Exploring the Nature of Road Safety Education in Basic Schools and School Children's Travel Mode Options in Winneba, Ghana

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Abstract

Road safety education among school children is a critical issue that needs to be addressed as African countries record more road traffic-related deaths and disabilities. Despite efforts to increase road safety education across various mediums, basic schools in Ghana have received little of such attention despite their role in socialisation. This study explored the nature of road safety education and school children's travel mode opinions in Winneba. The study adopted a quantitative research approach which sampled 400 school children within Class 4 to 9 (Junior High 3) from 5 basic schools. Questionnaires were filled after class hours after receiving approval from school heads. Jamovi was used to analyse the data and presented using frequency, cross-tabulation and chi-square test of independence. The study found that walking constitutes a major travel option for children in Winneba as this mode comes at no cost. Even though schools constituted a primary source of knowledge, road safety education was not assigned to a dedicated subject teacher(s) and was seldom taught in school. The study found a significant relationship between the impact of road safety education and school children's frequently used travel mode option. The study recommends efforts to dedicate road safety lessons to subjects like Social Studies and Our World Our People since such subject's touch on Ghanaians' daily living situations.

Keywords: Road safety education, children, school, quantitative, Winneba.

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Introduction

Access to education is crucial to realising the United Nations' Sustainable Development Goal 4. Adom-Asamoah et al. (2015) opine that people may live and work or school in different locations as cities and towns grow, making it possible to enjoy various educational facilities using various travel modes. However, Amoako-Sakyi (2017) noted that children's use of a particular travel mode to school might largely depend on parental approval, economic status or perception of safety associated with a particular mode of transport. The Ghana Statistical Service (2013) reveals that 74.4% of all school children in Ghana travel on foot to school, while bicycle, school bus, and public transport (trotro) account for 6.7%, 6.2% and 3.6%, respectively. Unfortunately, road users on foot (pedestrians, which includes school children) are among the road users with the highest fatality risk in Ghana (National Road Safety Authority, NRSA, 2021), hence the need to heighten road safety education for all road users, including children.

Road safety education among school children is a critical issue that needs to be addressed to reduce the number of road crashes and fatalities (Ackaah, 2010). With the increasing population and urbanisation, road vehicles have also increased, leading to more crashes and fatalities (González-Sánchez et al., 2021; Hesse & Ofosu, 2014; Sam et al., 2023). Existing literature, including Onywera and Blanchard (2013), reports that African countries record more road traffic-related deaths and disabilities than Europe and the U.S despite having fewer vehicles. The World Health Organization (2020) reveals that 186,300 children under 18 years are globally lost to traffic injuries. About 93% of child road traffic deaths occur in low and middle-income countries (Kilbey et al., 2011). Ngunde et al. (2019) argue that children below ten years are the most at risk since their growth stage, road conditions, and lack of supervision during outside play expose them to a greater risk of traffic injuries.

With regards to children's developmental/growth stage, Goniewicz et al. (2017) and Lee et al. (2018) reveal that roadside objects like parked cars, dustbins, darkness, and other road furniture significantly reduce drivers' visibility of children and other small objects in traffic. Moreover, children's cognitive limitations and poor appreciation of traffic rules limit their ability to make safe decisions in traffic, which has implications for their safety (Sangowawa et al., 2012). This situation highlights the need for road safety education for all road users, particularly children and motorists.

Road safety education involves an "effort to enlighten, to civilise and thus to impart more "mature views, beliefs, and values" to road users (Wilde, 2001, p.86). It also involves efforts to empower them with road safety skills (Goddard et al., 2020). The demand for such education is often based on the premise that young road users lack the knowledge, skill, or both to operate in traffic conditions safely and that addressing these shortfalls will reduce their risk of being killed or injured (Raftery & Wundersitz, 2016). In recognition of this road safety education, school-aged children have become a priority for developing and Organisation for Economic Co-operation and Development (OECD) countries, as seen in growing sponsorship and activities (Raftery & Wundersitz, 2016). For instance, Amoako-Sakyi (2017) cites the influx of resources from Oil Marketing Companies (Engen Ghana Limited and Vivo Energy) and Non-Governmental Organisations (NGOs) in facilitating road safety campaigns among basic schools in Ghana. Additionally, Raftery and Wundersitz (2016) also cite increased public funding of extra curriculum activities on road safety education in basic schools in South Australian schools. Indeed, selecting schools as a target for road safety education is apt since most schools in OECD countries possess the resources (computers, classrooms, etc.) and teachers necessary to deliver road safety education. This selection also comes on the heels of various developmental agendas

(SDG 4) that have increased access to educational facilities for children as 80%, 90%, and 92% of children in Nigeria, Ghana, and the US have access to school, respectively (Akyeampong & Hunt, 2007; Isabella, 2022; U.S. Department of Education, 2022). Given increased access to education, Goddard et al. (2020) also cite the inclusion of road safety initiatives, programmes and activities as part of the formal teaching curriculum in schools as another factor that renders schools a fitting avenue in championing road safety education for children.

