Cawangan Perak

UNIVERSITI TEKNOLOGI MARA

INSPIREd 2022
Virtual Ipoh International Summit on Professionalisme, Research and Education

IeGRESAFE 2022

E-PROCEEDING OF

1st INTERNATIONAL E-CONFERENCE ON GREEN & SAFE CITIES 2022

"Sustaining the **Resilient, Beautiful and Safe Cities** for a Better Quality of Life"

20 & 21 SEPTEMBER 2022

Organisers:

GRESAFE_CITIES
Green Safe Cities, Research Interest Group

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

UiTM CAWANGAN PERAK
KAMPUS HIJAU

Co-organisers:

OFFICE OF RESEARCH, INDUSTRIAL LINKAGES, COMMUNITY & ALUMNI (PJIM&A), SERI ISKANDAR CAMPUS
DEPARTMENT OF BUILT ENVIRONMENT STUDIES & TECHNOLOGY (JABT), FACULTY OF ARCHITECTURE, PLANNING & SURVEYING (FSPU)

https://myse.my/gresafecities2/IeGRESAFE/

e-PROCEEDING OF
1st INTERNATIONAL E-CONFERENCE ON
GREEN & SAFE CITIES

" **Sustaining the Resilient, Beautiful and Safe Cities for a Better Quality of Life** "

ORGANISED BY

Gresafe_Cities RIG
The University of Queensland, Australia
Kampus Hijau UiTM Perak

CO-ORGANISED BY

Research, Industrial Linkages, Community
& Alumni Network (PJIM&A)

ORGANISING COMMITTEE

Patron   : Prof. Sr. Dr Md Yusof Hamid
Advisor   : Assoc. Prof. Ts Dr Norhafizah Abdul Rahman
Chairman 1   : Assoc. Prof. Ts Dr Siti Rasidah Md Sakip
Chairman 2   : Assoc. Prof. Sr Dr Nur Azfahani Ahmad
Secretary 1   : Ms Nur'Ain Ismail
Secretary 2   : Ms Nurhidayah Samsul Rijal
Treasurer 1:   : Dr Nor Nazida Awang
Treasurer 2   : Dr Nadiyanti Mat Nayan

MAIN SECRETARIAT

Invitation & Sponsorship	:	Ts Dr Ida Nianti Md Zin (L)
		Dr Nor Eeda Ali
		Ms Nur'Ain Ismail
		Ms Nurhidayah Samsul Rijal
		Ts Ahmad Haqqi Nazali Abdul Razak
Participation, Registration & Certificates	:	Dr Atikah Fukaihah Amir (L)
		Ms Marina Abdullah
Graphic & Printing	:	Mr Muhammad Falihin Jasmi (L)
		LAr Ruwaidah Borhan
Promotion & Website	:	Ts Nur Hasni Nasrudin (L)
		Ts Sr Dr Asmat Ismail
Information technology (IT & AV) & Media	:	Mr Aizazi Lutfi Ahmad (L)
		Mr Muhammad Anas Othman
		Mr Tuan Sayed Muhammad Aiman Sayed Abul Khair
Scientific Reviewers & Publication	:	Assoc. Prof. Sr Dr Thuraiya Mohd (L) – Sc. Reviewer
		Assoc. Prof. Dr Sallehan Ismail (L) - Journal
		Assoc. Prof. Sr Dr Siti Aekbal Salleh
		Assoc. Prof. Dr Kharizam Ismail
		Assoc. Prof. Ts Dr Siti Akhtar Mahayuddin
		Assoc. Prof. Sr Dr Nur Azfahani Ahmad
		Assoc. Prof. Sr Dr Natasha Khalil
		Dr Puteri Rohani Megat Abdul Rahim
		Ts Dr Azizah Md Ajis
		Sr Dr Asmalia Che Ahmad
		Dr Dzulkarnaen Ismail
		Dr Lilawati Ab Wahab
		Ms Marina Abdullah
Event Manager & Moderator	:	Ts. Ahmad Haqqi Nazali (L)
		IDr Dr Othman Mohd Nor
		TPr Dr Kushairi Rashid
		Dr Mohd RofdziAbdullah
		Ar Haji Azman Zainonabidin
Banquets & Charities	:	Ms Noor Faiza Rasol (L)
		Mr Afzanizam Muhammad
		Ms Siti Rohamini Yusoff

A SYSTEMATIC LITERATURE REVIEW ON SAFE ROUTES TO SCHOOL (SRTS) PROGRAM AND FACTORS INFLUENCING TRAVEL MODE CHOICE TO SCHOOL

Nur Shaffiqa Muhammad Soffian[1]*, Amelia Ahmad[2], Norsyazlin Mohd Rosli[3]
*Corresponding Author
[1,2,3]Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA, Malaysia

*shaffiqa7785@uitm.edu.my
ameli620@uitm.edu.my
norsy986@uitm.edu.my

Abstract

Children is the most exposed road users where their most frequent main option modes of transport are walking and cycling. This paper attempts to establish a systematic review of existing literature on Safe Routes to School (SRTS) program. This study examines several aspects of literature review which include the issues prior to the existence of the Safe Routes to School (SRTS) Program and factors that influence travel mode choice among parents in commuting their children to school. The outcome of this article is to provide direction for future studies. It is necessary to address parent's concern in transporting their children to school. This paper could be very helpful for researchers, policy makers and whoever interested in making sustainable cities and communities in accordance with the principles of Sustainable Development Goals.

