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THE EFFECTIVENESS OF AN AWARENESS PROGRAM IN ENHANCING THE IMPLEMENTATION OF TRAFFIC SAFETY STANDARDS AMONG SCHOOL BUS DRIVERS

(A Quasi-Experimental Applied Study at Asim bin Omar bin Al-Khattab School in the Wilayat of Bousher)

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ABSTRACT

This study falls under the category of applied research and adopts a quasi-experimental design, specifically the one-group pretest-posttest model. It aimed to assess the impact of an awareness-based training program on school bus drivers at Asim bin Omar bin Al-Khattab School in the Wilayat of Bousher, by examining changes in their practices related to implementing traffic safety standards. The study emerged from an urgent field need, as several reports point to a significant gap between expected and actual safety practices in the school transportation environment. The study sample consisted of 10 school bus drivers. A structured observation checklist was used as the main data collection tool. The drivers were observed before the intervention and then exposed to a training program covering three main areas: the fundamentals of selecting a school bus driver, principles of defensive driving, and practical training in preventive driving techniques. The data were analyzed using the Statistical Package for the Social Sciences (SPSS), applying means, standard deviations, and the Wilcoxon signed-rank test. Results indicated statistically significant improvements (at $\alpha \leq 0.05$) in the drivers' safe driving behaviors in the posttest phase, demonstrating the effectiveness of the training program. However, no statistically significant improvement was observed in the technical safety standards of the buses, which was attributed to the limited authority of drivers and the lack of contractual provisions mandating technical upgrades by vehicle owners. The study recommends mandatory participation of all school bus drivers in specialized training programs on preventive driving, equipping school buses with technical features that meet international safety standards, and the development of a comprehensive school transport safety protocol to enhance service quality and reduce potential risks.

Keywords: Road safety, school transport, buses, defensive driving, awareness program, bus drivers, Sultanate of Oman.

1.0 INTRODUCTION

In contemporary educational systems, ensuring safety across all aspects of the educational process is a core concern. This is aimed at preventing accidents, injuries, and the associated human and material losses. Ensuring this goal is realized involves adopting prevention strategies and occupational safety protocols. Schools play a fundamental role in instilling safety awareness within the school community, especially among students.

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

To achieve this, safety procedures must be embedded into all school operations and programs, reducing or eliminating risks for students, teachers, and staff. Safety needs are fundamental to human well-being, coming second only to physiological needs in Maslow's hierarchy. Without a safe environment, individuals cannot function, create, or grow (Al-Hajri, 2006).

Safety policies and procedures help shape and regulate operational aspects of educational institutions. They guide everyday practices that ensure a safe school environment and enhance overall performance. All school personnel are obliged to follow these procedures to safeguard the wellbeing of both individuals and the collective (Al-Asmi, 2006).

Efforts across the European Union, for example, have recognized the importance of enhancing student safety through peer-to-peer awareness, school-local authority collaboration, and reviewing school violence policies. These efforts reflect a shift in societal priorities toward establishing strategic, preventive school safety approaches (Al-Owaisi, 2006).

The need for safe student transport has become a pressing concern locally and globally. In some countries, such as the UK and the US, school transportation safety is considered a key gateway to learning. Governments and educational institutions across the world are responsible for providing safe, sustainable, and efficient student transport. School buses are often preferred due to their cost-efficiency, flexibility, and relative safety, especially when managed by professional transportation agencies (Bank, 2012).

In Oman, students make up approximately 20% of the population. During the academic year, which runs from September to June, they rely on various types of school buses, including 41-seater, 25-seater, 15-seater, and 4WD vehicles in mountainous regions. The safety of this transportation system is crucial for both families and schools. School buses are an integral part of the traffic ecosystem, involving drivers, passengers, and road users. Therefore, ensuring traffic safety requires meeting specific criteria across all these components (Ambusaidi, 2006).

This study investigates the extent to which school bus drivers at Asim bin Omar bin Al-Khattab School in Bousher, Oman, adhere to traffic safety standards and aims to improve their practices through hands-on defensive driving training.

