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Universal Design Accessibility In the Built Environment
"Universal Design" means the design of products, environments, programmes & services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

UNIVERSAL DESIGN enables a wider cohort of people to benefit from accessibility, safety and usability - Without discriminating against anyone.

The Seven Principles of Universal Design state that facilities should be designed to be usable to the greatest possible extent rather than ‘by all’

“Housing is too frequently designed for the ‘average’ person with ‘average’ physical ability when, in reality, few people meet this description of ‘average’. People range greatly in size and physical and mental abilities, and they experience many changes throughout their lives.”

GLOBAL - PEOPLE WITH DISABILITIES (PWDS)

• Estimated 15% of the world's population has a disability
• More than ONE BILLION people with special needs worldwide
• An estimated 80% live in developing countries

(Source: WHO Report, 2011)

PEOPLE WITH DISABILITIES (PWDS) IN MALAYSIA

• There are 436,317 PWDs registered with the Department of Social Welfare by Dec 2012
• 37.3% - learning disabilities (autism is the highest %)
• 33.4% - physically disabled
• 9.0% - visually impaired
• 3.3% - hearing impaired
• 3.3% - mentally disabled
• 0.4% - speech disability
• 4.6% - other type of disabilities.

(Source: Jabatan Kebajikan Masyarakat [JKM] Malaysia, 2012)

ELDERLY IN MALAYSIA (60+)

• Population of 60+ in 2010 is 7.9%
• Population projection in 2040 will be 16.3%

(Social Welfare Department, 2013)
INTRODUCTION

POPULATION RATIO 65+

- Australia
- Japan
- Malaysia
- USA
- Sweden

Source: Satoshi Kose (ICUDBE, 2013)
Strategies and approaches in designing, constructing and managing the accessible built environment to ensure that it satisfies all the needs of the intended users.
INTENDED USERS

(Source: Asiah Abdul Rahim, 2013)
Obstructive VS Supportive Built Environment

- People live and move in an everyday of planned and unplanned experiences and activities, always in the context and interrelationship of social, physical and virtual environments.
- On a daily basis, a person uses a home, transportation, communication and information technology, commercial facilities, workplaces, streets and squares, entertainment areas.
- Each of these settings and services – and also the chain of connections – must be integrally and inclusively accessible for a diversity of users.
- The built environment must manifest itself to users as a necessary spatial-morphological whole and fabric of accessible and usable buildings and open space, public and private spaces, implements and facilities.
- Decision-makers, designers and builders must work in the structure and in the fabric of that global built environment.

(Source: Hubert Froyen (Ed.) *Universal Design – A Methodological Approached*)
The Universal Design Pyramid demonstrate the bottom up methodology of universal design.

Source: Universal Design Pyramid (Goldsmith, 2000)

JOSEPH KWAN (2013), Universal Design: Architect’s Social Responsibility. Hong Kong (ICUDBE 2013)
In the 70s’, Professor Edward Steinfeld, as director and researcher with the Rehabilitation Engineering Research Centre (RERC) of the University at buffalo in New York, developed a usable synthesis of relevant design data related to functional limitations. In *The Enabler* (1979) he compiled an overview of such limitations, without becoming entangled in medical jargon and without revealing confidential medical data.

(Source: Hubert Froyen (Ed.) *Universal Design – A Methodological Approach*)
7 PRINCIPLES OF UNIVERSAL DESIGN

1. Equitable Use
   The design is useful and marketable to people with diverse abilities.
   1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.
   1b. Avoid segregating or stigmatizing any users.
   1c. Provisions for privacy, security, and safety should be equally available to all users.
   1d. Make the design appealing to all users.

2. Flexibility in Use
   The design accommodates a wide range of individual preferences and abilities.
   2a. Provide choice in methods of use.
   2b. Accommodate right- or left-handed access and use.
   2c. Facilitate the user's accuracy and precision.
   2d. Provide adaptability to the user's pace.

