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Evaluating Pedagogical Strategies for Pedestrian Safety Education Among High School Students

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ABSTRACT

Pedestrian-related accidents are a significant public health concern, particularly in sub-Saharan Africa, where pedestrian fatalities among young people continue to rise. In Ghana, the absence of targeted pedestrian safety education in senior high schools contributes to these fatalities. This study aims to assess the knowledge of pedestrian safety among senior high school students and evaluate their preferred learning strategies for safety education. Using a descriptive survey design, data were collected from 103 students in the Ashanti Region of Ghana. Quantitative methods, including descriptive statistics and regression analysis, were employed to analyze the data. The results revealed that while 75.7% of students demonstrated adequate knowledge of pedestrian signs, only 35% had sufficient knowledge of pedestrian safety rules. Students expressed a clear preference for active learning strategies, with outdoor practical exercises and roleplay rated as the most effective methods. No significant relationship was found between students' gender and the effectiveness of these strategies, suggesting that interactive teaching methods are universally effective across demographic groups. The findings highlight the need to integrate student-centered, experiential learning methods into the national curriculum to enhance pedestrian safety education.

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Introduction

Pedestrian-related accidents are a growing public health crisis, particularly in low and middle-income countries where road safety measures and education are often insufficient. In 2021, Ghana recorded over 400 pedestrian-related fatalities, with a significant portion involving school-aged children [1][2]. Road traffic injuries are now recognized as the leading cause of death for individuals aged 5-29 globally, disproportionately affecting vulnerable populations such as children and adolescents in sub-Saharan Africa [2][3]. In Ghana, pedestrian accidents contribute to approximately 45% of road traffic fatalities among youth aged 10-17 [1]. This highlights an urgent need for targeted interventions to address pedestrian safety, particularly through formal education.

Globally, road safety education has been widely studied and implemented, particularly in high-income countries where formalized programs have significantly reduced traffic-related fatalities and injuries [4][5]. Studies from countries such as the United States and the United Kingdom have demonstrated that well-designed road safety curricula, which include pedestrian safety, can effectively lower accident rates among young people [6]–[8]. In contrast, research in sub-Saharan Africa remains scarce, with most educational efforts focused on improving driver behavior rather than pedestrian safety [9][10].

Recent studies have explored the role of active learning strategies, such as role-play, simulations, and practical exercises, in enhancing student engagement and knowledge retention [11]–[13]. These strategies have proven effective in diverse contexts, especially in teaching safety concepts that require practical application [14][15]. However, limited research exists on the applicability of these methods in low-resource settings like Ghana, where road safety infrastructure is underdeveloped and pedestrian safety education is often informal or absent [16][17].

In Ghana, pedestrian safety education is typically informal, delivered through community programs or occasional road safety campaigns [18][19]. These initiatives are sporadic and lack the structured, sustained approach necessary to bring about lasting behavioral changes. While some studies have examined the knowledge and practices of students regarding road safety, few have addressed the pedagogical strategies most effective in teaching pedestrian safety [7][20]. Moreover, the existing literature does not fully explore the learning preferences of high school students in sub-Saharan Africa, a critical factor in designing effective educational interventions [8][21].

Pedestrian safety in Ghana is a critical issue, particularly for adolescents who face daily risks when navigating busy streets. The lack of formalized pedestrian safety education in Ghanaian senior high schools has contributed to rising accident rates among young people

[8][16]. This gap in education leaves students ill-prepared to safely navigate their road environments, increasing their vulnerability to accidents and contributing to Ghana's high pedestrian fatality rate. Furthermore, inadequate pedestrian safety education not only endangers students' physical safety but also impacts their mental well-being and academic performance, as students and families may experience trauma or loss due to traffic accidents [3][13]. Therefore, this study aims to assess the current state of pedestrian safety knowledge among senior high school students in Ghana and evaluate the effectiveness of various pedagogical strategies for teaching these concepts.

