

Teaching Riders to Read the Road: Instructional Methods for Road-Sign and Traffic-Law Awareness in Dar es Salaam, Tanzania

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Abstract

The study focused on how vocational educators enable the acquisition of motorcycle riders' knowledge of road signs and traffic laws by motorcycle riders in Dar es Salaam, Tanzania. According to the results, the educators utilized a combination of explanation, mediation through Kiswahili language, visualization, questioning, discussion among peers, role-playing, demonstration, and practice under supervision. What made these practices effective was the way in which they related to each other: familiar road situations helped to understand traffic laws, whereas guided practice helped riders to apply the rules, justify their actions, and get instant feedback. Nonetheless, the shortage of motorcycles, lack of time for practice, unequal participation, and commercialization of the road hindered this process. This research was conducted using an interpretative qualitative case study design that included 25 respondents; six vocational and regulatory stakeholders, six students, eight alumni who work as riders, and five motorbike users. The data collection methods used were interviews, two focus group discussion, document analysis, and observation of classroom instruction, practical training in the yard, and street-level riding. The process of reflexive thematic analysis followed the steps of familiarization, open coding, category development, source comparisons, theme development, and interpretation. We conceptualize the intended learning outcome as traffic literacy-informed judgement. It is about moving beyond knowing the signs on the road and understanding the law.

Keywords: motorcycle rider education; road-sign awareness; traffic law; TVET pedagogy; Tanzania

Introduction

Motorcycle taxis provide mobility and income to people in African urban centers; however, the accessibility is linked to high rates of injuries. According to WHO (2023), there are 1.19 million road fatalities each year, and among those who are highly affected are users of two- and three-wheeled motorized vehicles. Nambiza et al. (2025, 2026) highlight how mistakes made on the road are related to occupational stress, peer pressure, and uneven enforcement in Dar es Salaam. Hence, the behavior of motorcycle riders should not only be looked at through the prism of their job; it has to be considered within the larger context of the transportation system. One of the ways of addressing this problem is vocational education. Our main argument is that safe driving does not involve just remembering the sign or the law: a rider has to understand its importance, see what is going to happen next, and react. This is the basic principle of competence-based education (Boateng et al., 2023; Mbwilllo, 2023).

Research conducted in Tanzania has established the problem of unsafe riding and non-uniform adherence to safety measures (Nambiza et al., 2025, 2026; Nzuchi et al., 2022; Sohal et al., 2024), although little is known concerning how the process of instruction renders signs and

laws actionable. We regard this as more than an empirical omission. Predominantly verbal or weakly rehearsed instruction may yield under pressure, whereas contextual explanation, simulation, and feedback may support more dependable judgement. We therefore ask: (1) Which methods are used to teach road signs and traffic-law provisions? (2) How do current and graduate riders judge their usefulness? and (3) What enables or constrains their enactment? We develop *situated traffic literacy* to describe the capacity to read a changing road environment and bring its signs, markings, legal expectations, and hazards into timely action.

Conceptual Framing

We draw on General Systems Theory (von Bertalanffy, 1968) to understand rider education as a set of interdependent relationships rather than an activity confined to the training centre. Learning is shaped by pedagogy, curriculum, language, equipment, practice, assessment, regulation, and commercial work. Classroom instruction and rehearsal may develop knowledge and judgement, but on the road they encounter congestion, livelihood pressure, peer expectations, passenger demands, and enforcement practices that may support or weaken safer riding. This relational reading is aligned with systems-based approaches that reject the idea of finding the responsibility for road safety entirely in individual decisions (Mooren & Shuey, 2024).

Knowledge of a traffic rule and implementation of the rule are two different skills. A trainee can recognize a stop sign but will still have difficulties in reading the intersection, considering the other road users, controlling one's speed, and stopping safely. For this reason, we interpreted awareness as a development of one's capacity for judgement, not simply as knowledge. This differentiation helped to focus on the process of transition from recognition and understanding of rules to implementation and on the points at which this process gets disrupted.

Systems approach here serves not only as the means of explanation but as the methodological tool as well. Instead of separating the meaning-making at the training center from traffic realities, we look into the process of circulation of meanings through Kiswahili language, visualization, discussion, demonstration, motorcycles, practice, evaluation, regulation, and work of riders. In such a way, we do not overlook the instructor's role in teaching while blaming him for circumstances that are out of his hands.