3. Simple and Intuitive Use
   Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or education level.
   3a. Eliminate unnecessary complexity.
   3b. Be consistent with user expectations and intuition.
   3c. Accommodate a wide range of literacy and language skills.
   3d. Arrange information consistent with its importance.
   3e. Provide effective prompting and feedback during and after task completion.
7 PRINCIPLES OF UNIVERSAL DESIGN

4. Perceptible Information
   The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
   4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
   4b. Provide adequate contrast between essential information and its surroundings.
   4c. Maximize "legibility" of essential information.
   4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
   4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

5. Tolerance for Error
   The design minimizes hazards and the adverse consequences of accidental or unintended actions.
   5a. Arrange elements to minimize hazards and errors; most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
   5b. Provide warnings of hazards and errors.
   5c. Provide fail safe features.
   5d. Discourage unconscious action in tasks that require vigilance.

6. Low Physical Effort
   The design can be used efficiently and comfortably and with a minimum of fatigue.
   6a. Allow user to maintain a neutral body position.
   6b. Use reasonable operating forces.
   6c. Minimize repetitive actions.
   6d. Minimize sustained physical effort.

7. Size and Space for Approach and Use
   Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.
   7a. Provide a clear line of sight to important elements for any seated or standing user.
   7b. Make reach to all components comfortable for any seated or standing user.
   7c. Accommodate variations in hand and grip size.
   7d. Provide adequate space for the use of assistive devices or personal assistance.

Elements of Universal Design

- Universal design – design of environments and products access to buildings, horizontal circulation, vertical circulation, mechanical circulation, sanitary circulation, indoor public facilities, outdoor public facilities, amenities etc
- Built environment: building typology, school, office, waterfront development, parks
  - i) Vertical circulation (change of level): stairs, ramps, lifts, escalators
  - ii) Horizontal circulation: access routes, step ramps, corridors, walkalators, bridges, crossings etc
- Assistive products – railings, grab rails, fittings
- Communication and information – signage, alarms, notices, digital, switches, flashing lights, blinking alarms, vibrators
Figure: Schematics Diagram of Universal Design Application in the Built Environment. (Source: Asiah Abdul Rahim, 2010)
### Universal Design – I.E. Its Application

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<th>Example Building typology</th>
<th>Example of Products Design</th>
<th>Services (human resources)</th>
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<td>Commercial Wheelchairs</td>
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</tbody>
</table>

(Source: Asiah Abdul Rahim, 2010)
UNIVERSAL DESIGN CONSIDERATION

Client’s Brief
- Design Process
- Pre-Construction Process
- Post-Construction Process
- Universal Design Consideration

New Building
- Post-Occupancy
- Access Audit in Building

Existing Building
- Post-Occupancy

(Source: Asiah Abdul Rahim, 2010)
PHYSICAL BARRIERS IDENTIFIED

Access Audit Simulation in Existing Building
CASE STUDY: KUALA LUMPUR CONVENTION CENTRE (KLCC)

Ramp facility and disable parking are designed with the consideration of Malaysian Standards (MS)
CASE STUDY: PUTRAJAYA
HOUSING, RESIDENTIAL & COMMUNITY AREA

- Comfortable width of walkway with railings assist the wheelchair users to use this ramp.
- Suitable floor finishes and sufficient walkway width help in providing good and safe outdoor environment.
CASE STUDY: PUTRAJAYA
HOUSING, RESIDENTIAL & COMMUNITY AREA

- Junction design that has provision of pedestrian zebra crossing
- Bollards provide good barrier for motorcyclist and cars from parking at this area and going up the curbs as the pavement are 'curb cuts'
- Should have 'warning tactile' at curb cuts before & after zebra crossing
• Accessible Bus Stop provides an area for wheelchair next to normal seating area, an e.g. of integrated design
• The bus stop has minimum difference in levels making it easier to wheel as gentle slopes are designed and curbs from the road are sufficient with height of bus

CASE STUDY: PUTRAJAYA
HOUSING, RESIDENTIAL & COMMUNITY AREA
• The walkway are leveled off from the house entrance to the main road.
• Any hard landscapes should be surrounded by a minimum height curb; e.g. like in this neighborhood
• Floor furnishes have a non-slip surface and its texture should be traversal by disabled persons.
CASE STUDY: PUTRAJAYA
HOUSING, RESIDENTIAL & COMMUNITY AREA

