SIZE AND SPACE FOR APPROACH AND USE

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Abstract

The Principles are a set of design guidelines for environments, products, and communications. The Principles can be used to evaluate existing designs, guide the design process, and educate both designers and users about the features of more accessible objects and places. One of the universal design principles is the size and space for approach and use. All designed objects should consider approach, reach, manipulation, and use to be very crucial, regardless of the user's abilities, limitations, or special needs. This paper helps understand and explains steps and approaches in planning size and space with examples in an urban environment. To create easily accessible design for all, understanding the various people who are disabled or small in size is critical.

Key Words: *Space, Size, Use, Size and space,*

1. Introduction

Size and space for approach and use is one of the universal design principles. The size and space of everything designed should be considered crucial for approach, reach, manipulation, and use regardless of the user's abilities, limitations, or special needs.

This principle emphasizes the need for design not only for aesthetic or visual aspects but also for delivering a practical and empathetic design that people can use to their maximum potential. It can be applied to a variety of fields, including product design, mobility design, and architectural design.

For approach and usage, four rules may be applied to goods, interfaces, and environments to create designs that everyone can use effectively.

2. Guidelines

2.1 Provide a Clear Line of Sight to Important Elements for Any Seated or Standing User

A person of any size can easily see all of the important elements of the product from any position, whether standing or seated. It is critical to design a product that is easy to approach in real life by taking all aspects of people into account.

2.1.1 Lower Help Desk

A low counter allows individuals and customer service desks to interact whether they are seated or standing, tall or short, or have any physical disabilities. The lowered counter section at the nurses' station improves patient visibility and access to vital equipment.

2.1.2 Home Planning

A home with an open floor plan allows visitors and residents to interact and move freely from one area to another. A full-length entry sidelight allows for outward visibility for people of all heights. Furthermore, the floor must be free of obstacles or partitions so that the person in the vehicle chair can move around the house without personal assistance.

2.1.3 Interior of Tram

The interior of the Alstom Citadis tram, which has a hundred per cent ultra-low floor, has both large open areas and two by two seating. As a result, wheelchair passengers can easily board and exit the tram and travel around without assistance.

2.2 Accessibility to Components for Any Seated or Standing User

A person of any size, standing or seated, can easily for reach all of the important elements of this product from any position. Furthermore, it is equally important for people of various sizes and mobility to have access to artifacts in the environment.

2.2.1 Lift Operation System

By providing a horizontal lift operation system, users who are short or seated in a wheelchair can gain access without the need for assistance. As a result, the product's efficiency rises while the number of users rises as well.

2.2.2 Subway Fare Machines

Subway fare machines place controls at various heights to provide convenience to both seated and standing customers. A person equipped with an RFID-compatible transmitter or a mobile phone can receive navigation cues to assist them in entering or exiting a station. All users have equal access to a fair vending machine.

2.2.3 Lower Kitchen

Instead of providing a kitchen top at a lower height with reachable controls and overhead cabinets, a standard kitchen table top comes at the height of two and half feet, allowing easy accessibility for differently-abled people who need assistance while cooking.

2.3 Accommodate Variations in Hand and Grip Size

When designing a product, keep in mind that it must be suitable for people of all hand sizes. When designing for children or adults, the design must be simple to use at any angle or size.

2.3.1 X-Box Adaptive Controller

Some people may not have the same functionality as others, and most products are designed for the general public. However, there are some products, such as Microsoft's X-Box controller system, that are specifically designed for specific audiences. The basic concept is that the product must reach all types of users, whether they are disabled or not, and that they should experience the product and its use.

2.3.2. Hand Grips

It is simple for the younger generation to use the public restroom. Whereas it is difficult for the elderly or disabled to access and use the toilet. The availability of various handles is desirable for older people who find using the restrooms challenging without assistance.

2.3.3 Chopping Knife

The chopping knife's loop handle accommodates a wide range of hand sizes and is very easy to grasp from any angle, allowing us to use it in a variety of ways.

