2025-26 HIVE Summer Internship Project

Safer School Zones: Multi-Dimensional Analysis of Traffic, Safety, and Transport Provision in WA

Primary Academic Supervisor
Dr. S Zaung Nau

Project Background

Road safety and traffic congestion around schools remain critical concerns for communities, policymakers, and transport planners. School zones are high-risk areas due to the daily convergence of students, parents, public transport, and local traffic. In Western Australia, crash incidents involving school precincts not only threaten the safety of young pedestrians and cyclists but also contribute to congestion and delays that affect the wider transport network. Despite ongoing investments in road infrastructure and traffic management, questions remain about whether current measures and public transport services adequately support safe and efficient school travel.

This project seeks to address these gaps by conducting a comprehensive data-driven analysis of crash accident records, traffic volume data, public transport service provision, and socio-demographic characteristics across the last three years. By examining these data sources together, the study will identify patterns of high-risk areas, periods of heightened congestion, and correlations between socio-demographic factors and road safety outcomes. Importantly, the project will also assess whether public transport availability is sufficient and accessible in reducing private vehicle reliance and mitigating traffic congestion around schools.

The outcomes of this research will provide actionable insights to inform evidence-based policy and infrastructure decisions. Findings will help highlight priority areas for targeted safety improvements, guide investments in traffic management, and support strategies for sustainable transport planning in school precincts. The project will also offer value to local governments, transport authorities, and education stakeholders by identifying opportunities for cross-sector collaboration to improve safety and accessibility for school communities. By integrating multi-source

datasets, this project will make an impactful contribution toward safer, more efficient, and more inclusi

Project Description, Expected Outputs, Possible Stretch Goals

This project aims to analyse the interaction between crash accident data, traffic volumes, public transport service provision, and socio-demographic characteristics around school zones in Western Australia over the last three years. School precincts are priority areas where safety and congestion challenges converge, making them vital for evidence-based policy and planning. The intern will collect, clean, and integrate datasets from multiple sources to identify patterns of crash risk, peak congestion, and transport accessibility gaps. The analysis will support a deeper understanding of whether current transport services and infrastructure adequately meet the needs of school communities and how improvements could reduce congestion and improve safety.

Expected Outputs

The student will produce a set of interactive visualisations and dashboards that communicate key findings to both technical and non-technical stakeholders. Outputs may include:

1.Heat maps of crash hotspots around school precincts.
2.Time-series charts of traffic volumes and congestion trends.
3.Overlay maps showing the relationship between public transport routes/stops and school locations.
4.Demographic-layered visualisations highlighting potential inequities in access to safe and efficient school travel.
5.Interactive dashboards (e.g., Power BI or Tableau) integrating crash, traffic, and transport data into a user-friendly format for decision-making.

Possible Stretch Goals

If time and data availability allow, the project could extend into:
1.Predictive modelling to forecast congestion and crash likelihood around schools.
2.Scenario simulations comparing the impact of improved public transport provision versus road infrastructure changes.
3.Benchmarking Western Australia's school zone safety and congestion against national or international case studies.

4.Developing policy recommendations for targeted interventions in high-risk or underserved areas.

Links to background reading and any relevant recent work in the field

Singh, N. and Kumar, M., 2025. A novel analytical framework to identify and classify accident hotspots integrating gradient classifier and spatial clustering. Earth Science Informatics, 18(1), p.168.

Active Travel to School Roadmap 2023-2030 (Department of Transprot) https://www.transport.wa.gov.au/getmedia/FC90D65C-EBFD-4028-8A04-48F45E125915/AT_P_ATSchoolRoadmap.pdf

Grigorev, A., Lillo-Trynes, D. and Mihaita, A.S., 2025. Spatial Association Between Near-Misses and Accident Blackspots in Sydney, Australia: A Getis-Ord $ G_i^* $ Analysis. arXiv preprint arXiv:2506.03356.

Kang, C., Wu, X., Shi, J. and Yang, C., 2024. Association between built environment characteristics and school run traffic congestion in Beijing, China. arXiv preprint arXiv:2411.11390.

What type of visualisation will the student develop or produce?

The student will develop GIS-based maps and interactive dashboards to visualise crash hotspots, traffic congestion trends, and public transport accessibility around schools. Outputs will include heat maps, time-series graphs, and layered maps combining demographic and transport data, enabling policymakers and stakeholders to identify risk areas and assess the adequacy of current safety and transport provisions.

How will the visualisation contribute to your research outcomes?

The visualisations will translate complex crash, traffic, and transport data into clear insights, highlighting school zone risk areas and congestion patterns. This evidence will guide targeted road safety improvements, assess adequacy of public transport, and support policymakers in designing safer, more efficient school travel systems.

If the project is successful, where would you consider publishing the results?

Transport & Road Safety Journals

Accident Analysis & Prevention (Elsevier) – Leading journal for crash data analysis, school zones, and safety interventions.

Traffic Injury Prevention (Taylor & Francis) – Strong fit for studies linking crash outcomes with public health and safety.

Journal of Safety Research (Elsevier) – Covers empirical and applied safety research, including transport safety in school precincts.

Transportation & Planning Journals

Transportation Research Part A: Policy and Practice – For policy implications of congestion and transport access around schools.

Transportation Research Part C: Emerging Technologies – If you use advanced modelling, predictive analytics, or GIS methods.

Journal of Transport Geography – Ideal if your results focus on spatial, demographic, and accessibility patterns.

Case Studies on Transport Policy – Applied and practical, suitable if you want to highlight WA-specific findings.

Draft Project Timeline:

Week 1

Nov 10 - Full day HIVE induction
Nov 11 - Area and Project Induction with Primary supervisor
Develop project plan with HIVE and academic team
Literature and relevant project review

Understanding the data sources and data dictionaries including available variables and how they will be analysed.

Week 2

Data Collection, Cleaning and Integration

Week 3

Heat maps of crash hotspots around school precincts.

Week 4

Time-series charts of traffic volumes and congestion trends.

Week 5

Overlay maps showing the relationship between public transport routes/stops and school locations.

Week 6

Demographic-layered visualisations highlighting potential inequities in access to safe and efficient school travel.

Week 7

Interactive dashboards (e.g., Power BI or Tableau) integrating crash, traffic, and transport data into a user-friendly format for decision-making.

Week 8

Interactive dashboards (e.g., Power BI or Tableau) integrating crash, traffic, and transport data into a user-friendly format for decision-making.

Week 9
Focus on report writing and presentation preparation

If time and data availability allow, the project could extend into:
1.Predictive modelling to forecast congestion and crash likelihood around schools. 2.Scenario simulations comparing the impact of improved public transport provision versus road infrastructure changes.

Week 10
Focus on report writing and presentation preparation
30th Jan Final Presentation Showcase Day and final report due

If time and data availability allow, Benchmarking Western Australia's school zone safety and congestion against national or international case studies.

Student Experience and Supervision:

How often will you meet with the student over the 10-week period?

Twice per week (Monday and Wednesday)

Your work desk location and the location of student desk

402, level 5 common shared area for HDR

Student Attributes:

Please indicate any preference for student's academic discipline or field of study

Any as long as the students have data management and visualisation skills and willing to learn GIS

What competencies are required to start this project

Intermediate - Data structures, analytics, statistical modelling
Intermediate - GIS

Do you have any other student attributes you think are important to the project?

Personality, Willingness to learn, Independent learning, Creativity,