 in the better eye.

## 1.7 FIELD FINDINGS

School for the blind children Gindiri, Mangu, Plateau State, the school was established in 1953 by the then Sudan United Mission British branch (SUMB) as part of efforts aimed at ensuring that visually impaired children in Nigeria have increased access to quality education.

A school for the visual impaired was sample and various discoveries was made from the identification of the types of visual impairment to how they maneuver their way in and out of any facility the find them self. Even though Nigerian Architects must times didn't take cognizance of visual impaired person in their designs.

The questionnaire that was distributed during study has three sections, section A: bio-data, section B: Way-finding, Categories of visual impairment, Consciousness of your environment among the visual impairment, way-finding techniques approach use by visually impaired to walk round. Section C: Visual impaired.

Section A of the questionnaire was bio-data which states the particulars of the visual impaired students, which deals with gender, age range, marital status, and occupation.

Section B of the questionnaire was way-finding for visual impairment; these sections is divided into three sub-heading i). Categories of visual impairment ii). Consciousness of your environment among the visual impairment. iii). Way-finding techniques approach use by visually impaired to walk round.

### Way-finding

Analysis of the questionnaire

The Categories of visual impairment answer the first research question on the categories of visual impairment, 44% of the visual person that filled the questionnaire were unable to see anything at the distance of 5metres, 25% of the second group could not see less than 10 metres, 17% of the students could not see less than 20 metres and while 14% of people cannot see less than 15 metres.

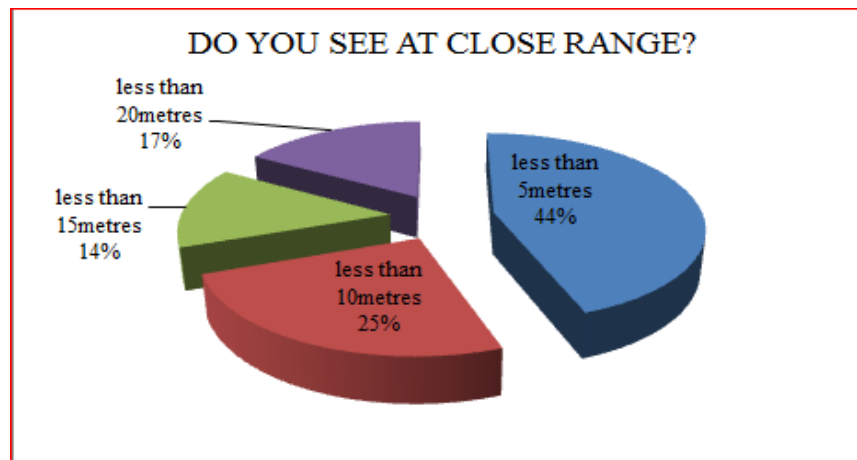


Figure 1. Error! No text of specified style in document..1: Range of sight

Source: Authors field work

In the second question rise by this questionnaire which is intend to answer research question one categories of visual impairment, majority of the student hat filled these questionnaire were of the opinion that says they understand new environment through sound, follow by footsteps, then colour and finally smell in per centile connotations 56%, 22%, 14% and 8% respectively.

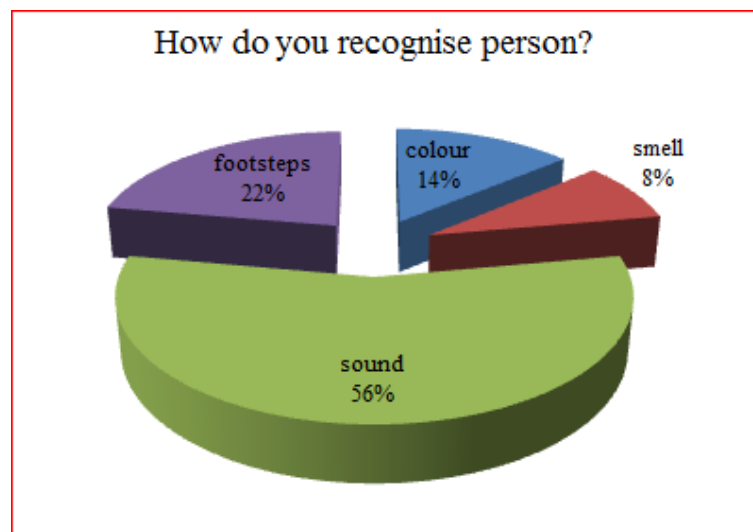


Figure 1. Error! No text of specified style in document..2: Recognition of person

Source: Author's field work

### Consciousness of your environment among the visual impairment

This section of the questionnaire Consciousness of your environment among the visual impairment answer the second research questions on what are the techniques employed by visual impaired person to find their way around? This conscious effort by visual impair person to know, master a given environment by the use of some common sense like counting the numbers of doors, I stay there for a long time, paint on the wall, and someone help me there, which after the computation of the results 8% goes to the first and subsequently 13%, 30%, and 49% respectively.