Statement of the Problem

Daily observations, current practices, and frequent incidents suggest a significant gap in school bus drivers' adherence to traffic safety standards. Reports indicate a high number of school bus-related traffic accidents, primarily due to drivers' limited awareness of safety protocols.

Table 1: Number of Traffic Accidents Involving School Buses in Oman (2013–2017)

Year	Number of Accidents	Injuries	Fatalities
2013	14	159	7
2014	8	85	7
2015	7	54	3

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

2016	3	47	6
2017	10	55	8

Source: Royal Oman Police – General Directorate of Traffic (2018)

Research Questions

This study seeks to answer the following questions:

1. What is the current level of adherence to traffic safety standards in school buses at Asim bin Omar bin Al-Khattab School in Bousher?
2. To what extent is the awareness program effective in enhancing school bus drivers' adherence to traffic safety standards?

Study Objectives

- To assess the pre-training adherence of school bus drivers to traffic safety standards.
- To evaluate the impact of an awareness training program on improving adherence to safety practices.
- To identify key safety procedures that school bus drivers should implement.
- To provide practical recommendations for enhancing traffic safety in school transportation settings.

Study Hypotheses

- **H1:** There is no statistically significant difference ($\alpha \leq 0.05$) in drivers' adherence to technical safety standards before and after the awareness program.
- **H2:** There is a statistically significant difference ($\alpha \leq 0.05$) in drivers' safe driving behaviors before and after the awareness program.

Significance of the Study

This study is important for several reasons:

- It provides an assessment of traffic safety standard adherence among school bus drivers.
- It applies a quasi-experimental method to evaluate the effectiveness of awareness-based training.
- It raises awareness among school stakeholders — including principals, teachers, parents, and students — regarding the importance of implementing safety measures.
- It offers insights for decision-makers in Oman's Ministry of Education on improving school transportation safety systems.
- It contributes to the academic literature with practical findings relevant to school transportation safety.

Operational Definitions

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

- **Program:** A set of awareness-raising activities delivered in a structured environment over a specified time, aimed at improving school bus drivers' safety practices (based on Shehata & Al-Najjar, 2003).
- **Standards:** Targeted performance benchmarks used to measure actual results, particularly in driving safety contexts.
- **Traffic Safety:** The implementation of traffic laws, regulations, and preventive measures to reduce accidents and protect lives and property (UNICEF, 2010).
- **Traffic Safety (Operational):** The application of traffic safety protocols by school bus drivers to reduce accidents and ensure student safety.

Study Delimitations

- **Location:** Asim bin Omar bin Al-Khattab School, Bousher, Muscat Governorate, Oman.
- **Subject Matter:** The effectiveness of an awareness program in promoting traffic safety among school bus drivers.
- **Participants:** All school bus drivers at the selected school.
- **Time Frame:** The 2018–2019 academic year.

CHAPTER TWO: THEORETICAL FRAMEWORK

Introduction

There is no doubt that transportation plays a vital and direct role in individuals' daily lives. It significantly influences their choices, including the relationship between their place of residence and destinations such as workplaces or schools. Additionally, transportation affects individuals' physical and cognitive capacities, making it a central component of societal infrastructure. Recognizing this, the government of the Sultanate of Oman has paid considerable attention to roads and traffic safety. Similarly, the Ministry of Education has developed multiple strategies aimed at ensuring traffic safety for school students.

1. The Concept of Safe School Transportation

The term "safe school transportation" refers to a range of practices and preventive measures that ensure students can travel safely between their homes and schools without exposure to physical or psychological harm. Although traditionally associated with school buses as the primary mode of transport, modern studies argue that safe school transport is a broader concept. It encompasses safe walking paths, the surrounding infrastructure, driver behavior, community safety awareness, and institutional regulation.

Tietz & Lai (2011) noted that in some European countries, students use diverse modes of transport such as walking and biking. This necessitates the development of safe environments for sidewalks, roads, and bus stops. Auerbach et al. (2020) emphasized that transportation safety extends beyond vehicle design to include boarding and disembarking zones, student interaction with traffic environments, school monitoring practices, and driver awareness levels.

