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SCHOOL VAN SCHEDULES AND ACADEMIC PERFORMANCE OF LEARNERS IN PRIMARY SCHOOLS IN NANSANA DIVISION, WAKISO DISTRICT, UGANDA

BY

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A DISSERTATION SUBMITTED TO GRADUATE SCHOOL IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTERS OF EDUCATION PLANNING AND MANAGEMENT OF METROPOLITAN INTERNATIONAL UNIVERSITY

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DECLARATION

I Sekitto Muhammad Kawooya to the best of my understanding declare that, this dissertation entitled "School van schedules and academic performance of learners in primary schools in Wakiso district, Uganda" is my original work and has never been submitted for any academic award to any institution of learning.

Sign……Date……..

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APPROVAL

This dissertation entitled "School van schedules and academic performance of learners in primary schools in Wakiso district, Uganda" has been done under my supervision and now is ready for submission to the school of Graduate Studies and Research for further examination.

SIGN……..DATE……

DR. NAMULONDO VERONICA

UNIVERSITY SUPERVISOR

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DEDICATION

With sincere regards I dedicate this piece of work to the Almighty God for His mercy and guidance throughout, my family as well as relatives and friends who have supported me in various ways. I also dedicate this piece of work to my supervisor for her tolerance, love and guidance throughout this exercise to ensure that it's a success.

"May god bless all in abundance"

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LIST OF ABBREVIATIONS

IV	Independent Variable
DV	Dependent Variable
FDG	Focus group Discussion
CA	Continuous Assessment
SES	Social Economic Status
EST	Ecological System Theory
CLT	Cognitive Load Theory
UNEB	Uganda National Examinations Board
UPE	Universal Primary Education
MEO	Municipality Education Officer
MED	Ministry of education department
P1-P7	Primary one to Primary Seven

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ABSTRACT

This study examined the influence of school van scheduling on the academic performance of primary school learners in Nansana Division, Wakiso District, Uganda. Specifically, the study assessed the relationship between total commute duration, number of pick-up and drop-off stops, van capacity utilization, and learners' academic performance, as well as mechanisms for mitigating negative academic effects associated with prolonged school van schedules. A mixed-methods cross-sectional research design was adopted, integrating quantitative and qualitative approaches. The study was conducted in ten purposively selected private primary schools offering regular van transport services. A total of 341 participants were involved, including learners (P1–P7), parents/guardians, teachers, school administrators, van operators, and the Municipal Education Officer. Quantitative data were collected using questionnaires and academic records, while qualitative data were obtained through interviews, focus group discussions, and classroom observations. Quantitative data were analyzed using descriptive and group-level inferential patterns in SPSS, while qualitative data were analyzed thematically. Findings from both strands were triangulated to enhance validity. The findings revealed consistent group-level patterns indicating that long commute durations, frequent pick-up and drop-off stops, and high van occupancy levels were associated with learner fatigue, reduced alertness, diminished classroom engagement, and moderate academic performance. Overcrowding and discomfort, particularly in high-use vehicles, further compromised learners' cognitive readiness and participation. Qualitative evidence highlighted stakeholder-proposed mitigation strategies, including route optimization, schedule adjustments, capacity regulation, and strengthened collaboration between schools, parents, and authorities. The study concludes that school van schedules are significant determinants of academic performance among primary school learners. It recommends learner-centered transport scheduling, enforcement of capacity guidelines, and policy-driven regulation of school transport systems to enhance academic outcomes.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter presents the background to the study, the statement of the problem, general objective, specific objectives of the study, research questions, the scope of the study, the significance of the study findings, justification and conceptual framework and definition of key terms.

1.1 Background to the Study

The background to the study includes the historical, conceptual, theoretical and contextual perspectives

1.1.1 Historical perspective

Around the world, the daily journey to and from school plays a significant role in shaping a child's educational experience. In many countries, particularly in urban and peri-urban areas, the reliance on school transportation has increased due to expanding residential zones and congestion in city centers (Hatfield, Kustar, & Reinmuth, 2024). Scholars and educators globally have raised concerns about the impact of long commute times on students' health, cognitive function, and academic achievement (Krumholz, 2021).

Children who spend extended hours on school buses or vans are more likely to experience fatigue, irregular sleep patterns, and reduced concentration in class(Julius & Matovu, 2025). The situation is particularly evident in countries like the United States and India, where long-distance travel to school is a growing issue for rural and suburban students (Yadav & Singh, 2020). While school transportation is a logistical necessity, its timing and scheduling can influence learning outcomes more than previously acknowledged(Julius & Kazaara, 2025b).

The relationship between school transportation schedules and learners' academic performance has garnered significant attention worldwide. Research indicates that prolonged commute times and early school start times can adversely affect students' cognitive functions, attendance, and overall academic outcomes (Hopson, Kizito, & Muwonge, 2022).

In Italy, a study conducted at the Politecnico di Milano analyzed the impact of commuting time on students' Grade Point Averages (GPA). The findings revealed that longer commute times negatively influenced academic performance, emphasizing the need for policies that address urban mobility challenges to enhance educational outcomes (Burzacchi et al., 2024). Elsewhere like in Germany, research highlighted that extended travel times to

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school are associated with decreased student engagement and academic achievement. The study emphasized the importance of optimizing school transportation to mitigate these adverse effects (Müller & Schneider, 2021).

For the case of China in Asia, a nationwide survey examined the effects of school travel on children's psychological well-being and academic performance. The study found that longer commute durations were significantly associated with lower academic achievements, particularly in urban and rural areas (Li et al., 2022). A study by the Korean Educational Development Institute investigated the impact of long commutes on students attending high-performing schools outside their residential zones which indicated that early wake-up times and extended travel led to chronic sleep deprivation, impairing memory retention and academic output, especially among younger students (Kim & Lee, 2021).

In a study conducted by the Australian Council for Educational Research focusing on students in rural regions who travel long distances to school(Alex & Julius, 2024). The findings revealed that students commuting more than 60 minutes each way often experienced fatigue and concentration issues, leading to lower engagement levels and reduced academic confidence (Thomson et al., 2021.)

In the United States, a study by Gottfried (2023) published in Education Finance and Policy examined the impact of school transportation on student outcomes in Michigan. The research found that access to school buses improved attendance and academic performance, particularly for students from low-income families(Lydia et al., 2023).

International research highlights the crucial impact of school transportation schedules on students' educational experiences. Findings from various studies suggest that minimizing commute times and improving transportation logistics can enhance learners' cognitive well-being, reduce absenteeism, and improve academic achievement (Hopson et al., 2022; Gottfried, 2023). These global insights offer a valuable framework for contextualizing similar challenges in Uganda, particularly within Wakiso District, where many primary school children endure long travel distances and early morning van pick-ups that may compromise their readiness to learn and academic outcomes(Seth, 2019).

In Africa, the question of access to education has often focused on enrollment, school infrastructure, and teaching quality(Julius & Kazaara, 2025c). However, the journey to school especially for young children has become an increasingly relevant part of the conversation. In many African cities, urban sprawl and the commercialization of housing have pushed families to the outskirts of towns. As a result, school commutes have lengthened, often requiring motorized transport (Julius & Kaazara, 2025).

In South Africa, for example, studies have highlighted how long and early school travel distances negatively affect learners' emotional well-being and performance, particularly among low-income families (Mthethwa & Chikoko,

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2020). Similarly, in Nigeria, overcrowded school buses and unpredictable transport schedules have been linked to student stress and absenteeism (Ajayi, 2021). These patterns reflect a wider continental concern that, whereas necessary efforts have been made towards educational access, the quality of that access including how children physically get to school needs more focused attention(Pauline, 2023).

Within East Africa, countries such as Kenya, Tanzania, and Uganda face shared transportation related challenges in education. In Nairobi, Kenya, for example, early morning school van pick-ups sometimes as early as 4:30 a.m. are common among private school students who must travel long distances from their places of residence estates to urban /city schools(A. I. Kazaara & Nancy, 2025). Research by Kamau and Otieno (2021) noted that these early commutes are associated with increased levels of sleep deprivation and reduced academic engagement, especially among primary school learners (Godfrey et al., 2023). In Tanzania, poor road networks and unreliable school transport systems contribute to chronic lateness and fatigue among pupils (Mwema & Mbwambo, 2022). These studies suggest that across East Africa, while school transport is meant to enhance access to school and education, poor scheduling and long hours of travel can counteract its intended benefits by undermining learners' academic preparedness and well-being.

In Uganda, there has been a rapid increase in private schooling and suburban housing, especially around major towns like Kampala(Seth & Ntirandekura, 2022). As parents seek better education for their children, many opt for schools located far from their residences, relying heavily on school vans to bridge the distance. Unfortunately, this has resulted in increasingly early pick-up times (sometimes as early as 4 a.m.) and return trips that extend into the evening hours (sometimes as late as 8 p.m.)(Julius & Kazaara, 2025a).

A recent study by Namuyanja (2023) on school-going children in Kampala and its surrounding districts found that long school driving hours not only interfere with children’s sleep cycles but also reduce time available for them to do homework and other family interactions. Furthermore, teachers report noticeable signs of fatigue and reduced attention spans in early morning lessons, particularly among children who travel the farthest(A. G. Kazaara & Julius, 2025). Despite these realities, policies around school transport remain underdeveloped, leaving a gap between educational access and actual learning quality.

In Wakiso District, which encircles the capital city of Kampala, rapid urbanization over the past two decades has fueled a boom in private schools and a surge in the number of school vans of all sorts (ranging from 3-seat saloon cars to buses) operating daily across the district(Mark et al., 2023). According to the Wakiso District Education Office (2022), over 65% of primary school children in peri-urban areas such as Nansana, Kira, and Kasangati use school vans to reach school.

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The district has also noted rising concerns from parents and school administrators about children's fatigue, absenteeism, and reduced academic performance, particularly among those who travel long distances daily(Lydia et al., 2023). Teachers have expressed frustration that children often arrive at school already tired and drowsy, sometimes having naps during the van travels, and show limited focus during morning lessons.

In Nansana Division, one of the most densely populated parts of Wakiso District, school van usage is both widespread and essential. With increasing competition for placement in quality schools and traffic congestion along routes like the Hoima Road, many children are picked up before sunrise and dropped off well after sunset. Anecdotal reports from school headteachers and parents reveal a worrying pattern that children who endure long van rides tend to perform worse academically, especially in subjects that require early-morning attentiveness such as mathematics and science(Jallow et al., 2022). Local health practitioners have also observed rising cases of anxiety, chronic fatigue, and low motivation among school going children in the division (Kiyaga & Namutebi, 2022). Despite its crucial role in education access, the current school van system in Nansana may be contributing unintentionally to the very learning gaps it was meant to close.

1.1.2 Theoretical Perspectives

This study is grounded in Bronfenbrenner's Ecological Systems Theory (EST) (1979), which provides a multi-layered framework for understanding how a child's development is shaped by interactions across various environmental systems. In addition, the study draws on Cognitive Load Theory (CLT) as developed by Sweller (1988), to explain how mental fatigue resulting from environmental stressors such as long commutes can impair learning and academic performance. Together, these two theories offer a comprehensive lens through which the relationship between school van schedules and learner outcomes in primary schools can be examined.

Bronfenbrenner (1979) proposed that child development occurs within five interrelated systems: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem, each influencing the child in different but interconnected ways (Rosa & Tudge, 2013). The key assumptions of EST are that development is shaped by reciprocal interactions between the child and their environment, that multiple environmental systems operate simultaneously and interdependently, and that changes in one system can affect others over time.

The strengths of EST are its holistic approach to child development, capturing the complexity of environmental influences on learning, and its ability to identify multiple points for intervention, from household routines to school policies. However it weaknesses include its broad scope, which can make empirical measurement challenging, and its limited attention to internal cognitive processes. Critics argue that EST may understate individual agency and personal differences in development (Tudge et al., 2009).

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At the microsystem level, the child's immediate environments such as home, school, and the school van play a crucial role in shaping daily experiences. In contexts where children spend extended hours commuting due to early pick-ups and multiple stopovers, their engagement in classroom activities may be affected due to fatigue, irritability, or lack of sleep (Gottfried, 2023). The mesosystem involves the interconnections between different microsystems, such as coordination between family routines and school schedules. Misalignment of van arrangements with household rhythms may reduce parental support, negatively affecting learners' academic progress (Telford et al., 2021). The chronosystem considers the element of time, showing how repeated long commutes can accumulate to cause chronic fatigue, irregular sleep patterns, and stress, which erode motivation, attention, and overall academic growth (Beattie et al., 2020). In Nansana Division, traffic congestion and long distances often result in children arriving at school already exhausted, compromising their ability to concentrate and participate in learning (Hopson et al., 2022).