Keywords: *Safe Routes to School, SRTS, sustainable transportation, transportation mode, travel to school, parental.*

INTRODUCTION

Statistics on road accidents and criminal cases involving children are increasing in Malaysia. Between January and September of 2017, a total of 5,083 deaths were recorded out of 400,788 road accident cases. Total of 1,077 deaths due to road accidents involving school students were recorded (Bernama, 2017). Omar Ahmad (2020) also reported, the highest crime index offenses involving students are cases of theft, injuring people, burglary, rape, and robbery. In many countries, the proportion of children who actively commute between home and school is declining and it might be because of fear feelings towards the current scenario. Indirectly, children are no longer looking forward to active travel to school.

Today, there must be options for children to be physically active to school safely by walking and cycling. Traffic congestion near schools and environmental pollution from motor vehicle emissions are problems in many localities. The prevalence of obesity among children is a result if these youngsters are physically inactive (Pedestrian and Bicycle Information Centre, 2015). Children used to routinely travel by foot or bicycle from their home to school and it decreased sharply in the U.S from 1969 to 2001 (McDonald, 2007). Nowadays, parents are concerned about children's safety after motor vehicle traffic increases and indirectly they begin to drive them to school. Children avoid walking or cycling to school with the busy roads (Dessing et al., 2016). Even though their neighbourhood primary school is within walking

distance, some kids do not walk there. Despite living close to the school, they believed that using a car was more convenient (Lang et al., 2011 as cited in Rini et al., 2019). Parents' perspectives and concerns about their children's safety demonstrated the need for improved public security, which was the primary motivator for encouraging parents to let their kids walk or bike to school (Nasrudin & Nor, 2013).

Safe Routes to School (SRTS) program or also known as Active to School (AST) aimed to be increased should take parental and kid involvement into account while planning, as well as neighbourhood safety issues (Mah et al., 2017). There are countries that has actively run the SRTS program and show positive feedback including several states in the United States of America and they have even ranked their states based on actively cycling and walking to school. On the other hand, there are countries which are still struggling to reach child-friendly city. One of them is Indonesia though Surakarta, Indonesia has been awarded as Child-friendly City since 2011 (Rini et al., 2019). While in Malaysia, Safe Kids Malaysia Universiti Putra Malaysia (UPM) has joined hands with the Malaysian Road Safety Department (JKJR) with the JKJR Children's Helmet Initiative towards preventing and reducing injuries and deaths among children riding motorcycles to school which in line with the achievement targets targeted at Sustainable Development Goal (SDG) 3.6 by the United Nations to reduce injuries and deaths due to violations on the roads by half by 2020 and SDG 11.2 to improve road safety (Faculty of Medicine and Health Sciences, UPM, 2021). This initiative is good, but it did not encourage children to active travel to school. SRTS program needs to be explored on its overall effectiveness through previous studies.

However, there are limited research articles on SRTS that have claimed the 'systematic research' label so far. This study utilized the documented journal of SRTS. The wide range of factors that influence whether children choose active transport requires further research.

To address the gaps and the inadequacy in systematic research of SRTS literature, the paper aims to suggest that systematic literature review on SRTS and factors of travel mode choice to school may provide useful insights. The objective of the current study was to clarify the SRTS program and factors that influence travel mode choice to school.

METHODOLOGY

The literature review is the foundation for systematic writing. It is in the review that the researcher becomes familiar with the texts and authors who have been studying on the topic (Ferenhof and Fernandes, 2016 as cited by Trindade et al., 2017).

In the initial stage, the relevant literature sources were mainly derived from documented journals related to SRTS. The sources obtained during the search were evaluated and the PRISMA process was followed. Combination of word technique was applied using string search of "Safe Routes to School" for more focused results (refer to Table 2). After reviewing the search results, one-hundred-eighty-nine (189) potentially relevant articles founded from 1970 to 2022 (refer to Table 1). Material retrieved were then screened based on latest years from 2015 to 2022 to determine the relevancy of the materials, so that the review is based on the recent literature and the result shows there are sixty-eight (68) related articles (refer to Figure 1). Accordingly, exclusion criteria are based on none factors mentioned of mode choices to school and history of SRTS. Thus, thirty-nine (39) articles were excluded from the content analysis. A total of 29 relevant studies were found that explained in definition, history of SRTS and factors of mode choices to school. A flow of information is provided in Figure 1.

Table 1 presents the distribution articles based on type and year. It shows that the most published document is an article and varies from 1 to 19. Most articles published in the year 2009 (19) and 2012 (19).

Table 1

Literature from documented Journal of Safe Routes to School (SRTS)

Document Type	Documents
Article	145
Review	17
Conference Paper	16
Book Chapter	6
Note	3
Book	1
Undefined	1
Total	**189**

Year of Publication	Documents
2012	19
2009	19
2019	14
2014	13
2016	11
2013	11
2008	11
2007	11
2015	10
2011	10
2010	10
2018	8
2021	7
2020	7
2022	6
2017	5
2005	4
2003	3
2006	1
2004	1
2002	1
2001	1
2000	1
1999	1
1998	1
1988	1
1986	1
1970	1
Total	**189**

Note: All journals included systematic review are listed in this table.