In Ghana, the National Road Safety Authority (NRSA), formerly the National Road Safety Commission, is directly responsible for developing and promoting road safety programmes in Ghana. As part of its mandate to promote the teaching and learning of road safety in basic schools, the NRSA announced it had started distributing handouts and teaching manuals to basic schools (primary and Junior high) in June 2016. The NRSA produced these manuals in collaboration with the Ministry of Education and the Ghana Education Service (GES) (Amoako-Sakyi, 2017). The programme, which received financial support from the European Union, targeted basic schools in the Greater Accra, Western and Central regions. The Authority also anticipated that road safety will be incorporated into the academic curriculum of basics schools in the sub-region in the coming years and made examinable by the West African Examination Council (WAEC) as part of questions on Social Studies or Civic Education (NRSC, 2016). Unfortunately, some public schools engaged within the pilot areas refuted claims of receiving the said textbooks or manuals. The teachers engaged also claimed to be unaware of any road safety-related questions by WAEC even though the educational curriculum for basic schools has snippets of road safety issues (See Figure 1).

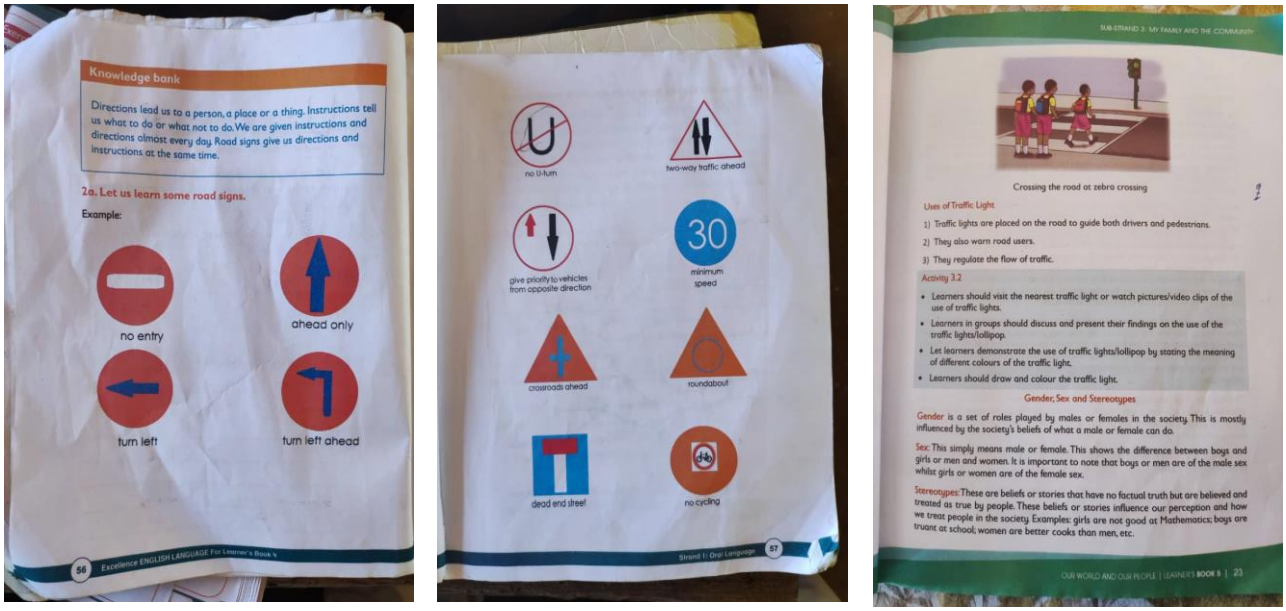

Figure 1: Snippets of road safety lessons in basic schools in Ghana.

While the above sheds light on road safety education for children, the discourse on the nature of such road safety education has primarily been dominated by academics in the global north, even though children in the global south record more injuries (Nasrudin & Nor, 2013). Across Ghana, the discourse on trip generation among children has primarily been dominated by the injury statistics (Setorwofia et al., 2020), children walking behaviour (Yankson et al., 2020) and challenges in the implementation of safety education (Odonkor et al., 2020). But for a few studies that explored challenges in the implantation of road safety education, research into the nature or content of such education is nearly absent. This situation makes Ghana unique as road safety education is loosely incorporated into the academic curriculum of basic schools despite its inherent road safety challenges. Reviewing the contents of road safety education of school children will offer a holistic perspective to evaluate the efficacy of road safety education in basic schools. Besides the introduction, this manuscript also contains a literature review, setting and methods, results, discussion and conclusions.