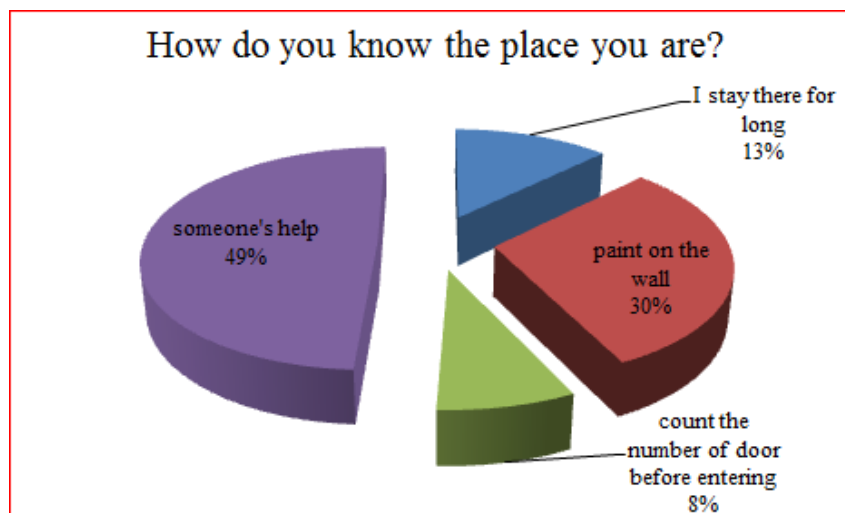


Figure 1Error! No text of specified style in document..3: Consciousness of my surrounding

Source: Author's field work

These questions also answer the research question two which tells on how conscious of a visual impaired person had when he/she found themselves in an environment, even though this parts will be highly influence by some architectural features found there like a particular feature I touch when am there.

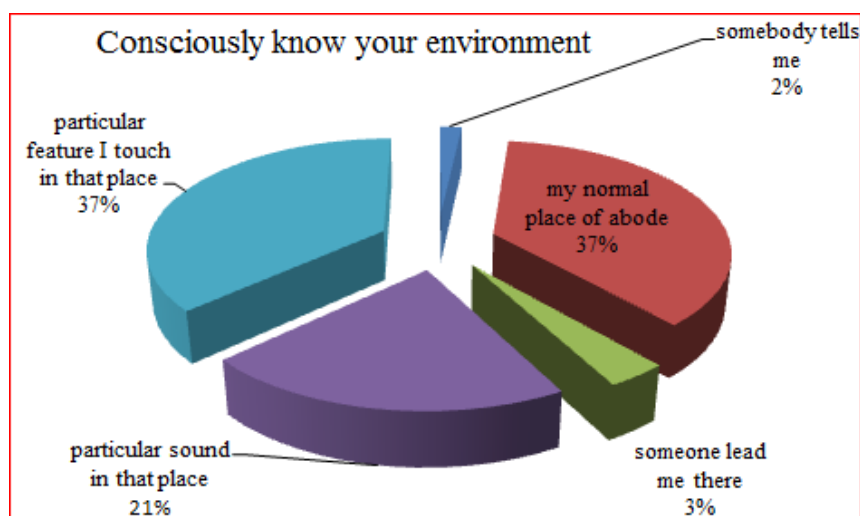


Figure 1Error! No text of specified style in document..4: Consciousness of my environment

Source: Author's field work

## Section B

### Way-finding techniques approach use by visually impaired to walk round

Architectural features play a very much importance to how, a visual impaired person move in a space without any obstruction or devoid of accident, at this it guide in the transitions of from one space to another.