• At Parks and green area should have clear signage and appropriate location of signboard.
• Sitting area is provided at the park
• Seamless Walkway connected to houses without steps.
• Clear pedestrian walkway between soft landscape and hard landscape.
GOOD EXAMPLES IN SINGAPORE

Correct use of gradient and warning block for the ramp

Clear signage for the PWD & appropriate height for wheelchair users
GOOD EXAMPLES IN EUROPE/UNITED KINGDOM

- Pedestrian friendly walkway for all types of user
- Accessible, multi-purpose and wide public walkway
- Ramps provided at heritage and new buildings
GOOD EXAMPLES IN UNITED KINGDOM

Adaptable Design to Heritage Building: External Lift at a Museum in Oxford University
GOOD EXAMPLES IN UNITED KINGDOM

Pedestrian Crossing
Ramp Design in new buildings

Adaptable Design to Heritage Building: Ramp Design

GOOD EXAMPLES IN UNITED KINGDOM
GODD EXAMPLES IN UNITED KINGDOM

- Signage for PWDs
- Complete Accessible Toilet
- Staircases
- Handrail Design
GOOD EXAMPLES OF STREETSCAPE

Several outdoor streetscape

Vertical transport at The Louvre
GOOD EXAMPLES IN PARIS, FRANCE

A Disabled Friendly Welcome Desk with Seating Area at Charles De Gaulle Airport, Paris.

Accessible toilet and electronic door with manual push button at wheelchair height at Charles De Gaulle Airport, Paris.

A Disabled Friendly Welcome Desk with Seating Area at Charles De Gaulle Airport, Paris.
GOOD EXAMPLES IN PARIS, FRANCE

A design of spiral staircase integrated with an open accessible lift inside The Lourve Musee in Paris.

The addition of handrails at both sides of the stairs for the elderly inside The Lourve Musee in Paris.
GOOD EXAMPLES IN PARIS, FRANCE

Directive and interactive Signage at Metro Train in Paris (Light & Sound)
GOOD EXAMPLES IN SEOUL, KOREA

The application of guiding blocks and warning blocks at public areas and train station
Symbols at toilet entrance that clearly indicate accessible toilet and normal toilet has warning blocks for the blind.
INTERGRATED TRANSPORTATION HUB

Accessible underground station and St. Pancras International in London

Airport Railroad Express (AREX) from Incheon International Airport to Seoul Station.
Interactive display, wheelchair park spot in train, mode of wheelchair transfer & Accessible toilets
Adaptable ramps and allocation areas for PWDs on public buses and taxis (Hong Kong, United Kingdom & Malaysia)
PLATFORM LIFT FOR WHEELCHAIR USERS WHEN NEEDED

BECOMES STEPS WHEN THE PLATFORM IS NOT IN USE

(Figure Source: Jim Harrison, ICUDBE 2013)
- Communication devices - sensors and ‘apps’ that are used on mobile phones, bluetooth or RFID (radio frequency identification) with proximity sensors (e.g. audio guide handsets in museums)
- Can be located to activate existing parts of the building - opening doors, switching lights or providing information
- Through the use of wearable sensors the services can be designed to respond to the individual needs of the building user, rather than just for people in general.
BENGKEL AKSES AUDIT DALAM PERSEKITARAN ALAM BINA
KOTA KINABALU 2012
PADA 9 – 10 April 2012
PUSAT PEMBELAJARAN BANDARAYA KOTA KINABALU

Anjuran Bersama:
Jabatan Standard Malaysia
dan KAED Universal Design Unit (KUDU), Kuliyyah Of Architecture Environmental Design,
International Islamic University Malaysia

Dengan Kerjasama:
Dewan Bandaraya Kota Kinabalu
THE BORNEO POST, TUESDAY, 20 DECEMBER 2011

UTUSAN BORNEO, SELASA, 10 APRIL 2012
REFERENCES

- British Standards
- Canada BC
- Japan Standards
- MS 1331: 2003 (revised) Malaysian Standard: Code of Practice on access for disabled persons outside public buildings
- Singapore Code.
- Singapore Standards.
- Toronto Guidelines.
Thank You

Email:
arasiah@iiium.edu.my,
kudu.kaed@gmail.com,
universaldesign.be@gmail.com