Literature Review

Road Safety Education (RSE) in schools

Road safety education programs impart knowledge and awareness about safe road usage, especially among students. A study by Poulter and McKenna (2010) found that students who participated in the "Safe on the Road" program significantly improved their knowledge of road safety in the short term in Europe; as a result, they concluded that learning should involve active and engaging activities to enhance long-term retention. Meanwhile, in the United States, improving road safety knowledge and changing students' attitudes towards road safety, like seatbelt usage and responsible road crossing behaviour, alter students' attitudes and behaviours, ultimately promoting safer road practices (Agyemang et al., 2023; Odame, 2022). Similarly, South Korean students have demonstrated better knowledge and attitudes towards road safety following the "Safe Streets" program through technology integration in teaching, using augmented reality to simulate real-life road scenarios, contributing to the program's effectiveness (Alonso et al., 2016).

Gaps within educational systems worldwide stimulate the need for road safety education. For instance, in a European study by Joubert et al. (2012), the primary gap in the UK's road safety education was the need for consistent curricular integration Safety education was delivered in ad hoc, one-off sessions, which may limit school children's long-term knowledge retention and behavioural impact. They recommended a comprehensive and systematic inclusion of road safety education within the curriculum for more effective outcomes.

Similarly, Odonkor et al. (2020) identified a need for personalised education strategies as a primary gap in the United States. Their study suggests that road safety education programs often utilise a "one-size-fits-all" approach, overlooking students' diverse needs and experiences.

Instead, they argue for customised educational strategies for personal understanding and risk perception differences.

In Asia, von Beesten and Bresges (2022) found that South Korean road safety education needs more focus on the role of pedestrians and cyclists. While there is extensive education on car safety, pedestrian and cyclist safety education is often neglected despite these groups being highly vulnerable road users. This suggests a gap in addressing the needs of different road users within the existing education system. In Africa, a study by Kimaro et al. (2016) in Tanzania, Ghana and Sudan observed that although there is a national mandate for road safety education, the implementation is hindered by the scarcity of learning materials and trained teachers, indicating a need for enhanced resource allocation.

The need to overcome these gaps resulted in a catalogue of remedial approaches that vary considerably. American schools emphasise the integration of RSE into a broader health and safety curriculum (Anderson et al., 2019). Meanwhile, a study of European schools by Janssen and van Nes (2020) found a distinct road safety curriculum, often enacted by government agencies, external experts, and schoolteachers. In Asia, notably in Japan, RSE is incorporated into the broader curriculum, targeting knowledge acquisition and behavioural change (Kojima et al., 2021). However, in Africa, where road accidents are high, RSE is often fragmented and not consistently included in school curriculums (Abegaz et al., 2020). Further review indicates that African and Asian programs showed a predominance of theory based RSE with less emphasis on practical skills (Kojima et al., 2021; Abegaz et al., 2020). Research also emphasises that road safety education's effectiveness and comprehensiveness largely depend on contextual factors such as cultural nuances, infrastructure, traffic environment, and policy support (Chen et al., 2022).

Regarding teaching methods, studies indicate a clear shift towards more interactive, student-centred learning strategies. Anderson et al. (2019) argue that role-playing, simulations, and group discussions are more effective than traditional lecturing in achieving learning outcomes in RSE. Kojima et al. (2021) highlight the success of using digital technology, including interactive online platforms and virtual reality, to teach road safety in Asia. However, in Africa, resource constraints often limit innovative teaching methods, with a reliance on more traditional, teacher-centred strategies (Abegaz et al., 2020). Despite this, there is a consensus that active and participatory methods are critical for effective RSE (Janssen & van Nes, 2020).

In view of the above, the effectiveness of road safety programs in schools has not been uniform across the globe. In Nigeria, despite improving road safety knowledge among students, the program failed to change attitudes and behaviours due to cultural factors used for adapting road safety education to suit local circumstances (Ndu et al., 2021). In addition, Sheppard et al. (2019) conducted a study in the United Kingdom argued that gaining knowledge and attitudinal change do not necessarily result in safer behaviour, indicating a gap between intention and action as they recommend incorporating practical experiences into education programs to enhance their effectiveness.

Factors that influence road safety education for school children

The socioeconomic status of families plays a significant role in road safety education. Families with higher socioeconomic status are more likely to access comprehensive road safety education programs, fostering an enhanced awareness of road safety rules and practices (Engström, Gregersen, & Granström, 2008). In contrast, children from disadvantaged backgrounds may not have the same level of exposure to road safety education due to limited resources or lack of

awareness. Schools and communities in lower socioeconomic areas may not be adequately equipped to deliver quality road safety education, leaving a gap in these children's knowledge.