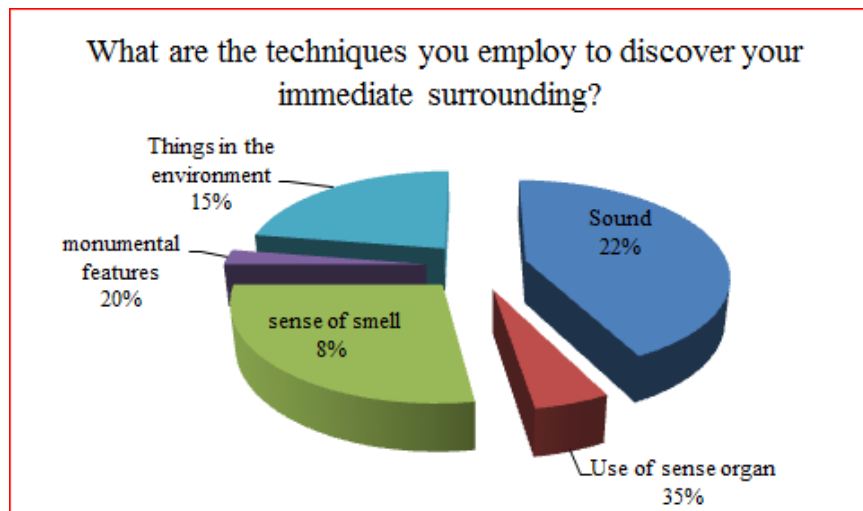


Figure 1Error! No text of specified style in document..5: Techniques you employ to walk around

Source: Author's field work

The last questions in the questionnaire state “how do you move in a room space?” (Blind) it answers the second research questions on what are the techniques employed by visual impaired person to find their way around? The visual impaired tends to use the available resource at their disposal couple the fact they don't know TGSI, and haptic information. From the studied carried out in SBC Gindiri the larger per cent age move by mobility cane to avoid accident and due to nor haptic information system they tend not to know how where it will work.

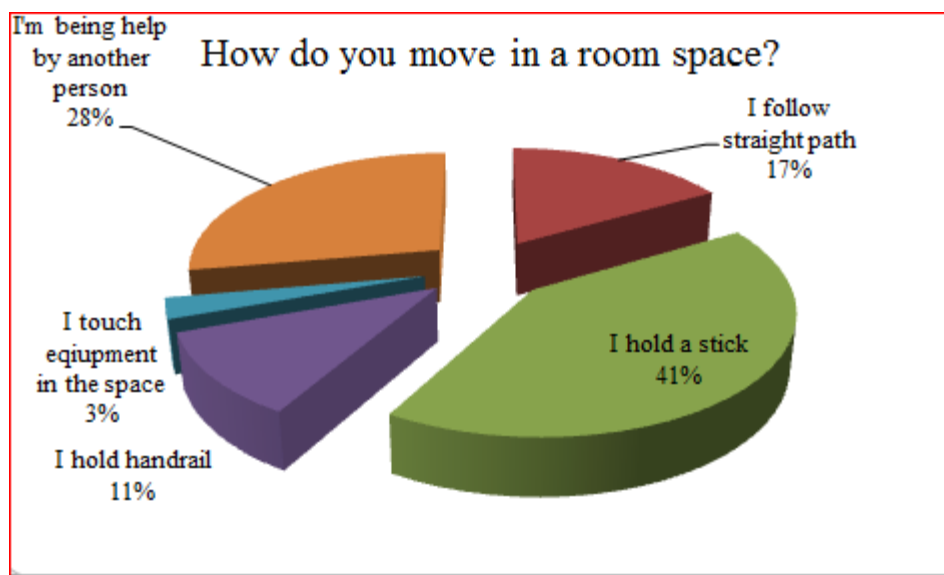


Figure Error! No text of specified style in document..6: Circulation in a room

Source: Author's field work

## 1.8 CONCLUSION AND RECOMMENDATION

At the end of this study the researcher may come to logical conclusion by give a guideline in the design of public buildings i.e. stadia complex, cooperate headquarters, university or shopping mall that legally certified blind person or partially blind person will be going should have some basic architectural features to move without hindrance or accident.

Durbin & Hughes, (2003) TSGI are textured surface features built into or applied to walking surfaces, this shows that architects in Nigerian practice have to inculcate TSGI.

