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WAYFINDING AND IMAGEABILITY OF DAILY COMMUTERS IN FERRY TERMINALS: CASE STUDY OF JALAN TUN UDA AND PENANG SENTRAL, PENANG

Abdul Munir Najmuddin[1], Jestin Nordin[2*], Mohd Najib Mohd Salleh[3], Farhana Mohd Razif[4]

[1,2,3,4] *School of Housing, Building & Planning, Universiti Sains Malaysia, Penang, Malaysia*

* *jestin.nordin@usm.my*

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Public transportations such as taxis, buses, trains, aeroplanes, boats, or even ferries are part of the methods of transportation for millions of people to commute to their workplaces, schools, visiting, or to their places of interest. The numbers of public transportation users are now increasing, therefore the need for a better transportation system is also crucial, and this condition applicable also to a ferry terminals. Though ferry service is usually among the least chosen way of transportation, but if it is the only way for the commuters to reach their destination, therefore a proper and workable terminals are in need including in Penang. In this research, respondents (commuters) were approached through series of interviews, and questionnaires to evaluate their experience in wayfinding within two ferry terminals of Penang, i.e. the Raja Tun Uda (built in 1960's), and the newly completed Penang Sentral (November 2018). Respondents approached were the daily commuters, elderly, children, and a first time user. Initial findings show that a proper planning and design of a ferry terminal can help to improve wayfinding experiences within a ferry terminal, hence make the ferry services effective and more efficient.

Keywords: Wayfinding, Imageability, Ferry terminal, Commuters, Physical design element

1. INTRODUCTION

As an effort to cope with the economic and social growths to gain a fully developed nation status, Malaysia has made good progress over time in improving the quality of her public mobility. The importance of having a reliable public transportation system is crucial yet essential, especially to cater for the low-income household groups who could be facing problems to afford own private vehicles, and the condition could be worsen with a bad transportation system (Ng, 2019). Careful studies in the planning for a public transportation helped contributing towards supporting a better economic and social growths by improving the mobility, accessibility, and further reduction in the transportation cost. A lower cost of transportation may increase the efficiency of a transport (Park, Seo, & Ha, 2019), where it can be achieved from better transportation infrastructure.

Actually, commuters' experience with space(s) is determine by the way how that persons navigate and orient themselves within the space of a terminal building. The daily movement patterns traced by a commuter absolutely influenced his or her behaviour and navigation strategy. Therefore, wayfinding ability plays an important part to achieve a good pattern of movement no matter it is an on land, water, or air transportation (Zomer et al., 2019). A good space planning within a building can be achieved from the established design principle of wayfinding which are: (i)

special identity to be created at carefully selected specific location, to distinguish specific area from others, (ii) to provide landmark(s) in providing ability to mental map the routes and orientation, (iii) to create a direct and easy pathways, (iv) to create spaces with strong visual characteristics, (v) to avoid too many diversion and route options, (vi) to provide maps or guide, (vii) to create signages at junctions to assist decision making, and lastly (viii) to create direct approach design to visualize final destination. As outlined by Foltz (1998), the physical design, colours, signages, display boards, and numbering and lettering will be kept inside ones' memory in a form of mental map that later will be helpful to navigate in between spaces (Foltz, 1998).

2. LITERATURE REVIEW

Wayfinding

The physicality of the built environment affected the level of wayfinding ability, and a commuter in a ferry terminal is not spared. A person's experience is developed through the familiarity of the route, and the overall spatial arrangement of the place or spaces. Therefore, the physical appearances such as the landmark, signposts, signboard, direction signs and pathways could elevate the decision-making of a person while navigating or experiencing buildings (Xia, Arrowsmith, Jackson, & Cartwright, 2008). Finding a destination in a newly experience place can sometimes be frustrating, thus requires good decision making. So, repetitive training is needed when navigating through building to assist and improve the wayfinding ability (Hölscher, Büchner, Meilinger, & Strube, 2009). Wayfinding quality is considered good when ones can easily navigate within spaces from the setting and clues of the explored building. In this case of elevated wayfinding ability, the physical characteristics of a building, signages, and display boards can help the commuters inside a building (Shiwakoti, Wang, Jiang, & Wang, 2019).

Imageability

It is crucial to comprehend the layouts of a building, such as the route, paths, walkways and landmarks, designated space, typology of a building, and the ability to distinguish the overall building characteristics. The imageability and visual plays an important role in supporting building users' ability to navigate and understands the flow of a building (Hölscher, Meilinger, Vrachliotis, Brösamle, & Knauff, 2006).