Beyond parental economic and social standing, the role of parents and the community in shaping children's attitudes and behaviours towards travel modes and road safety cannot be understated. Parents' road safety behaviours, such as consistently using seatbelts and obeying traffic signals in America, significantly influence their children's road safety practices (McDonald et al., 2019). By this, communities with robust road safety cultures reinforce these behaviours among children. In Europe, Aberg and Rimmo (2018) opine that parents' attitudes towards different travel modes significantly influence their children's travel behaviours because parents who frequently use and view public transport favourably have children more likely to use public transport. In India, a study by Gupta et al. (2021) revealed that parental attitudes toward road safety, especially among higher education students, directly impacted their children's road safety behaviours. However, the study also found that community norms could sometimes overshadow parental influence, especially in communities with prevalent risky road behaviours.

Institutional factors such as school policies, curriculum design, and teacher training significantly influence the effectiveness of road safety education. Schools with a well-designed curriculum that incorporates practical and theoretical aspects of road safety can enhance children's understanding and retention of safety practices (Downey, 2019). Additionally, teacher training is crucial, as well-equipped teachers can deliver road safety education more effectively and engage students in meaningful learning.

The pedagogical approach used in road safety education can greatly impact its effectiveness. Traditional lecture-based methods may not always engage children or facilitate long-term knowledge retention. On the other hand, interactive learning methods that involve role-playing,

simulations, games, and discussions can enhance children's active participation and understanding of road safety practices (Tolmie et al., 2005). Innovative approaches such as digital learning tools can further enrich the learning experience and cater to different learning styles.

The local traffic environment also influences road safety education. In areas with high traffic density and complex road layouts, it is crucial to provide children with more comprehensive and localised road safety education (Zeedyk et al., 2002). This helps them navigate their local traffic environment more safely and confidently. In contrast, children in rural areas or regions with lower traffic density may require different types of road safety education. Government policies and legislation play a crucial role in road safety education. Policies that mandate road safety education in schools can ensure widespread and consistent teaching of road safety practices. Furthermore, laws regulating road user behaviour, such as speed limits and pedestrian rights, can support the principles taught in road safety education, thereby reinforcing its importance (World Health Organization, 2011).

Road Safety Education in Ghana

Road safety education involves educational interventions aimed at improving pedestrian safety focus or empowering them with road safety skills. However, the targets are not only pedestrians but drivers as well. Usually, organisations or bodies mandated to educate the public on road safety roll out programmes aimed at altering driver behaviour. The National Road Safety Authority (NRSA) is directly responsible for developing and promoting road safety programmes in Ghana. Their targets include drivers, school pupils, teachers and parents. They have been organising outreach programmes over the years, and two such programmes which were touted to have made a lot of impacts are the “Save the Child” and “SAVE WAYS”

Programmes (Amoako-Sakyi, 2017). The SAVE WAYS programme, for instance, afforded the NRSA the rare opportunity to take school pupils through simulated experiences within school compounds and near real roads. This was seen as quite innovative, as previous campaigns for school pupils were normally done in regular classroom settings. The key objective of the SAVE WAYS Programme was to create and, in some cases, increase road safety awareness among pupils so as to enable them to make informed decisions and help them make safer journeys both to school and from school (TRL, 1997).

As part of its mandate to promote the teaching and learning of road safety in basic schools, the NRSA announced it had started distributing textbooks and teaching manuals (Figure 2) to primary and Junior high schools in the country in June 2016. The textbooks and manuals for the Basic Schools and teachers cover topics such as keeping safe on the road, safe crossing points, and first aid in road safety and road signs (NRSC, 2016).

Figure 2: Road Safety textbooks and teaching manuals

Children's Travel mode choice

Understanding how children travel nowadays, their thoughts about travel, and their opinions on different transport modes may provide important answers for policymakers in responding to children's current and future needs. But obviously, children do not act autonomously, and their travel behaviour also strongly influences their parents' travel behaviour (Zwerts et al., 2010).

The journey to and from school forms an essential component of every child's life. Children may travel to school using various modes like walking, cycling, private vehicles, motorcycles, school buses or paratransit modes (Amegah, 2022). The availability of alternative modes also gives parents and their children several options to decide on. A review of the existing literature revealed several factors that influence children's school mode choices.

Firstly, distance from the home to the destination is one major factor that influences travel mode choice decisions. How far or near a person may assume a distance influences the decision to walk or use motorised transport (Scheiner, 2016). However, it is imperative to note that distance is relative depending on who is making the trip. Specifically, children are most likely to choose a motorised travel mode if the distance is more than 1 km and are more likely to use non-motorised transport for journeys less than 1 km (Ipingbemi & Aiworo, 2018; Porter et al., 2015)

Another factor that influences children's travel mode choice decisions is household characteristics. Shengxiao and Pegnjun (2015) posited that household attributes such as income level, education level, and parent perception of safety play a key role in the decision-making for school mode choice. Adom-Asamoah et al. (2015) also argued that the economic status of parents or family (particularly household income and car ownership) defines the travel mode that is used for school journeys. For instance, households with high monthly incomes and available cars tend to depend more on motorised transport for school journeys than households with low monthly income levels (Easton & Ferrari, 2015). A previous study in Kumasi, Ghana, by Adom-Asamoah et al. (2015) revealed that in Nyhiaeso (a suburb of Kumasi), 67% of the households owned a car, and thus 55% of children in this suburb travelled to school by private cars. The children also relied on taxis and school buses in situations where private cars were not used.