Figure 1
Flow of information (according to PRISMA, 2021)
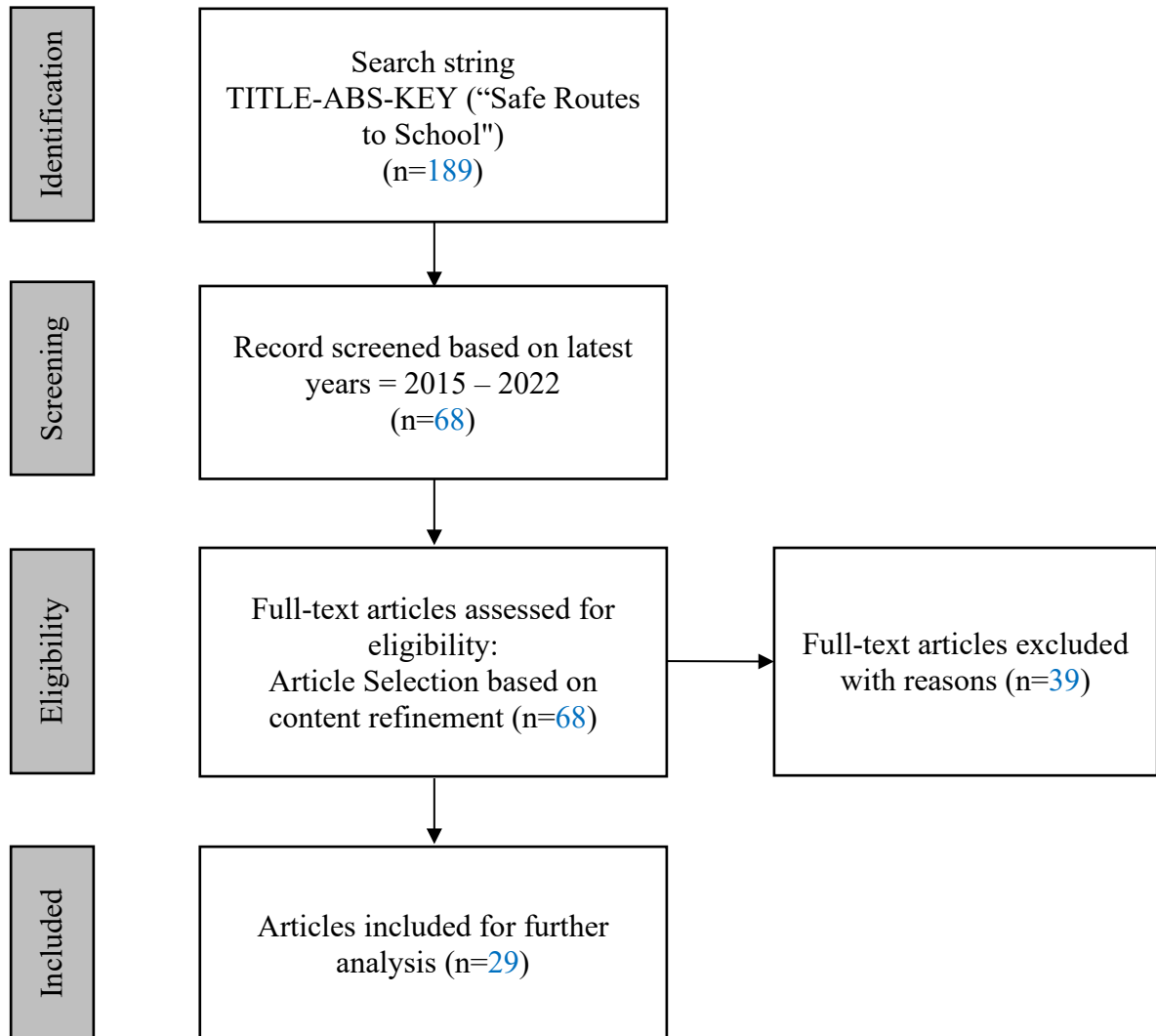
The review process was initiated with the selection of the topic (safe routes to school) and identifying the keywords in the searching document stage, as in Table 2.

Table 2
Keywords and Searching Information Strategy

Database	Search String
Safe Routes to School Documented Journals	TITLE-ABS-KEY ("safe routes to school")

LITERATURE BACKGROUND
Safe Route to School (SRTS) Program

SRTS is a movement which promotes good health, safety, and a sustainable transportation system for children to travel to and from school. It was initiated in response to the declining rates of walking and bicycling to and from school, although living nearby (McDonald and Aalborg, 2009, Anderson, 2017 and Pabeyo et al, 2010, as cited by Aibar Solana et al., 2018). It was initially introduced in the United States in 1990's (Safe Routes Partnership, n.d and UNC Highway Safety Research Center, 2022). Subsequently, the first federally funded program of its kind was introduced in 2005. Since then, the program has

experienced a few statutory and procedural transformations. The funding covers infrastructure development and programming in ensuring a safer environment encouraging children to travel to and from school either by walking or bicycling.

The SRTS program basically aims to encourage and give a big impact for healthy habits of walking and bicycling to and from school (Voulgaris et al., 2021); to create safer and appealing transportation alternatives to travel to school; and to assist in sustainable planning and implementations of projects and activities.

A successful SRTS requires the incorporation of six E's framework in its implementation, namely, engagement, equity, engineering, encouragement, education, and evaluation (Zimmerman & Lieberman, 2019). The SRTS program promotes and prioritises equity by targeting schools and communities which show the utmost need for safer walking and bicycling conditions, especially in low-income and coloured communities. The poor physical environments have been noted as being one of the main contributors in the high number of injuries and death while walking or bicycling to school.

