Universal design characteristic on themed streets

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Abstract. People around the world can access the streets to fulfil their daily activities regardless of their gender, age, and abilities. The streetscape is an urban public space which is built to facilitate the basic needs of people as social being. The themed street is an urban streetscape designed and built in detail with a theme or special purpose in an of urban development process. Universal design facilitates the full range of human diversity as physical appearance, perception, cognitive abilities, sizes, and shapes. By designing for the diversity, the specialized streets become more functional and user-friendly. The purpose of this study is to examine several design characteristics of themed streets in several countries from three different continents using universal design principles for giving proper directions to develop more user-friendly streets. Literature review and case study were used as research methods. The literature review was extracted and compiled from manuscripts, streetscape design books, and from universal design principles. Furthermore, the constructed theory were used to examine the case studies of themed streets. The findings indicated that themed streets’ character design were strongly influenced by local cultural aspect even though the basic guidelines were universal design principles; the resumed design direction can be suggested universal along with the richness of local aspects.

Keywords: Themed streetscape, characteristics, design guideline, universal design

1. Introduction
Streets constitute a significant part of open public space and are the most important symbols of the public realm. Streets that cater to the functional, social, and leisure needs of people have been positively associated with economic growth, physical health of people, and a sense of community. Increasingly, scholars suggest a thought on streets as a social space rather than just a channel for the movement (Vikas, 2006).

The themed street is an urban streetscape which are designed and developed in detail with a special theme or purpose in urban development. However, not all people can access the specialized street easily because of their limited ability (the elderly, children and people with special needs).

The purpose of this study is to examine several themed streets’ design characteristics in several countries from three different continents using universal design principles for giving proper directions to develop more user-friendly streets developments.

Literature review and case study were used as research methods. The literature review was extracted and compiled from manuscripts, books of streetscape designs, and the universal design principles, and then the constructed theory was used to examine the case studies of themed streets.

The findings indicated that themed streets’ character designs strongly were influenced by local cultural aspect even though the basic guidelines were universal design principles; the resumed design direction can be suggested universal along with the richness of local aspects.
2. **Methods**
This study was performed with two research methods, such as:
1. Literature study was compiled and analysed with several related literature to construct evaluation sheet of this dissertation.
2. Case study was used to explain several phenomena happening on the case and then can be generalized into the bigger scope of research area.

3. **Discussion**

3.1. **Universal Design Theory**
The history of “universal design” word was firstly announced by Ronald L. Mace (1941-1998) as founder and former program director of The Center for Universal design at North Carolina State University. In 1997, Ron Mace, who already used a wheelchair, collaborated with a group of architects, product designers, engineers and environmental designers and developed the Seven Principles of Universal design. Universal design takes into account the full range of human diversity, including physical, perceptual and cognitive abilities as well as different sizes and shapes of human body. Designing based on this kind of diversity, we can create things that are more functional and more user-friendly for everyone.

1. Equitable Use
2. Flexibility in Use
3. Simple and Intuitive Use
4. Perceptible Information
5. Tolerance for Error
6. Low Physical Effort
7. Size and Space for Approach and Use

The seven principles of universal design are one of the grand theories in this study along with themed streets. The seven principles of universal design were chosen in this study because the seven principles are the latest detailed concept. Universal design principles were implemented on street so people could use the streets without any obstacles. Moreover, universal design was examined on every section of the themed streets to support the street function for all users.

3.2. **Street Theory**
The Manual of Street (2007) explained more details about the streets that must have five principal functions:

1. Place;
2. Movement;
3. Access;
4. Parking;
5. Drainage, Utilities, and Street Lighting.

Themed Street is a term of the street as a part of the built environment which are designed in a theme and purpose to respond the characters of a district or an area in the frame of the urban development process. According to that terminology, the key points of a specialized streetscape are:

1. The elements of urban development process
2. Local character responses
3. Themes
4. Parts of the streetscape

In the next phase, three themed street guidelines (from Europe, Middle East and Australia) would be resumed into 8 items of specialized street which are: parking lots, public transportation modes, street furniture, street material, street utilities, signage, pedestrian space, and linkage design (see table 1). These physical items also compare their differences with the universal design principles.
Table 1. Summary of Universal Design Principles and Themed Streets

| Items                  | Universal Design                                      | Themed Streets                                      |
|------------------------|-------------------------------------------------------|------------------------------------------------------|
| Types of theory        | The product design concept                            | The streetscape design concept                       |
| Applications           | All designed products buildings, tools, learning, environment, others | Themed street, upper pass, under pass, others        |
| Samples of Application | Inclusive learning, barrier-free buildings, universal serial bus (USB) device, others | Monumental streets, cultural streets, shopping streets, bikeways, busways, others |
| Study item             | Equitable Use                                         | Parking lots                                         |
|                        | Flexibility in Use                                    | Bus stops/subways                                    |
|                        | Simple and Intuitive Use                              | Street furnitures                                   |
|                        | Perceptible Information                               | Street utilities                                     |
|                        | Tolerance for Error                                   | Signage                                              |
|                        | Low Physical Effort                                   | Street materials                                     |
|                        | Size and Space for Approach and Use                   | Pedestrian spaces                                   |
|                        |                                                       | Linkage designs                                      |

3.3. Islington Street Book

The Islington guideline contributed sixteen points to this research’s evaluation sheet. Furthermore, this guideline has added simplicity in design and sustainability, even though local wisdom and aesthetic aspects are also attached to the seven principles of universal design which coins as a grand theory.

3.4. Abu Dhabi Urban Street Design Manual

This Middle East specialized street manuals have contributed some elements of pedestrian priority in traffic management such as resting areas and visibility aspects with only describing guidance for passageways, and they are not area minded.

The conditions of Estidama of the Middle East urban development concept are local oriented study, which might not be adaptable to other regions. The conditions of dessert have contributed solution for street issues, especially in visual barrier and safety requirements which can be constructed as evaluation items for street examination items.

3.5. Landcome Street Design Manual

This Australia NSW Government’s property developer guidelines for street, environment, and building adjusted 12 principles concerning on usability and simple perception to be recognized and accessed by people, but none of them were easily accessed by handicapped persons nor citizen with special needs. Nevertheless, the best analysis performed was to design the street heuristically.

3.6. The Resumes of Street Guideline

Summarized from the 3 existing themed street guidelines (see table 2), there are substantial issues that need to be fixed and completed by this dissertation study, such as:

1. The previous studies aimed to only for tourism street facilities at Islington which produced an artificial disneyfication of specialized street without concerning on daily activities (Putra, 2013). This artificial disneyfication of tourism often forces the natural expression of the urban society to develop their neighbourhood.
2. The previous guidelines were oriented to design local district (Dubai; Lancome) which produced the unsustainable specialized street fabric from and to the site. This orientation of design built an exclusive area on the city.
Present condition analysis by universal design principles which were derived from literature studies and resumed as an evaluation sheet to compare with case studies and the site survey result

Table 2. Comparisons of Three Street Design Guidelines and the New Guideline

| No | Items          | Islington Street Book A borough-wide streetscape manual | Abu Dhabi Urban Street Design Manual | Street Design Guideline for Landcome | This paper                                                                 |
|----|----------------|-----------------------------------------------------------|-------------------------------------|--------------------------------------|-----------------------------------------------------------------------------|
| 1  | Purposes       | To build an attractive, safe and accessible streetscape by setting out guidelines and specifications for materials, street furnitures and layout designs for the public highway and footways | To design streets that create a safe environment for all users, recognizing varying levels of driver education and cultural differences | To build environment providing routes for vehicles and public transport and accommodate utility services and drainage system | To build themed street that can be used by all user regardless sexes, ability and ages based on principles of universal design |
| 2  | Methods        | Literature study                                          | Literature study                    | Literature study                     | Literature study                                                            |
| 3  | Community- participatory researches | Participatory action researches                             | Action plan researches               | Site surveys                                                                      |
| 4  | Results        | Tourism street books                                      | Abu Dhabi design guidelines by Estidama’s principles | Australia’s streetbook guidelines | The universal design based urban streetbook                                  |
| 5  | Cons           | Concerns on local tourism                                 | Desert climate responses             | Concerns on residential areas       | Concerns on urban streetscapes                                              |
| 6  | Pros           | Promote tourism, minimal material use                     | Strong traffic management, estidama local content | Legibility force, community-based design | Resuming and adding urban identity concept, universal based design           |
| 7  | Equitability in use | 0                                                          | 0                                   | 0                                   | 0                                                                           |
| 8  | Flexibility in use | 0                                                          | 0                                   | 0                                   | 0                                                                           |
| 9  | Sizes and spaces for approach and use | 0                                                          | 0                                   | 0                                   | 0                                                                           |
| 10  | Simple, intuitive | 0                                                          | 0                                   | 0                                   | 0                                                                           |
| 11  | Perceptible information | 0                                                          | 0                                   | 0                                   | 0                                                                           |
| 12  | Low physical efforts | 0                                                          | 0                                   | 0                                   | 0                                                                           |
| 13  | Tolerance of errors | 0                                                          | 0                                   | 0                                   | 0                                                                           |
### 3.7. The New Guideline Criteria