By implementing Kevin A. Lynch (1960) theory of crucial image of a city into a ferry terminal, there are five dominant physical elements (which are paths, edges, district, nodes, and the landmarks) that designer can implement to assist a commuter to understand his surrounding environment, orienting themselves inside of the terminal, and to also assigning the meaning the space can give to them (Lynch, 1960). These five elements could help develop the imageability (through mental mapping) of the ferry terminal through frequency of navigational experience of the same building. Mental mapping of the building correlated to the commuter's wayfinding experiences within the building (Foltz, 1998, Lokuge et al., 1996). Therefore, for a ferry terminal building to provide easy navigation for their commuters, the overall design of a ferry terminal should be carefully and properly planned in the effort to ease the movement of the commuter especially during the peak hours or seasons.

There are several factors to be seriously considered when designing a space of a ferry terminal building that could affect the wayfinding experiences of the ferry commuters:

(i) The building spatial layout and organization;

The organisation of the spaces and the layout of a ferry terminals are very crucial and important as it should be easily accessed and identified especially the internal circulation, and also to avoid overcrowding so to create clear wayfinding for the commuters towards their final destinations. Spatial layout organization could affect the efficiency of space and also the commuters' navigation ability (Hillier, 2009).

(ii) Real-time information and guidance; and

The availability of the real-time information such as the departure and arrival announcement are essentials, and the same goes to the need for information on the location and direction within the ferry terminal building. These information can be delivered at real-time using a display board. It

is crucial for a designer to identify the most strategic location to place a display boards.

(iii)Visual guidance

A visual guidance is part of a very important attributes in imageability to assist the navigation and wayfinding of a commuter in a ferry terminal. A visual guidance such as the signages, floor and layout maps, landmarks, and also colours should be easily found, identified, and located.

3. PROBLEM STATEMENT

The design of a ferry terminal plays a big role to ensure acceptable ferry commuters' wayfinding experience. The ferry terminal building's physical appearances and its images are equally important to the critical characteristics like the layout, spaces, and supporting spatial arrangements. These characteristics could determine, or at least affecting the ability of commuters' whilst manoeuvrering inside and around the building searching for their intended destinations. A bad overall terminal layout design could cause commuters to be easily lost within space. Thus, a careful and proper design is crucial and very important towards better overall commuters' wayfinding experience.

As an example, a good internal circulation layout can help ease the inter spaces congestion especially during the peak hours, or peak seasons such as public holidays. In contrary, a bad internal circulation layout planning and design will cause distraction and restriction in the movement and flows of the commuters. Therefore, again a robust, and careful design planning of a terminal buildings will help creating better wayfinding for the commuters.

4. RESEARCH PURPOSED & QUESTION

This research aims to identify the existing contributing building's design and physical appearances, and its images that affect the efficiency of wayfinding, and how those design elements influenced the movement of commuters inside the studied ferry terminals currently. Therefore, it is from this research that through direct observation, inspection, and interviews that the levels of effectiveness in the wayfinding within the ferry terminals are comparable. So, a countermeasure to increase the effectiveness level of wayfinding and imageability of a ferry terminals can be outlined at a later stage.

Research Questions

1. What are the impacts of physical appearances and imageability of a ferry terminal on commuters' wayfinding experience?

2. How the wayfinding experience and imageability provided in a ferry terminal are actually working: especially for an elderly, children, and a first time user (such as tourists)?

5. METHODOLOGY

The mixed-method research approach where both the qualitative and quantitative methods were used throughout this research that included direct survey or on-site observations, disseminating questionnaires, and interviews. While conducting the data collection, 40 respondents from each ferry terminals were approached in random to answer the questionnaires. Basically, respondents were asked to rate the level of wayfinding efficiency of the existing terminal buildings' physical characteristics that include overall layout and space planning. It does include the imageability of the building through the colour of the walls, signages, display boards, and any dominant traits such as the landmarks that could affect the wayfinding behaviour and experiences of the ferry passengers' through spaces when they are inside the ferry terminals.