Methodology

An interpretive qualitative approach to a case study that was bounded within the motorcycle rider-training programme at VETA Chang'ombe was used. The observation process took place in three distinctly functional places, which included the curriculum timetable classroom, where riders learned about the signs and provisions of law; the practical yard and simulated junctions, where they practiced; and the streets, which were characterized by traffic, passengers, business activities, and socialization. It was a process where the three places served different functions of learning, practicing, and application of knowledge and skills and not different cases or programs. The observation on the streets was not an informal training program but an apprenticeship program.

We chose 25 respondents whose roles made it possible to investigate instruction and the effects of such. These included the VETA Zone Coordinator (VO), the centre head (HOV), two instructors (VI-A and VI-B), a LATRA officer (LO), a traffic police officer (RTO), and six trainees (TMR1-TMR6). The snowballing technique helped us to identify eight graduates riding

as riders (P1-P8), whereas five motorcycle users (C1-C5) were sampled conveniently. User accounts served as an additional means of understanding rider experience, and were not intended to be viewed as official information on the curriculum.

We obtained written permission from VETA prior to entering classroom and yard spaces where instruction took place. We coordinated our visits with those times when training was being offered to trainees who were introduced to the research project by instructors but consent and participation was left at the discretion of the field researcher. Graduates' participation was determined after we verified their graduation from the course, while the motorcycle users were asked for participation after a ride or during an operation.

Data generation brought institutional intention, teaching practice, and experience into conversation. Semi-structured interviews with vocational and regulatory actors addressed instructional sequencing, language, materials, assessment, and constraints. Separate focus groups with six current trainees at VETA and eight graduates in Temeke reduced status differences and enabled comparison of current and retrospective experience. Interviews and discussions were mainly in Kiswahili, recorded with consent, and translated during transcription while retaining meaningful expressions. A checklist guided non-participant observation of resources, instructor actions, participation, feedback, and hazards. Authorised classroom and yard observations were supplemented by non-interactive, non-identifying street observations from 5–7 November 2025. Curriculum and training documents enabled comparison of prescribed, reported, and observed practice.

We conducted reflexive thematic analysis through documented stages (Braun & Clarke, 2022). Transcription, repeated reading, and memo writing established familiarity across interviews, focus groups, documents, and fieldnotes. Open coding in NVivo retained participants' expressions including 'realising together', 'waiting for a turn', and 'sending a trainee back to class' alongside interpretive codes such as contextual translation, unequal voice, guided correction, and road pressure. We compared related codes across groups and sources, clustered them into categories aligned with the research questions, and returned to full extracts, fieldnotes, convergent accounts, and counter-cases before refining the final themes. The interviews from all 25 subjects have been coded. The quotes given below are chosen for their analytical depth and variation. Audit trail, comparison of sources and methods, and context description helped to ensure credibility, dependability, and transferability. The pseudonym codes have been used, and quotations are edited to avoid repetitions. Ethical permission and informed consent have been taken.

Findings and Discussion

These results are described in light of the three research questions, but on the basis of one claim: the awareness was constructed in the process where riders went from recognizing the symbols to understanding the situations and taking action according to instructions and corrections. This study is structured by first looking at the strategies that enabled this process, second, riders' criteria for evaluating these strategies, and third, the conditions for sustaining or disrupting transfer.

Research Question 1: How do instructors mediate road signs and traffic law?

Contextual translation made legal knowledge usable, though unevenly

The results of our study reveal that teaching started with explanations through voice, drawing on a chalkboard, handouts, pictures, questions, and repetition, which helped in developing understanding of signs and selection of Traffic Act sections. But understanding became practical when teachers translated the information linguistically, visually, and situational-wise to roads and decisions that trainees were familiar with. We discovered that Kiswahili mediation was particularly significant in cases where schooling and English knowledge differed. As said:

“We combine lectures on theories with use of visual aids and field work in order to sensitize trainees on signage and regulations. Trainees are trained in a language that corresponds with the language used by the majority of trainees. From English to Kiswahili because majority of trainees have completed primary education. While we have enough materials for theories, we lack motorcycles and grounds for practice.”
(HOV, interview)

HOV presented a reading of language and material provision as being part of the same problem of pedagogy. Kiswahili provided a translation of the laws, while the lack of motorcycles and practice ground hampered the testing and correcting of knowledge gained. Accessibility became linguistic and material in nature. Instead of providing direct translations of the words, the instructors provided an explanation of the codified laws using examples and imagery, among other things.