To design effective pedagogical strategies for pedestrian safety education, this study draws on two key educational theories: Kolb's Experiential Learning Theory and Constructivist Learning Theory. Kolb's theory emphasizes the importance of learning through experience, arguing that active participation in learning leads to deeper understanding and retention of knowledge [12][22]. This aligns with findings that students prefer hands-on learning methods, such as role-play and outdoor practical activities, which engage them more actively in the learning process [17][23].

Similarly, Constructivist Learning Theory, as proposed by Piaget and Vygotsky, posits that learners construct their own understanding through interaction with their environment [24][25]. This theory supports the use of interactive teaching methods, where students actively participate in their learning, particularly in complex subjects like pedestrian safety where practical application is crucial [14][26]. By grounding the study in these educational theories, we seek to understand why experiential and interactive methods are more effective in promoting pedestrian safety knowledge among high school students.

The findings of this study have the potential to inform educational policy in Ghana, particularly in the design and implementation of pedestrian safety curricula in senior high schools. By providing evidence-based recommendations for integrating active learning strategies into the national curriculum, this study could contribute to a reduction in pedestrian fatalities and injuries among young people. Moreover, this research offers insights into how experiential learning methods, such as role-play and outdoor practical exercises, can be adapted to low-resource contexts like Ghana, where formal pedestrian safety education is limited [13][14].

The global relevance of this study extends beyond Ghana, as many developing countries face similar challenges in pedestrian safety education. By demonstrating the effectiveness of student-centered learning approaches in a sub-Saharan African context, this research can inform international efforts to improve road safety education in other low- and middle-income countries [3][11][27].

Material and Methods

This study employed a descriptive survey research design to assess the knowledge of pedestrian safety among senior high school students and to evaluate their preferred teaching methods for pedestrian safety education. A descriptive survey design was chosen because it allows for the collection of data from a large group of participants in their natural settings, making it ideal for exploring students' preferences and knowledge regarding pedestrian safety. Surveys are a widely accepted method in educational research for capturing attitudes and behaviors [28][29]. Alternative designs, such as experimental or longitudinal approaches, were not selected due to the study's exploratory nature and the need to establish baseline knowledge and preferences before designing intervention-based research.

The target population for this study comprised senior high school students in the Ashanti Region of Ghana. Stratified random sampling was employed to ensure representation across gender, grade level, and academic programs. The strata were based on some selected Senior High School in the Ashanti Region. A total of 103 students participated in the study, comprising 64 boys and 39 girls. This sample size was deemed sufficient for exploratory research, and the use of stratified random sampling allowed for the collection of data that represented various demographic subgroups [30]. While the sample size may limit the generalizability of the findings, it provides a solid foundation for future research that can expand the sample to include students from different regions and socio-economic backgrounds.

The primary data collection instrument was a structured electronic questionnaire, designed by the researcher and reviewed by educational experts for content validity. The questionnaire consisted of three sections: Demographic information: Collected data on the participants' gender, age, grade, and academic program. Pedestrian safety knowledge: Measured using multiple-choice and Likert scale questions assessing students' knowledge of pedestrian signs, rules, and road-crossing behaviors. Established scales were adapted from previous studies on road safety education [10][14]. Preferred teaching strategies: Evaluated students' preferences for different teaching methods, including lectures, role-play, multimedia presentations, and outdoor practical exercises, using a five-point Likert scale.

The questionnaire was piloted with a small sample of students from a different school to ensure clarity and consistency. Based on feedback from the pilot, minor adjustments were made to improve question phrasing and structure. Data collection took place over a period of four weeks. Electronic questionnaires were administered during class hours in a supervised setting to ensure high response rates and accuracy. Participation was voluntary, and students were given a clear explanation of the study's purpose and confidentiality measures. To mitigate the potential influence of the researcher's role as a teacher in one of the schools, an external

assistant facilitated the data collection process to minimize bias and ensure students' responses were free from external pressures.