6. FINDING & DISCUSSION

Wayfinding of commuters in the existing ferry terminals

Majority of the commuters (respondents) that were travelling from the both sides of Penang (the mainland, i.e. Butterworth, or the island side, i.e. Georgetown) ranked that the wayfinding experiences at both the terminals is good, and majority of them were satisfied with the available existing wayfinding tools at both terminals. Mostly, since been using the terminals for quite some time, therefore they have created a mental mapping ability that make them to easily identify the paths, the walls, and the overall building layout designs. To compare to the first time when

they were at the ferry terminals, the situations were different. This group of respondents find it easy to manoeuvre within the terminal buildings due to their wayfinding experiences within the Penang ferry terminals. From this group, 70% of the commuters are using the Penang ferry services for daily commuting to workplaces, while the other 30% using the ferry services only for specific occasions such as holidaying, sightseeing, or shopping.

From the data, majority (67.5%) of commuters depend on the available signages, floor maps, visible prominent landmarks, or any other visual elements that can be used to assist their wayfinding inside the ferry terminals. These existing physical appearances combination served as a visual guidance thus helping the commuters to communicate with their surrounding by transferring those recognised images into a mental mapping therefore improving their wayfinding decision making (Foltz, 1998).

Many public transportation terminal buildings were designed in a straight forward and parallel layout for easier circulation with people-oriented in mind. The accesses and exits are designed to make travelling hassle-free or at least less obstructed especially for those that need to travel within a limited period of time. Figure 1 shows the layout design of the Pengkalan Raja Tun Uda Ferry Terminal (on the island side) is very direct because the ingress and egress to the ferry is of the same pathway, only separated by the middle dividing hand railing. The approach is different to the one implemented at the Penang Sentral where in Figure 2, the integration of various path and walkways created some difficulties for commuters before they can reach the departure gate. Building layouts can affect the connectivity between spaces thus affecting the wayfinding experiences of commuters (Hillier, 2009).

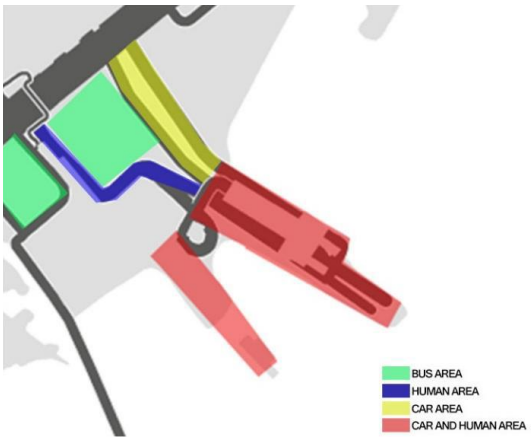

Figure 1: The existing site plan of Pengkalan Raja Tun Uda ferry terminal with their specific area of usage as shown in the legend (redrawn based on actual map)

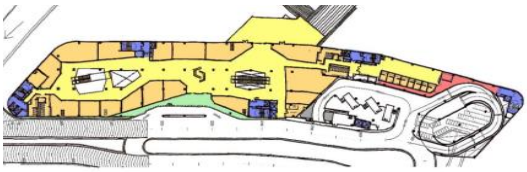

Figure 2: The second floor level of Penang Sentral that connects commuters to the ferry departure gate (redrawn based on actual building plan)

Majority of the commuters were satisfied with the wayfinding experiences at both the ferry terminals. According to them, the buildings' physical elements established at those ferry terminals are sufficient for them to manoeuvre inside the buildings. Contradictory to the earlier claim, they are some 38.75% of the respondents who complained that the internal building layout designs are misleading and confusing, while some other features such as the absent of information boards, signages, and confusing instruction should be avoided.

Influence of physical appearances and visual guidance towards the commuter's wayfinding experience

The physical appearances and visual guidance at a ferry terminal are part of the important characteristics that could influenced the commuters' decision-making. According to some 5% respondents, they only need one visual guidance based on the physical appearances

provided by the building to enable them manoeuvre easily inside the building. However, some other respondents will need to combine multiple visual guidance tools such as the information boards, signages, building layout and floor maps, and also the landmarks to move around. Thus, these physical appearances should be properly designed to assist easier manoeuvre inside the ferry terminals (Filingeri, Eason, Waterson, & Haslam, 2018).

Response by a respondent (0.8%) representing the elderly group admitted that an elderly usually relying on the specific colour painted path lines (drawn on the floor – at all designated walkways at both terminals) because of the difficulties to identify or reading the information boards, or signages because they are put too high at the ceiling levels, or the fonts are too small to be read.