Zimmermann and Lieberman (2020) stated several health and safety benefits of the SRTS programs to students as well as the communities. These benefits are, namely, healthier students, safer students, community connectedness, lowering costs, reducing traffic injuries and death, better climate, and cleaner air, reduce traffic congestion, as well as improvement in academic performance where all schools had specific policies, procedures and programs that mainly planned to ensure student's safety (Ikeda et al., 2020).

In all, the SRTS programs or initiatives shows clear orientation in promoting the Sustainable Development Goals Principles, especially, Goal 3 - Good health and well-being not just of the school children but also the communities and Goal 11 – Sustainable cities and communities, by making the cities and human settlements more inclusive, safe, resilient, and sustainable for the school children and the communities they live in.

Factors influencing Travel Mode Choice to School

Factors highlighted in this study that contribute to the reduction in children walking and bicycling to school including personal, built environment, surrounding and environment factors.

Personal Factors

Based on several previous studies, this paper focuses on three (3) main aspects that are considered as personal factors which influence travel mode choice to school. Main concern of parents is always their children's safety and played a critical role in choice of mode (Carver et al., 2010 as cited by Aibar Solana et al., 2018; Adom-Asamoah et al., 2015; and Nasrudin & Nor, 2013). The personal factor involves the school children themselves and the parents. That three (3) categories are sociodemographic, behaviour and convenience.

Sociodemographic

Yoon et al., (2011) and Rini et al., (2019) highlighted from previous study where there impacts from sociodemographic towards travel mode choice to school including age, gender, ethnicity, household income and parenting status, the number of family member, parents' vehicle ownership, householder occupation, time of the trip to school and road separation between pedestrian and vehicle. Younger children are less likely to travel independently (walking and cycling). Boys are more independent to actively travel to school without parents' escort. If the household income is high, the probability of chauffeuring is higher and is related to the fact that they have a car and they can afford a convenient travelling experience for their children. Children living with single fathers or single mothers seem to deal with quite unique preferences in their travel mode to school. The fathers have more trust towards their children

to commute to school independently, but the single mothers are less likely to let their children travel to school by cycling or walking (Fyhri and Hjorthol 2009; Motte-Baumvol et al. 2017; Scheiner 2013, 2016; Scheiner and Holz-Rau 2012; Schwanen 2007; Yoon et al. 2011 as cited by Chica-Olmo & Lizárraga, 2022), which agrees with common sense.

Behaviour

Pont et al. (2009) as cited by (Aibar Solana et al., 2018) point out that active commuting to school has a strong influence by family on children's behaviour where it comes from parental attitudes, values, and beliefs. Support from the parents also influenced how the children grew up in terms of their confidence level towards themselves (Mah et al., 2017) but there might or might not have strong correlation between parental support and active school travel in elementary school children. Based on a study done by Wen et al., (2008), parents' attitudes towards walking to school and their modes of travel to work were correlated with how their children travelled to and from school. The distance from home to school and the number of cars in the household also played a role.

Conveniency

Parents' perceptions of convenience to drive their children to school influence children's preference on mode to school rather than walking (Aibar Solana et al., 2018). There was a high propensity for parents to select modes for children which were like what they daily utilized (Adom-Asamoah et al., 2015b) and might be the same route to school (Henne et al., 2014 as cited by (Aibar Solana et al., 2018). Parents chose to use personal motor vehicle to send their children to school because of convenience and quickness especially considering the parents time restrictions and shorter time (Mitra and Buliung Mitra 2015; McDonald 2008; McMillan 2007; Westman et al. 2017 as cited by Chica-Olmo & Lizárraga, 2022). Since school time might vary for every school and every child, there is a positive correlation from mother's perception with children's extra-curricular activities organization (Aibar Solana et al., 2018) that might influence mother's daily time planning.

Built Environment Factors

Furthermore, the are studies have shown that built environment characteristics have impacts on travelling or walking to school. Children being the vulnerable group show significant numbers of injuries or fatalities when related to traffic accidents, occurring mainly on their journey to and from school. Clifton, et al. (2009) asserted the importance of understanding the interaction between pedestrian crashes and the various features of urban environments when promoting pedestrian safety. A study by Yu (2015) found that most of the school travel fatalities occur mainly, on highways, interstates, arterial roads or in areas with land use generated traffic or transit stops.

Bejleri, et.al. (2011) stated travel distance as one the main factors affecting walkability which relates to the physical built environment. In this study, travel distance refers to the straight-line distance in between the origin and the destinations. On the ground, the travel distance represents the travel paths which may be configured by the massing of building blocks and street patterns. The penetrability of the urban form and street patterns, hence, can influence the pedestrian opportunities to travel to their destinations, as in the case of school children. Since streets hold most types of travel, its significance provides a basis for us to understand the patterns of walkability. Southworth and Owens (1993) asserted that new street patterns which focus on self-contained subdivision planning have disengaged connectivity between neighbourhoods. The onus to restore the integration between developments without leaving behind the positive attributes of contemporary street patterns, among which, is safe streets for children, has become a dilemma for urban designers. Previous research done by (Dessing et

al., 2016), children will avoid roads with many accident cases, and they prefer neighbourhood streets over other type of streets for walking and cycling to school. Moreover, they also avoid any zebra crossings on their way to school. Between actual and shortest routes, it depends on parents and children's preference to avoid walking or cycling along the busy roads.