2.3.4 Home Entrance

Initially, some doors are very short in height, and some people are very tall and large, making it difficult to enter the house. In addition, the seated person and children are having difficulty opening or reaching the door handle. By making the door very light and providing a door handle that allows a seated and small user to access the handle without strain while opening or closing the door. The door handle is suitable for larger doors and can be easily opened by hands of all sizes.

2.4 Provide Adequate Space for The Use of Assistive Devices or Personal Assistance

There should be enough space for the product to be used with devices for people in wheelchairs and for carrying oxygen tanks or service animals without disturbing others.

People who use assistive devices for mobility may find it difficult to maneuver in small spaces. In such cases, providing adequate space for them would ensure their safety, convenience, and efficiency.

2.4.1 Metro Station Space

Wider areas at metro stations or other train stations are typically provided at varying widths to allow wheelchairs to pass through, as well as a height that is easily accessible to check-in while seated in a wheelchair.

2.4.2 Fare Gate

Fare gates are accessible to a wide range of people. The gate assembly is sufficiently long that exiting passengers will not have to slow down or stop walking for the gate to open. To assist with fare collection, the gate has several smart card targets.

2.4.3 Providing Ramps

By designing the vehicle in such a way that wheelchair users can enter using the ramp provided, they will be able to travel with their families. And they can enjoy the trip without putting any strain on their bodies.

2.4.4 Vehicle for The Wheelchair Person

Wheelchair users can drive a vehicle that is an electric automobile that can fit one person by entering the vehicle through the back door. As a result, disabled people can travel

independently and without limitations. In addition, the vehicle must have a wide opening door that allows a wheelchair or walker to get close to a seat.

2.4.5 Floor Planning

The floor plan and layout of the house allow for wheelchair transit and maneuverability in the hallways and rooms. At the same time, the home layout must be simple for elderly people to remember.

3. Origin

The origin of universal principle goes back to our ancestors in the stone age. They were aware of, followed and passed through the generations some of the principles of Universal design, including but not limited to size and space for approach and use. Now in the modern era, we have a plethora of techniques and approaches for generating artifacts that make our life easy. However, we find some similar sensitivity towards needs in a lot of artifacts produced in the stone age as well. A good example of this sensitivity can be found in the hammer. A hammer is a very effective utilitarian tool which was used during hunting and for making oher tools, It was designed to be handy, easy to carry and made with readily available material like wood, stone and bone (Smith, n.d.).

4. Size and Space Matter

Size, generally, refers to the dimensions of a product. In our day to day life, size and space play a very important role in altering our experience. This is particularly noticeable in densely populated areas.

4.1 Urban Planning

Urban planning is the process of developing a city by taking into account both the design and regulation of space, with a focus on the physical form, economic function, and social impacts of the urban environment (Fainstein, 2021). Urban planning is concerned with both the development of open space and the revitalization of existing city areas, involves goal setting, data collection and analysis, forecasting, design, strategic thinking, and public consultation.

Many large cities have redeveloped the older congested parts of the cities wherever possible or developed new extensions with more 'thought' and plans for expansion for the future. Roads, streets, walkways, trees, boulevards add spaces for movement as well as breathing spaces in the

cityscape. Haussmann's plan of Paris, the modernization plan of Georges-Eugène Haussmann transformed many areas of Paris by adding wider boulevards, better lighting, water sanitation, new parks, and improved rail transportation. It improved the cleanliness and reveals the beauty of the city by planning and recreating the proper city layout starting from the heart of the city and moving outward. Since the sewer system was relocated underground, the streets became more efficient and visually appealing. This promised a city with cleaner drinking water and fewer disease outbreaks. His proto-modern style, which incorporated geometric designs, was visually appealing and eventually increased Paris's functionality (Kumari, 2015).