Furthermore, parental perception of safety also plays a crucial role in the decision process of travel mode on school journeys. Safety concerns expressed by parents include fear of road crashes (as in the case of motorised transport and pedestrians) (Adom-Asamoah et al., 2015); and fear of abduction (Faulkner et al., 2010) which has raised major concern and panic over the past few years specifically in Ghana. For instance, Adom-Asamoah et al. (2015) revealed that 48% of parents identified safety as a reason for their decision to drop off their children at school.

Related to this, the perceived nature of the road also influences travel mode choice to school as the absence of protective measures like zebra crossing, road signs, traffic lights, and sidewalks deter parents from allowing their children to walk or cycle to school (Amoako-Sakyi, 2017).

Finally, age and gender of children are the two major sociodemographic attributes affecting mode choice for school journeys. As most school-going teenagers may determine their travel modes for school journeys, school trips of younger children are decided solely by their parents. Most studies have found an increase in the tendency to influence mode choice among school children with an increase in age (Easton & Ferrari, 2015; Ermagun & Levinson, 2017). Similarly, other studies revealed a relationship between age and shift from one mode to another. A study conducted in Dar Es Salam on the determinant of school travel revealed a negative relationship between age and motorised transport (Bwire, 2020). The studies posit that an increase in age will lead to children reverting from motorised transport to non-motorised transport. However, some studies identified an inverse (Wadud, MacKenzie & Leiby, 2016; Bertolini, 2017) or no relationship between age and travel mode choice (Wilson, 2010). Regarding gender, several authors have found that girls are less likely to walk than boys (Hatamzadeh et al., 2017). In contrast, studies by Bopp et al. (2012) found no relationship between gender and children's modes of travel to school.

Methods and Settings

This study was conducted in Winneba, a top-five accident hotspot on the Trans-West African Coastal Highway that connects Nigeria to Mali (Nyarko, 2021). Winneba’s proximity to the national capital city of Accra and the colonial city of Cape Coast makes it a residential hub for many people who travel to these two major cities for varied activities. Winneba is an educational

centre with many educational facilities (basic schools, universities, etc.), hence the selection of Winneba for this study (Ohene & Essuman, 2014). This study adopted an exploratory quantitative research design that is apt in shedding light on research problems that have received little or poorly explored attention (Creswell, 2018).

The study sample included school children between 9 to 15 years and within Class 4 to 9 (Junior High 3) in the following schools: Methodist B, A.M.E Zion ABC Primary and JHS, A M. E. ZION. D, University Practice School, and Zion D/A Primary JHS. These schools constitute the five most populous schools in Effutu. The authors sought to achieve a 50% representation of each class, resulting in a sample of equal proportions (80). In all, 400 schoolchildren were sampled for the study together to achieve representativeness of research findings, particularly in a targeted group whose members may not all be present at the time of engagement (Aziz et al., 2016). Here, all eligible respondents were selected using simple random sampling. By this, the register for each class (classes 4 to 9) was adopted as the sampling frame from which random tables were used to select 80 respondents for each school. Creswell (2018) maintains that this approach is the most straightforward among other probabilistic approaches since it requires little knowledge of respondents and uses single random selection. Indeed, this approach's reliance on randomisation enhances the study's internal and external validity and reduces sampling bias.

Data were collected using questionnaires to elicit opinions on respondents' travel mode choices and the efficacy of road safety education received in school. The questionnaire comprised three sections: socio-demographic characteristics captured elements like age, sex, class, disability, children's living arrangement and presence of a vehicle at home. The other two sections comprised their mode choice to the school (who decided on how you should travel? what is your most preferred mode? and what other alternative means of transport are available in your

community?) and the nature of road safety education received in class (where did you obtain your knowledge on road safety? and under which subject area do you have road safety education?). All questionnaires were administered using Kobo ToolBox (a free and open-source online survey platform). Five (5) research assistants were deployed to assist the children in responding to the questionnaire. Before administering the questionnaire, an introductory letter and a sample questionnaire were sent to the respective school heads and teachers to seek approval. This approval was needed since the school heads and class teachers were the closest caregivers and immediate representatives of parents/guardians (primary caregivers).

The instruments were pre-tested at the University of Education, Winneba (UEW) among students at the University Primary School. The instrument pre-testing occurred between 1st and 4th June 2021, involving one student each from class 4 to JHS 3 (Junior High School 3). The diverse selection from different classes aimed at obtaining a more comprehensive understanding of how the research instrument would work with children at different levels. The researchers used the pre-testing phase to ensure the respondents understood the questions as intended by the researchers, leading to more accurate data. Also, the pretesting allowed the research team to test the efficacy of the Kobo Toolkit regarding user experience and data collection capabilities in the field.