Deliberate upgrading of pedestrian or bicycle facilities, such as, improvement to sidewalks and bicycle lanes (for example, installation and widening) and traffic control system, may in a way, influence the possibilities of children walking or bicycling to school (Boarnet, et.al., 2006). Furthermore, pedestrian zones may increase facility accessibility, enabling parents to fulfil their obligations to their children on foot rather than in a private vehicle (Aibar Solana et al., 2018). To strengthen and secure provision of facilities and infrastructure for traffic control and road crossings, it is essential to deliver road safety education and skills training too (Ikeda et al., 2020).

Urban design features also influence travel mode choice. Transport Research Board (2005) listed five examples of design features of the built environment which may affect community's travel choice. There are: density, land use mix, street connectivity, street scale and aesthetic qualities. Handy et al. (2002) asserted that pedestrian orientation of the built environment can be increased by having these design features, and subsequently making walking and bicycling more appealing and interesting, as the physical and psychological are now lessened.

Surrounding and Environmental Factor

Rahman et al. (2020) found that the environmental factors include features of the natural and constructed environments, such as topography and climate, as well as aspects of the built environment, such as distance, land use mix, street connection, junction density, and neighbourhood aesthetics. While previous research has stated the environmental factor describe the elements outside of the transportation network, such as the topography, the climate, the proximity to stores and schools (Olsson, 2003). Furthermore, children's behaviour when travelling to and from school is intricate, diverse, and probably affected by elements both within and outside of the school setting (Smith et al., 2020). From this research there are nine (9) elements that influence children's travel mode choice to school namely distance, weather and topography, strangers, spatial interaction, health, air pollution, social relations, affective features, and cleanliness.

Distance

Aligning with previous research, due to their proximity to the school, several children preferred to commute by walking (Nikitas et al., 2019). According to Frank and Co., (2008) cited by Adom-Asamoah et al. (2015) the choice of transportation to school is greatly influenced by the distance between home and school, especially when using non-motorized means. If they lived more than 2.3 kilometres from home, it would affect the choice of transport mode to school (Ikeda et al., 2018, as cited in Smith et al., 2020). Meanwhile, Osman et al. (2020) stated that children are unable to actively commute to school due to the distance and surroundings in the facility area. Scheiner et al. (2019) suggested by creating a decentralised network of schools, it is possible to shorten travel times to school and encourage more active transportation. Indeed, in all models, journey distance has a variety of effects on children's travel mode choice (Hatamzadeh et al., 2017). Therefore, it is proven that distance from home to school is the most important variable influencing travel mode choice and it can be expected the longer the distances to school, the higher chances the children will be chauffeured (Chica-Olmo & Lizárraga, 2022).

Weather and Topography

Olsson (2003) mentioned weather and topography are the objective factors influencing travel mode choice to school other than socio-economic factors. Previous research has been done in Asia and Europe with varying outcomes. Due to the hot weather, children in Asia rarely walk to school in the afternoon. While children in Europe don't usually go on walks when it's cold and snowing (Hatamzadeh et al., 2017 and Rahman et al., 2020).

Social Relations

Social relations have a crucial role in promoting independent mobility and school travel activities. Children are more likely to be free to travel independently within their neighbourhood and go to school actively where parents are familiar with one another and engage in social interactions. (Love et al., 2019, and McDonald et al., 2010 as cited in Smith et al., 2020). Children perceived interactions with known individuals as facilitating aspects of their school travels, while other connections raised safety worries. Examples of these people include neighbours, friends, and siblings. Unknown individuals, teens, and bullies were those they considered as unsafe while travelling. Children's impressions of several places were impacted negatively by the presence of "creepy" persons, as described by a number of pupils, affecting feelings of safety (Wilson et al., 2019). The study that was done by Adom-Asamoah et al. (2015) at the various schools revealed that students from the same neighbourhoods often travel together to school.

Strangers

Rahman et al. (2020) stated that children who biked or walked to school were also impacted by neighbourhood violence and the presence of strangers. Worries about "stranger danger" were partially allayed when they understood that volunteers would be exempted from a background check (Nikitas et al., 2019).

Spatial Interaction

There are two ways in which spatial interaction may take place, namely, across spatial units (zones, neighbourhoods, areas, blocks) when closer units have certain common characteristics, and across behavioural units (individuals, households) because closer units share characteristics that influence behaviour (Adom-Asamoah et al., 2015). This statement is confirmed by Zarghami and Bagheri (2020) that children's travel mode choice to school will be influenced by non-built environment elements such as personal qualities and social interaction.

Health

Many people have claimed health as a justification for walking to school, citing the benefits of exercise, fresh air, and mental wellness for both children and parents. However, some parents drove because walking their children to school was difficult due to personal health issues including arthritis, asthma, or pregnancy-related bad health (Nikitas et al., 2019).

Air Pollution

Nikitas et al. (2019) also mention that environmental awareness was not a main element, while it did influence some children in travel mode choice to school. Although it was not a concern for all parents, the topic of air pollution and its influence on health was raised in all groups. Based on his study, few parents stated that they tried to avoid walking near a busy road, but other criteria such as time, rather than the health effects of air pollution, controlled their path.