#### Table 3. The New Guideline Criteria

| No | Sections                  | Research objects                                                                 |
|----|---------------------------|-----------------------------------------------------------------------------------|
| 1  | Parking lots              | Special need parking lots < 100m                                                 |
| 2  |                           | The ramp ratio 1: 20                                                              |
| 3  |                           | The minimum width 2m footway                                                      |
| 4  |                           | The maximum level difference 2cm                                                  |
| 5  |                           | Signage                                                                           |
| 6  | Bus stops/subways         | Local characters on decision point (information)                                  |
| 7  |                           | Clear view from and to the gates                                                  |
| 8  |                           | The minimum clear height 2.1m                                                     |
| 9  |                           | Traffic resting points                                                            |
| 10 |                           | The minimum width 2m footway                                                      |
| 11 |                           | Elevator or escalator                                                             |
| 12 |                           | 5-800m from public utilities                                                     |
| 13 |                           | Ramps should have a maximum gradient of 1 in 20 or 5 per 100                      |
| 14 |                           | Step marked short straight runs with a 3-12 per walk                              |
| 15 |                           | Risers should have uniform height (10-15) and min 30cm deep                      |
| 16 |                           | Adequate street lighting for people                                               |
| 17 |                           | Enclosed bus shelters                                                             |
| 18 | Linkage design            | Hierarchy on street types                                                         |
| 19 |                           | Well connected streets with good view and small street blocks                      |
| 20 |                           | Avoid cross road (x) and corner greater than 90°                                  |
| 21 |                           | Wind breakers (landscapes)                                                        |
| 22 |                           | Simple and directional signs on decision points                                   |
| 23 |                           | Local character priority                                                           |
| 24 |                           | Less material use                                                                 |
| 25 |                           | Street furniture/rest areas on decision points                                    |
| 26 |                           | Adjusted street lighting, visual and audio controls                               |
| 27 |                           | Future maintenance                                                                |
| 28 |                           | Strict reinstatements                                                              |
| 29 |                           | Public seating/rests 100-125m                                                     |
| 30 |                           | Minimum width 2m for footway with less level                                       |
| 31 |                           | Traffic calming protection                                                         |
| 32 | Street furniture          | Public art using on decision points                                               |
| 33 |                           | Street lighting for each 20m                                                      |
| 34 |                           | Public seating for every 100-125m                                                 |
| 35 |                           | Clear maps and local characters on decision points                                |
| 36 |                           | Providing a handrail/handgrip max 0.80m                                            |
| 37 |                           | A simple and local character priority                                              |
| 38 |                           | Clear traffic and wind barriers                                                   |
| 39 |                           | Supporting landscape vegetation                                                   |
| 40 |                           | Public facilities lid pressure less than 2kg with lower knob                       |
| 41 |                           | Braillecode/audio signal installment                                               |
| 42 |                           | Contrast visible                                                                  |
| 43 |                           | Permanent instalment                                                              |
| 44 |                           | Non slippery                                                                      |
| 45 | Street utilities          | Simple and local character priority                                               |
| 46 |                           | Less material use                                                                 |
| 47 |                           | Clear traffic and wind barrier                                                    |
| 48 |                           | The public facilities lid pressure less than 2kg with lower knob                   |
| 49 |                           | Manhole cover grid less than 5cm                                                  |
| 50 |                           | Avoid open drainage channel                                                       |
| 51 |                           | Every 500-800m                                                                    |
| 52 |                           | Information or security booth                                                     |
| 53 | Signage                   | Background-sign contrast color                                                    |
| 54 |                           | Local characters with international standards                                       |
| 55 |                           | Clear map with “you are here” sign                                                |
| 56 |                           | Location on decision point                                                        |
| 57 |                           | Texturized sign (braille)                                                         |
| 58 |                           | Sound signal and smell locators                                                   |
| 59 |                           | Clear view                                                                       |
| 60 |                           | Minimum 1m from ground instalment                                                 |
| 61 | Proper lighting |
|----|----------------|
| 62 | Building information |
| 63 | Public local arts on decision points |
| 64 | Hazardous area priority location |
| 65 | Permanent instalment |
| 66 | Street materials |
| 67 | Less material use |
| 68 | Local materials/textures |
| 69 | Non slippery |
| 70 | Using tactile texture |
| 71 | Permanent non slip ramps instalment |
| 72 | Nontoxic materials |
| 73 | Rubberized material footway than clay or asphalt |
| 74 | Low grate paving block |
| 75 | Minimum glare or reflection |
| 76 | Pedestrian space |
| 77 | Minimum width 2m clear footway |
| 78 | Mix used space |
| 79 | Support landscape vegetation |
| 80 | Traffic calming protection |
| 81 | Clear traffic and wind barriers |
| 82 | Ramps way ratio 1: 20 |
| 83 | Maximum level difference 2cm |
| 84 | Minimum clear height 2.1m |
| 85 | Public seating for every 100-125m |
| 86 | The manhole cover grid is less than 5cm |
| 87 | Provide handrail/handgrip max 0.80m |
| 88 | Using tactile texture |
| 89 | Well connected streets with good view and small street blocks |
| 90 | Proper lighting |
| 91 | Avoid cross roads (x) or more and corners greater than 90’ |