Based on the information gathered, mostly the commuters rely on the information boards and signages to assist their wayfinding while they were inside the ferry terminal buildings. However, 50% of the respondents complained that the signages are hard to be differentiate with the surrounding colour and ambience especially at Pengkalan Raja Tun Uda Ferry Terminal. But, they praised the signages at Penang Sentral as good with good colour combination that stands out from its surrounding. Figure 3 shows the use of icons, lesser wordings, with a clear white background on a dark backboard for the signage at Penang Sentral. The signage is eye-catching, and easier located. While, in Figure 4, the signages at Pengkalan Raja Tun Uda ferry terminal are much smaller, with too many wordings written too close making it hard to be read from afar.

Figure 3: The signage to assist wayfinding to the ferry terminal from inside Penang Sentral (image retrieved from http://ahseng2.blogspot.com)

Figure 4: View of the existing ferry walking commuters waiting area.

Regarding the design of a path and the walkways, it is essential to create a good visual guidance for the ferry commuters. Based on direct on-site observation, the Pengkalan Raja Tun Uda Ferry Terminal has not been upgraded for quite some time has a very direct and simple layout for the commuters to reach the departure gates. Figure 5 shows the concrete pathway provided for the commuters where it is only segmented by planter boxes, concrete walls and handrailing. It is actually good enough to create boundary and defining the pathways, however its perforated characteristics blending with the surrounding might be distracting especially to the first timers. According to Zhu, Lin, Becerik-gerber & Li (2020)too much of visual information can affect the commuters' decision making (Zhu, Lin, Becerik-gerber, & Li, 2020).

Figure 5: The existing pedestrian walkway to and from the ferry at Pengkalan Raja Tun Uda Ferry Terminal (on the island side).

Contradicting to the Raja Tun Uda terminal, the walkway design, and the internal layout and spatial arrangements at Penang Sentral are more updated (Penang Sentral completed and opened in November 2018). Penang Sentral is a much complex transportation terminal building that integrate multiple floors with different services such as the ground floor for the buses, the second floor is for the ferry, e-hailing, and taxi services. The pathways in Penang Sentral were designed to be coloured differently brighter against a darker walls creating visual differences in the building's physical appearance.

Besides the information boards, signages, and physical appearances, respondents did mentioned about the landmarks they usually relate to in order to establish their sense of wayfinding success rates. In the context of these two ferry terminal buildings, based on Figure 6, respondents at the Raja Tun Uda Ferry Terminal used the Rapid Penang bus stand located adjacent to the concrete pathways as an indication to the end of the terminal's commuters' pathways. Since the concrete pathway is quite long in distance, the established landmark (the bus stand) helped creating a mental mapping to indicate the whereabouts of the commuters.

Figure 6: The existing bus stand in between the ferry terminal's pedestrian pathway and the Rapid Penang bus stand located on site.

The physical appearances of the buildings

According to Zhu et. al (2020) a good design is where the building's users can easily establish their destination in that particular space (Zhu et al., 2020). The physical appearances of these buildings created a visual access that are different due to the nature of each building design. The Pengkalan Raja Tun Uda which were designed to has an open concept allowing for a great visual access towards the departure gates, its surrounding, and also the environment. Commuters inside the Raja Tun Uda terminal building are able to easily spot the location of the ferry departure gates and waiting areas from far, but not at Penang Sentral with confined space and restrictive views due to enclosed space of a big building design. Some commuters even find that the retails do create some distraction when they are inside the building due to most of the pathway inside Penang Sentral are established in between the retails and the walls.

7. CONCLUSION

Findings show that the ability to establish a positive wayfinding within a ferry terminals are varies in between persons. The building's physical appearances and the images of a ferry terminal are equally important to establish a positive wayfinding. Mostly, commuters will have better chance of positive wayfinding experiences when they keep on using the same route again and again by creating a mental mapping of the place. The combination of physical buildings appearances and other visual guidance such as an information board, signages, building layout and floor map, and landmarks will work best together to give better results in wayfinding. As an example, a signage with easy to understand icons with a simple clear wording, good colour separation, will definitely help to create better, readable signage for the commuters especially the elderly, children, and a first time user (such as tourists who just came to visit Penang). Therefore, for a ferry terminal building to provide an easy navigation and increase the wayfinding of their commuters while using the terminal building, the overall design of a ferry terminal layout should be carefully and properly planned in the effort to assist the movement of the commuters to reach their final destinations especially during the peak hours or seasons.

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