Friendliness of route along the home-school journey for less privileged children in old city zone of Makassar

A M Asrun\textsuperscript{1}, I Said\textsuperscript{1} and N Rusli\textsuperscript{1}

\textsuperscript{1}Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia 81310 Skudai, Johor, Malaysia

Email: fabu@utm.my

Abstract. The home-school journey is a part of less privileged children's daily routine in Makassar. Children's repetitive engagement with elements of the street environment contributes to their growth and development. This study determines the actual friendliness of route for less privileged children along their homeschool journey that lead them to perceive the street as their play space. Participatory observation and behavior mapping were conducted to 10 less privileged children, aged 9 to 11. Their movement, social play, place of visit and preferred route were elicited during their journey from home to school and back. The site was a neighborhood in the old city zone of Makassar. The data was analysis using GIS heat-map. It is found that less privileged children perceive the home-school journey as a route to reach their school as well as a place space especially coming back from school to home. Utilized and shaped affordances of school to home journey were more than those gained from home to school. Boys practiced a longer journey than girls on their way back from school to home. It means that the geography of less privileged children at urban street generates spatial skill through social play.

1. Introduction
In many major cities in Indonesia, going to school from home is regulated by motorized transport modes. In Makassar, rapid population growth, increase in car ownership, insufficient public transportation has increased the use of motorcycles and cars to cart children to school and back to home. A parental decision not permitting children to walk to school due to security and safety enhances children's dependence on transportation going to school [1]. Therefore, children have few opportunities to have direct experience in the outdoor environment by walking. It is an active mode for children to reach their school.

In the last few decades, fewer children walk to school particularly in developed countries [2-4]. The journey to school adds to traffic congestion in towns and cities during the peak commuting hours. It also costs parents time and deprives children of the opportunity for regular exercise and engages with the street elements [5,6]. The growth in accompanied travel to school has led to speculation about the cognitive and emotional impact of this change on child development. The phenomenon of accompanied travel to school has several important consequences. A prolonged period of escort to school and other destinations is like to hamper the development of children's spatial skills, limit their knowledge of the environment and damage their growing independence [7-9].

School becomes a dominant factor in the life of children by the time of schooling. Experiencing the school environment affects children's psychology either positively or negatively. In many cities of
Indonesia including Makassar, children from poor families walk to school since they could not afford transportation expenses. Walking to school from home and back is an active travel mode suggested as a key to promoting children’s physical activity as well as their social interaction. This commuting is a progressive functioning that makes children mature and also enhances their autonomy of movement [10].

In this study, a home-school journey is a place between home as first place and school as a second-place which is a place for children to experience every day [11]. Identified that children used the street setting for games, play, and adventure as well as socialize. We investigate whether the street environment is a friendly environment for less privileged children who walk to school and back home in the old city zone of Makassar. And, we anticipate that the children face many difficulties and barriers along the journey.

2. Literature Review

2.1. Play along home school journey

Play is a natural phenomenon for middle childhood children to develop their resiliency as they learn to cooperate, overcome challenges and negotiate with others. It generates well-being to children, physically, socially and cognitively. These functioning triggers them to be creative.

Play provides time for parents to be fully engaged with their children, to bond with their children, and to see the world from the perspective of their child. However, children who live in poverty often face socioeconomic obstacles that impede their right to have playtime, thus affecting their healthy social-emotional development. We speculate that less privileged children living in the old city zone of Makassar are facing the inadequacy of play in their living environment. Play means physical contact with the element of the environment and social interaction with peers [12, 13]. In middle childhood, play is movement locomotion or mobility [14, 15]. Movement is the center of children's lives, and through movement, children gather information regarding their environment [16-19]. This motoric action enhances their cognitive development [20]. Therefore, play comprises both movement and perception.

In the children's view, play is free, thus provides freedom of choice to them. Play lets them learn about the environment through experimentation. It means facilitating the children to explore and manipulate the environment. Exploration, through manipulation, generates a sense of fulfillment because it allows children to control their own playing. Manipulation permits a child to finalize the content of a playset. As such the child is developing a new structure from his own imagination which eventually satisfied him and the experience stays in his memory [21]. Therefore, in this study, we examine how the less privileged children explore and engage with the street elements while walking to schools and back to their homes. We expect they will find the street as a place with danger from traffic. On the other hand, we also predict that they enjoy the journey of going to school and back home.