Affective Features

Children's moods, feelings, and attitudes will be affected by affective features during their school-related trips (Wilson et al., 2019). In addition, based on her study the most often mentioned aspects by children that elicited pleasant emotional reactions were trees, parks, interactions with crossing guards, and interactions with pets. Children also appreciated the trees that lined the roadways because they provided a lot of shade. Others thought the trees in the suburban neighbourhood were attractive.

Cleanliness

Wilson et al. (2019) found that waste has a detrimental impact on children's impressions of their surroundings. They have identified displaced rubbish, such as dog faeces and litter, as a negative characteristic of their commute to and from school.

FINDINGS AND DISCUSSION
Sampled Articles

The sampled articles were mainly derived from the process adopted from PRISMA and total 29 articles included for further analysis. The result shows that conducting reviews systematically is growing from 2006 until recent years and revealed that SRTS is a very important topic to be discussed and studied. From table 3, there are 24.1% for both personal and built environment factors from a total of 29 SRTS articles. 31.0% articles were founded on factors that are related to surrounding and environment. Table 3 shows the summary of related articles that mentioned factors influencing travel mode choice to school.

Table 3
General Factors influencing Travel Mode Choice to School cited in the literature

Personal (24.1%)	Built Environment (24.1%)	Surrounding & Environment (31.0%)
Aibar Solana et al. (2018)	Clifton, et.al. (2009)	Olsson (2003)
Adom-Asamoah et al. (2015)	Yu (2015)	Adom-Asamoah et al. (2015)
Nasrudin & Nor (2013)	Bejleri, et.al. (2011)	Hatamzadeh et al. (2017)
Yoon et al. (2011)	Southworth and Owen (1993)	Nikitas et al. (2019)
Rini et al. (2019)	Boarnet, et.al. (2006)	Scheiner et al. (2019)
Chica-Olmo & Lizárraga, (2022)	Transport Research Board (2005)	Osman et al. (2020)
Mah et al. (2017)	Handy, et.al. (2002)	Zarghami and Bagheri (2020)
		Smith et al. (2020)
		Rahman et al. (2020)

Content Analysis

The current research found these three (3) factors to be the main factors influencing parents and children's choice on their travel mode to school. In most previous research it was mentioned the safety aspect where it contributes to those three (3) factors. Most parents are always affected by high cases happening in their surroundings regarding their children's safety.

Following this, frequency analysis was performed to determine factors considered as important in the travel mode choice to school. Table 4 shows the significant number of articles by frequency. Of the factors, surrounding and environmental had a frequency of nineteen (19). This includes distance, weather and topography, social relations, strangers, spatial interaction, health, air pollution, affective features, and cleanliness.

Built environment factor had a frequency of eight (8) and the highest number was discussed on facilities which includes street patterns, sidewalks, bicycle lanes, road crossings

and so on. While health, air pollution, affective features, and cleanliness were only mentioned once, they were considered the least important aspects.

Aspects mentioned under personal factors are ranging 3 to 4 and this is shown that it is moderately important, and it is solely on the human which is parents and the children.

The findings suggest the facilities are the key element to enhance parents and children trust in active travel to school. However, the action of parents and children themselves was moderately mentioned in previous studies.

Table 4
Frequency analysis results

Personal Factor	Frequency
1 Sociodemographic	3
2 Behaviour	4
3 Conveniency	4
Total	11
Built Environment Factor	
1 Facilities	8
2 Design	2
Total	10
Surrounding and Environmental Factor	
1 Distance	5
2 Weather and topography	2
3 Social relations	4
4 Strangers	2
5 Spatial interaction	2
6 Health	1
7 Air pollution	1
8 Affective features	1
9 Cleanliness	1
Total	19

CONCLUSION

From a theoretical point of view, findings of this study have provided an overview of strongly associated factors of built environment, surrounding and environment contribute to personal (parents and children) factors where indirectly, the decisions on travel mode of the children to school will finally be decided by the parents or the children themselves. Safety is not a factor in this study, but it can be a pillar of all factors where it appears in all factors that have been discussed. Children and especially parents who are very concerned over safety are much more prominent in the current studies and it leads to people deciding to try to commute their children themselves to school if possible. To be effective, SRTS programs that focus on active travel to school (walking and cycling) need to acknowledge the safety that is mostly concerned by parents and children's journey to school. Involvement of parents and children in the planning process is important to enhance their safety.

The literature offers evidence that distance affects children's choice on travelling mode from home to school and it is clearly stated that the SRTS program needs a lot of improvement since it seems not fully successful and partially accepted by both children and parents. The factors studied in this paper are evidently available since the program was introduced in the 1990's and it shows from this and previous research that the children become disadvantaged groups in terms of their ability to use the public space on their own. Routes and streets have become too dangerous and they are not allowed to be independent without any supervision by

the adults. The level of fear feelings in society is shown in this and previous studies based on the number of researches that has been done. This study can be a big challenge for the planning profession. Future demands support public health professionals and urban planners to create more effective environmental interventions to promote active transportation to school among children and it has clear orientation in promoting Sustainable Development Goals Principles in sustaining good health and parents and children well-being (Goal 3) and also encourage the sustainable cities and communities with sage and resilient for children and communities to live in (Goal 11).

Future research should focus on investigating the implementation of SRTS in Malaysia with qualitative or quantitative methods to better understand why SRTS should be sustained, safety concern notwithstanding.