To complement EST, Cognitive Load Theory (CLT) explains the internal mental processes affected by external stressors like long commutes. CLT posits that working memory has a limited capacity, and when learners are exposed to excessive non-instructional demands such as noise, overcrowding, or early-morning stress, their ability to process new information declines (Sweller, 1988; Paas & van Merriënboer, 2020). The assumptions of CLT are that working memory is limited in capacity and duration, learning is optimized when extraneous cognitive load is minimized, and pre-existing cognitive demands reduce the processing of new information.

Among the strengths of CLT include its ability to explain why external stressors impact learning and to guide interventions to mitigate cognitive overload. Its weaknesses include a focus on short-term working memory over long-term learning processes and limited ecological validity in real-world contexts (Paas & van Merriënboer, 2020). Children commuting in congested, noisy, or uncomfortable school vans may arrive at school already mentally overloaded, consuming cognitive resources needed for problem-solving, comprehension, and retention (Kalyuga, 2011). Even well-designed classroom activities may fail to engage learners fully if their mental bandwidth has been taxed before arrival. Factors such as the number of stopovers or crowding in the van contribute to extraneous cognitive load, diverting attention from meaningful learning tasks and compromising academic outcomes (de Jong, 2010).

Taken together, EST and CLT offer a robust foundation for examining how van schedules influence academic performance among primary school children. EST provides the macro- and micro-context of the child's developmental environment, while CLT highlights the internal mental processing limits under stressful conditions. Grounding the study in these complementary perspectives allows for a nuanced, context-sensitive analysis of how daily commuting routines, often overlooked in educational planning, play a critical role in shaping learning outcomes in peri-urban Uganda.

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1.1.3 Conceptual perspective

This study seeks to examine two primary constructs that is school van schedules and academic performance. School van schedules encompass the timing of morning pick-ups and afternoon drop-offs, the total duration of each trip, and the regularity (or variability) of these times over the school term (Mbabazi & Okello, 2021). In Nansana Division, School Van operators often set schedules based on road conditions and parental work routines, which can lead to very early departures and or late returns. Such scheduling practices shape children's daily rhythms, influencing sleep, nutrition, and opportunities for after school study (Musoke & Ssebuwufu, 2020).

Academic performance in this context refers to measurable indicators of learning achievement among primary pupils mainly the termly exam scores in core subjects (English, mathematics, science) and teacher-rated classroom engagement (Otieno & Kamau, 2022). While raw test scores offer an objective metric, many educators argue that classroom behavior such as attention span, participation, and timely completion of homework, equally communicate a child's academic well-being (Turyamuhweza, 2023). By combining these quantitative and qualitative measures, the study gains a fuller picture of how transport routines map onto learning outcomes (Nicholas & Nancy, 2024).

Conceptually, school van schedules function as the independent variable, while academic performance is the dependent variable. The relationship is not strictly one-way; it is shaped by moderating factors like the child's age, gender, household income child's health, and distance from school(A. G. Kazaara & Kazaara, 2025). For example, younger children may be more sensitive to early-morning departures than older peers (Mbabazi & Okello, 2021), and pupils from larger households might face additional morning activities to complete before boarding the van, thus amplifying fatigue. On the other hand, parental involvement and school-based support (e.g., homework clubs) can buffer negative effects of long commutes acting as mediators that either worsen or do away with the transport-related learning gaps (Musoke & Ssebuwufu, 2020).

Finally, this study looks at these concepts in a systems perspective, considering that school van schedules are as a result of interactions between urban infrastructure, school policies, parent work patterns, and operator practices(Julius & Kazaara, 2025b). In Nansana, road works or rains can force sudden schedule changes, turning a normally 60-minute drive into a 120- minutes drive hence an environmental shock that ripples through a child's day (Otieno & Kamau, 2022). A comprehensive understanding of these dynamic interactions is essential for designing effective interventions that can optimize both transport efficiency and children's readiness to learn.

1.1.4 Contextual Perspective

In recent years, Uganda has significantly experienced a shift in how children travel to school, particularly in urban and peri-urban areas like Nansana Division, one of the busiest municipalities in Wakiso District (Suzan & Gracious

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Kazaara, 2023). As population growth outpaces the expansion of educational infrastructure, many families are left with limited school options close to home. Consequently, school vans have become the most common form of transport for primary school children, especially those attending private schools located several kilometers away from their residences (Nakibinge & Kaggwa, 2022).

Nansana Division, situated on the northern outskirts of Kampala, has grown rapidly into a densely populated urban zone, with its neighborhoods stretching deep into semi-rural Wakiso. The congestion that comes with this poorly or unplanned urban expansion has worsened traffic conditions, causing children who rely on school vans to wake up as early as 4:30 AM in order to arrive at school on time. Some return home as late as 8:00 PM due to poor road infrastructure and traffic delays (Lwanga & Kabanda, 2023). While the use of school vans solves the challenge of distance, it also introduces new issues of long commutes, irregular sleep patterns, physical exhaustion, and reduced time for rest or homework all of which may impact children's ability to perform academically(Edgar & Moses, 2023).

Many schools, especially those offering the national curriculum under tight academic calendars, operate rigorous daily schedules that require alertness, concentration, and stamina from learners. Yet, children who experience disrupted morning routines and prolonged travel often enter the classroom already fatigued(Julius, 2025). Teachers in several Nansana-based schools have reported that some children sleep during morning lessons or struggle to stay attentive, particularly in numeracy and reading activities (Kiyaga & Namutebi, 2022). This raises concerns not only about academic performance but also about the overall well-being of learners who are still in their formative developmental years.

Despite these realities, there remains limited research focused on how school van scheduling specifically the timing and duration of pick-up and drop-off affects academic outcomes at primary level(Sub-county et al., 2023). Much of the existing literature on school transportation in Uganda focuses on access and safety, but few studies explore the cognitive, emotional, and academic consequences of early departures and long drives (Tumwebaze & Namirembe, 2021).

In the context of Nansana Division, where most parents work long hours in nearby urban centers and rely on hired vans to ferry their children across neighborhoods, the issue is not just logistical it is deeply educational. Without sufficient data on how school van schedules shape learning experiences, there is a gap in local policy and practice. This study seeks to address that gap by examining the influence of school van schedules on the academic performance of primary school children, focusing on real-life conditions in Nansana Division.

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By engaging with this topic, the research intends to offer practical insights to school administrators, parents, van operators, and policymakers on how transport-related routines can be well and better aligned with the cognitive and developmental needs of young learners in Uganda's urbanizing communities.

1.2 Statement of the Problem

Between 2015 and 2023, Nansana Division in Wakiso District, Uganda, has experienced rapid urbanization and population growth, resulting in increased traffic congestion and longer travel distances to essential services, including schools (UBOS, 2023). In response to perceptions of better academic quality, many parents enroll their children in schools located far from their homes. Consequently, a growing proportion of primary school learners in Nansana rely on school vans as their primary mode of transport (UWEZO Uganda, 2020).

As a result, school van schedules have become increasingly demanding. Reports indicate that some primary school children are picked up as early as 4:30 AM and dropped off as late as 8:00 PM, spending several hours each day commuting(Ntirandekura & Friday, 2022). These extended travel times significantly reduce time available for sleep, meals, rest, play, and homework, all of which are essential for healthy child development (Lwanga & Kabanda, 2023). This situation is particularly concerning for lower primary learners, who are developmentally more vulnerable to fatigue and cognitive overload.

Educational practitioners and child development experts have raised concerns that early pick-up times, prolonged commute durations, and late drop-offs contribute to physical exhaustion and reduced alertness among learners(Moses, 2023a). Fatigue is especially evident during morning lessons, when foundational subjects such as literacy and numeracy are taught. Research indicates that such fatigue negatively affects attention span, memory retention, classroom participation, and overall academic performance (UNICEF, 2019; UWEZO Uganda, 2020; UNICEF Uganda, 2021).

Despite the increasing reliance on school van transportation and the growing number of children exposed to long daily commutes in urban areas like Nansana, empirical research in Uganda has largely focused on school access, infrastructure, and aggregate school performance, with limited attention given to how school transport schedules influence learners' academic outcomes(Moses, 2023b). This gap is most evident at the lower primary level, where children are particularly sensitive to disruptions in sleep patterns and daily routines (Nakibinge & Kaggwa, 2022). As a result, decisions regarding school van operations are often made without evidence-based guidance, potentially undermining the academic benefits that expanded school access is intended to provide(Julius & Kazaara, 2025a).

Given the continued urban expansion, increasing traffic congestion, and rising dependence on school vans in Nansana Division, there is an urgent need for localized, evidence-based investigation. Therefore, this study seeks to examine how school van schedules specifically early pick-up times, long commute durations, and late drop-offs

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affect the academic performance of primary school children in Nansana Division. The findings will provide critical insights to inform policy formulation, school transport planning, and parental decision-making, thereby promoting a healthier balance between educational access, learner well-being, and academic achievement.

1.3 Objectives of the study

1.3.1 General objective

The study aims to investigate how school van scheduling affects the academic performance of learners in primary schools within Nansana division, Wakiso District, Uganda.

1.3.2. Specific objectives

1. To assess the relationship between total commute duration and academic performance of primary school learners.
2. To examine the relationship between number of pick up and drop off stops towards academic performance of primary school children.
3. To assess the relationship between capacity utilization and academic performance of primary school children.
4. To identify the mechanisms for mitigating negative academic effects of prolonged school van schedules among primary school children.

1.4 Research Hypotheses and Question

1.4.1 Hypothesis

1. **H_o1**: There is no significant relationship between total commute duration and academic performance of primary school learners.
2. **H_o2**: The number of pick-up and drop-off stops has no significant effect on the academic performance of primary school learners.
3. **H_o3**: Van capacity utilization does not significantly affect the academic performance of primary school learners.

1.4.2 Research Question

4. What strategies can be used to mitigate the negative academic effects associated with prolonged school van schedules among primary school learners?

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1.5 Scope of the Study

This will include: geographical, content and time scope.

1.5.1 Geographical scope

This study is specifically focused on Nansana Division, one of the most urbanized and densely populated administrative units in Wakiso District, Uganda. The area has experienced rapid residential growth, driven by its proximity to Kampala city and a rising demand for private education. As a result, many pupils travel long distances daily to reach schools located in different parts of the division or beyond. Nansana offers a relevant and practical setting for this research because of the widespread use of school vans as the primary means of transport for children, especially in private schools (Nakibinge & Kaggwa, 2022).

This study focuses on selected private day primary schools in Nansana Division, Wakiso District, Uganda, where school van transport systems ranging from saloon car vans, taxis, coasters and buses are commonly used. Since government-aided primary schools in Nansana seldom operate vans, they are excluded from this research. The study examines transport operations for day scholars commuting daily, omitting boarding schools and institutions without transport services. It also engages parents, teachers, van operators, school administrators and Municipal Educational Officer (MEO) as key informants.

1.5.2 Content scope

This study focuses on examining the relationship between school van schedules and the academic performance of primary school learners in Wakiso District, Uganda. The central variables under investigation are specific elements of school van scheduling namely, total commute duration, the number of pick-up and drop-off stops, and capacity utilization of the vans. The study aims to assess how these transport-related factors influence learners' academic performance.

Academic performance is evaluated using both quantitative indicators (such as exams scores and exam averages) and qualitative dimensions (including class participation, attentiveness, and homework completion). In addition to analyzing measurable relationships, the study explores strategies employed by families, school administrators, and van operators to mitigate the negative academic effects associated with prolonged or inefficient van schedules.

Although broader transport and infrastructure issues (e.g., road quality, traffic congestion) may be acknowledged when relevant, the study maintains a targeted focus on the direct academic implications of school van scheduling for children in the primary school age bracket (5–13 years)**.**

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1.5.3 Time scope

The school van scheduling challenge examined in this study emerged gradually between 2015 and 2023, a period during which Nansana Division experienced rapid urban expansion, increased population density, traffic congestion, and a growing preference among parents for schools located far from residential areas. These changes significantly increased reliance on school vans and led to progressively earlier pick-up times, longer commute durations, and later drop-offs for many primary school learners.

