Possibility of Implementing The 'Walking School Bus' Program in Encouraging Children Walkability in Malaysia

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Abstract

Children's safety has becoming a major concerned on the parental decision making in determining the possibility of children's independent travel to school. It has been highly debated among researchers in transportation study in terms of connectivity and street network, urban design, built environment, neighbourhood safety and road safety. A set of questionnaire survey (n=99) have been distributed for residents living in Taman Ilmu, Nibong Tebal, Pulau Pinang in order to acquire understanding on the children's travel behaviour to school. In addition, a focus group discussion has been held among mothers in order to acquire understanding on the parental evaluation on active commuting to school through collective mapping method. The research intended to study on the children's travel behaviour to school, parental evaluation on neighbourhood safety through collective mapping and possibility in implementing the 'Walking School Bus' (WSB) program in Taman Ilmu.

Keywords: Children's Travel Behaviour, Walking To School

1. INTRODUCTION

Active transportation to school (walking or cycling) can be a platform in developing habitual physical activity, pro-environmental transport habits and active lifestyle among children and youth as it potentially increasing the physical, psychological, social and cognitive health and well-being (Janssen and LeBlanc, 2010; Sallis et al., 2015). Physical activity can be define in various forms including participating in sports, playing with friends or active travelling at the designated places including school, home, open spaces and neighbourhood areas (Sallis et al., 2015; Tremblay et al., 2016). In particular, walking is a part of individual's everyday routine as it is the most convenient form of travelling that promoting healthy lifestyle regardless of age, gender, culture and fitness level (Ogilvie et al., 2007). In fact, walking also cultivating children independent social interaction (physically and socially) from an early age which indirectly helping them in maintaining and balancing the physical and mental health (Marotz, 2011).

Typically, active travel to school has been highly debated among researchers as it was the most accessible, cheapest and easiest form of travelling which offers numerous opportunities including protecting and conserving the environment (less usage of private transportation, less traffic congestion, less noise pollution and better quality of air) and creating liveable and healthy communities (Garrard, 2011). Despite these benefits, National Centre for Safe Routes to School (2016) has reported that based on the school travel patterns, it has shown that majority of the parents are not considering walking as an option for commuting to school particularly among young children. In addition, previous studies from various developed countries have shown decreasing in the proportions of active commuting and independent mobility among school children (McDonald, 2007; Fyhri et al., 2011; Schoeppe et al., 2013). Apart from that, acquiring an understanding about parent perceptions on active transportation are crucial in determining factors influencing the selection of transportation modes to school and the children daily physical activities. According to Mackett (2013), it has reported since the year 2002, the percentage of children aged 7-13 years old which have been allowed commuting to school unaccompanied in United Kingdom was only about 40% and recent study in Australia has recorded lesser percentage of children commuting to school by walking or cycling which less than 46% and only 38% are independently mobile (Carver et al., 2012). But, it can be seen that there is a significant increases in the proportion of car-oriented transport to school. For instance, in England the proportions of primary school children commuting to school by car has recorded about 15% in the year 1976 to 37% in the year 2000 to 44% in the year 2017.

The phenomenon of car-centric trend has occurred due to these two key factors, (1) children safety reasons and (2) convenient when commuting using car (Westman et al., 2017). Thus, the National Centre for Safe Routes to School has introduced the Walking School Bus (WSB) Program in order to encourage more walking and cycling to school where safety is not a barrier. The Walking School Bus Program is one the sustainable mobility initiative in creating more interactive and enjoyable walking trips to school which involving few parents or older adults in escorting a group of children according to the designated route to school. Hence, this research aiming to conduct a study on the possibility of implementing the Walking School Bus Program in encouraging children walkability to school in Malaysia. There are few objectives needed to be addressed before the implementation of the program in order to acquire an in-depth understanding on the major concerns including the perceptions of the local communities itself. The objectives are as following:

a) Identify the factors influencing parental decision on active commuting among children.
b) Determine the suitability in implementing the walking school bus program in accordance to the existing neighbourhood area and parental evaluation on active school travel.

2. LITERATURE REVIEW

This section aims to provide a background information as the primary findings for the research which including factors influencing children walkability to school, promoting active school travel in encouraging children walkability and barriers and challenges in promoting Walking School Bus (WSB) program. All of the relevant points from the previous research have been identified and synthesised in order to supports the research study.

2.1 Factors Influencing Children Walkability to School

The travel mode in daily commuting especially children in primary school is highly determine by the parental choice even though, there are many other factors which are related to children walkability including built environmental factor, demographic factor, psychological factor or social and economic factor (McMillan, 2005). According to the previous research by Lopez and Wong (2017), the travel distance from home to school also greatly associated with walkability patterns especially among younger generation. It has reported that older generation tend to spend more time for walking as compared to younger generation in which the selection of travel mode is depending on their level of comfortability and safety. In addition, socio-economic factors such as car ownership and parental employment status have received extra consideration on children walkability to school as it indicates the higher the household income, the higher the number of car ownership per household resulting to majority of the parents will sending their children to school using private transportation before they went to the workplace due to job scheduling and time constraint (Lopez and Wong, 2017).