The collected data was analyzed using SPSS, a widely recognized statistical software for social science research. Data analysis was conducted in phases: Descriptive statistics such as frequencies, percentages, and means were calculated to describe the demographic characteristics of the participants and their responses to the knowledge and preference questions. Cross-tabulation was used to examine the relationships between demographic variables (such as gender, age, and academic program) and students' pedestrian safety knowledge. These analyses helped identify any significant associations between demographic factors and knowledge levels. Multiple linear regression was applied to explore the relationship between students' pedestrian safety knowledge (dependent variable) and demographic variables such as age, gender, grade, and program (independent variables), while ANOVA was used to assess differences in preferred teaching strategies across different demographic groups.

While the study provides valuable insights into the knowledge and learning preferences of senior high school students in Ghana, the findings may not be fully generalizable to all student populations in the country. The focus on urban schools may not reflect the experiences of students in rural areas, where access to road safety infrastructure and education may differ. However, the study contributes to the growing body of literature on road safety education in developing countries, providing a framework that can be adapted for use in other low-resource settings [3][4].

Verbal consent was sought from school authorities. Data confidentiality was strictly maintained, with all electronic responses securely stored on password-protected devices. No identifying information was collected, ensuring participants' anonymity. All participants were informed of their rights to withdraw from the study at any time.

Results

A. Demographic of respondents

This study analyzed the demographic characteristics of 103 senior high school students to understand the composition of the sample and its potential influence on the study outcomes. The majority of the students (90.3%) were aged between 15 and 18 years, with a small percentage (5.8%) above 19 years and 3.9% between 12 and 14 years. The gender distribution was skewed, with 62.1% of the sample being male and 37.9% female. In terms of academic level, the largest proportion of students were in SHS 1 (41.7%), followed by SHS 2 (35%) and SHS 3 (23.3%) (Table 1).

Table 1. Demographic details of the participants

Category	Number of respondents	Percentage (%)
Gender		
• Male	64	62.1
• Female	39	37.9
Form		
• SHS 1	43	41.7
• SHS 2	36	35.0
• SHS 3	24	23.3
Program		
• General Science	57	55.3
• General Arts	18	17.5
• Business	12	11.7
• Home Economics	10	9.7
• Visual Art	5	4.8
• Agricultural Sci.	1	1.0

A significant finding was the high representation of General Science students, comprising more than half of the sample (55.3%), followed by General Arts (17.5%), Business (11.7%), Home Economics (9.7%), Visual Arts (4.8%), and Agricultural Science (1%). This distribution reflects broader national trends in secondary school education, where science programs are often prioritized, and technical or vocational programs, such as Agricultural Science, receive less attention [6, 8].

B. Cross-tabulation analysis

Cross-tabulation analysis (Fig. 1 and Fig. 2) further illuminated key demographic patterns. In the 12-14 age group, all participants were male, while in the 1518 age group, a more balanced distribution was observed, with 55 males and 38 females. Among students aged 19 and above, males were again the dominant group, with only one female represented. Academic level also showed notable gender differences, with males predominating in SHS 1 and SHS 3, while SHS 2 had a higher proportion of female students. Additionally, there was a clear gender disparity across study programs, with males strongly represented in General Science, while females dominated Home Economics. This gender-program imbalance may reflect broader societal gender norms and educational choices that align males with STEM fields and females with domestic sciences, as noted in previous studies on gender and education in Ghana [2][16].