Empirically, the study was conducted over a seven-month period from May to December 2025, during which data collection, analysis, and interpretation were carried out. The investigation focused primarily on the 2025 academic year, with particular attention to patterns observed during Term I and Term II, which represent normal school operations with stable timetables and consistent van schedules. These terms provided a reliable basis for examining routine transport-related fatigue and its influence on academic performance. Term III data were used cautiously due to possible disruptions from end-of-year activities and assessments.

To contextualize current findings and identify whether the observed challenges represented persistent or emerging trends, the study also drew on retrospective insights from 2023–2024**,** including school records and stakeholder experiences, to strengthen interpretation and situate the problem within a broader temporal framework (Lwanga & Kabanda, 2023).

1.6 Significance of the Study

The daily school journey is often taken for granted, yet for many young learners in Nansana Division, it begins in the early hours of the morning, sometimes before sunrise, and ends late in the evening. The growing reliance on school vans, especially in urban and peri-urban areas like Nansana, has become a defining feature of modern schooling in Uganda. While vans solve logistical challenges for parents and schools, there is as increasing concern that the structure and timing of these transport arrangements may unintentionally affect children’s academic performance.

This study is important because it draws attention to a frequently overlooked aspect of education planning; the impact of school van schedules on children's learning outcomes.". Understanding how factors like early pick-up times, long travel distances, and late drop-offs affect academic focus, participation, and achievement can help to plan and design more learner-friendly transport policies and school daily routines (Nakibinge & Kaggwa, 2022).

For school administrators and education policymakers, the findings can provide evidence to support better planning of van routes and scheduling, ensuring that pupils arrive at school well-rested and mentally prepared to learn. For

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teachers, the study may offer insights into behavioral or performance patterns that could be linked to fatigue or overstimulation from long commutes. Parents and guardians, too, may benefit by gaining a clearer understanding of how daily routines beyond the classroom can significantly influence their children's academic outcomes (Lwanga & Kabanda, 2023).

Furthermore, the research holds value for urban planners and local government authorities in Wakiso District, as they make decisions on school zoning, traffic flow, and infrastructure development. It raises broader questions about educational access, quality of life for learners, and the intersection between transport and education equity. Also it providesprovides timely and localized evidence on how current transport practices are affecting learners in real terms, particularly as schools strive to restore consistent academic performance standards in the post-pandemic era (Tumwebaze & Namirembe, 2021).

Ultimately, this study contributes to the broader discussion on creating school environments that not only promote academic excellence but also protect and support the well-being and holistic development of young learners.

1.7 Justification of the Study

Academic performance among primary school learners is influenced by a range of both in school and out of school factors. While teaching quality, curriculum, and classroom instruction have received substantial attention, factors related to learners' daily routines such as transport schedules remain underexplored, particularly in urbanizing settings like Nansana Division in Wakiso District.

As more families enroll their children in schools farther from home, reliance on school vans has grown. However, irregular or prolonged van schedules can cause fatigue, lateness, and loss of study time, which can negatively affect a learner's academic engagement and achievement (Nakibinge & Kaggwa, 2022). Research in similar urban settings has shown that early morning pick-ups and long commutes contribute to reduced concentration and poor classroom performance (Tumwebaze & Namirembe, 2021). Despite this, school transport planning remains largely a logistical concern, not an educational one.

This study is therefore timely and necessary. It aims to uncover the educational impact of school van scheduling and propose practical strategies for minimizing academic disruptions caused by transport inefficiencies. The findings will be relevant for school managers, local authorities, and education policymakers seeking to improve learning outcomes by considering the full spectrum of a learner's daily experience.

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1.8 Conceptual Framework

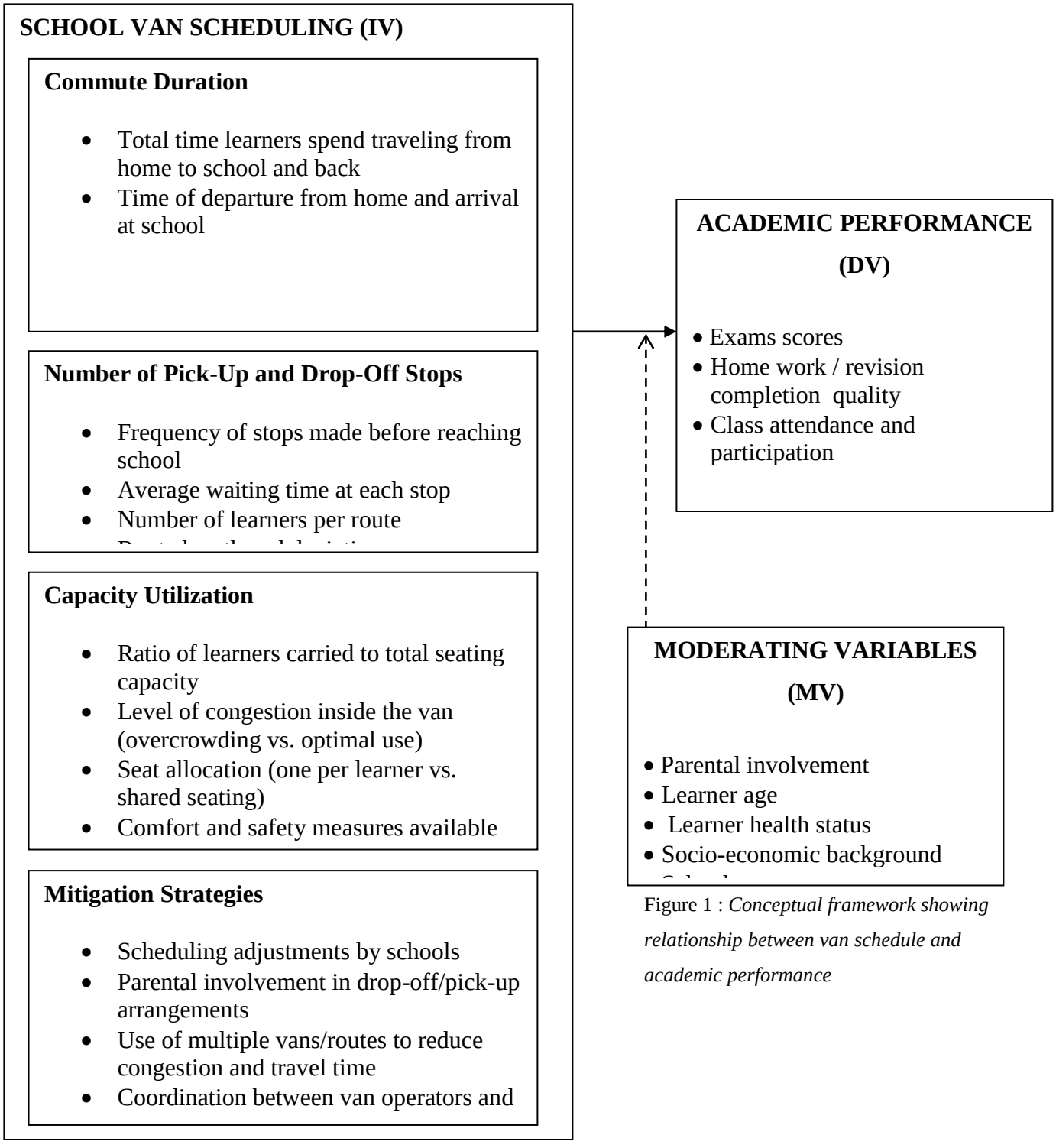

Figure 1 : *Conceptual framework showing relationship between van schedule and academic performance*

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Source: Researcher 2025

This conceptual framework illustrates how school van scheduling may influence the academic performance of primary school learners in Nansana Division, Wakiso District. Grounded in Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner, 1979; Tudge et al., 2021) and Cognitive Load Theory (Sweller et al., 2019), the framework recognizes that external environmental factors and cognitive demands shape learners' ability to perform academically.

School van scheduling is conceptualized through four core elements: total commute duration, number of pick-up and drop-off stops, van capacity utilization, and mitigation strategies employed by schools and parents to reduce travel-related disruption. These constitute the independent variables, while academic performance measured by exam scores, class attendance, participation, and homework/revision quality is the dependent variable.

The relationship between school van schedules and academic performance is expected to be mediated by learner fatigue, reduced sleep, stress, and limited time for homework or revision. For example, longer commutes may increase fatigue, delay school arrival, and reduce available study time, leading to lower academic achievement. Moderating variables such as parental involvement, learner age, health status, socio-economic background, and school support systems may either buffer or exacerbate these effects.

Furthermore, mitigation strategies, including staggered pick-up times, use of multiple routes, and parental coordination, may reduce the negative impact of long or irregular commutes. This framework directly informs the study's objectives and hypotheses by identifying specific IV-DV relationships for quantitative testing, while also guiding qualitative exploration of practical interventions to improve learners' daily educational experiences.

1.9 Definition of Key Terms

- **School Van Schedules**: The planned timing of school transport services, specifically the times when children are picked up from home in the morning and dropped off in the evening. This study focuses on patterns such as pre-dawn pick-ups, prolonged travel times, and late return hours, which may affect children's energy levels and concentration throughout the school day (Nakibinge & Kaggwa, 2022).
- **Academic Performance**: The degree to which a primary school learner attains expected educational outcomes. In this study, it is measured using both quantitative indicators (e.g., exam scores, homework completion) and qualitative measures (e.g., class participation, attentiveness, and teacher-reported learning consistency) (Lwanga & Kabanda, 2023).

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- **Commute Duration**: The total time a learner spends traveling to and from school each day in a school van. This includes driving time, waiting periods, and traffic-related delays. Extended commutes have been linked to fatigue, reduced concentration, and increased emotional stress in children (Tumwebaze & Namirembe, 2021).
- **Pick-Up Time**: The specific morning hour at which a child is collected from home by the school van. Early pick-up times, particularly those between 4:30 AM and 7:00 AM, may reduce sleep duration and result in fatigue and impaired cognitive performance during school hours (Kyazze & Nalukwago, 2020).
- **Drop-Off Time**: The evening hour at which a child is returned home after school. Late drop-offs, typically after 6:30pm, may limit time available for homework, rest, meals, and family interaction factors essential to academic readiness (Mugerwa & Ssenyonga, 2022).
- **Primary School Children**: For this study, this term refers to learners aged approximately 5 to 13 years enrolled in lower and upper primary levels. Children in this age group are particularly sensitive to environmental factors such as transport routines, which may affect their academic and emotional development (UNICEF Uganda, 2023).
- **Nansana Division**: An urban administrative division within Nansana Municipality, Wakiso District, Central Uganda. Characterized by rapid population growth, urbanization, and widespread use of school transport services, it provides a relevant setting for investigating the impact of school van schedules on academic performance (Wakiso District Education Department, 2021).

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents a critical review of existing literature related to the relationship between school van schedules and the academic performance of learners, particularly at the primary school level. It synthesizes relevant theoretical perspectives, conceptual understandings, and empirical findings from global and local studies. The review also highlights knowledge gaps that justify the need for the present study, especially within the context of Wakiso District in Uganda.

The focus is to explore how early morning pickups, long commutes, late drop offs and time spent in school vans potentially affect learners' academic engagement, classroom participation, and overall performance. The literature is organized around key themes and is anchored in relevant educational theories and research findings.

2.1 Theoretical Review

This study is grounded in two complementary theoretical frameworks: Ecological Systems Theory (EST) by Urie Bronfenbrenner (1979) and Cognitive Load Theory (CLT) by John Sweller (1988). These theories provide a multidimensional lens through which the effects of school van schedules specifically early pick-ups, long distances, extended travel time, and late drop-offs on the academic performance of primary school learners in Nansana Division, Wakiso District can be examined. The integration of both theories enhances the explanatory power of the study by addressing both external environmental influences and internal cognitive processes, which are reflected in the conceptual framework.

2.1.1 Ecological Systems Theory (EST)

Ecological Systems Theory, developed by Urie Bronfenbrenner, offers a comprehensive framework for understanding the various environmental systems that interact to shape a child's development. The theory identifies five interrelated systems microsystem, mesosystem, exosystem, macrosystem, and chronosystem that influence learners' outcomes (Bronfenbrenner, 1979; Tudge et al., 2009).