Based on the previous research on travel behaviour modelling, it has shown that attitude will shaping the individual's behaviour especially when it comes to decision-making process as constructed in the behavioural theories including Theory of Planned Behaviour (TPB) (Domarchi et al., 2008; Krueger et al., 2016). Evidence from the research conducted by Mehdizadeh et al. (2017) on children's travel behaviour to school, it has verified that the inter-relationship between parental preferences and travel mode selection are correlated with 'convenience and accessibility' and 'safety and security' factors. For instance, poor parental evaluation on the safety requirements on walking facilities, road design safety and the existing conditions of built environment leading to decreasing in the number of parental permission for children's walking to/from school as it reflected on how parental view the future risk of their children's safety and capabilities (children's skill and knowledge in identifying the future threats surrounding them) (Rundmo et al., 2011; Yu and Zhu, 2016; Mehdizadeh et al., 2017; Davoudi et al., 2018).

2.2 Promoting Active School Travel in Encouraging Children Walkability

According to the previous research on the physical activity and active transportation, a model known as socio-ecological model have been designed to fully understand on the factors influencing both attributes. The model comprises of four (4) main factors that inter-correlated with active school travel which are individual, social or cultural, physical (natural and built environment), guideline policies (Giles-Corti et al., 2005; Sallis et al., 2012). It has recorded that physical environment such as travel distance to school, walking and cycling infrastructure, safety barriers, traffic calming, urban design and recreation settings are positively associated in encouraging children walkability (D'Haese et al., 2015; Rothman et al., 2014; Lu et al., 2014). Meanwhile, social or cultural referred to socio-demographic characteristics (household income, educational level, car ownership and culture), social interaction, social cohesion and social support among community (Pont et al., 2009; Rothman et al., 2018).

Therefore, the United States Department of Transportation has created an approach known as Safe Routes to School (SRTS) program in promoting active school travel among students by conducting an assessment on six (6) components which are evaluation, engineering, education, encouragement, enforcement and equity in identifying the potential barriers (Safe Routes to School National Partnership, 2016). The program have showing a positive significant impact in increasing the rate of active travel as it was designated to address issues on safety and travel distance to school which meet the parental needs. The program has been designed

with multiple checkpoints under supervision of volunteers in each checkpoint, the parents will escort their children to the nearest checkpoint (from home) and waited for the first group (first checkpoint) to come and walk together until they reach the last destination (school). In addition, implementing additional strategies which can decrease the traffic-related danger will attract more participation from the children thus, increase the percentage of active school travel in that area.

2.3 Barriers and Challenges in Promoting Walking School Bus Program

The Safe Routes to School (SRTS) initiative such as Walking School Bus program is favourable in encouraging active travel among school children as it creating a healthy and liveable communities as well. But evidence from recent research has reported that the program would facing challenges in sustaining the operation on a long-term basis. For instance, it requires highly commitments and formal supports from the local community and governments (local authority and school administration) in terms of funding resources, scheduling activities, guideline policies and built environment (Carlin et al., 2016; Larouche et al., 2018). In addition, it is a voluntarily-based program where lack of interaction among neighbourhood community and educational awareness on road safety and active transportation has resulting to failure in implementing the program and lower number of parental positive perceptions on active transport among children. Thus, the success of the program is highly determining on the strong bonding and collaborations especially among parents, school and community in that particular area.

Although most of the parents are still doubting on the children's safety level regarding the concept of active school travel, but children would perceived active school travel in a different point of view. Based on the Hinckson (2016), it has been observed that children tend to enjoying more the presence of their surrounding including socialising with friends especially when walking in a larger group of schoolmates, promoting a healthy lifestyle, building up confidence and independence in themselves even at the small age, appreciating and interacting more with the surrounding nature of environment. As a result, best practices in implementing active travel among school children should take into account 'accessibility and connectivity' especially the school route options by avoiding heavy traffic areas or installing traffic calming measures, feasible travel distance of designated routes and nicely design covered pedestrian walkway with safety barriers as it determining the rate of successful active school travel and decreasing the perceptions of protective parenting cultures.

3. METHODOLOGY

This section will provide detailing on the sampling used in the research including the study area, the characteristics of the selected respondents and the recruitment process and data analysis method. All of the information are collected, analysed and kept confidential for research purposes only.

3.1 Study Area: Taman Ilmu, Nibong Tebal, Penang

The chosen study area was Taman Ilmu which located at Nibong Tebal district in Penang. As this study will be focusing more on sub-urban context thus, Taman Ilmu has been taken into consideration due to various characteristics such as it was located in the suburban setting (total

population of Nibong Tebal is approximately 79,787 population and limitation in terms of accessibility and connectivity for transportation facilities) and the educational facilities such as school and university are located about 0.5km – 3km radius from Taman Ilmu. In addition, the socio-demographic profile of Taman Ilmu are varied according to the type of houses which are terrace houses (single-storey and double-storey) and semi-detached houses. Refer Figure 1-Location Area and Figure 2-Site Area for further details.