Our analysis of documentaries confirmed this sequence of theory and practice. Curriculum and manuals went from traffic signs and provisions to demonstration of competence in simulated and actual road environments. The results became more complex going from simple recognition to interpretation and application. In our view, it was the lack of motorcycles and practice ground that allowed for this to be incomplete.

“I normally employ two theories: theory and practical. In the theoretical lesson, I give the explanation for each of the part on the motorbike. In the practical class, the trainees observe, carry out tasks and ultimately take a ride on the road to see if they are complying with the rules and observing road signs. When the trainee is yet to be competent enough to observe the rules and signs, then I take him/her to the classroom first.” (VI-A, interview)

VI-A's version is taken to demonstrate that the recursive sequence was the expected one rather than the linear one. Performance was not merely a test of theory; it was a test of the ability to apply it, and failure would lead to explanation in class prior to more road practice.

This aspect of explaining became more evident in the way graduates recalled their classroom-based training. While P4 was thankful for the good basis laid down through lectures and repetitive learning, he also admitted how hard it was to keep up the enthusiasm when road signs and rules were detached from the motorcycle and the road:

“In the case of my VETA classes, the teachers taught road signs using chalkboard presentations ... They would draw images and make us memorize what the signs mean. In terms of the Traffic Act, they read some portions of the act, for instance, helmet and license requirements, and asked some questions to determine our comprehension level. This was great, but boring since there were no real bicycles yet.” (P4, graduate FGD)

The story of P4’s narrative was read with ambivalence: explanation, interrogation, and repetition created common language but were inadequate when recognition was not accompanied by action. Existing trainees spoke of legal issues in terms of junctions, zebra crossings, overtaking, helmets, and nighttime riding. The stories of TMR3 included colorful handouts, mnemonics for different types of signs, roadside observation and discussion:

“The instructor repeats lessons and uses quizzes. Road signs are taught using colored handouts that resemble signs on Tanzanian roads, correlating them with traffic act regulations like the right of way. The signs on busy roads are observed and analyzed in classroom. It works well but students from rural areas need more help with regard to road signs and conditions.” (TMR3, trainee FGD)

Similarly, the framework of competencies indicated that awareness was more than mere memory but entailed decision-making, perception of danger and adaptive reasoning through discussion, reflection and practice. This is a commonality that leads us to conclude that representation, roadside observations and discussion represent a process leading to application of understanding. In addition, there is a paradox here in that while the expectations of the curriculum are broad, the illustrations and practice environments are not.

In our case, TMR3 is the qualification of what we would otherwise have viewed as a positive evaluation. The presence of nearby signs links representation to use but the context of the road remains mostly urban with little focus on rural and unpaved roads. The curriculum, thus, becomes one that the differentiated learners encounter through their differences in education, language, experiences and geographical context.

Participation deepened interpretation but did not give every learner an equal voice

It was discovered that contextual translation rendered legal knowledge comprehensible, and participation brought interpretation into view. Close calls, incidents, encounters with the police, and disputable practices were resources from which trainees were able to compare responses and test everyday assumptions against traffic laws and safety. P8 explained this phenomenon:

“The trainers make frequent use of group discussions. We form circles and narrate our stories regarding the close calls or incidents that we have witnessed. The trainer helps us relate our experiences to safety policies. It becomes a real experience when one hears from other people and not from the instructor.” (P8, graduate FGD)

“Realising together” is understood by us as an innovation in terms of locus of interpretation. Personal experiences on the road became assertions that one’s peers could interrogate and moderate. While teachers did not abandon their role as authorities or reduce the process of creating legal meaning to a democratic process, they made experiential knowledge part of a dialogue with the Traffic Act and principles of road safety.

In P8’s story and documentary materials, this practice was anything but an accidental deviation from the programme curriculum. Training manuals recommended simulation, role

play, and case study; competency-based education stressed peer learning and reflection. We observed a pattern in which the experience was first narrated, then collectively interpreted, connected to a formal rule and transferred to a practical decision.

In the observation at VETA Chang'ombe, the sequence took on its practical meaning as follows:

"In practical activities, the trainers encouraged the trainee riders to ask questions in order to explain the significance of certain road signs as well as to justify their actions at certain points of the junctions." (Observation, VETA Chang'ombe Centre, 03/11/2025)

It is our understanding of the above statement as one in which participation was extended beyond discourse in the classroom. The riders made their thinking known in action, enabling the instructors to stop the maneuver in order to question the logic behind it and correct any misunderstandings that may become habitual.