Some EU countries have begun implementing comprehensive student transportation models that start from the home and continue through to the school. These include training students

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

and families on safe routes, ensuring sufficient signage and protected sidewalks, verifying the safety of bus stops, and confirming the presence of functioning warning systems such as red flashing lights and stop arms. Furthermore, buses must be equipped with seat belts, internal monitoring systems like cameras, and other smart technologies to ensure student safety during transport (Al-Amro, Al-Dughayshim, & Al-Faleh, 2010).

This holistic vision aligns with the goals of the present study, which seeks to assess the effectiveness of an awareness program for school bus drivers. The study does not limit itself to technical aspects of the bus but also targets defensive driving skills and driver conduct, reflecting a comprehensive approach to school transportation safety.

2. Benefits of School Transportation

School transportation offers a wide range of educational, social, economic, environmental, and safety-related benefits. From an educational perspective, it fosters self-reliance among students and instills discipline in terms of punctuality. It also minimizes students' exposure to harassment during daily commutes.

Socially, it reduces physical and emotional burdens on parents and minimizes social disparities among students. Economically, it lowers transportation costs for families and saves time and effort. Environmentally, it reduces the use of private vehicles, thereby lowering emissions and noise pollution. From a safety standpoint, it alleviates traffic congestion around schools and reduces the frequency and severity of traffic accidents (Ambusaidi, 2006).

3. Global Challenges in Developing Sustainable School Transportation Systems

Sustainable school transportation faces several structural and organizational challenges that vary across national contexts but share common barriers. A workshop held in Toronto, Canada, on the future of sustainable school transport identified key challenges including: limited government funding, lack of coordination among relevant authorities, weak institutional frameworks, and insufficient performance data for effective monitoring and improvement.

At the community level, a major obstacle is the lack of awareness among parents regarding the benefits of school transport, along with prevailing negative attitudes. This is compounded by insufficient awareness programs for students, families, and school personnel, weak enforcement of safety standards, and the absence of regulatory mechanisms to ensure service providers' compliance with safety requirements. Problems such as overcrowded buses are common due to insufficient seating capacity.

Further, legal gaps in operational contracts and a lack of transparency and accountability in management frameworks hinder the development of an effective system (Al-Saud, 2012). Addressing these challenges necessitates strategic reorganization of roles and policies to build a safe, sustainable school transportation system that ensures equity in access to education.

4. Status of School Buses in the Sultanate of Oman

School transportation in Oman faces several challenges related to safety, including:

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

- Overcrowded buses exceeding seating capacity.
- Lack of professional training for drivers.
- Poor infrastructure at pick-up and drop-off points.
- Non-compliance with internal and external bus design standards.
- Absence of designated bus lanes in many areas.
- Unsafe student behaviors such as moving inside the bus or misusing the doors due to lack of awareness.

Ambusaidi (2012) highlighted additional organizational issues such as:

- Low wages in driver contracts.
- Multiple operators with varying standards.
- Lack of unified criteria across drivers and vehicles.

To address these issues, the Ministry of Education launched several initiatives in cooperation with local partners like the Royal Oman Police and Mwasalat Company. One of the most notable is the "Safe Route" (Darb Al-Salama) project, a pioneering initiative using smart systems and international safety standards to enhance student transport safety (Ministry of Education, 2019).

5. “Darb Al-Salama”: Oman’s Smart School Transport Safety System

The challenges Oman faces in school transportation mirror global trends, particularly in terms of funding limitations, fragmented institutional roles, and weak oversight. Specific issues in Oman include:

- Overloaded buses.
- Untrained drivers.
- Poor pick-up point infrastructure and signage.
- Unsafe student behavior during boarding and disembarking.

The general supervisor of the project noted inconsistencies in safety standards among providers due to lax oversight and weak legal alignment. As a response, the Ministry of Education partnered with Omantel to launch the “Safe Route” system between 2015–2017. This smart system uses:

- GPS tracking.
- Surveillance cameras.
- Real-time notifications to parents and schools.
- Motion sensors to detect students left behind in buses.
- Data integration with the Ministry’s digital platform.