3.2 Data Collection

The research aims to develop understanding on the children's travel behaviour to school and parental perceptions on implementing active school travel among residents living in Taman Ilmu. On the 31st of August 2020 till 2nd of September 2020, the data collection process involving questionnaire survey and focus group discussion among mothers (focusing on those living in Taman Ilmu) have been carried out. The details will be explained as below:

i. **Questionnaire Survey**
   The questionnaire survey has been distributed randomly among residents following a stratified random sampling method. A total of 99 respondents have been voluntarily participated in the survey. The survey took about 30 minutes to be fully completed consisting few sections of questions including demographic profile, daily transportation status, children's independent travel and the evaluation on several aspects (convenient, trust, safety, surrounding influence, preference, children's activities and weather).

ii. **Focus Group Discussion**
   The focus group discussion has been conducted in a group form consisting 3 – 4 persons per group. A total of 9 respondents have been voluntarily participated using a snowball sampling method. The group discussion took about 30 – 40 minutes to be completed involving questions on the parental perceptions regarding active school travel, conducting a collective mapping in identifying the potential barriers and recommendations on the surrounding environment and the possibility of implementing walking school bus program in the neighbourhood area. The focus group discussion was recorded using an audio recorder for validity purposes.

3.3 Data Analysis

The research adapted quantitative and qualitative research method for data collection process. For quantitative research method, SPSS Software was employed for analysing the descriptive data while for qualitative research method, collective mapping was conducted in order to understand the existing condition of Taman Ilmu and the potential barriers in implementing the active school travel program to encourage children walkability in the area. Throughout the analysis, all of the information were extracted and interpreted thoroughly based on the raw data to ensure the findings achieving the research objectives.
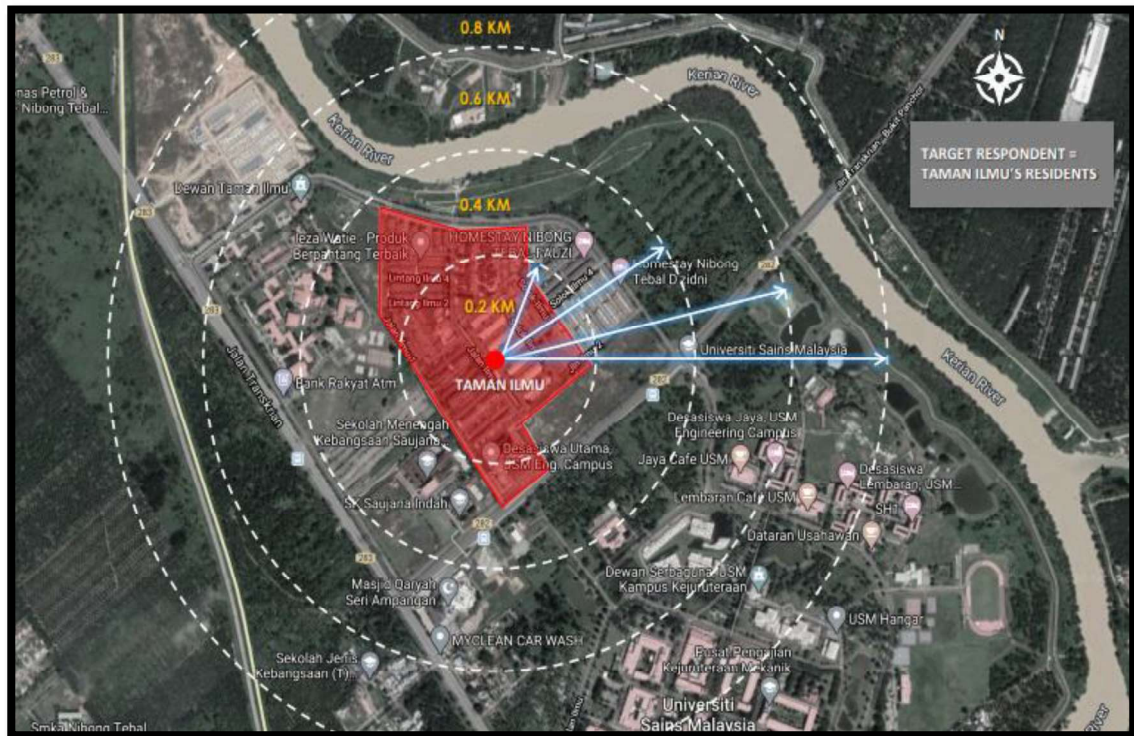
Figure 1 Location Area of Taman Ilmu

4. FINDINGS AND DISCUSSIONS

This section aims to provide details on the data collected whereby the results reported are based on the data to lessen biases findings therefore, the focus group discussion have been conducted for supporting the findings and acquire understanding on the existing condition of Taman Ilmu from the local community.

Figure 2 Site Area of Taman Ilmu

4.1 Socio-demographic Profile

Characteristics	n	Percentage (%)
Age Groups		
20 – 29 years old	1	1.0
30 – 39 years old	44	44.4
40 – 49 years old	46	46.5
50 – 59 years old	7	7.1
60 years old and above	1	1.0
Marital Status		
Married	94	94.9
Divorce	5	5.1
Educational Qualifications		
Primary Level	6	6.1
Secondary Level	45	45.4
Undergraduate Level	39	39.4
Postgraduate Level	9	9.1

Table 1 Respondent's Socio-demographic Profile

Table 2 Respondent's Age Groups and Children's Age Groups

Respondent's Age Groups	Children's Age Groups (n=193)		
	0 – 3 years old	4 – 6 years old	7 – 12 years old
20 – 29 years old	1	1	1
30 – 39 years old	14	27	64
40 – 49 years old	5	12	57
50 – 59 years old	1	1	8
60 years old and above	0	0	1
Total (%)	21 (10.9%)	41 (21.2%)	131 (67.9%)