The microsystem includes settings in which the child interacts directly, such as the home, school, and daily transportation routines. The mesosystem involves the relationships among these settings for example, the link

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between home and school while the macrosystem encompasses broader societal structures such as education policy and public infrastructure, including school transport systems.

In the context of Wakiso District, primary school learners often contend with early morning departures, long commutes, and late evening drop-offs, largely due to traffic congestion, extended travel distances, and the geographical spread of learners (Nabugoomu & Mugisha, 2021). These routines fall within the learner's microsystem because they directly shape daily experiences. Notably, late drop-offs where learners return home well after 6:00 p.m. reduce the time available for rest, family interaction, and homework completion, contributing to cognitive fatigue and academic disengagement (Mulumba, 2022). Additionally, early wake-up times and prolonged van rides have been associated with physical exhaustion and decreased classroom attention spans, further undermining academic performance.

The mesosystem becomes significant when these transport-related routines disrupt the functional link between home and school. For instance, tired children may be unable to revise their work at home or maintain active participation in classroom tasks, thereby weakening the educational process (Onyango & Aloka, 2020). Similarly, parents may struggle to support schoolwork or communicate with teachers when the learner arrives home too late or fatigued to reflect on their school day.

Bronfenbrenner's theory aligns closely with the conceptual framework of this study, which posits that school van schedules (independent variable) including early pick-ups, long distances, long rides, and late drop-offs affect learners' academic outcomes (dependent variable) through mediating factors such as sleep deprivation, fatigue, reduced participation, and missed homework. Previous studies in East Africa have linked environmental stressors like irregular or exhausting school travel routines with lower academic achievement and diminished cognitive functioning in children (Onyango & Aloka, 2020; Wamuyu & Karanja, 2021).

One of the key strengths of the Ecological Systems Theory is its capacity to account for multiple interrelated influences on a learner's development. It is especially relevant in real-world settings like Wakiso District, where transportation routines intersect with school, family, and community life to shape academic experiences (Rosa & Tudge, 2013). The theory supports a systems thinking approach, allowing researchers to view school transport schedules not as isolated logistical concerns, but as embedded within the broader ecological context of child development.

However, despite its strengths, the theory has notable limitations. Its broad and descriptive nature makes it difficult to quantify specific cause-effect relationships, such as the precise impact of late drop-offs on test scores or attention spans. Furthermore, the theory provides limited direction on how to operationalize interactions between systems

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(Darling, 2007). Therefore, while Bronfenbrenner's model offers a strong conceptual foundation, it must be used alongside empirical tools and contextual indicators to effectively analyze the real world effects of van transport schedules on academic performance in primary schools across Nansana division in Wakiso District and this provides room to complement it with Cognitive Load Theory.

2.1.2 Cognitive Load Theory (CLT)

While Ecological Systems Theory offers a broad understanding of how environmental contexts shape child development, it does not sufficiently explain the direct mental processes that underlie academic performance. To complement this gap, this study also draws on Cognitive Load Theory (CLT) developed by Sweller (1988) and expanded by Chandler and Sweller (1991)**,** which explores how the human brain processes, stores, and retrieves information during learning.

Cognitive Load Theory suggests that learners have a limited working memory capacity, and when overloaded especially by unnecessary or unrelated mental demands learning efficiency declines (Sweller et al., 2019). CLT distinguishes between intrinsic load (difficulty of the content), extraneous load (mental strain from external distractions), and germane load (effort used to process and understand content). In the context of school van schedules, extraneous cognitive load becomes particularly relevant. Prolonged commutes, noise, overcrowding, early wake-up times, and fatigue all linked to school transport may overload children's mental resources before formal lessons even begin.

Recent studies support this connection. For example, Kimani and Maina (2022) found that Kenyan learners subjected to long early-morning commutes showed reduced attention spans and lower test scores by midday. Similarly, Mwangi and Musau (2021) reported that frequent exposure to long and tiring transport routines interfered with learners' ability to retain new content, especially in mathematics and literacy subjects. These findings align with CLT's core assumption that the efficacy of learning depends not only on curriculum quality, but also on the learner's cognitive readiness which can be compromised by exhaustion and stress which are common components associated with school van schedules.

Applying CLT to the Wakiso District context, learners who spend extended hours in vans may enter class already mentally taxed, with diminished capacity for processing instructional content. This affects not only comprehension but also long-term retention and academic outcomes. In overcrowded or noisy vans, learners may also experience heightened sensory stimulation, further straining cognitive resources. The theory thus provides a crucial lens through which to interpret the mechanism by which van-related stressors (independent variables) impair academic performance (dependent variable).

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By combining Cognitive Load Theory with Ecological Systems Theory, this study adopts a multi-dimensional lens**:** one that considers both the environmental contexts of the learner and the internal mental processes that influence educational outcomes. This complementary theoretical framework strengthens the explanatory power of the study and ensures that both systemic and cognitive dimensions are adequately addressed.

2.1.3 Integrating EST and CLT.

Scholars in education and developmental psychology increasingly advocate for integrating environmental and cognitive frameworks to explain variations in learner outcomes particularly in settings where external stressors are frequent and significant. For example, Rosa and Tudge (2013) emphasize that Bronfenbrenner's Ecological Systems Theory remains indispensable in contexts like education, where home, school, and transport systems jointly shape a learner's daily experience. They argue that these systems must be analyzed not in isolation, but as interacting forces influencing both behaviour and academic development.

However, as Tudge et al. (2009) point out, while EST effectively identifies which environmental structures exist around a learner, it does not fully explain how these systems affect the learner's internal ability to learn. This is where Cognitive Load Theory (CLT) becomes crucial. Paas, Renkl, and Sweller (2003) explain that mental overload from external distractions such as noise, exhaustion, or disorganized schedules can strain a child's cognitive capacity, directly affecting how new material is understood and remembered.

In African contexts, this integrated approach has gained traction. For example, Obonyo and Ndege (2021) found that long and tiring school commutes in urban East Africa not only delay learners but also drain their mental energy, leading to poor concentration and reduced academic participation. Similarly, Mwangi and Musau (2021**)** highlight that children facing daily transport-related stressors struggle with memory retention and test performance findings that reinforce both EST (environmental constraints) and CLT (cognitive processing limitations).

These arguments support the theoretical integration used in this study. Whereas EST helps identify the external and structural aspects of school van schedules, CLT helps explain the internal cognitive strain they produce. Together, these theories provide a robust framework for examining how daily transport routines influence the academic performance of primary school learners in Nansana division, Wakiso District.

2.2 Conceptual review

2.2.1 School Van as a Mode of Learner Transport

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A school van refers to a dedicated vehicle typically privately or school owned that transports learners to and from school daily. In many urban and peri-urban regions of developing countries, including Uganda, school vans are an increasingly common solution for bridging the distance between learners' homes and schools, particularly in areas where public transport is unreliable or unsafe for children (Mulumba, 2022; Kalule, 2023). The service is often coordinated by the school itself or outsourced to private operators who follow mapped routes with scheduled stops.

School vans offer several benefits: they ensure learner safety, reduce lateness, and provide logistical support for parents who may be working during school drop-off and pick-up hours (Ndung'u, 2020). However, challenges arise when school vans are operated with limited regulation, leading to concerns about overloading, mechanical safety, and most relevant to this study poorly structured transport schedules. For many Ugandan primary school learners, particularly in districts like Wakiso, the use of school vans has become essential, yet the implementation of these services varies widely between institutions (Mwebesa, 2021).

The school van serves not merely as a transport tool but as a microsystem in the learner's daily experience, influencing time management, rest patterns, and socialization. According to Bronfenbrenner's Ecological Systems Theory, such daily environments directly affect children's development and educational outcomes (Bronfenbrenner, 1979; Tudge et al., 2009). In this context, the school van becomes more than a vehicle it is a daily space of transition between home and school that interacts with broader systems of learning and wellbeing.

2.2.2 School Van Scheduling

The school van schedule refers to the structured timetable that governs how learners are transported to and from school, including designated pick-up and drop-off times, route length, the number of stops, and the total duration of the commute (Behrens & Watson, 2020). In many urban and peri-urban settings such as Nansana Division school van schedules have become a central component of daily learner routines, especially where schools draw pupils from wide catchment areas and privately managed transport services dominate. As a result, the timing and structure of these schedules increasingly influence children's academic readiness, physiological well-being, and cognitive functioning.

International and regional literature indicates that poorly designed van schedules particularly those involving early pick-ups before 6:30 a.m., long travel durations, and late evening drop-offs have significant implications for learner alertness and academic performance (Wheaton et al., 2016; Onyango & Aloka, 2020). Learners who spend extended periods commuting often experience chronic fatigue, reduced concentration spans, and lower engagement during morning lessons. Kim and Lee (2014), for example, found that learners who travelled more than 45 minutes each way exhibited diminished attention and poorer academic scores compared to their peers with shorter commutes.

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Similar concerns have been reported in East Africa, where inefficient routing and heavy traffic congestion extend travel times and interfere with learners' preparedness for school activities (Adepoju & Okafor, 2021; Onyango & Aloka, 2020).

In Uganda, the challenge is compounded by the absence of standardized school transport regulations. Studies show that private school vans in Wakiso District often begin pickups as early as 5:30 a.m. and return learners home after 6:00 p.m., resulting in extended days that compromise sleep, homework time, and rest (Mwebesa, 2021; Kalule, 2023). Kalule's (2023) findings particularly highlight the lack of route audits, timing assessments, and safety checks, which contributes to erratic scheduling practices that prioritise operational convenience over the learner's developmental needs.

From a cognitive perspective, long commutes and disrupted sleep cycles increase the extraneous cognitive load placed on learners pressures that are unrelated to learning but still occupy significant working memory resources. According to Cognitive Load Theory (Sweller et al., 2011), learning is most effective when extraneous demands are minimized, allowing learners to focus their intrinsic and germane cognitive capacities on academic tasks. Early wake-up times, fatigue, and prolonged confinement in transit environments hinder this optimal cognitive functioning, thereby reducing comprehension, retention, and overall academic performance.

Furthermore, school van schedules directly influence out-of-class routines, which are equally important for holistic learning. Late drop-offs limit the time available for homework, revision, play, extracurricular participation, social bonding, and adequate rest all contributors to emotional stability and academic success (Brockman et al., 2011; Goyal & Singh, 2019). When learners arrive home exhausted or with insufficient time for personal activities, they often exhibit hurried or incomplete homework, mood swings, and irregular sleep patterns, ultimately affecting classroom participation and assessment performance (Wahlstrom, 2016).

Beyond academic outcomes, the structure of school van schedules also affects safety, parental involvement, and overall learner well-being. Unpredictable or overly rigid transport routines can disrupt family time, reduce parental monitoring of homework, and limit opportunities for recreation and cultural activities (Ndung'u, 2020). Younger learners are particularly sensitive to such disruptions, as inadequate sleep and routine instability may lead to irritability, lower memory retention, and increased absenteeism (Wahlstrom, 2016).

In sum, the school van schedule is more than a logistical arrangement; it represents a structural aspect of the learning environment with academic, cognitive, psychological, and developmental implications. As literature indicates, early pick-ups, multiple stops, long commute durations, and late drop-offs collectively shape the learner's daily readiness and capacity to engage meaningfully with academic work. These insights underscore the need for learner-centred

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and evidence-based scheduling practices, particularly in rapidly urbanising divisions such as Nansana, where traffic congestion, long travel distances, and unregulated private transport services intensify the challenges associated with school commuting.

2.2.4 Academic Performance

Academic performance refers to the extent to which learners achieve educational goals as measured through various forms of assessment such as examinations, coursework, classroom participation, and co-curricular engagement. It reflects a learner's cognitive, emotional, and behavioral investment in the learning process and is a central indicator of educational success at both individual and institutional levels (OECD, 2020).

In primary education, academic performance is often evaluated through standardized test scores, continuous assessment records, homework quality, and teacher observations of classroom engagement. According to Ngware et al. (2021), strong academic performance in early grades lays the foundation for future educational attainment and socio-economic mobility. These outcomes are shaped not only by school-based factors such as teaching quality and curriculum but also by external variables, including home environment, transport routines, and health status.