The data was analysed using Jamovi (a free and open-source quantitative data analysis software). Jamovi offers a wide range of statistical tests and data visualisation tools. The data were first cleaned, identifying and correcting errors, removing duplicates and dealing with missing inconsistent data. Descriptive statistics were used to summarise the data. This includes techniques like frequency (how often each value occurs), cross-tabulation (a method to quantitatively analyse the relationship between multiple variables) and the chi-square test of

independence. These techniques help in providing a basic understanding of the data's underlying structure. At every level of the study, adherence to ethical protocols was strictly followed, given the nature of the respondents. Here, informed consent, anonymity, privacy, and confidentiality were upheld to the latter. No payment or financial reward was given to the respondents or their caregivers (teachers).

Results

Profile of respondents

More females (58.2%) than males (41.8%) participated in the study. Regarding age cohort, respondents aged 12 to 14 were more than half (50.2%) of the study's population, while those aged 9 to 11 and above represented 31.5% and 18.3%, respectively. Less than 2% of respondents had a disability, mainly physical impairment that ranged from a loss or malfunction of an arm or limb to skeletal deformation. On children's living arrangements, 98.2% lived with an adult (a parent or guardian) at the time of the survey; the remaining 1.7% lived in students' hotels. Nearly 37% of the participating schoolchildren had no means of transport in their homes. Those with bicycles, motorcycles, and private cars constituted 23%, 14.5% and 12.5%, respectively. Regarding travel time to school, 83% of children travelled for 30 minutes or less. Most of these school trips (49%) were undertaken by the children alone.

Table 1: Respondents' profile

Variables	Percentages
Sex	
Male	41.8
Female	58.2
Age	
9-11 years	18.3
12-14 years	50.2
15 -17 years	31.5
Class	
Class 4	23.3
Class 5	12.5
Class 6	18.0
JHS 1	19.8
JHS 2	15.0
JHS 3	11.5
Disability	
No	98.3
Yes	1.7
Child living with	
Guardian	34.3
Parent	64.0
Self	1.8
Vehicle availability in children's home	
None	36.9
Bicycle	22.8
Motorcycle	14.7
Tricycle	4.2
Private car	12.5
Taxi/trotro	9.0
Travel duration/time to school	
Less than 30 minutes	82.5
31 to 60 minutes	16.5
Above 60 minutes	1.0
Travel aid	
Parent	6.6
Other adults	1.2
Siblings	11.5
Friends	31.7
Alone	48.9
Total	100

Source: Field Work, 2022.

School children's mode options to school

We analysed various means of transport (i.e., travel options) used by the study respondents to and from school (Table 2). As Table 2 presents, walking remained the dominant travel mode for the study respondents, with 70% (281) of the respondents being captive walkers. However, the decision to walk to or from School was either the child's decision (46.1%) or influenced by the parent/guardian (50.7%). Beyond walking, taxis remained the second most utilised travel mode, albeit parents-informed (89.5%) because it required paying fares. We observed that the number of students using bicycles was 36% lower than those with bicycles in their homes (see Table 1). Regarding this, we observed that parental influence (53.8%) remained key in children's use of bicycles to school. Just a few of the study respondents used commercial motorcycles (0.25%), trotro (0.25%), private motorcycles (3.5%), or commercial tricycles (3.75%) at the time of the survey.

Table 2: Cross-tabulation of frequently used children's travel modes and the agent that decided which mode to use.

Frequently used modes	Who decides on the mode to use			Total (%)
	Parent/Guardian (%)	School authorities (%)	Self (%)	
Walk	50.7	3.2	46.1	100
Bicycle	53.8	0.0	46.2	100
School bus	25.0	0.0	75.0	100
Private car	52.1	1.4	46.6	100
Motorcycle private	35.7	0.0	64.3	100
Taxi	89.5	8.0	2.5	100
Trotro	100.0	0.0	0.0	100
Tricycle/Pragia	46.7	0.0	53.3	100
Motorcycle/Okada	100.0	0.0	0.0	100
Other	25.0	25.0	50.0	100

Source: Field Work, 2022.

Nature of road safety education received in schools.

The study respondents claimed to have obtained some level of road safety knowledge mainly from their schools (48.2%) and parents (35.5%) (Table 3). The respondents mentioned Integrated Science (24.4%), Social Studies (34.6%) and Our World Our Planet (18.5%) as the main subjects with road safety contents (see Table 3). Nearly all children (99.5%) claimed to have received road safety education about 1-3 times in their last school term. The respondents revealed knowledge of the following road safety activities: the use of a traffic light (27.4%), zebra crossing (24.5%) and traffic crossing drill (20.0%) as skills in use for their everyday trips to/from schools. They claimed to have studied the following topics: road signs (27.2%), keeping safe on the road (23.6%), safe crossing points (22.4%) and first aid (13.8%). Unfortunately, about 38.8% of respondents claimed to have sustained or know a friend who sustained an injury while walking to or from school. The nature of the accident was mainly falling from the sidewalk (43%), vehicle-to-bicycle collision (23.7%) and vehicle-to-pedestrian collision (13.4%).