## Recommendations

All Nigeria architects and designers should incorporate all the features that will warrant wider usage of the facility they are responsible of designing so that the visual disabled person will not feel being secluded in a place where he/she is supposed to be celebrated. The site should be plan with features that is simple to describe, and understand. The signage should be visible effort to give directions for both the visual impaired and the visual abled person coming for the first time.

Whether addressed through architecture or information, the design of way-finding systems should include: (1) identifying and marking spaces; (2) grouping spaces; (3) linking and organizing spaces; and (4) communicating this information to the user.

Finding one's way is an essential ability and a prerequisite for autonomy and independence, thereby promoting self-sufficiency and self-esteem Marquardt, (2012). Way-finding is as much an architectural issue as a graphic issue (Hunter, 2010). Architects and designers need to take serious concern for inclusive approaches to way-finding and learn more about the psychological impacts on blind person within his built space.

## 1.9 REFERENCES

1. Aina, L. O. (2001). Research in Information Sciences: An African Perspective. Ibadan.
2. Awolola, J.A. (2000). *A practical guide to research writing*. Ilorin: Olad.
3. Burgess, R., Dumais, J., Franklin, S., Gough, H., & Walker, C. (2003). Survey Methods and practices. Ottawa: Statistics Canada.
4. Chao Li (2004) Spatial Ability, Urban Way finding and Location-Based Services: a review and first results: London. ucl.
5. Durbin, P., & Hughes, T., (2003) Tactile Ground Surface Indicators & Audible Tactile Traffic Signals. Revision of RTS 14: Guidelines for Installing Pedestrian Facilities for People with Vision Impairment. IPENZ Traffic Management Workshop – Christchurch 2003 Technical Paper. Eguzoikpe.
6. Fritz, J., Way, T. & Barner, K. (1996) Haptic representation of scientific data for visually impaired or blind persons. Paper presented at the Technology and Persons with Disabilities Conference. Giess, C., Evers, H. & Meinzer.
7. Glenn, B. T. & Chignell, M. H. (1992). Hypermedia: Design for browsing. In H. R. Hartson & D. Hix (Eds.), *Advances in Human-Computer Interaction*, Vol. 3. Norwood, NJ: Ablex Publishing Corp.
8. Heath D. A., Amos J. F., & Miller S.C. (2010). Optometric clinical practice guideline: Care of the Patient with visual Impairment (Low Vision Rehabilitation). American optometric associations, Lindbergh Blvd., St. Louis, MO 63141-7881
9. Huelat, B.J. (2007) way finding: design for understanding: A Position Paper for the Environmental Standards Council of The Center for Health Design. califonia.
10. Hunter S. (2010). Design resource: center for inclusive design and environmental access Architectural Way-finding IDeA Center, New York: University at Buffalo.

11. Lang, J. (2011). Creation of architectural theory, Translated by A. eini far; Fifth Edition, Tehran.
12. Lelhaj, R. & Sarbangholi, H.S. (2014). Gender factors influencing architectural design specific for disabled: Kuwait Chapter of Arabian Journal of Business and Management Review Vol. 4, No.4; December. 2014
13. Lynch, K. (1960). The Image of the City. Cambridge: MIT Press.
14. Microsoft Encarta (2009). ©© 1993-2008 Microsoft Corporation. All rights reserved.
15. Nada, A. A., Fakhr, M. A., Seddik, A.F. Assistive Infrared Sensor Based Smart Stick for Blind people.
16. Oshodi (2007). Understanding research methods .Lagos: Bimsmat NIG.
17. Passini, R., and Arthur. P. 1992. Wayfinding: People, signs and architecture. New York: McGraw-Hill Inc. Processes, Baltimore, Maryland: The Johns Hopkins University Press.
18. Shitu, M. (2015). Evolving space standard for family caregivers in hospital design proposed Dandume general hospital, *unpublished M.Sc. thesis*, Ahmadu Bello University, Zaria, Nigeria.
19. United Nations (UN) Convention (2006). On the Rights of Persons with Disabilities (UNCRPD), Approved by the General Assembly in December 2008.
20. Webster, N. (1983) Webster's new twentieth century dictionary of the English language. USA: Encyclopedia Britannica, Inc.
21. Wilm, S., Foster A. & Noe C. (2008). Promoting access To the Built environment: Guidelines. 64625 Bensheim Germany: Nibelungenstrasse 124.
22. World health organizations