Based on the findings above, it has recorded that the highest respondent's age groups are in the middle-aged which between 30-49 years old where majority of them are married and only 5.1% of them has divorced at the age of 35-45 years old. In fact, Taman Ilmu is a typical Malaysian neighbourhood area consisting majority of the residents are Malay and Muslim. For educational qualifications, an approximately 45.4% of the respondents acquire secondary educational level (SPM/STPM/STAM/equivalent) followed by 39.4% acquire undergraduate educational level (Diploma and Bachelor's Degree). In addition, the highest age of the respondent's children are between 7-12 years old. Therefore, it can be concluded that the respondent's age will determine the number of children's age groups where the probability of respondent's age between 30-49 years old having children between age groups of 4-12 years old is higher.

Table 3 Occupational Status (Profession Types, Monthly Income, Working Level and Working Hours)

Characteristics	n	Percentage (%)
Profession		
Government	45	45.5
Private	10	10.1
Self-employed	14	14.1
Others (Housewife)	30	30.3
Monthly Income		
RM999 and below	3	3.0
RM1000 – RM1999	10	10.1
RM2000 – RM2999	12	12.1
RM3000 – RM3999	19	19.2
RM4000 – RM4999	12	12.1
RM5000 and above	16	16.2
Not Applicable	27	27.3
Working Level		
Full-time	60	60.6
Part-time	7	7.1
Freelance	4	4.0
Not Applicable	28	28.3
Working Hours		
Fixed	49	49.5
Shift	7	7.1
Flexible	15	15.1
Not Applicable	28	28.3

Based on Table 3, it has recorded that half of the respondents are the government workers and about 30% of them are housewives. From the observation, Taman Ilmu is located 2-3km away from University of Science Malaysia (USM) resulting to half of the residents living in Taman Ilmu could be part of the USM staffs. In addition, Taman Ilmu also was surrounded by other educational facilities such as primary and secondary school in which it will indirectly affecting the resident's profession sector as well. Other than that, the highest monthly income recorded is between RM3000 – RM3999. This indicates that the educational qualifications affecting the

level of individual's monthly income as from the previous data it has recorded that about 45% acquire secondary educational qualifications followed by 39% are undergraduate level. As most of the respondents are working in the government sector thus, majority of them are full-time workers with fixed working hours which is from 8am-5pm or 7am-2pm and some of them could be working on the flexible hours. According to the working hours, an assumption can be made in which some of the respondents could be working as the school staffs due to the working hours from 7am-2pm. While for part-time workers, it could be due to self-employment in which majority of the self-employed workers tend to having a flexible working hours as they are the one who operated the businesses.

Data recorded regarding working hours are as following:
a) 8am – 5pm or 9am – 5pm (42 respondents)
b) 7am – 2pm or 7.30am – 2.30pm (6 respondents)
c) Flexible working hours (13 respondents)
d) Not applicable (referring to housewives – 38 respondents)

4.2 Daily Transportation Status

Table 4 Respondent's Transportation Ownership

Characteristic	Transportation Mode (n=99)		
	Car	Motorcycle	Both
Transportation Ownership	27	2	70

Table 5 Transportation Mode to the Workplace and Children's Transportation Mode to School

Characteristics	Transportation Mode (n=99)				
	Car	Motorcycle	Walking/Cycling	Public Transportation	Others
Transportation Mode to the Workplace	47	26	1	1	26
Children's Transportation Mode to School	41	15	10	1	32
Total	88	41	11	2	58

* Others: Referring to different usage of transportation modes choice every day.

Based on table above, majority of the respondents owned both (motorcycle and car) but most of the respondents are using car as major transportation mode choice either to the workplace or when sending children to school every day. This is because they found it more convenient and comfortable when using private transportation for daily commuting thus, every morning they will sending children at school first before they went to the workplace. In fact, there are several advantages received including can reduce other transportation costs, time management and the children's safety is under parental personal responsibilities which is more secured. In addition, the findings shown that even they are using different usage of transportation modes choice every day (others), but the chosen transportation modes are motorised vehicles such as car or motorcycle rather than non-motorised vehicles when sending children to school.

Therefore, two (2) conclusions have been derived based on the findings which are:

a) Majority of the respondents living in Taman Ilmu are choosing private transportation over active transportation particularly when commuting although the travel distance from home to school is within 500 meters radius.
b) The level of parental trust among parents living in Taman Ilmu regarding children's ability to travel independently are lower even though the highest age of the respondent's children are between 7-12 years old. According to the child safety experts from the American Academy of Paediatrics (AAP), children between the ages of 9-11 years old can safely travel independently to school as long as they are capable of showing good judgement and acquiring certain developmental and maturity level.