Table 3: Nature of road safety education received in basic schools.

Variables	Percentages
Knowledge of road safety	
Yes	100
No	0
Main source of knowledge	
Parents/Guardians	33.5
TV/Radio	16.1
School	48.2
Social Media	2.3
Subjects with road safety content	
Science	24.4
English	7.5
Our World Our Planet	18.5
Creative Arts	4.6
Citizenship Education	5.9
Social Science	34.6
Religious and Moral Education	1.1
Visual Arts	0.9
Twi	0.9
Information Communication Technology (ICT)	1.1
Mathematics	0.4
Frequency of road safety education in the last school term	
1-3	99.5
4-6	0.5
7-9	0
Above 9	0
Actions known	
Use the traffic light	27.4
Use the Zebra crossing	24.5
Select a safe crossing point	17.9
Do the traffic crossing drill	20.0
Cross the road after alighting from a vehicle	10.3
Curriculum	
Keeping safe on the road	23.6
Safe crossing points	22.4
First aid in road safety	13.8
Road signs	27.2
The use of paratransit and school buses	11.6
Other	1.5
Ever sustained injury or been involved in accident while travelling to/from school?	
Yes	61.3
No	38.8
Type of accident	
Fall in an open drain	5.9
Fell on the sidewalk	43.0
Tripped on a pathway obstruction	5.9
Vehicle-to-pedestrian collision	13.4
Vehicle-to-bicycle collision	23.7
Other	8.1

Association between the impact of road safety education and school children's travel mode options

Table 4 indicates that a substantial number of school children had once been injured as they walked (45.2%) or cycled (50%) to school, respectively. No injuries were reported with private car or motorcycle use.

The study further explored the relationship between the impact of road safety education (measured by reported incidence of injury to respondents or school mates) and school children's frequently used travel mode (i.e.travel mode option) using the Chi-square test of independence. The categorical nature of the data informed the choice of this analytic technique. The study found a significant relationship between the impact of road safety education and the school children's frequently used travel mode, x^2 (4, 400) = 37.109, P < 0.000. The Cramer's V value of 0.305 indicates a strong (large) association between the variables, implying that the frequently used travel mode is informed by the extent of road safety education (in this case, the extent of injuries associated with using the travel modes).

Table 4: Chi-square test of independence on children's main travel mode and recorded injures while travelling to/from school.

Travel Mode	Have you/a friend ever been injured while travelling to/from school?		
	No (%)	Yes (%)	Total (%)
Private Car	100	0	100
Taxi	90.5	9.5	100
Bicycle	50	50	100
Walk	54.8	45.2	100
Private Motorcycle	100	0	100
Total	61.3	38.8	100

Discussion

The study explored children's mode choice and the contents of road safety education enjoyed by 400 basic school children in Winneba. The results identified walking as a dominant travel mode for the study respondents. Although many studies (e.g., Amoako-Sakyi et al., 2021; Porter, 2002; Sam, 2022) have justified the need for walking as an active transport mode, children's decision to walk to school was heavily subjected to parental/guardian approval. Nasrudin and Nor (2013) observed that parental decisions on their children's mode choice depend on economic status. They observed a positive relationship between parents' economic status and the use of private cars or walking to school by children from high-and low-income households in Malaysia. Like many fishing communities, Winneba is a low-income community (Ghana Statistical Service, 2013), and even though this is a precondition to walking, the relatively shorter walking time between children's homes and their schools may also have influenced the parental decision to allow their children to walk to school.

Unlike primate cities like Accra, where walking as a travel mode is heavily competed by commercial minibuses (trotro), Winneba's status as a secondary city with a lower population makes it challenging to operate higher occupancy buses like the trotro (minibus). Taxi services emerged as the most suitable alternative to walking, especially for children who had to travel more than 30 minutes to school. Unfortunately, respondents who use taxis were less than a third of those who walk. However, not all children who travelled more than 30 minutes went by taxi. This situation corroborates Adom-Asamoah et al. (2015)'s finding, which observed low patronage of taxi services among children of public schools in the Ashanti Region. Adom-Asamoah et al. (2015) concluded that most children in public schools come from poorer homes

and may not afford to pay daily taxi fares even though this reduces children's risk of accidents and injuries while walking longer distances.