Scholars such as Tadesse and Kebede (2020) emphasize that academic performance is multidimensional. It goes beyond examination results to include active participation in classroom discussions, critical thinking, punctuality, regular attendance, and the ability to complete assignments on time. In this regard, it is increasingly recognized that learners' physical and emotional well-being such as sleep quality, fatigue levels, and daily stressors can significantly influence how well they perform academically (Gupta & Pundir, 2023).

Furthermore, Sweller's Cognitive Load Theory (Sweller, 2019) highlights that a learner's ability to process and retain information is influenced by their cognitive state. Factors such as fatigue, distraction, and emotional stress can overload the learner's working memory, thereby reducing comprehension and performance. In contexts where learners endure long commutes or have disrupted sleep due to early pick-ups and late drop-offs, academic performance may decline due to compromised mental readiness.

In the East African context, studies by Aloka and Bojuwoye (2020) and Mulumba (2022) reveal that learners who spend more time in daily travel to and from school often report lower academic achievement. This is attributed to decreased concentration, absenteeism, and reduced time for homework and revision. Particularly among younger learners, the physical and psychological effects of long commutes manifest in reduced classroom engagement and lower test scores.

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Ugandan research by Nakalema and Ssenyonga (2023) found that in districts such as Wakiso, learners who arrive at school tired or late often miss key instructional periods, especially in subjects like mathematics and science that are taught in the early hours. The researchers argue that academic performance should be understood as an outcome not only of cognitive aptitude and school environment but also of logistical and temporal factors affecting learners' readiness to learn.

In this study, academic performance is operationalized through four primary indicators: classroom participation, homework completion and quality, exam scores, and general academic achievement. These indicators offer a comprehensive view of learners' cognitive output and are sensitive to the conditions imposed by daily routines such as school van schedules.

2.2.5 Primary School Learners/Children

Primary school learners typically aged between 6 and 12 years represent a unique and critical developmental group within the education system. In Uganda, this cohort forms the foundational level of formal education, beginning with Primary One (P.1) and ending with Primary Seven (P.7). During this stage, learners undergo rapid changes in cognitive ability, physical development, emotional regulation, and social identity formation, all of which significantly influence their educational experiences and outcomes (Ministry of Education and Sports [MoES], 2020).

From a developmental perspective, primary school children are in what Piaget (1952) refers to as the concrete operational stage of cognitive development, where they begin to think logically about concrete events but still struggle with abstract reasoning. This makes the learning environment, including classroom structure, pedagogy, and routines such as transportation, particularly influential in shaping their academic success. Bronfenbrenner's Ecological Systems Theory (1979) further situates the child within a nested set of environments home, school, and community that interact to influence learning outcomes. The microsystem (e.g., family routines, transport schedules, school policies) and chronosystem (e.g., time-based routines such as daily van pick-up and drop-off) are particularly relevant for understanding how external routines can affect learner development.

In Uganda, the Universal Primary Education (UPE) policy has greatly expanded access to education, but it has also introduced challenges related to overcrowding, teacher-learner ratios, and disparities in learner welfare, particularly in peri-urban areas like Nansana. These challenges often intersect with logistical barriers such as long commuting times and early departure from home, especially for children who rely on school vans (Kagwa & Ssenyonga, 2021).

Research has shown that primary school learners are more vulnerable than older students to disruptions in their routines, including irregular transport schedules. According to a study by Aloka and Bojuwoye (2020), younger

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learners tend to have a lower tolerance for fatigue and changes in sleep patterns, which can result in lower attention spans and emotional instability. These factors have been linked to reduced academic engagement, incomplete assignments, and even school avoidance.

Furthermore, primary school children often rely heavily on adult guidance for time management, homework completion, and emotional support. When their school transport routines are poorly organized featuring early pick-up times (before 6:30 a.m.), long distances, or late drop-offs (after 6:00 p.m.) learners may miss out on critical developmental needs such as adequate sleep, family bonding time, and unstructured play, all of which are essential for cognitive and emotional growth (Nakalema & Ssenyonga, 2023).

Cognitive Load Theory (Sweller, 2019) also contributes to the understanding of primary school learners by suggesting that young children have limited working memory capacity. When external demands such as early rising, long travel, or physical fatigue consume much of their cognitive resources, less capacity is available for learning tasks in school. Thus, van schedules that encroach upon rest, play, and revision time can directly hinder knowledge acquisition and academic performance.

Therefore, conceptual interrelationship among the school van, van schedules, primary school learners, and academic performance is grounded in the understanding that school transport logistics represent a key environmental context in a child's daily routine. According to Bronfenbrenner's Ecological Systems Theory, the school van operates as a microsystem that interacts with the learner's home and school environments to influence development, while the structure of van schedules functions as part of the chronosystem, organizing the learner's time and experiences across the day (Bronfenbrenner, 1979; Tudge et al., 2009).

In this study, the school van is conceptualized as an institutional service facilitating learner mobility, while van schedules are defined by early pick-up times (before 6:30 a.m.), long commutes (over 30–45 minutes), and late drop-offs (after 6:00 p.m.). These schedules can disrupt sleep, increase fatigue, and overload children's cognitive capacity especially during early developmental stages thereby diminishing academic focus and productivity (Onyango & Aloka, 2020; Mulumba, 2022).

Academic performance measured through classroom engagement, exam scores, homework completion, and overall achievement is conceptualized as a cumulative outcome of both internal learner characteristics and external environmental influences such as van schedules (Uwezo, 2020).

This study assumes that school vans and their schedules are not isolated logistical tools but embedded elements of the learner's ecological and cognitive development systems. Their effects on the learning process are mediated by sleep quality, fatigue, and cognitive readiness factors that disproportionately affect young learners. This

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interrelationship forms the theoretical foundation of the study and informs the development of research questions, objectives, hypotheses, and measurement indicators.

2.3 Empirical Review

2.3.1 Commute Duration and Academic Performance of Learners

Commute duration the total time a learner takes to travel from home to school and back has emerged as a critical factor influencing academic performance, especially among primary school learners. Scholars argue that long commute durations not only consume time that could otherwise be allocated to academic and recreational activities but also impose physical and cognitive burdens that impair learning (UNICEF, 2021). These effects are particularly severe in urban and peri-urban settings, where school catchment areas have expanded and transport systems are often inefficient.

Empirical studies highlight that extended school travel time is associated with reduced academic achievement. Kim and Lee (2021), in a study conducted in South Korea, found that students with longer commute times performed significantly lower in standardized tests, particularly in mathematics and reading. The study identified fatigue, early waking times, and reduced after-school study hours as the primary mediators of this effect. Similarly, Ramos and Ortega (2020) found that in rural Brazil, learners who commuted for over 45 minutes daily were more likely to have low academic scores and higher dropout risks. The researchers linked these outcomes to decreased classroom attentiveness and lack of motivation caused by long, uncomfortable travel experiences.

In Africa, Ochieng and Amollo (2021) examined the impact of school commute time on academic performance among public primary school learners in Nairobi, Kenya. They found that children with daily commutes exceeding 40 minutes had significantly lower grades and less participation in class. Fatigue, chronic tardiness, and missed assignments were identified as key consequences of prolonged commuting. Similarly, Chibesa and Mwanza (2022) in Zambia reported that learners with long commutes were more likely to miss school or arrive late, leading to knowledge gaps and lower performance in core subjects.

In the Ugandan context, Namatovu and Kiggundu (2022) investigated learners in Wakiso District and found that commute durations exceeding 60 minutes adversely affected pupils' academic performance. Teachers noted that such learners often arrived tired, exhibited poor concentration, and failed to complete homework. Additionally, Ssenyonga and Mbaziira (2023) found that long school van journeys in Nansana Division negatively influenced learners' ability to revise, rest, and engage effectively in classroom activities.

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These findings support the theoretical foundations of Bronfenbrenner's Ecological Systems Theory, which emphasizes the influence of environmental contexts (like transport routines) on child development (Tudge et al., 2009), and Cognitive Load Theory, which suggests that excessive non-instructional demands such as long travel can reduce learners' cognitive capacity for school-related tasks (Sweller et al., 2019).

2.3.2 Number of Pick-Up and Drop-Off Stops and Academic Performance of Learners

The number of pick-up and drop-off stops on a school van route refers to how many times the vehicle halts to collect or drop learners on its way to and from school. Although this aspect of school transportation logistics may appear operational, studies indicate that it has critical implications for learner well-being and academic achievement, particularly in contexts where school transport systems are not tightly regulated (UN-Habitat, 2021).

A high number of stops tends to elongate the total commute time, increasing the duration a child remains in transit before and after school. According to Singh and Kaur (2021), extended pick-up and drop-off schedules in urban India led to students spending more than 90 minutes in vans daily, negatively affecting their attentiveness and classroom engagement. Learners picked up first and dropped off last were particularly prone to fatigue and missed the opportunity for after-school learning or rest. These logistical delays reduced learners' effective time for revision and sleep, leading to lower academic performance.

Furthermore, Guzman and Sierra (2020) observed in Colombia that students subjected to multiple stop commutes reported higher stress levels and cognitive exhaustion. The frequent halting and starting of vans was also found to disrupt learners' early morning mental readiness for lessons, particularly in younger children who require stable routines for optimal functioning. This supports the Cognitive Load Theory's assertion that non-instructional burdens, such as long and irregular commutes, impose extraneous cognitive demands that detract from learning capacity (Sweller et al., 2019).

In the East African context, Otieno and Wanjiru (2022) found that in Nairobi, school vans with over 10 daily pick-up points took 60–90 minutes to complete their routes. This significantly delayed learners' arrival and contributed to chronic lateness and diminished lesson engagement. The study revealed a statistically significant negative correlation between the number of stops and pupil performance in literacy and numeracy assessments. Teachers reported that learners on such routes were often sleepy, inattentive, or emotionally irritable in morning sessions.

In Uganda, Luyiga and Namusoke (2023) explored van logistics in Wakiso District and found that excessive pick-up and drop-off stops led to longer commutes and less time for homework and family interaction. These children, particularly those in lower primary grades, exhibited slower cognitive processing, lower participation in class, and a higher likelihood of missed assignments. This supports Bronfenbrenner's Ecological Systems Theory, which asserts

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that disruptions within a child's microsystem such as school transportation routines can significantly influence educational outcomes (Tudge et al., 2009).

Therefore available literature consistently suggests that a high number of school van stops is an overlooked but significant factor affecting academic performance. The main pathways identified include increased fatigue, reduced instructional time, and emotional stress all of which hinder effective cognitive functioning and learning outcomes among primary school learners.

2.3.3 Number of Learners per Van (Capacity Utilization) and Academic Performance of Learners

Capacity utilization, defined as the number of learners transported in a school van relative to its recommended seating capacity, is a critical but often overlooked dimension of school transport planning. Overcrowded school vans not only compromise safety but also contribute to learner discomfort, fatigue, and cognitive overload factors that negatively influence academic performance (UNICEF, 2021).

High capacity utilization frequently results in physical congestion, restricted movement, poor ventilation, and heightened stress among learners, especially during long commutes. A study by Adeyemi and Fasakin (2020) in Lagos, Nigeria, reported that over 70% of primary school learners were transported in vans exceeding their seating limits. This overloading led to increased incidents of learner irritability, noise, and even motion sickness, which in turn negatively affected their attention span and learning preparedness upon arrival at school.

From a cognitive standpoint, such conditions elevate extraneous load, as posited by Sweller et al. (2019) in their work on Cognitive Load Theory. Learners experience unnecessary psychological strain that distracts from essential processing, reducing their ability to retain instructional content once in class. Additionally, social discomfort due to crowding may induce emotional fatigue or behavioral issues, further compromising their academic engagement (Chakrabarti & Kwon, 2021).

Empirical studies in low-income urban areas reveal similar trends. In a study conducted in Nairobi, Kenya, Wekesa and Musyoka (2021) observed that students transported in overcrowded school vans showed lower scores in both mathematics and reading assessments compared to peers who commuted in less crowded vehicles. Teachers in these schools also reported higher rates of absenteeism and classroom indiscipline among students who arrived after enduring stressful morning commutes.

In Uganda, Sserunjogi and Kabanda (2022) explored the relationship between school van overcrowding and academic outcomes in Wakiso District. They found that learners transported in vans with more than 20 pupils often double the intended capacity were twice as likely to report fatigue, reduced concentration, and delayed homework

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completion. These findings align with Bronfenbrenner's Ecological Systems Theory, where physical and social factors within the child's microsystem such as overcrowded transport environments interfere with optimal development and learning (Tudge et al., 2009).