4.3 Children's Independent Travel

This section is basically explaining on the children's independent travel. The list of questions as following:

a) Allowing children walking from home to school.
b) Allowing children walking from home to other places apart from school.
c) Allowing children crossing the road.
d) Allowing children walking out during night time.
e) Allowing children cycling on the main road.
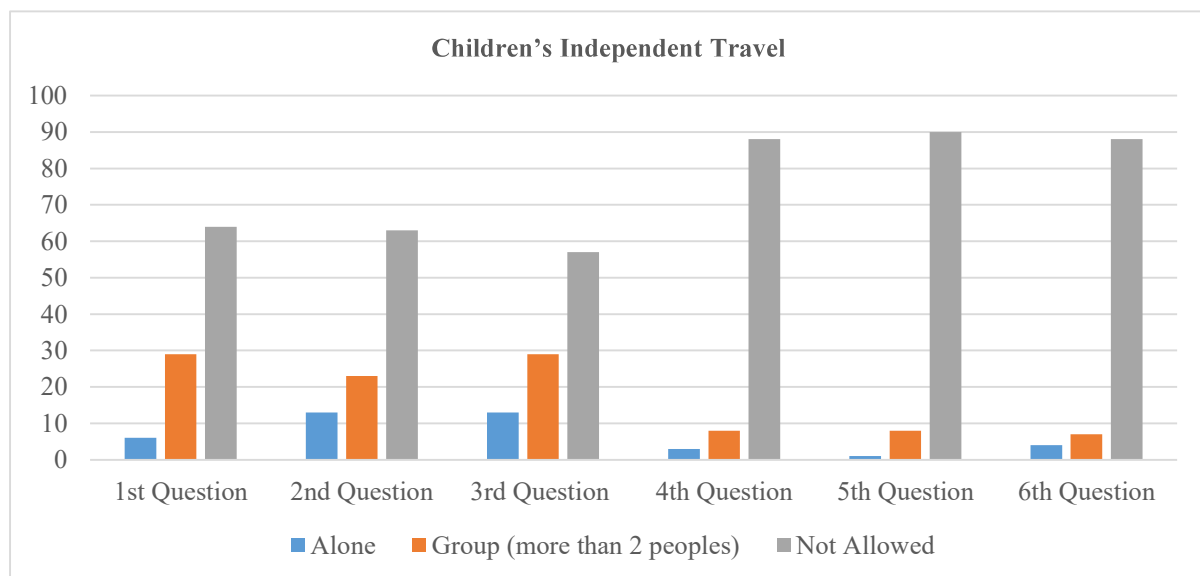f) Allowing children using public transportation.

Figure 3 Parental Decision on Children's Independent Travel

Based on the bar graph above, it can be seen that majority of the respondents voted for not allowing their children travel independently especially during night time, cycling on the main road and travelling independently using public transportation. This is because Taman Ilmu is located in the sub-urban area where the facilities and infrastructure including street light and urban design are not fully developed. Thus, it is highly discouraged for any individuals including adults to travel independently either walking or cycling particularly during night time. Although there is educational facilities located there such as University of Science Malaysia (USM) but the existing surrounding environment of Taman Ilmu needed extra safety measure including built environment in order for developing a liveable community-based

neighbourhood area. For instance, parental perceptions on walking and the higher effects of parental perceived safety on built environment facilities such as walking facilities along the school route, the neighbourhood safety were found to be greatly associated with the parental decision on the children's mode choice to school (Mehdizadeh et al., 2019; Vanwolleghem et al., 2016; McMillan, 2005).

In addition, it can be seen that the level of parental trust on children's safety notably on road safety has becoming a major concerns on children's active travel to school. It has been highly debated in the previous research on barriers for walking to school by Martin and Carlson (2005), perceptions of local neighbourhood and active travel among children by Timperio et al. (2006) and a review of walking and bicycling to school by Sirard and Slater (2008), which discussing on the street connectivity that potentially connecting more street networks resulting to higher traffic volume, indirectly affecting active travel to school as more street crossings occurred. Based on observation in Taman Ilmu, there are heavy flow of traffic at the main road near to the school area especially during peak hour which causes traffic congestion in that particular area. This situation has indicated, most of the parents are not allowing their children to travel independently to school due to safety factor. In fact, previous research by Cole et al. (2007) and Giles-Corti et al. (2011) have reported neighbourhood area with lower traffic volume tend to have greater number of children walking to school as compared to the neighbourhood area with greater traffic volume.

4.4 Evaluation Aspects

This section is basically evaluating on the aspects influencing parental decision in sending children to school using private transportation. The list of questions as following:

a) Private transportation is more convenient compared to other public transportation (school bus/school van) as transportation mode for children to school.
b) I am not allowing my children walking or cycling to school.
c) I am allowing my children walking or cycling to school if the infrastructure and facilities are sufficient and user-friendly for the children's safety.
d) Most of the parents are using private transportation when sending children to school therefore, I would like to do the same.
e) Walking to school can reduces the expenditure cost but I am still sending my children to school using private transportation.
f) Children's school activities influencing the selection of transportation mode choice due to time management.
g) Other factor such as weather influencing the selection of transportation mode choice.
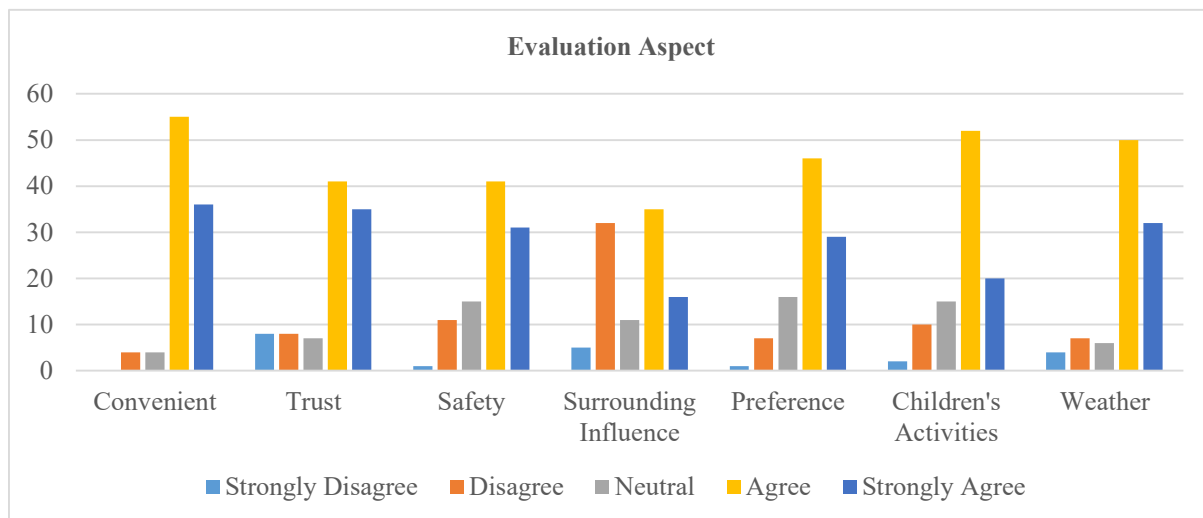
Figure 4 Evaluation Aspect Influencing Parental Decision

From the bar graph above, it can be observed that convenient, parental trust, children's safety, preferences, children's activities and weather recorded the highest voted from the respondents as the affecting factors which influencing the parental decision in using private transportation for daily travelling including sending children to school. Based on convenient aspect, majority of the respondents agreed that private transportation is the most convenient transportation mode choice. It is because most of the parents are sending children to school by car before they went to the workplace every morning. It can be seen from the previous data reported on (1) children's transportation mode to school that recorded car as the highest transportation mode choice and (2) from the focus group discussion whereby they reported on the heavy traffic flow at the main road near school area every morning due to dropping-off children at school gate. These findings were supported with previous research by McMillan (2007), Bradshaw (1995) and Joshi and Maclean (1995), parents who are driving car to the workplace found that dropping-off children are more convenience rather than accompanied children for active commuting every morning.

Apart from that, parental trust on children's ability to travel independently and children's safety are the prominent factors influencing parental decision making. It has found out that parental trust are associated with (1) parental intention in allowing active travel and (2) parental emotion including worries due to parental perception of potential risks on children's safety. This is in line with previous studies discussing on the parental worry as contributing factor to the barrier on children's walking to school (Mehdizadeh et al., 2017), individual's emotion (worry) as one of the influencing factor in the transportation mode selection (Backer Grøndahl et al., 2009), risks perception will stimulating other emotions such as anxious and worries to the individual (Kummeneje et al., 2019). Parental evaluation on built environment such as walking facilities are greatly associated with the parental trust towards surrounding environment and parental concerns on the children's safety about risks perception (Rundmo & Nordfjærn, 2013; Viklund, 2003). In fact, higher parental perceived on personal responsibilities including children's safety when crossing the road for instance, leading to decreasing in number of children's active travel (Rundmo et al., 2011).

Last but not least, majority of the respondents agreed that walking can reduce the expenditure costs but they are still choosing over private transportation due these two (2) major factors which are (1) convenient factor and (2) children's safety factor. As discussed before, majority of the parents are working thus, it is more convenient and comfortable for them to dropping-off children at school beforehand as they are using the same routes to the workplace and time-saving. In fact, different activities schedule for each children also becoming one of

the factor on the selection of transportation mode choice. As most of them are working parents hence, they need to balance the work-family obligations and also reducing all of the expenditure costs. Therefore, by using private transportation could help them managing the time by combining all of the children's school activities into their scheduling activities resulting in decreasing the expenditure costs, increasing time management and decreasing parental worries on children's safety.

4.5 Collective Mapping

A focus group discussion (FGD) session with some of the mothers living in Taman Ilmu has been held as part of the research focus. During the session, a collective mapping method have been conducted in order to acquire understanding on the existing neighbourhood area scenario and the future challenges on implementing the walking school bus program at Taman Ilmu in encouraging active commuting among school children. All of the participants will be receiving an A3 paper with Taman Ilmu map printed on the paper. So, the participants needed to sketch or listing out all the existing issues and problems together with the routes used when sending children to school. The outcome allows the researchers in identifying existing issues for future recommendation towards encouraging children's walkability in Taman Ilmu. There are several issues and problems have been identified as illustrated in Figure 5.