3.8. The Case Study at Jalan Asia Africa

The street cuts Bandung City into two parts, the north part and the south part. It was named after the Asia-Afrika Conference, held in Bandung back in 1950s. Jalan Asia Afrika is the part of Grote Postweg constructed in 1808. This specialized street becomes a tourist attraction right in the middle of Bandung because it is a historical building with Art Deco style and its connection to the Alun-Alun (square) of Bandung. This specialized street has a zero-kilometre monument that indicates this themed street is the centre of Bandung (see figure 1).

![Figure 1. Condition of Jalan Asia Africa](image-url)
Jalan Asia Afrika street design is straight type of street. It was dedicated as cultural street to support the big event, Asia-Africa International Conference (see figure 1). Historical buildings like Asia Afrika museum, the local newspaper office, old colonial hotels, and the historical central post office were built along this street until Bandung square and Central Mosque areas. Street materials on Jalan Asia Afrika are slightly different from the ones on Jalan Braga in which they cross on one point. The pattern of tile is checker style and the tactile paving is continuous to the pedestrian curbs. Several street furnitures such as seating, flag poles, and lightings are implanted in groups at historical site passage only which make this area become crowded with public facilities and reduce pedestrian space.

Jalan Asia Afrika has a historical meaning for Indonesia. This street was designed and built for international conference events. The evaluation has shown that Jalan Asia Afrika is good especially on linkage design (3.71) and flexibility principle (3.18). Jalan Asia Afrika street also got the lowest score in parking lot section (2.73) and low physical effort principle (3.02) (see figure 2). The Parking lots here are near the Grand Mosque and behind the street. However, the parking lot spots (2.73) did not facilitate special parking areas. The condition of the tolerated pedestrian way (3.13) such as tactile paving was not well placed even though it was already installed permanently. This condition was also worsened by the unavailability of themed street furniture installation though the surrounding buildings are the colonial types that are strong enough to be the theme of the street. Street utilities section (2.66) showed that some open drainage still can be found in the pedestrian ways that might harm passengers who accessed the street without noticing what they will pass. In signage section, minimum signage and materials use in this area has become the old problem of the district. The pedestrian ways were not linked well (3.29) on the height and curbs. Furthermore, some building passages still obstructs the pedestrian way, and they may become barriers for the disabled people to pass this specialized street. This street is straight line type which clearly links each part of the street.

This examination result has showed that the street culture of universal design principles in Indonesia still needs improvement, especially for its parking lots although the linkage designs as the part of urban historical area is still acceptable and well noticed as the main character of this street.
4. Conclusion

Based on the analysis and comparisons of street guidelines on multiple countries used to examine this case study, there are some concluding points namely:

1. Indonesia needs more efforts to improve the facilities and redesign their specialized streets based on the Universal design principles.

2. Cultural aspects can be more strengthened in Indonesia to support specialized street designs and developments. The cultural aspects which can be adapted are: accommodations of various cultures into one theme of pop and antique culture which are implemented material on tile, strong antique style of each building’s façade on Indonesia themed streets, design of small stage at street segments to support cultural act performances, and at local traffic management to restrict vehicle access during the performances.

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