4.2 Analog Products of Human Scale: Pencils

One of the best inventions made by mankind is the pencil. It is very simple to use, and the size is small enough to fit in your hand, allowing you to grip it perfectly while writing without difficulty, and it does not take up much space. Originally, it was just a piece of charcoal struck between two kinds of wood and tied with rope, but it has now been perfected with continued evolution. As a result, it can accommodate small hands such as children's and big hands like adults', making it a portable and effective writing tool (Popova, 2013).

4.3 Digital Products of Human Scale: Smartphones

A smartphone is a portable device that combines telephone and computing functions into a single unit. In the beginning, the mobile phone was bulky and difficult to transport. This has become much more compact and powerful as a result of continuous upgrades and evolution. It assists children in learning new things through the use of smartphones. It has various features such as a camera, audio and video recording, and some other features that come in a small package. It also comes in a variety of sizes, allowing people to find the one that is most comfortable for them. Smartphones are developed in a variety of sizes to appeal to a wide range of market consumers. When it comes to iPhone 13, they come in a variety of sizes and specifications. As a result, everybody can have their cell phone, which is more convenient.

5. Concept of Sharing Space

The concept of sharing space is an urban design method that reduces segregation between modes of road users. Privately owned vehicles are becoming more common in urban areas, while space is shrinking as a result of increased traffic and crowding.

Using public transportation reduces the number of owned vehicles on the road while also saving time. However, not everyone is interested in using public transportation, and we cannot force

them to do so. Where different people use and require different things for their daily needs. As a result, many automobile companies are developing shared mobility based on various people's needs. Some recent examples of shared mobility are listed below for discussion.

5.1 Toyota e-Palette

Toyota's Global Mobility Services Platform will be used by the *e-Palette* Alliance to develop advanced vehicle and related mobility services for business applications. The *e-Palette* Concept Vehicle will be a self-driving, battery-electric vehicle equipped with connected technologies. The vehicle is adaptable to a variety of uses, including ride-sharing, logistics, and mobile shops (Toyoda, 2018).

5.2 Hiriko Fold

Some automobile projects try to design folding cars that provide solutions to urban issues. The Hiriko Fold, a super-compact two-passenger electric car, was created specifically for city driving. The main advantages of this vehicle are that it folds upright to fit into tight parking spaces and can travel up to 75 miles on a single charge. The Hiriko Fold has first-rate maneuverability thanks to zero-turn radius wheels that allow it to move sideways, making parallel parking a breeze. In this way, we can save parking space in the urban zones (Ashley, 2012).

6. Conclusion

The universal design principle of size and space for approach and use is one of the oldest principles that was used by humankind to design and shape our surroundings for comfort and effectiveness. The use of this principle by designers ensures that people with different physical or mobility characteristics can access and use a building, space, or product to its full potential.

References

1. Ashley, S. (2012, June 13). Folding cars offer a solution to urban transport problems. Retrieved September 10, 2021, from BBC website https://www.bbc.com/future/article/ 20120613-folding-cars-offer-city-solution
2. Kumari, G. (2015, May 22). Haussmann's Paris. Retrieved September 22, 2021, from Slideshare website https://www.slideshare.net/gayathrikumari7/group-2-48470229
3. Popova, M. (2013, June 24). The Surprising History of the Pencil. Retrieved September 28, 2021, from The marginalia website
4. https://www.themarginalian.org/2013/06/24/history-of-the-pencil/>
5. Smith, S. (n.d.). Stone Tools. Retrieved October 1, 2021, from Human origins website

6. https://humanorigins.si.edu/evidence/behavior/stone-tools

7. Fainstein, S. S. (2021, August 5). urban planning. Encyclopedia Britannica. Retrieved October 11, 2021) from https://www.britannica.com/topic/urban-planning

8. Toyoda, A. (2018, January 09). Toyota Launches New Mobility Ecosystem and Concept Vehicle at 2018 CES, Retrieved November 10, 2021, from Global Toyota website https://global.toyota/en/newsroom/corporate/20546438.html