Thus, across different contexts, evidence consistently demonstrates that overutilization of school van capacity adversely affects learners' mental readiness, emotional stability, and academic output. Proper regulation of van capacity could therefore serve as a critical intervention for improving educational outcomes, especially in urban and peri-urban school settings.

2.3.4 Mechanisms for Mitigating the Negative Academic Effects of Prolonged School Van Schedules Among Primary School Children

Prolonged school van schedules marked by early pick-ups, long commute durations, and late drop-offs can have detrimental effects on the academic performance and well-being of primary school learners. However, several mitigation strategies have emerged from recent empirical and policy-focused literature, aimed at minimizing these negative outcomes and promoting child-friendly transport environments.

One prominent mitigation strategy is the optimization of school van routes and pick-up schedules to reduce commute times and ensure more balanced distribution of travel burdens among learners. A study by Chakrabarti and Roy (2021) in urban India showed that strategic route optimization led to a 20–30% reduction in average commute times, which was associated with improved student alertness and increased classroom participation. Route planning software and community-based transport scheduling are now being recommended in many low-income urban settings to manage school transport more efficiently (UNICEF, 2021).

Staggered school start times have also been adopted as a systemic approach to address early morning fatigue. Research by Mendelson et al. (2022) in South Africa found that when school start times were adjusted by even 30 minutes later, learners showed improved sleep quality and enhanced performance in morning lessons. This aligns with the chronosystem aspect of Bronfenbrenner's EST, where changes in routine events over time can significantly influence developmental outcomes.

Another mitigation mechanism includes provision of rest or nap breaks at school for younger learners who endure long morning commutes. Studies by Kim and Han (2020) indicate that mid-morning naps can partially compensate for early wake times, enhancing concentration and reducing behavioral problems in class. This practice acknowledges the importance of reducing cognitive overload, as suggested in CLT, by allowing recovery from mental fatigue before academic demands intensify.

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Some schools have also introduced on-board educational activities or calming environments during van rides to prepare learners mentally for the school day. Osei and Boateng (2021), studying Ghanaian private schools, found that soft background music and guided mindfulness practices on school vans helped reduce anxiety and improve learner mood before class, indirectly boosting academic readiness.

Parental and community involvement in monitoring transport quality and advocating for better services is another effective mitigation mechanism. According to Wekesa and Musyoka (2021), parent-teacher transport committees in Nairobi facilitated improvements in van safety, punctuality, and seating discipline, which collectively enhanced the commuting experience and reduced learning disruptions caused by fatigue or stress.

In Uganda, a study by Namugga and Kiggundu (2023) emphasized the importance of policy enforcement and regulation of school transport, recommending that authorities set guidelines on maximum commute durations and van occupancy. They also called for capacity-building programs for school van operators on child-friendly transport principles.

Overall, these strategies are consistent with both EST and CLT: the quality of the microsystem (school van environment) and the regulation of learner cognitive load both influence how effectively a child engages with academic tasks. Successful mitigation of prolonged school van schedule effects thus requires an integrated approach combining policy, parental involvement, scheduling reforms, and learner-centered commuting experiences.

2.4 Literature Review Gaps

2.4.1 Limited local research on commute duration and learning

Studies from various global contexts consistently show that long school commutes are linked to reduced cognitive performance, poor concentration, and increased fatigue among learners. For example, Kim and Han (2020) in South Korea, and Chakrabarti and Roy (2021) in India, found that prolonged travel time significantly hinders students' academic engagement and outcomes. However, these studies are primarily based in high-density urban or Asian contexts, which may not reflect the realities of learners in low-resource settings like Uganda. In the Ugandan primary school context particularly in peri-urban areas such as Nansana Division there is limited empirical evidence to confirm whether similar effects occur. This study addresses this gap by examining the relationship between commute duration and academic performance among primary school learners in a localized Ugandan context.

2.4.2 Neglected impact of pick-up and drop-off frequency

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Existing research has focused predominantly on total commute duration, with less attention given to the number of stops a school van makes before reaching the school. These frequent pick-ups and drop-offs, while seemingly minor, can prolong travel time, contribute to boredom or stress, and reduce a learner's emotional readiness for classroom engagement. Although studies such as Olsson et al. (2020) have acknowledged psychological strain due to travel conditions, little is known about how the number of van stops specifically affects learning outcomes especially in developing settings. This study investigates how the frequency of stops influences punctuality, alertness, and academic performance among primary school learners.

2.4.3 Overlooked link between van congestion and learner well-being

Overcrowding in school vans is a common concern raised by parents and teachers, yet few studies have systematically explored how this affects learners' academic experiences. Wekesa and Musyoka (2021), in a study conducted in Kenya, found that van congestion contributes to discomfort, distraction, and safety concerns. However, there is a lack of quantitative data linking overcrowding with academic performance in the Ugandan primary school context. This research seeks to fill that gap by evaluating how van occupancy levels impact learners' attentiveness, fatigue, and homework completion.

2.4.4 Limited context-specific solutions for school commute challenges

International research has suggested various strategies to mitigate the negative effects of school commuting such as staggered start times, mindfulness during rides, and optimized transport routes (Schwartz & Rothbart, 2020). However, few of these solutions have been adapted or tested in local Ugandan settings. In areas like Nansana Division, where transport systems are informal and infrastructure is limited, there is a need to identify practical, community-based interventions. This study contributes by examining existing and potential mitigation strategies such as parental coordination, school policy enforcement, and flexible van scheduling.

2.4.5 Lack of theoretical grounding in school transport studies

A final but critical gap is the absence of integrated theoretical frameworks in studies on school transport and academic outcomes. Many studies approach the issue from a logistical or statistical viewpoint without considering how multiple environmental and cognitive factors interact to influence learning. This study is anchored in Bronfenbrenner's Ecological Systems Theory (EST), which explains how systems such as the family, school, and transport interact in shaping learner development. It also applies Cognitive Load Theory (CLT) to assess how fatigue and overstimulation during long or stressful commutes impact learners' working memory and academic functioning. This dual framework allows for a more detailed and comprehensive understanding of the research problem.

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2.4.6 Summary of gaps and study contribution

In summary, existing literature lacks localized, theory-based evidence on how school van conditions affect academic performance in the Ugandan primary education context. Gaps remain in understanding the role of commute duration, van stop frequency, vehicle overcrowding, and context-appropriate mitigation strategies. This study addresses these shortcomings by examining transport-related factors in a real-world Ugandan setting, grounded in relevant developmental and cognitive theories. The findings aim to inform school policies, improve transport systems, and enhance learner outcomes in peri-urban areas such as Nansana Division.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methodology employed to examine the impact of school van use on the academic performance of private primary school learners in Nansana Division, Wakiso District, Uganda. It describes the research design, study population, sample size and sampling procedures, data collection methods, data quality assurance, management, processing, and analysis strategies. Articulating these procedures ensures the transparency, acuracy, and reliability of the findings, facilitating replicability and contextual relevance (Creswell & Creswell, 2018; Saunders, Lewis, & Thornhill, 2019).

3.1 Research Design

A mixed-methods cross-sectional design was adopted, integrating quantitative and qualitative approaches to investigate the relationship between school van schedules and academic outcomes. The cross-sectional nature allowed data collection at a single point, enabling assessment of associations between transport variables (commute duration, number of stops, vehicle type) and learners' performance (Creswell & Plano Clark, 2018; Bryman, 2016).

Quantitative data captured learners' academic records, commuting times, and demographics, permitting statistical analysis of patterns. Qualitative data, collected through interviews and focus group discussions, provided insights into lived experiences, operational challenges, and perceptions of fatigue, alertness, and learning readiness (Tashakkori & Teddlie, 2010). This integrative approach facilitated triangulation, enhancing validity and contextual depth (Creswell & Creswell, 2018).

3.2 Area of Study

The study was conducted in Nansana Division, a densely populated peri-urban area in Wakiso District bordering Kampala. The division experiences heavy traffic, poor road infrastructure, and a growing reliance on private school vans (Wakiso District Education Office, 2022).

Children are often picked up as early as 4:30 a.m. and dropped off after 7:00 p.m., facing multiple stops and extended commutes (Lwanga & Kabanda, 2023; Kiyaga & Namutebi, 2022). Teachers and administrators report fatigue, reduced alertness, and diminished engagement during lessons, particularly in numeracy and science

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(Tumwebaze & Namirembe, 2021). Nansana thus provides a relevant context for studying transport-related academic outcomes and informing local and district-level educational planning.

3.3 Study Population

The population comprised learners (P1–P7), their parents/guardians, school van operators, teachers, and administrators directly involved with or affected by van transport and the Municipality Education Officer (MEO).

- Learners (P4–P7) provided primary data through questionnaires and academic records, reflecting the cognitive impact of commuting (Basch, 2011). Younger learners (P1–P3) were indirectly accessed via observations and interviews.
- Parents/guardians offered insights into home routines, transport arrangements, and learner readiness (Epstein, 2001).
- Van operators provided data on travel logistics, capacity, and operational challenges (Ndeti et al., 2021).
- Teachers and administrators contributed information on classroom behavior, attendance, and academic outcomes (Gaynor, 2020; Osei-Owusu & Okrah, 2020).
- Municipality Education Officer (MEO); provide data as the overseer of school operations and educational programs in Nansana Division, offering a district-level perspective on school transport policies, compliance, and learner outcomes (MoES, 2021; Wakiso District Education Office, 2022).

This multi-stakeholder approach aligns with Bronfenbrenner's Ecological Systems Theory, capturing the interaction of multiple environmental systems affecting learners (Bronfenbrenner, 1979; Tudge et al., 2009).

3.4 Sampling Techniques and Procedures

3.4.1 Sampling Frame

The study focused on private primary schools offering regular van transport, identified through purposive selection and snowballing. Inclusion criteria included registration, provision of daily transport, coverage of P1–P7, and willingness to share academic data. Ten schools were ultimately selected to capture diverse transport models (buses, coasters, vans, taxis and saloon cars) used as vans.

3.4.2 Sampling of Schools

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Nansana Division in Wakiso District has a substantial number of private primary schools, many of which rely on school vans to transport learners over varying distances. However, at the time of the study, no comprehensive official register was available indicating the exact number of private primary schools using school vans within the Division. The accessible population therefore comprised private primary schools that met the study's inclusion criteria: regular use of school vans for learner transportation, enrolment of primary school learners who commute daily, and willingness to participate in the study. From this population, ten (10) private primary schools were purposively selected.

Purposive sampling was considered appropriate because the study sought to examine specific scheduling characteristics namely total commute duration, number of pick-up and drop-off stops, and van capacity utilization which are not uniformly present across all schools. Selecting schools that actively exhibited these characteristics ensured alignment with the study objectives and hypotheses. Furthermore, a sample of ten schools was considered adequate to generate reliable and analyzable quantitative data while allowing for contextual depth, consistent with educational transport and school-based studies that prioritize analytical relevance over representativeness (Creswell, 2014; Patton, 2015).

3.4.3 Sample Size

Using Krejcie and Morgan (1970), a population exceeding 1,000 requires at least 278 respondents. To enhance subgroup reliability, 341 participants were targeted:

Table.3.1 showing categories of sample population

Category	**Sample Size**
Learners (P4–P7)	180
Learners (P1–P3)(Observational Samples)	30
Exam Marks for learners of (p4 –p7)	50
Parents/Guardians	40
Class Teachers	10
Van Operators	20
Headteachers/Administrators	10
MEO	1

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Total	341

Source: Researcher 2025

3.4.4 Sampling Techniques

The study employed a multi-stage sampling strategy integrating purposive, stratified, simple random, and observational techniques to ensure broad representation of stakeholders and transport conditions. Ten private primary schools offering regular van transport services were purposively selected, with snowball referrals used to identify comparable institutions. Learners in Primary Four to Primary Seven were stratified by class level and proportionally selected through simple random sampling using class registers. Learners in Primary One to Primary Three were not directly sampled due to age-related limitations but were examined through structured non-participant observations, supported by teacher and parent insights.