a) Traffic congestion on the main road near school areas due to parents dropping-off children at school every morning.
b) Crowded with cars parking on the roadside due to inadequate parking spaces for instance resulting to traffic congestion.
c) Safety factors such as secluded areas due to big trees, inadequate streetlight, wild monkeys, insufficient of walking facilities and road safety (heavy flow of traffic at the main road).
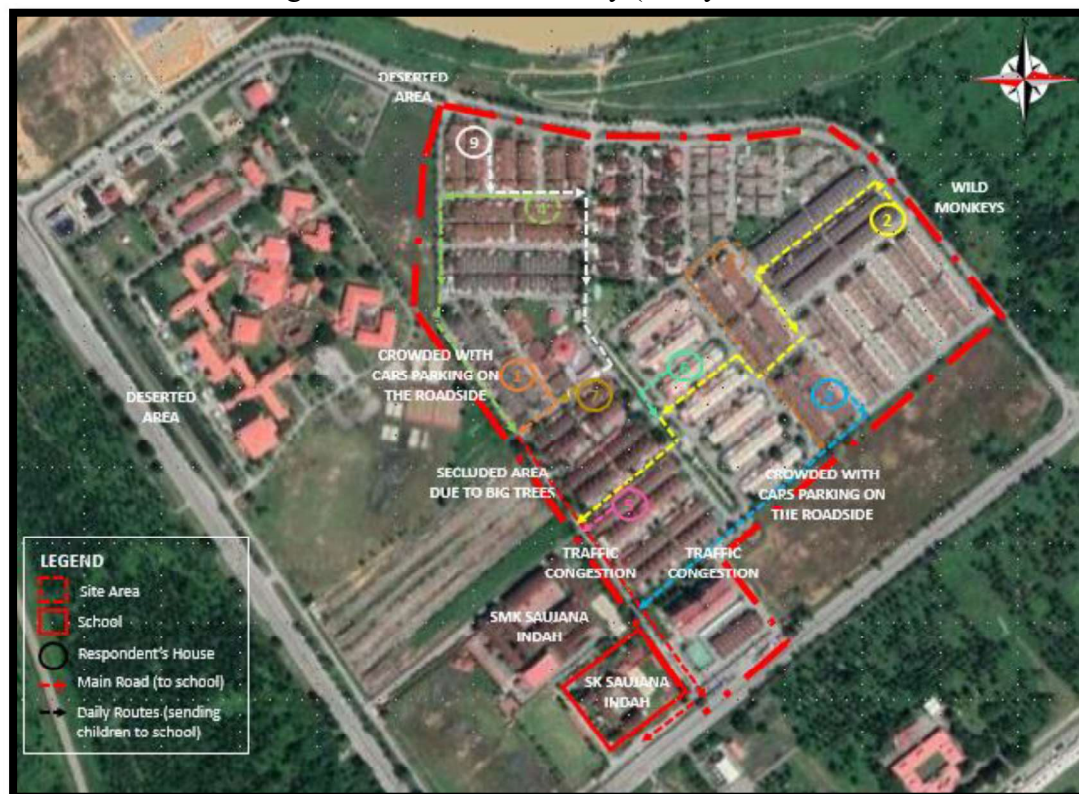

Figure 5 Collective Mapping during FGD Session with Mothers Living in Taman Ilmu

5. CONCLUSION

In conclusion, the prominent factors that have been identified based on findings and discussion are (1) parental trust on children's ability for travelling independently and (2) children's safety in regards to the road safety issues and other factors such as sexual harassment, assaulted, child molester. Perceiving diverse factors influencing the parental perception on the children's safety and well-being regarding active travel has expediting the local authorities and stakeholders in identifying and enhancing the future challenges on the feasibility of implementing the walking school bus program. The program has been anticipated as a sustainable initiative in combining the elements of 3E's (entity/people-economic-environment) by promoting a healthy lifestyle, economically balance, environmental friendly (encouraging active commuting) and providing opportunities to socialising independently and interacting with the nature. Lastly, as the major priorities of majority parents are the children's safety and well-being therefore, gaining the parental trust and confidence on children's active travel and upgrading the existing facilities and infrastructure including surrounding environment to decreasing the parental worries on children's safety are the crucial measure taken in ensuring highest probability on the successful rate of walking school bus program.

6. ACKNOWLEDGEMENT

REFERENCES

Backer Grøndahl, A., Fyhrie, A., Ulleberg, P., Amundsen, A.H. (2009), Accidents and Unpleasant Incidents: Worry in Transport and Prediction of Travel Behaviour, *Risk Analysis,* 29(9), 1217-1226.

Bradshaw, R. (1995), Why Do Parents Drive Their Children to School?, *Traffic Engineering and Control,* 36(1), 16-19.

Cole, R., Leslie, E., Donald, M., Cerin, E., Owen, N. (2007), Residential Proximity to School and the Active Travel Choices of Parents, *Health Promotion Journal of Australia,* 18(2), 127-134.

D'Haese, S., Vanwolleghem, G., Hinckson, E., De Bourdeaudhuij, I., Deforche, B., Van Dyck, D., Cardon, G. (2015), Cross-Continental Comparison of the Association between the Physical Environment and Active Transportation in Children: A Systematic Review, *International Journal of Behavioural Nutrition and Physical Activity,* 145(12), 1-14.

Davoudi, S., Mamdoohi, A.R., Zavareh, M.F. (2018), The Effect of Parents' Attitudes on their Tendency towards their Children Walking to School, *Sharif Journal of Civil Engineering*, 34.2(1.1), 97-106.