Initially applied to 630 out of 6,500 buses, the program aims to extend nationwide in the coming years (Ministry of Education, 2019; Times of Oman, 2019). The project represents a shift from traditional transport to an integrated system based on smart technology, coordinated governance, and enhanced safety.

6. Mwasalat Company as a Model for Safe Student Transport

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

Mwasalat, a government-owned public transport company in Oman, applies high safety standards based on drivers' competence, skill, and awareness. In 2019, the company signed an agreement with the Ministry of Education to provide student transport to select schools as part of a pilot project.

Mwasalat's practices include:

- Equipping buses for safe and comfortable trips.
- Operational efficiency and traffic law compliance.
- Responsible driving in various conditions.

The company also implements an ISO 39001-certified safety awareness program based on five pillars, as outlined in the study.

CHAPTER THREE: METHODOLOGY

1. Research Method and Design

This study employed a **quasi-experimental method**, specifically the **one-group pretest-posttest design.** This design is appropriate for evaluating the impact of a training intervention on a single group without a control group. The procedure involved administering an observation checklist to assess school bus drivers' adherence to defensive driving practices before the implementation of the awareness program and then again afterward.

Creswell (2012) notes that this design is particularly suitable when a comparison group is not available and focuses on detecting changes within the same group following a treatment.

2. Study Population and Sample

The study population consisted of **all school bus drivers** at **Asim bin Omar bin Al-Khattab School** in the **Wilayat of Bousher**, Muscat Governorate, **during the 2018/2019** academic year, totaling 10 drivers.

A comprehensive sample was used, meaning all individuals in the population were included in the experimental group.

This approach ensures that all behavioral variations are captured and that the sample fully represents the target group. As Abidat et al. (2010) explain, comprehensive sampling is appropriate in educational field studies, especially when the population size is small and easily accessible.

3. Study Variables

This study involves two primary variables:

- **Independent Variable:** The awareness training program designed to improve defensive driving behavior.

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

- **Dependent Variable:** The extent to which school bus drivers implement traffic safety standards, as measured using a structured observation checklist administered before and after the training.

According to experimental design principles, the independent variable is expected to cause measurable changes in the dependent variable. El-Sayed (2015) emphasizes that identifying variables and defining their causal relationships enhances the clarity and scientific rigor of experimental research.

4. Research Instrument

The primary instrument used in this study was a **structured observation checklist,** designed to assess school bus drivers' compliance with traffic safety standards. It was applied in two phases:

1. **Pre-program application**, to assess baseline practices.
2. **Post-program application,** to evaluate the impact of the intervention.

The checklist consisted of two main components:

- **Technical Bus Safety Standards:**
  Comprised of **29 items,** evaluated using a **three-point scale:**
  (Highly Available – Partially Available – Not Available).

- **Driver Behavior and Driving Skills:**
  Included 20 items, rated on a three-point scale:
  (Compliant – Non-compliant – Not Applicable).

Observation checklists are widely recognized for their ability to objectively and accurately capture real-life behavior, particularly in studies where behavior before and after an intervention is being assessed (Abidat et al., 2010).

5. Validity and Reliability of the Instrument

Content Validity:

The observation checklist underwent expert validation. It was reviewed by the academic supervisor and a panel of specialists, including training professionals from **Mwasalat Company,** to ensure alignment with recognized traffic safety standards. Based on their feedback, items were revised and refined accordingly.

The awareness program was also developed based on pretest findings collected by company experts between **December 20 and January 2, 2019.**

Reliability:

Internal consistency was assessed using Cronbach's Alpha for both pretest and posttest data:

Instrument Component	Number of Items	Pretest Alpha	Posttest Alpha

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

Technical Bus Safety	26	0.54	0.58
Driver Behavior & Skills	19	0.61	0.45

While some values are moderate, they are deemed acceptable for field-based educational studies, particularly when evaluating human behavior that may be influenced by external factors (Abidat et al., 2010).

6. Study Procedures

The following steps were followed to ensure methodological rigor:

1. Review of Literature and Standards:

Relevant documents from Oman, the UAE, India, New Zealand, and the United States were analyzed to develop the checklist items.

2. Pretest Observation:

Conducted on 14 school buses and their drivers using the checklist under the supervision of school staff and Mwasalat professionals, without informing drivers of the specific criteria to ensure objectivity.