2.2. Performance of less privileged children during play

Children get benefits from playing outdoor and moving freely [22, 23]. Identifies three play types in relation to children’s performances: (i) physical, (ii) social and (iii) cognitive. Physical activities are associated with motor skill development. That is motoric engagement improves their coordination, bone and muscle growth, strength, agility, and endurance, all of which are essential for healthy childhood life. For the less privileged children, the home-school journey involves plenty of movement. Thus, we anticipate that these children are agile due to rigor actions during their walk.

The journey to school is a social phenomenon. It affords the children to walk with friends and learn social skills including negotiating, turn-taking, sharing, cooperating, respecting other’s views and expressing their idea, feelings and need without the constant mediation from adults. It means that the walk to school and back to the home could be a social play. Along the journey, they may be talking
with peers and adults, watching others playing but with no obligation to attempt to engage in the activity [24].

The physical and social performances at the home-school journey are supported by cognitive functioning. That is a mental process that includes remembering the route, attending their pace while avoiding moving traffics, and making a decision to select their shortest route to the school. It means that walking to school is also a cognitive play involving imagination and creativity [25, 26]. We anticipate that the less privileged children could be choosing a different route when they go back to their homes.

This study follows the concept of a child-friendly environment coined. The concept stipulates that such an environment possesses 10 dimensions in which this study applied only five dimensions. They are (1) dwelling, (2) safety and security, (3) family, peers and community, (4) urban and environmental qualities, and (5) sense of belonging. We speculate that the home-school journey provides these dimensions to the less privileged children in the old city zone of Makassar. That is the street landscape is perceived by the children as a place to meet friends and feel safe as well as be independent of adult supervision.

2.3. Spatial knowledge, travel behavior and the built environment
Activity, known as travel behavior, is acknowledged as a significant factor in the acquisition of spatial knowledge. Various social and environmental factors influence children's activity and, in turn, shape their spatial knowledge and skills. In this study, we acknowledge that walking, either alone or with friends, to school provides knowledge to the less privileged children. It is freedom of movement, a sensorimotor experience. As such, distance effects spatial knowledge. It determines the travel mode to school, as long distances are associated with more walking, and thus yield better spatial knowledge of the route. Indeed, found that distance has an indirect effect on children's spatial representation accuracy [27]. Moreover, residential density, street connectivity, and route distance are environmental factors influencing walkability [28, 29]. Apart from children's spatial knowledge and mobility of the street environment, this study also measured these factors to determine the friendliness of the home-school journey of less privileged children in Makassar's old city zone.

Activity, known as travel behavior, is acknowledged as a significant factor in the acquisition of spatial knowledge. Various social and environmental factors (conceptualized as types of individual-environment interactions) influence activity and, in turn, shape our spatial knowledge and skills. Correspondingly, these social and environmental factors are the targets of most previous and contemporary studies on spatial knowledge and its mental representation.

3. Method
Using Google Map and site observation, we selected a public elementary school, SD Negeri Timur, which is situated in the old city zone of Makassar. This investigation was conducted at Wajo district which has four elementary schools. The city consisted of 1.5 million residents of which 38% is the children population. It is conducting a child-friendly environment program since 2014. In the old city zone of Makassar, 7.4% of the population are living in a high density of 1.1 km²; only 5% of the city. This investigation was conducted at Wajo district which has four public elementary schools.

The unit of analysis for this study was middle childhood children, aged 9 to 11. Based on the Office of Statistics at Municipality of Makassar, they are less privileged children who walk to school and back to home. Their families usually do not own any vehicles at home to cart them to their school. Children’s activities including walking and socialization while moving from their home to the school were observed for three days by five researchers. Locations of their home and school, as well as positions of the children walking and playing along the home-school route, were noted on a printed Google Map. The observation was done on 10 children walking along 27 streets, as their home-school routes. The sketch maps of the routes were noted in a diary by each researcher.