Fyrhi, A., Hjorthol, R., Mackett, R.L., Fotel, T.N., Kytta, M. (2011), Children's Active Travel and Independent Mobility in Four Countries: Development, Social Contributing Trends and Measures, *Transport Policy,* 18(5), 703-710.

Giles-Corti, B., Timperio, A., Bull, F., Pikora, T. (2005), Understanding Physical Activity Environmental Correlates: Increased Specificity for Ecological Models, *Exercise and Sport Sciences Reviews,* 33(4), 175-181.

Giles-Corti, B., Wood, G., Pikora, T., Learnihan, V., Bulsara, M., Van Niel, K., Timperio, A., Mccormack, G., Villanueva, K. (2011), School Site and the Potential to Walk to School: The Impact of Street Connectivity and Traffic Exposure in School Neighbourhoods, *Health and Place,* 17(2), 545-550.

Janssen, I., LeBlanc, A. (2010), Systematic Review of the Health Benefits of Physical Activity and Fitness in School-Aged Children and Youth, *International Journal of Behavioural Nutrition and Physical Activity,* 40(7), 1-16.

Joshi, M.S., MacLean, M. (1995), Parental Attitudes to Children's Journeys to School, *World Transportation Policy and Practice*, 1(4), 29-36.

Kummeneje, A.M., Ryeng, E.O., Rundmo, T. (2019), Seasonal Variation in Risk Perception and Travel Behaviour among Cyclists in a Norwegian Urban Area, *Accident Analysis and Prevention*, 124, 40-49.

Mackett, R., Lucas, L., Paskins, J., Turbin, J. (2003), A Methodology for Evaluating Walking Buses as an Instrument of Urban Transport Policy, *Transport Policy,* 10(3), 179-186.

Martin, S., Carlson, S. (2005), Barriers to Children Walking to or from School - United States, 2004, *Jama-Journal of the American Medical Association,* 294(17), 2160, Reprinted from: MMWR (2005), 54, 949-952.

McDonald, N.C. (2007), Active Transportation to School: Trends among US School Children 1969-2001, *American Journal of Preventive Medicine*, 32(6), 509-516.

McMillan, T.E. (2005), Urban Form and A Child's Trip to School: The Current Literature and A Model for Future Research, *Journal of Planning Literature,* 19(4), 440-456.

McMillan, T.E. (2007), The Relative Influence of Urban Form on A Child's Travel Mode to School, *Transportation Research Part A Policy and Practice,* 41(1), 69-79.

Mehdizadeh, M., Mamdoohi, A., Nordfjaern, T. (2017), Walking Time to School, Children's Active School Travel and Their Related Factors, *Journal of Transport and Health,* 6, 313-326.

Mehdizadeh, M., Zavareh, M.F., Nordfjaern, T. (2019), School Travel Mode Use: Direct and Indirect Effects through Parental Attitudes and Transport Priorities, *Transportmetrica A: Transport Science,* 15(2), 749-775.

Ogilvie, D., Foster, C.E., Rothnie, H., Cavill, N., Hamilton, V., Fitzsimons, C.F., Mutrie, N. (2007), Interventions to Promote Walking: Systematic Review, *British Medical Journal*, 334(7605), 1204.

Pont, K., Ziviani, J., Wadley, D., Bennett, S., Abbott, R. (2009), Environmental Correlates of Children's Active Transportation: A Systematic Literature Review, *Health Place,* 15(3), 849-862.

Rundmo, T., Nordfjaern, T., Iversen, H.H., Oltedal, S., Jørgensen, S.H. (2011), The Role of Risk Perception and Other Risk-Related Judgements in Transportation Mode Use, *Safety Science,* 49(2), 226-235.

Rundmo, T., Nordfjaern, T. (2013), Predictors of Demand for Risk Mitigation in Transport, *Transportation Research Part F: Traffic Psychology and Behaviour*, 20, 183-192.

Sallis, J.F., Floyd, M.F., Rodriguez, D.A., Saelens, B.E. (2012), Role of Built Environments in Physical Activity, Obesity and Cardiovascular Disease, *Circulation,* 125(5), 729-737.

Sirard, J.R., Slater, M.E. (2008), Walking and Bicycling to School: A Review, *American Journal of Lifestyle Medicine,* 2(5), 372.

Timperio, A., Ball, K., Salmon, J., Roberts, R., Giles-Corti, B., Simmons, D., Baur, L.A., Crawford, D. (2006), Personal, Family, Social and Environmental Correlates of Active Commuting to School, *American Journal of Preventive Medicine*, 30(1), 45-51.

Vanwolleghem, G., Van Dyck, D., De Meester, F., De Bourdeaudhuij, I., Cardon, G., Gheysen, F. (2016), Which Socio-Ecological Factors Associate with A Switch to or

Maintenance of Active and Passive Transport During the Transition from Primary to Secondary School?, *Public Library of Science One,* 11(5).

Viklund, M.J. (2003), Trust and Risk Perception in Western Europe: A Cross-National Study, *Risk Analysis*, 23(4), 727-738.

Yu, C.-Y., Zhu, X. (2016), From Attitude to Action: What Shapes Attitude Toward Walking to/from School and How Does It Influence Actual Behaviours?, *Preventive Medicine,* 90, 72-78.