Parents or guardians and van operators were purposively selected because of their direct involvement in daily transport routines, while teachers and school administrators were included for their roles in monitoring attendance, punctuality, and academic performance. The Municipal Education Officer was purposively sampled to provide oversight perspectives on school transport regulation and educational supervision. Further stratification by transport type buses or coasters, vans or taxis, and smaller vehicles such as saloon cars or motorcycles enabled comparison of commuting conditions and learner outcomes, consistent with multi-stage sampling principles **(**Acharya et al., 2013**).** This approach enhanced analytical depth, supported subgroup comparisons, and aligned with the study's conceptual framework and mixed-methods design (Bryman, 2016; Palinkas et al., 2015).

3.5 Data Collection Methods

This study employed multiple data collection methods in order to generate both quantitative and qualitative evidence on the relationship between school van scheduling and the academic performance of primary school learners. The use of varied methods enabled triangulation of findings and strengthened the credibility of the results.

Quantitative data were primarily collected using structured questionnaires administered to Primary Four to Primary Seven learners and their parents or guardians. The questionnaires were designed in a child-friendly manner, with mostly closed-ended items and Likert-scale responses to capture measurable information on van usage patterns, levels of fatigue, punctuality, and perceived academic performance. This approach allowed for systematic quantification of learners' transport experiences and their potential academic implications, consistent with mixed-methods research practices (Creswell & Plano Clark, 2018).

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In addition, academic records for learners in Primary Four to Primary Seven were reviewed to obtain objective measures of academic performance. Scores from core subjects were extracted and used to examine patterns and associations between transport-related variables and learners' academic outcomes. The use of official school records helped minimize self-report bias and enhanced the reliability of performance data.

Qualitative data were collected through key informant interviews conducted with teachers, school administrators, van operators, and the Municipal Education Officer (MEO). Semi-structured interview guides were used to explore participants' experiences and observations regarding school van schedules, learner fatigue, punctuality, classroom engagement, and logistical challenges associated with school transport. This flexible interview format allowed participants to provide in-depth insights while maintaining alignment with the study objectives (Kvale & Brinkmann, 2015).

Focus Group Discussions (FGDs) were also conducted with selected learners and parents to capture shared experiences, perceptions, and coping strategies related to daily school commuting. FGDs facilitated interaction among participants, enabling the study to uncover common concerns, collective interpretations, and socially shared experiences that may not easily emerge from individual interviews (Morgan, 2020).

For learners in Primary One to Primary Three, non-participant classroom and school-arrival observations were employed. Since younger learners were less able to reliably complete questionnaires, observations provided an indirect but valuable means of assessing the possible effects of school van schedules on fatigue, punctuality, attentiveness, and classroom readiness. The observation approach followed established classroom observation principles to ensure systematic and unbiased recording of learner behaviors (Evertson & Weinstein, 2013).

3.6 Quality Control

To ensure data quality and methodological accurate, all research instruments were pre-tested in schools outside the study area to enhance clarity, reliability, and age-appropriateness (Fraenkel et al., 2020). Research assistants were trained on standardized data collection procedures, ethical conduct, and observational consistency to minimize bias and procedural errors (Creswell & Creswell, 2023).

Uniform protocols were applied across questionnaires, interviews, and observations to maintain consistency during data collection (Creswell & Creswell, 2023; Fraenkel et al., 2020) Data credibility was strengthened through triangulation of multiple sources and methods (Nowell et al., 2017), while data entry accuracy was ensured through double-entry verification and systematic coding checks (Taber, 2018). All data were securely stored using password protection, anonymization, and restricted access in line with national research ethics guidelines (UNCST, 2021).

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3.7 Data Management and Processing

Quantitative data were entered into SPSS v20 after cleaning, coding, and screening for outliers. Qualitative data were transcribed verbatim, manually coded, and categorized thematically (Braun & Clarke, 2021). Triangulation occurred during interpretation, integrating quantitative and qualitative findings for comprehensive analysis.

3.8 Data Analysis Procedures

Quantitative analysis involved descriptive statistics, correlations, and inferential tests aligned with hypotheses. Qualitative analysis applied thematic coding and narrative synthesis to contextualize numerical trends. Findings from both methods were triangulated to ensure robustness and support interpretation of the impact of school van schedules on academic performance.

3.8.1 Quantitative Data Analysis

Quantitative data were obtained from the learner questionnaires, parent questionnaires, and academic performance records. Because these datasets were collected from independent random samples, it was not possible to link individual learners' questionnaire responses directly to their academic performance records. In line with accepted analytical practice for unlinked datasets (Creswell, 2021; Cohen et al., 2018), the quantitative analysis was therefore conducted at the group level, focusing on patterns and distributions within each dataset. Data were coded and entered into the Statistical Package for Social Sciences (SPSS Version 20)(Nelson et al., 2022). The following analytical procedures were used:

a) Descriptive Statistics

Frequencies, percentages, means, and standard deviations were computed to describe Commute durations (pick-up and arrival times), Number of van stops, Van capacity indicators (number of children per van, type of van, comfort levels), Academic performance patterns across subjects. These descriptive summaries provided the baseline quantitative patterns for each variable.

b) Group-Level Inferential Analysis

Because the datasets could not be merged at the individual level, traditional inferential statistics such as Pearson correlation, t-tests, or ANOVA were not appropriate. Instead, inferential conclusions were drawn using group-level analytical comparisons, which included:

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Comparing group patterns in commute-related variables with group distributions of academic scores. Identifying associations between high-risk commute patterns (long travel hours, many stops, congestion) and overall academic performance trends, Using cross-tabulated descriptive patterns to detect meaningful relationships and Drawing inferences based on pattern consistency across independent datasets (Saunders et al., 2019; Bryman, 2016). This method allowed the study to test hypotheses ethically and scientifically without violating data structure limitations.

c) Triangulation With Qualitative Data

To strengthen validity, group-level quantitative findings were triangulated with Qualitative interview data from teachers and parents, Focus group discussions with learners and Open-ended questionnaire responses. This mixed-methods triangulation enriched the interpretation of how travel conditions influence fatigue, punctuality, attention, and ultimately academic performance.

d) Hypothesis Testing Approach

Each of the three hypotheses was tested through Descriptive pattern comparison (quantitative), Cross-variable interpretation (group-level inferential reasoning) and Triangulated qualitative support. Conclusions were made based on the convergence of evidence rather than individual-level statistical tests.

3.8.2 Qualitative Data Analysis

Qualitative data from interviews, focus group discussions (FGDs), and classroom observations were analyzed using thematic analysis, following Braun and Clarke's (2021) six-phase framework. This approach allowed systematic identification and interpretation of patterns across narrative data. Analysis was guided by Bronfenbrenner's Ecological Systems Theory (EST) and Cognitive Load Theory (CLT) to contextualize learners' experiences within their environmental and cognitive realities.

First, all audio-recorded interviews and FGDs were transcribed verbatim, and observation notes were expanded to preserve contextual meaning. Transcripts were repeatedly reviewed to ensure familiarity and accuracy.
Second, initial coding was conducted manually, assigning descriptive labels to meaningful segments of text. Codes captured issues such as fatigue, early wake-up times, van delays, homework disruption, and commuting stress.

These codes were then grouped into patterned categories, enabling the identification of recurrent issues across participants. In the next phase, patterns were synthesized into broader themes that reflected core insights, including early-morning fatigue, overcrowding in vans, emotional strain from long commutes, and challenges in communication between parents and van operators.

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Themes were subsequently interpreted in relation to EST highlighting how home, transport, and school environments interact and CLT, which explains how fatigue and stress increase extraneous cognitive load, affecting attention and learning.

Finally, findings were presented using direct quotations to preserve authenticity. Qualitative insights were triangulated with quantitative findings to validate patterns and deepen understanding of how van scheduling influences learners' academic performance.

3.9 Validity, Reliability, and Trustworthiness

To ensure methodological rigor, the study applied appropriate procedures for validity and reliability in quantitative data, and trustworthiness criteria for qualitative data, consistent with the recommendations of Creswell and Creswell (2023) and Nowell et al. (2017).

3.9.1 Validity and Reliability in Quantitative Data

- Content Validity: The questionnaires and observation checklist were developed using insights from prior research on school transportation and learner outcomes (Fraenkel et al., 2020; Taber, 2018). Two experts in educational research reviewed the instruments to ensure clarity, relevance, and alignment with the study objectives.
- Pilot Testing: A pilot study was conducted in one private school outside the main sample. Responses from the pilot informed refinement of ambiguous items, following guidelines from Fraenkel et al. (2020).
- Reliability**:** Internal consistency of multi-item scales (e.g., fatigue indicators, classroom attentiveness) was assessed using Cronbach's alpha. Reliability coefficients met the acceptable threshold of 0.70, as recommended by Taber (2018).

3.9.2 Trustworthiness in Qualitative Data

- Credibility: Credibility was enhanced through triangulation of data sources (learners, parents, teachers, van drivers, MEO), prolonged engagement in schools, and member-checking during follow-up discussions (Shenton, 2004).
- Dependability: An audit trail was maintained, documenting coding decisions, codebook iterations, interview procedures, and theme development, consistent with Nowell et al. (2017).

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- Transferability: Rich, contextual descriptions of school environments, transport routines, and community settings were provided to allow readers to determine applicability to similar Ugandan contexts (Creswell & Poth, 2018).

3.10 Ethical Considerations

This study adhered to strict ethical protocols due to the involvement of human participants, including minors.

3.10.1 Ethical Approval

Introductory letter was issued by the Municipal Education Officer, authorizing data collection in selected schools. Also approvals were sought from the heads of institutions were data were collected.

3.10.2 Informed Consent and Assent

Informed consent was obtained from all adult participants (parents, teachers, headteachers, and drivers). Learners in P4–P7 provided verbal or written assent alongside parental consent. Consent procedures included clear explanations of the study's purpose, voluntary participation, confidentiality, and the right to withdraw at any stage.

3.10.3 Confidentiality and Anonymity

Confidentiality was ensured by assigning codes instead of real names. No identifying information (names of learners, van drivers, schools, or locations) appears in the report. All digital data were encrypted and password-protected. Also the real names of the school were pseudonyms.

3.10.4 Child Protection Measures

Interactions with learners were conducted under teacher supervision. No photographs or videos of children were taken. All research assistants were trained in child-sensitive communication and safeguarding in line with the Ministry of Education and Sports' Child Protection Guidelines (2020).

3.10.5 Minimizing Harm and Discomfort

Data collection was scheduled to avoid disrupting lessons. No personal or intrusive questions were asked. Care was taken to ensure learners did not feel pressured or emotionally distressed.

3.10.6 Voluntary Participation

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Participation was fully voluntary. No participant was coerced, and withdrawal had no consequences. These procedures upheld ethical principles of Respect for Persons, Beneficence, and Justice (U.S. DHHS, 2020).

3.11 Limitations of the Study

Despite applying rigorous procedures, certain limitations were encountered.

1. Restricted scope; the study focused only on private primary schools in Nansana Division, where school vans are commonly used. This limits generalization to public schools or rural communities.
2. Limited direct responses from P1–P3; Younger learners were not directly surveyed due to developmental limitations. Insights about them were drawn from observations and adult interviews, which may reduce precision.
3. Variations in academic records; differences in record-keeping practices across schools may have affected uniformity of academic performance data.
4. Sample Size and Time Constraints**;** only ten schools participated due to logistical and ethical requirements. Although purposively selected, they may not capture the full diversity of commuting experiences in the division.

Nevertheless, the mixed-methods approach and triangulation strengthened the credibility of the findings.

3.12 Delimitations of the Study

The study boundaries were intentionally set to ensure feasibility and focus.

1. Geographic delimitation; The study concentrated on private primary schools within Nansana Division, excluding public schools due to limited formal van systems.
2. Participant delimitation; Learners in P4–P7 were directly engaged, while P1–P3 learners were assessed indirectly through observations and adult reports.
3. Institutional delimitation; Ten private schools were purposively selected to allow manageable data collection within available time and resources.
4. Conceptual delimitation; The study examined only how school van scheduling influences academic performance. Other potential factors (e.g., home income, parental education, school quality) were intentionally excluded.

These delimitations enabled a focused and ethically manageable study aligned with the research objectives.

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CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

4.0 Introduction

This chapter presents, analyzes, and interprets the data collected on the effects of school van schedules on the academic performance of primary school learners in Nansana Division, Wakiso District, Uganda. The primary aim of this chapter is to provide a clear and systematic account of the findings from both quantitative and qualitative data sources, aligned with the research objectives and hypotheses established in earlier chapters.