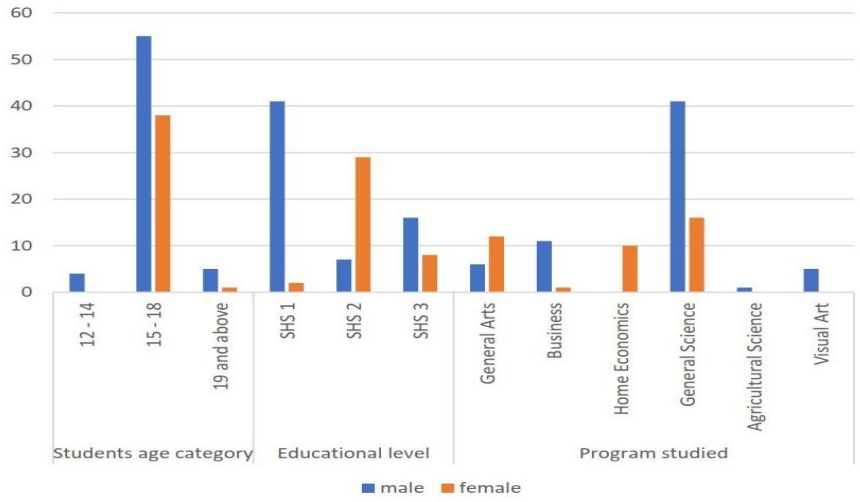


Fig. 1. Cross tabulation of gender vs age, educational level, and program studied

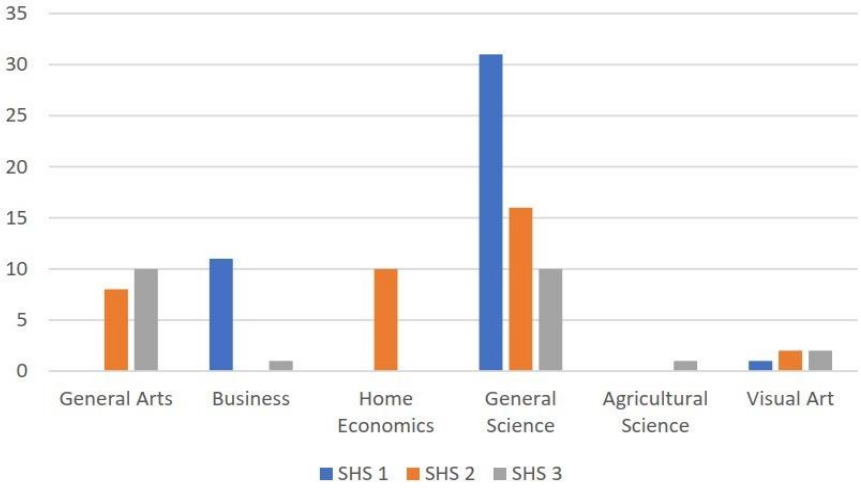


Fig. 2. Cross tabulation of educational level and program studied

These demographic insights are essential in understanding the context in which pedestrian safety knowledge and teaching strategies will be analyzed, particularly considering the dominance of science students and the gender-based academic divisions. Such factors could potentially influence how students engage with pedestrian safety education and their preferences for teaching strategies.

C. Knowledge on Pedestrian Safety

The study assessed students' ability to recognize pedestrian signs. Table 2 shows the distribution of students based on the number of signs they could identify. It was observed that 38.8% of the students identified all six signs, demonstrating a high level of familiarity with basic pedestrian signage. However, a significant portion of the sample showed a more limited ability to recognize these signs: 15.5% could identify only one sign, and 13.6% recognized two signs. This suggests that while a majority of students have been exposed to pedestrian signs, a

notable minority may have insufficient exposure, potentially limiting their ability to navigate pedestrian environments safely.

Table 2. Identification of pedestrian signs

Number of signs	Number of respondents	Percentage (100%)
One sign	16	15.5
Two signs	14	13.6
Three signs	15	14.6
Four signs	11	10.7
Five signs	7	6.8
Six signs	40	38.8

In addition to sign recognition, students were asked to define the meaning of the signs they identified. The responses were categorized into three levels: no knowledge, inadequate knowledge, and adequate knowledge. As shown in Table 3, 75.7% of students demonstrated adequate knowledge of pedestrian signs, while 22.3% exhibited inadequate knowledge, and 2% showed no knowledge at all. The high percentage of students with adequate knowledge indicates that the majority are familiar with pedestrian signs and can correctly interpret them. This finding contrasts with previous studies, such as [8], which reported low levels of road sign comprehension among students. This could reflect improvements in pedestrian education or localized factors that have enhanced students' exposure to and understanding of pedestrian signage.