Our observations also make the claim that participation was inclusive more difficult. There were some trainees who continued to dominate the discourse despite the invitation of others to speak. Although documentary guidance emphasised inclusion, it said little about confidence, prior experience, or group status. Learner-centred activity could therefore still allow confident participants to define relevant experience and persuasive interpretation.

We therefore argue that participation expanded the knowledge available without distributing interpretive authority equally. Experienced riders enriched discussion but could reproduce stage hierarchies and leave quieter trainees' misconceptions unspoken. Inclusive pedagogy required structured turn-taking, small-group responsibilities, individual explanations, and demonstrations beyond plenary talk. Participation deepened awareness when reasoning became collective, visible, and correctable.

Research question 2: How riders judged instructional effectiveness

Having examined what instructors did, we now consider how riders decided whether those methods worked. A method's presence in a lesson says little about its educational value unless learners can retain, explain, and use what it offers. Current trainees and graduates judged instruction through what remained available to memory and action after the lesson and, eventually, after the course.

Contextual relevance made formal rules intelligible

We found riders' judgements converging first around contextual relevance. Neither did they rule out legal knowledge nor regard experiences as substitutes for it. They treasured that moment when the statutory language becomes a discernible issue, which could be discussed and sorted out. The way in which TMR2 explains the link between them is as follows:

"The teachers employ group discussion extensively. They make us form small groups and pose questions based on the Traffic Act, such as "What do you do at a zebra crossing?" After that, we discuss and present our points and the teacher corrects us citing laws. They also employ videos of accidents resulting from the disregard of signs to frighten us into heeding. Role playing as an approach plays a pivotal role in the training since we play the roles of traffic policemen and riders violating laws." (TMR2, trainee FGD)

In our interpretation of the scenario, the trainees are supposed to publicly perform interpretation, face alternatives and return to the Act as instructed. The expression ‘makes the awareness stick’ positions retention as something interpretive rather than entertaining. Contextualisation proved useful in that it was an experience tested against the law rather than accepted at face value.

Visual and emotional engagement strengthened memorability

We found memorability the second requirement. Engaging images and emotionally charged content enhanced attention and memorability, though their power lay in how they were used by the instructors. TMR4 explained the relevance of recognisable imagery of crashes to beginners like himself:

"For beginners like us, visuals and videos are very important. The instructors show us footage from local news broadcasts about motorcycle accidents in Tanzania. They instill the fear of the consequences, in a good way because we get motivated to learn road signs and traffic rules." (TMR4, trainee FGD)

This is our interpretation of how TMR4 considered fear motivational rather than being the same as learning. Pictures created immediacy of risk but could not account for the link between risk, choice, rules, and consequences. Emotional involvement enhanced memory where instructors turned it into hazard reasoning; shock alone was likely to create temporary compliance rather than judgement.

Practical enactment determined whether awareness became usable competence

Our analysis revealed that riders placed most emphasis on whether the knowledge would survive its transition from classroom awareness to actual performance. TMR1 appreciated the connection between visual explanation and practice on the mock roads, while also recognizing the point of diminishing returns in explaining for too long:

"Instructors begin with classroom lectures using flip charts and projectors to explain traffic signs such as stop signs, speed limits, and no entry signs. They then take us to the mock roads to identify traffic signs when riding slow. This combination is effective since it's not just theoretical, although at times the lecture becomes too long." (TMR1, trainee FGD)

The 'mix' worked for us as it involved the movement of the same sign through the modes of representation: it was viewed, it was named, it was experienced in movement and it led to a decision. Thus, practical activity put meaning into test rather than relying on theory. Nevertheless, P6 found the limits of such an achievement:

"The practice area taught me how to ride safely in the city, but the skills of riding in rural and emergency situations are poorly developed due to the limited experience we have. I would like to say that the facilities have allowed me to learn probably 60-70% of the skills I need." (P6, graduate FGD)

We do not consider P6's assessment as a psychological metric. This is an evaluation of the situation in which competence could be practiced: urban basics could be solidified whereas the judgement in rural and emergency situations was still relatively vulnerable.