The route sketch maps were transferred into the GIS database environment in QGIS software. Each route traveled by children from home to school and visa Versa was digitized inline form. In total, 20
lines from 10 children were converted into points and were analyzed using the Kernel Density model to produce heatmap. In other words, the heatmap was created with the Kernel Density Estimation algorithm. Kernel density estimation is a method used to diversify points or area points. Therefore, it mapped the density of the route chosen by less privileged children. According to the research, kernel density estimator is stated as:

$$f_{(s,h)}(x) = \frac{1}{nh^2} \sum_{i=1}^{n} K \left( \frac{x-s_i}{h} \right)$$  \hspace{1cm} (1)

With $K$ function called Kernel, $s$ is the location of the less privileged children's home, $s_i$ is the location of the school in bandwidth range, $n$ is the number of less privileged children who travel to school by walking in bandwidth range and $h$ is the bandwidth which is the radius of location on children school travel. Thus $d_i$ is the distance between location $s$ and $s_i$. A Gaussian function is used in this study.

$$K(d_i) = \frac{1}{\sqrt{2\pi}} \exp \left( -\frac{1}{2} d_i^2 \right)$$  \hspace{1cm} (2)

4. Results and discussion
This study found that when less privileged children go to school because they have reached the school gate on time that is by 7:30 am. However, when they back from school, boys took a different and long route to reach their home. Figure 1 shows that the boys took a longer travel distance than girls. The boys passed by shopping malls without going into the complex. For example, a boy named Ari went to school using a short route, 428 meters. Then back to the home he took longer and a different route, 1706 meters, that is 3 times longer when he went to the school (see figure 2). The boys visited the medical clinic along a route and peeked into its glass wall. The reason was that they would like to become a doctor. And, climbed the steps of a bank building with the intent to work at the monetary office. They stopped at a push-cart food stall (known as global) along a street to purchase snacks and drinks and shared the food among themselves. In addition, they played hide-and-seek, they ran and jumped during their walks to home.

![Distance covered by less privileged children walking to school and back to home.](image)

*Figure 1. Distance covered by less privileged children walking to school and back to home.*
In contrast, Olivia walked to school at a distance of 484 meters, and not much different when she went back home at a distance of 538 meters. Even though she took a short distance back home, but she took a different route. While Olivia and her friends going back home, they were talking to each other about their homework and they loved to see a purple shop that sold school bags and make-up accessories. It means that the journey from school to home provided them more utilized affordances than their preceding journey in the morning going to school. Repetitive encounters with elements of the streets with their friends allowed the less privileged children to recognize as their place of sociality. Physical engagement with the environmental qualities of the city as well as social interaction with peers. Therefore, the children experienced two normative dimensions of a child-friendly environment, namely, environmental qualities and peer interaction. It means that the less privileged children of Makassar viewed their home-school journey as a friendly environment. In contrast, safety was not the concern of them walking in between cars along the busy streets of Makassar. They felt safe walking to school due to accompaniment with friends. This behavior was contradicting our expectation that urban streets were not safe for young children to walk to their schools.

**Figure 2.** Routes took by 10 less privileged children going to school and back to home.

**Figure 3.** The Kernel density estimation of a hotspot.
The walking behavior of the less privileged children was further analyzed using the Kernel Density model to produce heatmap. The result as shown in figure 3 reveals that the intensity of childhood experiences with their home-school routes can be divided into three categories; high, medium and low. The route, indicated in red, closed to the school was highly used by all children which as passed by them early morning. It was the shortest route relative to the medium and low-density ones. Other short routes are those taken by the girls going to school and back to their home. Streets in which boys located their favorite stops were also highly walked. Here, situated the cart and pedicab known as becak. The boys not only socialized with themselves but also interacted with food sellers and pedicab cyclists. They often conversed with the adults by telling them about their school. This sociality is an affordance for young middle childhood children; a progressive behavior for the growth.

5. Conclusions

Urban streets in the old city zone of Makassar are play space and social place for less privileged children, especially for boys. The middle childhood children perceived that the streets are safe for them to commute by walking to their school and back to their homes. This positive perception is generated by social interaction among the children as well as with familiar adults. Sharing their time with peers as well as meeting adults is the constructive behavior the less privileged children practiced during their home-school journey. Their spatial skills obtained along the journey are a set of mental processes; recognizing the street features, then remembering them and making a decision to walk safely along the journey. In sum, they create their own pattern of movement going to school and then develop a different pattern coming back to their home. It means that the less privileged children in Wajo District of Makassar viewed the street as their friendly environment.

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