Table 3. Students' Knowledge of Pedestrian Safety

Level	Pedestrian Signs (%)	Pedestrian rules (%)	Road Crossing Rules (%)
No Knowledge	2.0	10.7	32.0
Inadequate Knowledge	22.3	54.3	35.0
Adequate Knowledge	75.7	35.0	33.0

Next, the study evaluated students' knowledge of pedestrian rules-such as where and how pedestrians should walk, and the regulations they are expected to follow. Table 3 illustrates, 54.3% of the students exhibited inadequate knowledge of pedestrian rules, while only 35% had adequate knowledge. A further 10.7% of the students had no knowledge of pedestrian rules. These results indicate that while many students are familiar with the basic visual cues of pedestrian safety, they may lack a comprehensive understanding of the rules governing pedestrian behavior. This gap is significant, as adherence to pedestrian rules is crucial for safety, particularly in high-traffic areas. It suggests a need for educational interventions that focus not only on signs but also on instilling an understanding of safe pedestrian practices.

The study also explored students' knowledge of road-crossing rules, which are critical for preventing accidents. 35% of students demonstrated inadequate knowledge of road-crossing behavior, 33% had adequate knowledge, and 32% had no knowledge. This distribution highlights a significant issue: one-third of the students lack even the most basic understanding of road-crossing practices, while another third have only an inadequate grasp of safe behaviors. Given that improper road crossing is a leading cause of pedestrian accidents, this finding points to an urgent need for targeted education that addresses these deficiencies in student knowledge.

To provide a holistic view of students' pedestrian safety knowledge, the responses from all three categories-pedestrian signs, rules, and road-crossing behaviors-were aggregated. 50.5% of the students were classified as having adequate overall knowledge, while 40.8% had inadequate knowledge, and 8.7% had no knowledge at all. These results indicate that while half of the students possess a satisfactory understanding of pedestrian safety, nearly half lack the knowledge necessary to safely navigate pedestrian environments. This emphasizes the importance of enhancing pedestrian safety education in schools, with a focus on both theoretical knowledge and practical skills.

Finally, a multiple linear regression analysis was conducted to examine whether demographic factors such as age, gender, academic level, and program of study predicted students' pedestrian safety knowledge. The results, summarized in Table 4, show that the model was not statistically significant, indicating that these demographic variables do not significantly explain the variance in pedestrian safety knowledge. The regression coefficients confirmed that none of the independent variables-age, gender, academic level, or program of study-were statistically significant predictors of pedestrian safety knowledge. This suggests that demographic factors alone are not sufficient to explain variations in students' knowledge of pedestrian safety. This aligns with prior studies suggesting that pedestrian safety knowledge is more heavily influenced by targeted education and practical experience than by demographic characteristics [2][16].

D. Teaching Strategies

Students were asked whether they had received formal or informal education on pedestrian safety; 86.4% of the respondents had some form of education on pedestrian safety. Out of these students, 81.6% had received formal education (e.g., classroom instruction), while 75.7% had undergone informal education (e.g., learning from peers, family, or media). These findings suggest that a majority of students have been exposed to pedestrian safety education in both structured and unstructured settings.

Students were asked to indicate their preferred teaching strategies for pedestrian safety. Table 5 provides a breakdown of their responses across both formal and informal education

contexts. In the formal education category, 44.7% of students preferred lectures, 31.1% favored role-play scenarios, 41.7% chose multimedia presentations, 16.5% selected group discussions, and 18.4% preferred outdoor practical exercises. In the informal education category, 33.0% of students indicated a preference for learning through community or family role models, 30.1% preferred peer education, 42.7% favored social media campaigns, and 9.7% chose community events. Additionally, 23.3% of the students cited personal experiences (e.g., witnessing traffic accidents) as an important source of learning.