We thus reject the search for an optimal technique. Lecture without context was theoretical; visual presentation without analysis might induce episodic fear; and practice within only urban

environments could not guarantee adaptive ability. From the riders' perspective, relevance made the rules comprehensible, visuals made them memorable, and repetition made them usable.

Research question 3: What enabled or constrained implementation and transfer

In addressing the final question, we follow learning beyond the lesson into the material and occupational conditions of riding. Street observations sounded a caution: some riders slowed at warning signs and stopped at junctions, while others ignored the same cues as traffic and pursuit of passengers intensified. We cannot infer programme impact because individual training histories were unverified; the contrast instead reveals the pressured environment into which competence must travel.

Awareness and compliance diverged under road pressure

Our analysis distinguished acquiring awareness from being consistently governed by it. Regulatory actors joined signs, licensing, protective equipment, defensive riding, and assessment to braking, steering, obstacle avoidance, and night riding. Yet this formal integration could not settle the pressures riders met after training. Awareness remained an occupational competence, not a self-executing guarantee of compliance.

"Many riders treat a boda boda as 'quick transport' that need not stop at traffic lights or zebra crossings. To them, enforcement is harassment and they would rather pay a fine than abide by the laws." (RTO, interview)

"Customers rush us and say 'faster; I am in for work.' It is a great economic burden. We require more customers and hence some will not pay attention to safety measures to satisfy them." (P4, graduate FGD)

These two quotes are analyzed as meaning that the transfer problem is no longer about lack of awareness. The riders operated under an occupational reasoning in which speed made the customer happy, increased turnover and made penalties negotiable. Awareness did not disappear, but its influence on behavior was being questioned.

"LATRA encourages motorcycle riders to undergo VETA training to help them know road signs and traffic regulations The structured theoretical and practical modules lead to better knowledge retention and, in many cases, more positive attitudes towards safety measures such as helmets and reflectors. We see competency-based training as part of the wider system for reducing road crashes." (LO, interview)

In our systems reading, LO locates the training centre within, not above, road safety. Instruction sits alongside licensing, regulation, vehicle condition, enforcement, and commercial work. A trainee may understand a rule while working under arrangements that reward speed, tolerate non-compliance, or reinforce the rule inconsistently.

A service user offered cautious corroboration from the passenger's position:

"Riders who have gone through formal training seem more professional and less likely to speed. They also emphasise that I wear a helmet and sit properly." (C1, user interview)

We treat C1's account cautiously because the user could not verify a rider's course history; it is not evidence of programme effect. It nonetheless provides an external description of conduct passengers associated with training: moderated speed, helmet use, and explicit attention to passenger positioning.

“When riders understand not only the rules but also the reasons behind them, they are more likely to follow them. Training that allows them to ask questions and discuss situations is very important.” (RTO, interview)

We also found regulatory consciousness taught at times through deterrence fines, licence suspension, or crash imagery more strongly than hazard reasoning. The graduates stated that their awareness decreased when training did not account for nighttime driving, rain, visibility issues, or heavy traffic; some felt that certain knowledge was outdated and were able to learn from near accidents. We deduce that fear and memory alone will not ensure compliance without regular reinterpretation in varying circumstances.

Material scarcity redistributed, rather than merely reduced, learning

Our findings suggest that resource scarcity has done more than simply cut down learning time; it has distributed unequal opportunities to develop proficiency. The techniques that the riders found most valuable relied on functional motorcycles, space, instructors' attention, and repetition. Shared bikes, time constraints, travel expenses, and insufficient emergency training thus created unequal opportunities on task in an otherwise equal curriculum.

“Access to the yard is possible during certain times, and distance from my house means transport is expensive. I have been practising simple turns twice per week, and as such, my turning and emergency braking skills are poor.” (TMR2, trainee FGD)

“Theory is taught, but there isn’t much practical training. We have the cones and the helmets, but we lack enough bicycles for the number of trainees. If there were more bicycles or simulations, we could master hazard recognition quicker.” (TMR6, trainee FGD)

We interpret this as the transformation of scarcity from a minor issue for administration into the essence of teaching. The use of motorcycles eliminated repetition, feedback delay, and available risk scenarios. Travel costs and limited yard time worked even more to the advantage of trainees who were closer to the center or had enough money to access the training. An ostensibly standard course could thus offer highly uneven opportunities for developing competence.