REFERENCES

Adom-Asamoah, G., Okyere, S. A., & Senayah, E. A. (2015). Factors influencing school travel mode choice in Kumasi. In *International Journal of Development and Sustainability* (Vol. 4, Issue 1). www.isdsnet.com/ijds

Adom-Asamoah, G., Okyere, S. A., & Senayah, E. A. (2015). Factors influencing school travel mode choice in Kumasi. In *International Journal of Development and Sustainability* (Vol. 4, Issue 1). www.isdsnet.com/ijds

Aibar Solana, A., Mandic, S., Generelo Lanaspa, E., Gallardo, L. O., & Zaragoza Casterad, J. (2018). Parental barriers to active commuting to school in children: does parental gender matter? *Journal of Transport and Health*, *9*, 141–149. https://doi.org/10.1016/j.jth.2018.03.005

Bejleri, Ilir, Steiner, R.L., Fischman, A. and Schmucker, J.M., (2011), Using GIS to Analyse the Role Barriers and Facilitators to Walking in Children's Travel to School.

Bernama (2017, November 11). 1,077 pelajar sekolah mati kerana kemalangan. Harian Metro. https://www.hmetro.com.my/mutakhir/2017/11/282767/1077-pelajar-sekolah-mati-kerana-kemalangan

Boarnet, M.G., Anderson, C.L., Day, K., McMillan, T., Alfonzo, M. (2006), Evaluation of the California Safe Routes to School Legislation: Urban Form Changes and Children's Active Transportation to School, *American Journal of Preventive Medicine*, 2005; 28(2S2).

Chica-Olmo, J., & Lizárraga, C. (2022). Effect of Interaction between Distance and Travel Times on Travel Mode Choice when Escorting Children to and from School. *Journal of Urban Planning and Development*, *148*(1). https://doi.org/10.1061/(asce)up.1943-5444.0000776

Clifton, K.J., Burnier, C.V. and Akar, G., (2009), Severity of Injury Resulting From Pedestrian-Vehicle Crashes: What Can We Learn From Examining the Built Environment?

Dessing, D., de Vries, S. I., Hegeman, G., Verhagen, E., van Mechelen, W., & Pierik, F. H. (2016). Children's route choice during active transportation to school: Difference between shortest and actual route. *International Journal of Behavioral Nutrition and Physical Activity*, *13*(1). https://doi.org/10.1186/s12966-016-0373-y

Faculty of Medicine and Health Sciences. (2022, August 2). *Portal of Faculty of Medicine and Health Sciences*. Universiti Putra Malaysia, 2021.

Handy, S.I., Boarnet, M.G., Ewing, R., and Killingsworth, R.E., (2002), How the Built Environment Affects Physical Activity_Views from Urban Planning, *American Journal of Preventive Medicine* 23(2S).

Hatamzadeh, Y., Habibianb, M., & Khodaii A. (2017). Effective factors in walking mode choice of different age groups for school trips. *Transportation Research Procedia*, 25, 2297–2308. https://doi.org/10.1016/j.trpro.2017.05.441

https://medic.upm.edu.my/industry_and_community_relations/community/safe_kids_malaysia-4591?L=bm

Ikeda, E., Mavoa, S., Cavadino, A., Carroll, P., Hinckson, E., Witten, K., & Smith, M. (2020). Keeping kids safe for active travel to school: A mixed method examination of school policies and practices and children's school travel behaviour. *Travel Behaviour and Society*, *21*, 57–68. https://doi.org/10.1016/j.tbs.2020.05.008

Mah, S. K., Nettlefold, L., Macdonald, H. M., Winters, M., Race, D., Voss, C., & McKay, H. A. (2017). Does parental support influence children's active school travel? *Preventive Medicine Reports*, *6*, 346–351. https://doi.org/10.1016/j.pmedr.2017.04.008

McDonald, N. C. (2007). Active Transportation to School. Trends Among U.S. Schoolchildren, 1969-2001. *American Journal of Preventive Medicine*, *32*(6), 509–516. https://doi.org/10.1016/j.amepre.2007.02.022

McDonald, Noreen C. and Aalborg, Annette E., (2009) Why Parents Drive Children to School: Implications for Safe Routes to School Programs. *Journal of the American Planning Association*, 75:3, 331-342. https://doi.org/10.1080/01944360902988794

Nasrudin, N., & Nor, Abd. R. Md. (2013). Travelling to School: Transportation Selection by Parents and Awareness towards Sustainable Transportation. *Procedia Environmental Sciences*, *17*, 392–400. https://doi.org/10.1016/j.proenv.2013.02.052

Nikitas, A., Wang, J. Y. T., & Knamiller, C. (2019). Exploring parental perceptions about school travel and walking school buses: A thematic analysis approach. *Transportation Research Part A: Policy and Practice, 124,* 468–487. https://doi.org/10.1016/j.tra.2019.04.011

Olsson, A. L., (2003). Factors that influence choice of travel mode in major urban areas: The attractiveness of Park & Ride. *KTH Tidigare Institutioner*

Omar Ahmad (2020, December 2). Jenayah libat pelajar membimbangkan. *Harian Metro*. https://www.hmetro.com.my/mutakhir/2020/12/648603/jenayah-libat-pelajar-membimbangkan

Osman, N., Nasrudin, N., Abdullah, Y., A., & Khalid, N., S. (2020). Factors Influencing Active Travel Mode to School for Primary School Children. *Environment-Behaviour Proceedings Journal, 5*(13), 13-19. https://doi.org/10.21834/e-bpj.v5i13.2089

Pedestrian and Bicycle Information Center. (2022, June 29). *Safe Routes to School Online Guide*. University of North Carolina Highway Safety Research Center, 2015. http://guide.saferoutesinfo.org/index.cfm.