Table 4. Pedestrian safety knowledge vs Age, Gender, Form, and Program studied

Model	**Sum of squares**	**df**	**Mean squares**	**F**	**Sig.**
Regression	26.815	4	6.704	0.696	0.597
Residual	944.215	98	9.635		
Total	971.029	102			
Model	**Beta**	**t**	**Sig fig**		
Constant	9.560	3.809	0.000		
Age	1.015	0.930	0.355		
Gender	-0.470	-0.675	0.501		
Form	-0.247	-0.536	0.593		
Program	0.180	0.746	0.457		

These results highlight the students' strong preference for interactive and practical methods of learning in both formal and informal settings. The high preference for multimedia presentations and role-play in formal education suggests that students value engaging, visual, and experiential learning activities. Similarly, the high preference for social media campaigns and peer education in informal settings reflects the influence of digital platforms and peer interactions in shaping students' pedestrian safety awareness.

Table 5. Students' preferred strategies

Formal Education		**Informal Education**	
Strategy	Frequency (%)	Strategy	Frequency (%)
Lecture	46 (44.7)	Com. Role Models	34 (33.0)
Roleplay	32 (31.1)	Peer Education	31 (30.1)
Multimedia	43 (41.7)	Social Media Campaign	44 (42.7)
Group Discussion	17 (16.5)	Community Events	10 (9.7)
Outdoor Practical Exe.	19 (18.4)	Personal Experience	24 (23.3)

To assess the effectiveness of the preferred teaching strategies, students rated each method on a five-point Likert scale (1 = "Not effective" to 5 = "Very effective"). Table 6 presents the mean ratings and standard deviations for each strategy. Outdoor practical exercises received the highest mean rating, indicating that students found hands-on, experiential learning to be highly effective in improving pedestrian safety knowledge. Role-playing

scenarios also received a high rating, further supporting the effectiveness of active learning approaches.

Table 6. Mean Ratings of Teaching Strategies

Teaching Strategy	Mean Rating	Standard Deviation
Outdoor Practical Exercises	4.52	0.84
Role-Playing	4.25	0.88
Multimedia Presentations	4.21	0.83
Group discussion	3.24	1.20
Lectures	2.98	1.32
Community or Family Role models	4.06	0.85
Peer Education	3.81	1.22
Social Media Campaign	4.00	1.18
Community Events	4.00	.133
Personal Experience	4.75	0.53

Multimedia presentations were rated as effective (M = 4.21, SD = 0.83), reflecting the appeal of digital tools and interactive content in formal education settings. Group discussions received a neutral rating (M = 3.24, SD = 1.20), suggesting that while some students found this method effective, it was not universally preferred. Lectures, despite being one of the most commonly used methods, received the lowest rating, indicating that students found this method to be less effective than more interactive approaches. In the informal education category, personal experiences (e.g., witnessing traffic incidents) were rated as the most effective strategy, emphasizing the impact of real-world experiences on students' understanding of pedestrian safety. Social media campaigns were also highly rated, showing the influence of digital platforms in informal learning contexts. This indicates that students prefer interactive and practical teaching strategies, both in formal and informal education settings. The low rating for lectures aligns with existing literature that critiques the overreliance on passive learning methods in African education systems [31]. The preference for active, experiential methods, such as roleplay and outdoor exercises, mirrors findings from [14], who emphasized the importance of interactive learning for improving pedestrian safety among adolescents. Thus, the need to integrate more interactive and experiential learning methods into pedestrian safety education. Both formal and informal education could leverage the strengths of digital platforms, peer education, and real-world experiences to engage students and enhance their understanding of pedestrian safety.

To ensure the validity of further statistical analyses, Levene's Test was conducted to assess the homogeneity of variances between male and female students across all strategies. The results (Table 7) indicate that the assumption of homogeneity of variances holds for all teaching strategies, as none of the p-values are below 0.05. This validates the use of ANOVA to

further assess differences between male and female students in their ratings of the teaching methods.