3. Data Analysis:

Pretest data were analyzed using Microsoft Excel to identify weaknesses.

4. Program Design:

Based on analysis results, Mwasalat experts designed a training program covering:

- Driver selection standards (health, security record, responsibilities).
- Defensive driving theory (golden rules, daily checks, traffic error avoidance).
- Practical training on defensive driving and student management.

5. Training Implementation:

A single experimental group of 14 drivers participated in lectures and field-based training sessions delivered by certified Mwasalat instructors.

6. Posttest Observation:

The checklist was reapplied to the same group after training.

7. Data Entry and Statistical Analysis:

Data were processed using SPSS, including:

- Reliability testing via Cronbach's Alpha.
- **Wilcoxon signed**-rank test to evaluate differences between pretest and posttest scores.

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

According to Creswell & Creswell (2018), this process is typical for quasi-experimental studies that utilize one-group pretest-posttest designs when control groups are not feasible.

7. Statistical Analysis Techniques

The study used the SPSS software package for statistical analysis. Key procedures included:

- **Descriptive Statistics:**
  Means and standard deviations to assess driver performance before and after training.
- **Inferential Statistics:**
  The Wilcoxon Signed-Rank Test, a non-parametric alternative suitable for ordinal data or non-normally distributed samples in repeated measures designs.
- **Frequencies and Percentages:**
  Used to describe qualitative data within the checklist.

This analytical approach aligns with recommendations from researchers like Al-Zu'bi (2011) and Pallant (2020), who advocate for the Wilcoxon test in single-group experimental designs involving non-parametric data.

CHAPTER FOUR: RESULTS AND DISCUSSION

This chapter presents and analyzes the results of the study based on the following research questions:

1. What is the current level of implementation of traffic safety standards on school buses?
2. How effective is the awareness program in enhancing school bus drivers' adherence to traffic safety standards?

First: Results For Research Question One

Research Question:

What is the current level of implementation of traffic safety standards on school buses at Asim bin Omar bin Al-Khattab School in Bousher?

Table 3 shows the means and standard deviations for the application of technical safety standards before and after the awareness program:

Variable	Mean	Standard Deviation
Technical Bus Safety (Pre)	2.27	0.46
Technical Bus Safety (Post)	2.56	0.20

These results indicate a slight improvement in the mean score for technical safety standards following the awareness program. However, this improvement was not statistically significant at the overall level of the component.

Nonetheless, minor improvements were noted in specific items such as:

- The presence of fire extinguishers inside the bus (Item 17),
- Updated insurance documentation (Item 23),
- Improved tire condition (Item 26).

The lack of statistically significant improvement is attributed to institutional and administrative limitations beyond the drivers' control—such as technical specifications, vehicle ownership issues, and contractual regulations between the Ministry of Education and transport service providers.

These findings support the view that training drivers alone is insufficient to improve technical conditions unless accompanied by regulatory and institutional interventions that compel operators to meet international safety standards (Abidat et al., 2010; Al-Zu'bi, 2011).

Second: Results for Research Question Two

Research Question:

How effective is the awareness program in enhancing school bus drivers' adherence to traffic safety standards?

Table 4 shows a significant improvement in defensive driving behaviors among school bus drivers:

Variable	Mean	Standard Deviation
Driver Behavior (Pre-training)	2.21	0.21
Driver Behavior (Post-training)	2.76	0.13

To verify the statistical significance of this improvement, the Wilcoxon signed-rank test was applied (Table 5):

Table 5: Wilcoxon Signed-Rank Test Results for Driver Behavior Scores

Group	N	Mean Rank	Sum of Ranks	Z-value	p-value
Pre-test	14	7.31	58.50	-3.77	0.003
Post-test	14	7.00	77.00	-2.99	

The results show **statistically significant differences at the level ($\alpha \leq 0.05$)** in favor of the **post-training scores**, confirming the **effectiveness of the awareness** program in improving drivers' safe driving practices.

This outcome aligns with prior studies such as **Putnam et al. (2003)** and **Bronaugh (2008),** which demonstrated the success of behavioral training programs in enhancing bus driver compliance with safety procedures.