Systems analysis helps to resolve the dilemma. It is not enough to evaluate instructors on the basis of their dedication to active learning where motorcycles, maintenance, space, time, and realistic training are lacking. However, equipment acquires significance for education through sequencing, participation, feedback, and assessment of judgment along with skills. The best practices of VETA were those that were scarce, making awareness solid as classroom knowledge rather than as attitude under stress.

Conclusion and Implications

In our view, the learning potential of VETA rider training was not in the variety of methods employed, but in their relationship to one another. What made them valuable was their use by the learner when progressing from the point of being aware of a sign to explaining its meaning, making sense of a situation, deciding on an action and making sense of that action. The approach is consistent with competence-based learning where knowledge, skill, and judgment are combined in a real-life context and competence is not seen as coverage of material (Boateng et al., 2023; Mbwillo, 2023). In our interpretation, theory framed legal knowledge but became

restricted when divorced from judgment; performance was educational when it brought correction and new explanation.

We also see why the transition from knowing to acting was precarious. At the center, unequal participation, few motorcycles, lack of practice time, and differential access hindered the consolidation process. Out on the streets, traffic, passenger needs, economic necessity, peer culture, and enforcement inconsistency contended with training. Tanzanian research identifies the context of risky riding as occupational and organizational, not only a lack of knowledge (Nambiza et al., 2025, 2026; Nzuchi et al., 2022; Sohal et al., 2024). This is why we avoid interpreting non-compliance as either evidence that training was ineffective or simply moral failure. Training provided a real yet conditional source of safer judgement.

Theoretical and Pedagogical Implications

In this way, we employ *situated traffic literacy* as a way of describing what we mean by awareness beyond merely recollection. This entails symbolic literacy, legal knowledge, hazard recognition, anticipation of other road users, passenger behavior, decision-making, and actions that riders can explain and reflect on. Competence is not transferred but constructed under different traffic and occupational contexts. General Systems Theory (von Bertalanffy, 1968) accounts for how curriculum, language, pedagogy, technology, evaluation, policy, enforcement, and work affect outcomes. This approach is also consistent with road-safety programs which refuse to assign sole responsibility for safety to individual users (Mooren & Shuey, 2024).

For this reason, we recommend that there should be cycles of explanation, performance, evaluation, and re-assessment where not only performance but the reasoning behind actions should be assessed (Boateng et al., 2023; Mbwilllo, 2023). Crash pictures need not be used to create shock but to analyze hazards and available options. Turn-taking needs to be structured, there must be clear roles, group reporting, and individual assessment. Simulations need to increase in difficulty night-time riding, rainy weather, traffic congestion, low visibility, passengers' communications, emergency situations, and time pressures without risking novices in real life.

Institutional and Policy Implications

For VETA, motorcycles, practice time, instructor time, and retesting are issues of educational quality and equity. Centres should keep track of minimum individual practice time, trainee to motorcycle ratio, trainee to instructor ratio, serviceability of motorcycles, and correctional practice time. Marked tracks, scenario cards, video hazard perception, and simulated riding could supplement riding, but never substitute. Instructor training should focus on diagnostic questioning, inclusive teaching, bilingual legal negotiation, and learning from mistakes.

Our systems perspective broadens responsibility for VETA. Training, licensing, enforcement, rider organization, and commercial riding have to reinforce each other. VETA, LATRA, traffic police, rider associations, and municipalities should collectively evaluate the curriculum; the licensing exam should include hazard perception together with recollection and vehicle control; and phase-based refresher courses should go back to situations where work pressures compromise awareness. Formal rider education can have safety benefits (Yu & Tsai, 2021), but the effects of formal rider education require enforcement and interventions that take into account phase leadership and the economics of commercial rider education.

What we need in our view, at this moment, is not an expanded syllabus, but rather the protection of the process of learning that exists within the practice of the teachers. When there are shortages and scheduling that keep apart the processes of recognition, interpretation, repetition, evaluation, and re-evaluation, then competence is fragile. Linking these things together through training and following up afterwards would bring legal knowledge into the realm of common judgment. Rider education must thus be seen as part of an ongoing process.

Limitations and Research Implications

It is recognized that a bounded case such as this one cannot estimate causal effects. Observations on public roads were unable to identify each rider's training background, and participant interviews provide evidence of perceived retention rather than of actual behavior. Longitudinal studies need to track confirmed trainees in professional riding, while comparative studies between various centers with different resources will help identify the combination of components and their minimal levels for traffic literacy.

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