Table 7. Homogeneity of Variances

	Levene Statistic	Df (Gender)	Df (Strategies)	Sig.
Lecture	0.066	1	44	0.798
Role-play	0.836	1	30	0.368
Multimedia	0.283	1	41	0.597
Group Discussion	0.740	1	15	0.403
Outdoor Practical Ex.	0.012	1	17	0.914
Community Role models	0.428	1	32	0.518
Peer Education	0.226	1	29	0.638
Social Media Campaign	0.110	1	42	0.742
Community Events	1.319	1	8	0.284
Personal Experience	0.017	1	22	0.898

ANOVA was employed to assess whether there were statistically significant differences in the effectiveness ratings of teaching strategies between male and female students. The results (Table 8) indicate that none of the strategies showed statistically significant differences between male and female students. This suggests that gender does not significantly influence how students perceive the effectiveness of the teaching strategies. The lack of significant gender differences in the perceived effectiveness of teaching strategies indicates that both male and female students value similar methods for learning about pedestrian safety. While descriptive statistics suggest that role-play and outdoor practical exercises were rated slightly higher by both genders, the ANOVA results show that these differences are not statistically significant. Consequently, gender does not appear to be a key determinant in the effectiveness of these strategies. This finding has important implications for the design of pedestrian safety education programs, suggesting that a gender-neutral approach may be sufficient in engaging students effectively. Furthermore, it highlights the need to continue focusing on interactive and experiential teaching strategies, such as personal experiences and social media campaigns, which were rated highly by both genders.

E. Integration of Experiential Learning into School Curricula

To enhance the effectiveness of pedestrian safety education, it is crucial to integrate experiential learning strategies into the existing school curricula. One effective way to integrate experiential learning is through outdoor practical exercises. Schools can allocate specific time slots during the school week for supervised outdoor activities focused on pedestrian safety. These sessions could involve guided walks around the school vicinity, where students practice safe road-crossing techniques, identify pedestrian signs, and learn to

navigate traffic. These exercises could be integrated into existing subjects such as Physical Education or Social Studies, where practical activities are already a component. Students could be assessed on their ability to apply pedestrian safety rules during these exercises, with feedback provided to reinforce learning.

Table 8. ANOVA Result

	Sum of Squares	df	Mean Square	F	Sig.
	78.232	44	1.778		
Roleplay	0.424	1	0.424	0.540	0.468
	23.576	30	0.786		
Multimedia	1.186	1	1.186	1.740	0.194
	27.931	41	0.681		
Group Discussion	2.859	1	2.859	2.123	0.166
	20.200	15	1.347		
Outdoor P. Exercises	0.106	1	0.106	0.143	0.710
	12.631	17	0.743		
Community Role Models	0.370	1	0.370	0.504	0.483
	23.512	32	0.735		
Peer Education	0.817	1	0.817	0.538	0.469
	44.021	29	1.518		
Social Media Campaign	0.863	1	0.863	0.613	0.438
	59.137	42	1.408		
Community Events	0.625	1	0.625	0.325	0.584
	15.375	8	1.922		
Personal Experience	0.013	1	0.013	0.043	0.838
	6.487	22	0.295		

Another valuable strategy is the use of role-playing scenarios in the classroom. Students can act out different pedestrian situations, such as crossing at a busy intersection or navigating a roundabout, which reflect common road environments in Ghana. Role-playing can be incorporated into the Social Studies class, where students learn about personal and community safety. Teachers can use these sessions to discuss the consequences of unsafe pedestrian behaviours and the importance of following traffic rules. Students could be evaluated based on their participation and understanding of the scenarios, with a focus on their ability to demonstrate safe pedestrian practices.