PRISMA. (2022, August 2). *PRISMA Transparent Reporting of Systematic and Meta-Analysis*. PRISMA, 2021. https://prisma-statement.org/

Rahman, M., L., Moore, A., Smith, M., Lieswyn, J., & Mandic, S. (2020). A Conceptual Framework for Modelling Safe Walking and Cycling Routes to High Schools. *International Journal of Environmental Research and Public Health 17*(9), 3318. https://doi.org/10.3390/ijerph17093318

Rini, E. F., Putri, R. A., Mulyanto, Musyawaroh, & Nugraheni, D. S. (2019). Factors influencing the modal choice to access elementary school in supporting Surakarta as child friendly-city. *MATEC Web of Conferences*, *280*, 03022. https://doi.org/10.1051/matecconf/201928003022

Safe Routes Partnership. (2022, June 29). *History of Safe Routes to School*. https://www.saferoutespartnership.org/safe-routes-school/101/history

Scheiner, J., Huber, O., & Lohmüller, S. (2019). Children's mode choice for trips to primary school: a case study in German suburbia. *Travel Behaviour and Society, 15,* 15–27. https://doi.org/10.1016/j.tbs.2018.09.006

Smith, M., Ikeda, E., Hawley, G., Mavoa, S., Hosking, J., Egli, V., Zhao, J., Mackay, L., Donnellan, N., Amann, R., Mackie, H., & Witten, K. (2020). An integrated conceptual

model of environmental needs for New Zealand children's active travel to school. *Journal of Transport & Health, 16,* 100814. https://doi.org/10.1016/j.jth.2019.100814

Southworth, Michael and Owen, Peter M., (1993), The Evolving Metropolis: Studies of Community, Neighborhood, and Street Form at the Urban Edge, *Journal of the American Planning Association*, 59:3, 271-287

Transport Research Board, (2005), Does the Built Environment Influence Physical Activity? Examining the Evidence, TRB Special Report

Trindade, E. P., Hinnig, M. P. F., da Costa, E. M., Marques, J. S., Bastos, R. C., & Yigitcanlar, T. (2017). Sustainable development of smart cities: A systematic review of the literature. *Journal of Open Innovation: Technology, Market, and Complexity*, *3*(3). https://doi.org/10.1186/s40852-017-0063-2

UNC Highway Safety Research Center. (2022). *National Center for Safe Routes to School. Safe Routes Info*. https://www.saferoutesinfo.org/

Voulgaris, C. T., Hosseinzade, R., Pande, A., & Alexander, S. E. (2021). Neighborhood effects of safe routes to school programs on the likelihood of active travel to school. In *Transportation Research Record* (Vol. 2675, Issue 8, pp. 10–21). SAGE Publications Ltd. https://doi.org/10.1177/0361198121995490

Wen, L. M., Fry, D., Rissel, C., Dirkis, H., Balafas, A., & Merom, D. (2008). Factors associated with children being driven to school: Implications for walk to school programs. *Health Education Research*, *23*(2), 325–334. https://doi.org/10.1093/her/cym043

Wilson, K., Coen, S., E., Piaskoski, A., & Gilliland, J., A. (2019). Children's perspectives on neighbourhood barriers and enablers to active school travel: A participatory mapping study. *The Canadian Geographer, 63*(1), 112–128. https://doi.org/10.1111/cag.12488

Yoon, S. Y., Doudnikoff, M., & Goulias, K. G. (2011). Spatial analysis of propensity to escort children to school in Southern California. *Transportation Research Record*, *2230*, 132–142. https://doi.org/10.3141/2230-15

Yu, Chia-Yuan, (2015), How Differences in Roadways Affect School Travel Safety, *Journal of the American Planning Association*, 81-3, 203-220

Zimmerman, S., & Lieberman, M. (2019). (2022, June 29). *Safe Routes to School Program Census Project*. https://www.saferoutespartnership.org/sites/default/files/resource_files/national_census_report_final_2019_09_10.pdf

Surat kami : 700-KPK (PRP.UP.1/20/1)
Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim
Rektor
Universiti Teknologi MARA
Cawangan Perak

Tuan,

PERMOHONAN KELULUSAN MEMUAT NAIK PENERBITAN UiTM CAWANGAN PERAK MELALUI REPOSITORI INSTITUSI UiTM (IR)

Perkara di atas adalah dirujuk.

2.   Adalah dimaklumkan bahawa pihak kami ingin memohon kelulusan tuan untuk mengimbas (*digitize*) dan memuat naik semua jenis penerbitan di bawah UiTM Cawangan Perak melalui Repositori Institusi UiTM, PTAR.

3.   Tujuan permohonan ini adalah bagi membolehkan akses yang lebih meluas oleh pengguna perpustakaan terhadap semua maklumat yang terkandung di dalam penerbitan melalui laman Web PTAR UiTM Cawangan Perak.

Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

setuju.

27.1.2023

PROF. MADYA DR. NUR HISHAM IBRAHIM
REKTOR
UNIVERSITI TEKNOLOGI MARA
CAWANGAN PERAK
KAMPUS SERI ISKANDAR

SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

nar

Universiti Teknologi MARA Cawangan Perak : Experiential Learning In A Green Environment @ Seri Iskandar