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

The study emphasizes that **awareness and structured training** are key elements in reducing risks within the school transportation system—especially when combined with ongoing supervision and expert-led instruction.

Summary of Key Findings

- The overall level of technical safety compliance in school buses **remains below expectations,** despite slight improvements in certain items.
- Limitations in **driver authority and contract conditions** hinder substantial changes in vehicle safety features.
- In contrast, the **awareness program proved highly effective** in improving **driver behavior and defensive driving skills**.

Verification of Hypotheses

- **Hypothesis 1:**
  There are no statistically significant differences in pretest and posttest scores for technical safety standards.
  Not rejected — No significant improvement was found in this component.

- **Hypothesis 2:**
  There are statistically significant differences in pretest and posttest scores for driver behavior in favor of posttest results.
  Accepted — Results confirmed the training's effectiveness in improving safe driving behaviors.

These outcomes underscore the impact of behavioral training, while also highlighting the limitations of training alone in addressing technical vehicle issues without regulatory and institutional support.

CHAPTER FIVE: RECOMMENDATIONS, CONCLUSION, AND FUTURE RESEARCH

1. Recommendations

Based on the study's findings and the observed level of implementation of traffic safety standards in school buses, the following recommendations are proposed:

1. **Design and implement a specialized training program for school bus drivers,** aligned with internationally approved traffic safety standards. This program should be conducted under the supervision of qualified institutions such as the Road Safety Institute and Mwasalat Company to ensure quality and effectiveness.
2. **Professionalize the role of school bus drivers by introducing a licensing system**. Drivers should not be allowed to operate a school bus unless they have successfully completed certified training programs and passed knowledge and performance assessments. This would help raise professional standards in the field.

Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

3. **Revise the contractual agreements** between the Ministry of Education and school bus owners to include clear stipulations regarding safety and technical requirements, as well as penalties and financial consequences for non-compliance.
4. **Launch a nationwide community awareness campaign** targeting parents, students, teachers, and school administrators to emphasize the importance of adhering to traffic safety procedures inside and outside school buses. This would help foster a stronger culture of safety in the school environment.
5. **Develop and adopt an official national school transport safety protocol**, which includes:

    - Standardized operating procedures.
    - Emergency response mechanisms.
    - Clearly defined responsibilities for all stakeholders.
    - A unified regulatory framework at the national level.

2. Conclusion

This study has yielded significant findings regarding the current state of traffic safety implementation on school buses and the effectiveness of an awareness-based training program. The results demonstrated that the **training program was effective in improving drivers' defensive driving behaviors** and compliance with safety procedures.

However, the study also revealed that **technical safety issues related to the vehicles themselves did not show significant improvement,** primarily due to limitations beyond the drivers' control, such as:

- Weak regulatory enforcement,
- Financial constraints,
- Inadequate technical specifications in service contracts.

These findings underscore the need for an integrated institutional approach—one that not only focuses on drivers but also supports:

- The professionalization of school transport staff,
- Continuous training,
- Reformed contracting frameworks that enforce compliance with safety standards.

Additionally, **community-wide awareness and stakeholder involvement**—including school leaders, parents, and teachers—are critical in promoting a safer and more accountable school transportation system.

As a practical, field-based intervention study, this research provides a foundation for improving school transport policies and offers actionable insights that can inform future research and practice.

3. Suggestions for Future Research

In light of the study's scope and findings, the following future research directions are proposed:

1. Conduct a **comprehensive evaluation of the legal and regulatory frameworks** governing school transport contracts in the Sultanate of Oman.
2. Study the **impact of community awareness** on improving student safety behavior on school buses.
3. Design and pilot a **national standardized protocol** for school transport safety and test its field effectiveness.
4. Carry out **comparative studies** between Oman's school transportation system and best practices in countries with advanced systems.
5. Investigate the **effectiveness of smart technologies** (e.g., tracking systems, sensors, automated alerts) in reducing bus-related accidents and improving safety compliance.

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Volume: 08, Issue: 04 July - August 2025

ISSN 2582-0176

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