Multimedia presentations and digital tools also offer a dynamic way to teach pedestrian safety concepts. Schools can utilize videos, animations, and interactive simulations to illustrate complex scenarios, such as the correct way to cross a multi-lane road or the meaning of different traffic signals. These tools can be integrated into ICT classes. For schools with limited access to technology, partnerships with NGOs or government agencies could provide the necessary resources. Students could complete online quizzes or interactive modules to assess their understanding of the concepts presented through multimedia.

Peer education and social media campaigns are additional strategies that can enhance pedestrian safety education. Schools can establish peer education programs where older students are trained to teach pedestrian safety to their younger peers. This approach not only reinforces the older students' knowledge but also creates a supportive learning environment. Additionally, students can be encouraged to create and share social media content, such as videos or infographics, that promote pedestrian safety awareness. These activities can be integrated into extracurricular activities, such as clubs or incorporated into ICT or Creative Arts classes. The effectiveness of these initiatives can be assessed through student feedback and the reach of the campaigns within the school and local community.

Community involvement and real-world experiences can further enrich pedestrian safety education. Schools can organize field trips to local traffic departments or invite traffic officers to give talks and demonstrations on pedestrian safety. Students can also participate in community events, such as road safety awareness days, where they engage with the public on pedestrian safety issues. These activities can be linked to Social Studies where students learn about civic responsibility and community engagement. Reflective essays or presentations can be used to assess students' learning and their ability to apply this knowledge in their daily lives.

To ensure the successful implementation of these strategies, teacher training and resource development are essential. Teachers will need training on how to conduct experiential learning activities and integrate them into the curriculum. Workshops and professional development sessions can be organized in collaboration with educational authorities and road safety organizations. This training can be part of ongoing professional development programs, with a focus on active learning methodologies and the use of technology in education.

Finally, policy recommendations at the national level can support the integration of experiential learning into pedestrian safety education. The findings of this study can inform a review of the national curriculum to include pedestrian safety education as a mandatory component, with an emphasis on experiential learning methods. The government and educational authorities should allocate resources, such as funding and materials, to support the implementation of these strategies, particularly in low-resource settings.

Conclusion

This study provides critical insights into the pedestrian safety knowledge and preferred learning strategies of senior high school students in Ghana. The findings revealed significant gaps in students' understanding of pedestrian safety rules and roadcrossing behavior, despite relatively strong knowledge of pedestrian signs. The study demonstrated a clear preference for active, experiential learning methods such as role-play and outdoor practical exercises, which were rated as more effective than traditional lecture-based

approaches. These results emphasize the need to rethink how pedestrian safety education is delivered in schools, particularly in low-resource settings where practical education can yield better engagement and retention.

Theoretical implications suggest that these findings align with experiential learning theories, which advocate for active participation in the learning process. By implementing such strategies, educators can foster a deeper understanding of pedestrian safety concepts, ultimately leading to safer pedestrian behaviors. Moreover, this study contributes to the limited literature on pedestrian safety education in sub-saharan Africa, offering empirical evidence on the effectiveness of various pedagogical methods in this context.

Furthermore, the analysis found no significant differences in the effectiveness of teaching strategies across gender, indicating that these active learning methods are equally impactful for both male and female students. The analysis showed that demographic factors such as age, gender, grade level, and academic program were not significant predictors of pedestrian safety knowledge. This suggests that efforts to improve pedestrian safety education should be universally applied across different student demographics, focusing on common educational needs rather than tailoring strategies to specific groups.

The broader implications of this study extend beyond Ghana, offering insights for policymakers and educators in other low- and middle-income countries seeking to reduce pedestrian accidents through improved safety education. By aligning educational strategies with student preferences, there is significant potential to enhance the effectiveness of road safety curricula and contribute to global efforts to reduce pedestrian-related fatalities.

Since the study includes a small sample size and reliance on self-reported data, caution should be exercised when generalizing the findings. However, these limitations also open avenues for future research. Longitudinal studies are needed to assess the long-term impact of the preferred teaching strategies on student behavior. Furthermore, future research should explore the role of community-based interventions and parental involvement in reinforcing pedestrian safety education.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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