Children's awareness of road safety education is an indicator of their understanding of safe practices while navigating traffic environments. The study found that more than 50% of the respondents relied on sources outside the classroom, such as parents and social media, as their primary means of receiving road safety education. This finding contradicts the findings of Raftery and Wundersitz (2016) and Dragutinovic and Twisk (2006), who suggested that road safety education primarily occurs within the classroom. To explain this discrepancy, one possible factor could be the difference in the frequency at which the respondents received road safety lessons compared to children in Austria. Raftery and Wundersitz (2016)'s study revealed that children in Austria received daily road safety tips and engaging activities, which likely contributed to their higher level of awareness in comparison. This suggests that the frequency and consistency of road safety education may play a significant role in shaping children's understanding and behaviour regarding road safety.

Furthermore, the involvement of parents in promoting road safety education was confirmed by Muir et al. (2017) in their research on the parental role in children's road safety experiences. According to their study, 77% of parents in Austria actively participated in raising road safety awareness among their children. This active parental involvement can be attributed to the desire to prevent any potential loss or grief from road accidents. Parents often recognise the importance of equipping their children with the necessary knowledge and skills to navigate traffic safely.

Among the various road safety activities, children identified using traffic lights as the most common activity known to them. This was an interesting observation, considering that Winneba has traffic lights only in a limited section of the community. This finding, however, supports the

assertion made by Purcell (2020) that traffic lights are the most recognised road safety item for children. One of the main reasons for this familiarity is children's adaptability to colour schemes and visual objects, which are key learning materials for lessons on traffic lights. In Purcell's (2020) view children tend to grasp and remember information better when it is presented visually and colourfully, and by this, respondents' recollection of traffic lights was not surprising. Furthermore, poetry and rhymes related to traffic lights in basic schools also contributes to children's understanding and utilisation of traffic lights. These rhymes are designed to be simple and easy to recall, enabling children to remember and apply the rules associated with traffic lights more effectively. For example, in Ghana, a famous rhyme goes, "*When you see a traffic light; there is something you should know.*"

The use of zebra crossings also ranked high among children's road safety activities. However, it is worth noting that most zebra crossings in Winneba are barely visible. Despite this, children still recognised and acknowledged the importance of zebra crossings. One possible explanation is the visual resemblance to a zebra, which captures children's attention. According to Sayer et al., (2006), the assurance of a safer crossing space provided by zebra crossings increases their attractiveness to children. Compared to other road markings, a zebra crossing clearly indicates to children that it is a designated area for pedestrians to cross the road safely.

The study highlights an important observation regarding road safety lessons in basic schools in Ghana. It reveals that these lessons are not specifically allocated to a particular subject in the educational curriculum. This lack of a dedicated subject or course for road safety makes it challenging to determine the importance and priority given to road safety issues within the education system. According to Agyemang et al. (2023), road safety education in Ghana is currently regarded as an extra-curricular activity for school children. This means that road safety

education is not integrated into the regular academic syllabus followed by students. To address this gap, organisations such as Engen Ghana Limited and the National Road Safety Authority have collaborated with the Ghana Education Service to develop a road safety manual. The manual serves as a resource for educators to provide students with road safety information and guidance. However, it is important to note that the enforcement and implementation of this manual may not be guaranteed since road safety education is not examinable in basic schools. Overall, the current situation in Ghana indicates that road safety education for children is not significantly emphasised within the formal education system. This raises concerns about the effectiveness and sustainability of road safety initiatives in the country.

The study found a large significant relationship between the impact of road safety education and the children's frequently used travel mode. This implies that the school children's frequently used travel mode is informed by the extent of road safety education (in this case, the extent of injuries associated with using the travel modes). This assertion confirmed an earlier finding by Poku-Boansi et al. (2019) that parent's and children's notion of risk as a key factor inform their travel mode choice. Specifically, 60.8% of parents in Adenta (a peri-urban community in Accra) who receive reports of travel risk or injuries admonish their children to adopt alternative paths (for pedestrians) or pay for their children to board taxis or buses. Simply put, parents and children choose a less risky travel option.

Conclusion

The findings suggest that walking constitutes a major travel option for children in Winneba as this mode comes at no cost. While road safety was a familiar concept, schools constituted a primary source of knowledge as parents and social media were second and third common

sources of road safety education. Even though this deviates from the reality in Europe and America, the dominance of parents as a source of knowledge (as in the case of this study) reflects low priority accorded to road safety education in basics schools in Ghana. As already stated, road safety education is not examinable by the West African Examination Council (WAEC) since they were not found in the educational syllabus for basic schools.

The study recommends consolidating efforts by the Ghana Education Service to dedicate road safety lessons to key subjects like Social Studies, English Language and Citizenship Education. These subjects touch on Ghanaians' daily living situations, including their moral and civic responsibility and safety in public spaces. Doing this will clearly outline a subject teacher whose area of expertise meets this topic. Additionally, the content of these lessons should include other essential topics such as cycling, playing along the road and group walking behaviour. Also, the West African Examination Council (WAEC) should institute efforts to make road safety lessons examinable since this would increase road safety awareness among basic school children.

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