The chapter is organized into seven sections. It begins with an overview of the response rates from learners, parents, and other respondents, followed by a description of the demographic characteristics of the study participants. Thereafter, descriptive statistics for the key variables including total commute duration, number of pick-up and drop-off stops, van capacity utilization, and learners' academic performance are presented.

Group-level analytical comparisons and triangulated mixed-methods inference were employed to test the study's hypotheses. Specifically, the relationships between commute duration, number of stops, and van capacity utilization on learners' academic performance are examined using group level analytical comparison. The chapter also presents qualitative findings from interviews and focused group discussions, highlighting stakeholders' perspectives on the challenges and possible solutions for mitigating the negative effects of school van schedules.

Finally, the chapter concludes with a summary of key findings, emphasizing how the results address the study objectives, test the hypotheses, and relate to the conceptual framework, particularly Bronfenbrenner's Ecological Systems Theory (EST) and Cognitive Load Theory (CLT). These frameworks help to interpret how environmental factors, such as commuting patterns, may influence learners' cognitive capacity and academic outcomes.

4.1 Response Rate

The study successfully collected data from multiple sources to ensure a comprehensive understanding of the effects of school van schedules on academic performance.

Table 4.1 shows the distribution of participants and response rates for each data collection instrument.

Respondent Category	Instruments Distributed	Instruments Returned	Response Rate (%)

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Learners (P4–P7)	180	180	100%
Parents	40	39	97.5%
Learners' Scores	50	50	100%
Learners Observation (P1–P3)	30	30	100%
Headteachers	10	10	100%
Drivers/Conductors	20	20	100%
Class Teachers / FGDs	10	8	80%

Source: Primary data 2025

As reflected in Table 4.1, data were obtained from 180 learners in Primary Four to Primary Seven, 39 parents, and 50 academic records across the ten selected schools. Additionally, all 30 learner observation sheets for classes P1–P3 were successfully completed. Qualitative data were collected through interviews with 10 headteachers, 20 drivers or conductors, and 10 class teachers, providing deeper insights into the operational dynamics of school van scheduling.

To enrich the qualitative dimension, the study also conducted 10 Focus Group Discussions (FGDs) one in each participating school. Each FGD consisted of 2–4 participants drawn from teachers and administrative staff involved in learner support and transport coordination.

The decision to conduct ten FGDs was based on three considerations: ensuring representation across all selected schools, enabling in-depth discussion within small and manageable groups, and achieving data saturation where no new themes emerged after multiple sessions in line with established qualitative research practice (Krueger & Casey, 2015).

The high overall response rate can be attributed to several factors. School administrators demonstrated strong cooperation, with headteachers facilitating access to participants and clearly communicating the purpose of the study. The research instruments were simple, concise, and user-friendly, which encouraged full participation. Furthermore, the researcher personally administered and actively followed up on the instruments, while respondents recognized the relevance and potential benefits of the study to their schools and communities. These combined efforts ensured high levels of engagement across all respondent categories.

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4.2 Demographic Characteristics of Respondents

Understanding the demographic characteristics of respondents was important in interpreting patterns related to school van schedules and academic performance. The study involved three categories of participants: learners, parents, and key informants (headteachers /director of studies, drivers/conductors, class teachers, observers, and the Municipal Education Officer). Tables 4.2a, 4.2b, and 4.2c summarize their characteristics.

Table 4.2a: Demographic Characteristics of Learners (N = 180)

Variable	Category	Frequency	Percent (%)
Age of Learners	8	3	1.7
	9	26	14.4
	10	57	31.7
	11	42	23.3
	12	35	19.4
	13	15	8.3
	14	2	1.1
Class Level	P4	96	53.3
	P5	59	32.8
	P6	17	9.4
	P7	8	4.4
Gender	Boy	87	48.3
	Girl	93	51.7

Source: Primary data 2025

Reflecting on the table 4.2a above, the demographic results indicate that the majority of learner respondents were aged between 10 and 12 years, which corresponds with the typical age range for pupils in upper primary classes in Uganda.

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Most learners (53.3%) were in Primary Four, reflecting the larger enrollment size of the lower upper-primary classes within the selected schools. Gender distribution was nearly balanced, with girls slightly outnumbering boys (51.7% vs. 48.3%), indicating an equitable representation across sexes.

Table 4.2b: Demographic Characteristics of Parents (N = 39)

Variable	Category	Frequency	Percent (%)
Relationship to Child	Mother	30	76.9
	Father	6	15.4
	Guardian	3	7.7
Age Bracket	26–35 years	27	69.2
	36–45 years	9	23.1
	46 and above	3	7.7
Occupation	Civil servant	3	7.7
	Doctor	2	5.1
	Farmer	3	7.7
	Hotel manager	2	5.1
	Marketeer	1	2.6
	Nursing officer	2	5.1
	Shopkeeper	2	5.1
	Teacher	9	23.1
	Trader	15	38.5
Level of Education	No formal education	1	2.6
	Secondary	11	28.2
	Tertiary/Higher	27	69.2

Source: Primary data 2025

Table 4.2b indicates that among parents, most respondents were mothers (76.9%), which aligns with the common trend in Ugandan households where mothers are more involved in school-related engagements. A considerable

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proportion (69.2%) were aged between 26 and 35 years, suggesting that the majority were young to middle-aged parents. The dominant occupations included traders (38.5%) and teachers (23.1%), reflecting the semi-urban context of Nansana Municipality where small businesses and private-school employment are common. Educational levels were generally high, with 69.2% possessing tertiary or higher qualifications, enhancing the credibility of responses regarding issues affecting their children's schooling.

Table 4.2c: Demographic Characteristics of Key Informants (N = 69)

Variable	Category	Frequency	Percent (%)
Position of Respondent	Headteacher	8	11.6
	Director of Studies	2	2.9
	Driver	14	20.3
	Conductor	6	8.7
	Class teacher	9	13.0
	MEO	1	1.4
	Lower-class observer (P1–P3)	29	42.0
Years in Service	1–3 years	19	27.5
	3–5 years	27	39.1
	Above 5 years	23	33.3

Source: Primary data 2025

For Table 4.2c, the key informants consisted primarily of lower-class observers (42%), drivers (20.3%), and class teachers (13%). This composition provided a strong mix of operational and pedagogical perspectives on school van scheduling. Their experience levels varied, but the majority (39.1%) had served between 3 and 5 years, suggesting that respondents were adequately familiar with the day-to-day functioning of their institutions.

Overall, the demographic characteristics demonstrate a well-distributed, credible, and contextually representative sample, providing a strong foundation for analyzing how school van schedules influence learners' academic performance.

Table 4.2d: Learners' Academic Performance (N = 50)

	N	Minimum	Maximum	Mean	Std. Deviation

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mathematics term 2, 2025 score	50	32	94	64.74	17.373
English term 2, 2025 score	50	22	93	65.12	20.400
Science term 2, 2025 score	50	13	100	61.78	23.855
Social studies term 2, 2025 score	50	12	94	59.84	27.862
Average score across subjects	50	20	95	62.51	21.204
Valid N (listwise)	50				

Source: Primary data 2025

Academic performance of learners was analyzed using term 2, 2025 which revealed that scores in Mathematics, English, Science, and Social Studies. Statistics indicated that learners' mean scores based on the table 4.2d range from 59.84 (Social Studies) to 65.12 (English), with a combined average of 62.51, indicating moderate performance. The variability in scores, indicated by standard deviations, suggests differences in individual learning outcomes, possibly influenced by commute-related factors, number of stops, and van congestion.

4.3 Descriptive Statistics for the Study Variables

This section presents the descriptive statistics of the study variables, based on learners' and parents' questionnaires, as well as academic performance records. The analysis focuses on the three study objectives: the effect of total commute duration, the number of pick-up and drop-off stops, and van capacity utilization on academic performance. Frequencies, percentages, means, and standard deviations are reported and interpreted.

4.3.1 Objective 1: Effect of Total Commute Duration on Academic Performance

Total commute duration was assessed through learners' responses on morning pick-up times, arrival times at school, departure times from school, and arrival home times. The frequencies are summarized in **Table 4.3**.

Table 4.3: Distribution of Learners by Commute Times (N = 180)

Variable	Category	Frequency	Percent (%)	Cumulative Percent (%)
Morning Pick-Up (B4)	Before 5:30 a.m.	25	13.9	13.9
	5:30 – 6:00 a.m.	80	44.4	58.3

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	6:01 – 6:30 a.m.	34	18.9	77.2
	After 6:30 a.m.	41	22.8	100.0
Arrival at School (B5)	Before 7:00 a.m.	59	32.8	32.8
	7:00 – 7:30 a.m.	100	55.6	88.3
	7:31 – 8:00 a.m.	15	8.3	96.7
	After 8:00 a.m.	6	3.3	100.0
Departure from School (B6)	3:30 – 4:00 p.m.	45	25.0	25.0
	4:01 – 4:30 p.m.	47	26.1	51.1
	After 4:30 p.m.	88	48.9	100.0
Arrival Home (B7)	Before 5:00 p.m.	15	8.3	8.3
	5:00 – 6:00 p.m.	110	61.1	69.4
	6:01 – 7:00 p.m.	35	19.4	88.9
	After 7:00 p.m.	20	11.1	100.0

Source: Primary data 2025

The data indicate that the majority of learners (44.4%) are picked up between 5:30–6:00 a.m., arriving at school mostly between 7:00–7:30 a.m. (55.6%). Many learners leave school after 4:30 p.m. (48.9%) and reach home between 5:00–6:00 p.m. (61.1%) (Nelson et al., 2023). This pattern suggests that learners experience long commutes, which could contribute to fatigue, reduced study time, and potentially affect academic performance.

4.3.2 Objective 2: Effect of the Number of Pick-Up and Drop-Off Stops on Academic Performance

The number of stops made before reaching school was captured from learners' responses. Frequencies are shown in **Table 4.4**.

Table 4.4: Number of Pick-Up and Drop-Off Stops (B9, N = 180)

Number of Stops	Frequency	Percent (%)	Cumulative Percent (%)
0 stops	2	1.1	1.1

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1–3 stops	51	28.3	29.4
4–6 stops	30	16.7	46.1
7–10 stops	39	21.7	67.8
More than 10 stops	58	32.2	100.0

Source: Primary data 2025

A substantial proportion of learners (32.2%) experience more than 10 stops, while only 1.1% have direct transportation. The frequent stops may contribute to longer commute times and reduce the time and energy available for learning, potentially affecting punctuality and classroom engagement.

4.3.3 Effect of Van Capacity Utilization on Academic Performance

Van capacity utilization was examined through three interconnected indicators: vehicle type, number of children per van, and learners' perceived comfort. Table 4.5 presents a comprehensive overview of these measures.

Table 4.5: Van Type, Capacity Utilization, and Learner Comfort (B7,B8 &B3, N = 180)

Vehicle Type	Number of Children in Van	Frequency	Percent (%)	Comfort Level	Frequency	Percent (%)
Bus	<10	2	1.1	Always comfortable	4	2.2
	10–15	5	2.8	Sometimes uncomfortable	4	2.2
	16–20	6	3.3	Sometimes squeezed/scared	3	1.7
	>20	3	1.7	Not sure	5	2.8
Taxi	<10	10	5.6	Always comfortable	25	13.9
	10–15	40	22.2	Sometimes uncomfortable	45	25.0
	16–20	35	19.4	Sometimes squeezed/scared	10	5.6
	>20	25	13.9	Not sure	30	16.7
Noah	<10	4	2.2	Always comfortable	8	4.4
	10–15	8	4.4	Sometimes uncomfortable	10	5.6
	16–20	10	5.6	Sometimes squeezed/scared	3	1.7
	>20	7	3.9	Not sure	8	4.4
Ipsum	<10	7	3.9	Always comfortable	10	5.6
	10–15	7	3.9	Sometimes	11	6.1

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				uncomfortable		
	16–20	3	1.7	Sometimes squeezed/scared	1	0.6
	>20	8	4.4	Not sure	3	1.7
Total		180	100.0		180	100.0

Source: Primary data 2025

The table reflects that van capacity utilization and comfort were examined in relation to vehicle type. The majority of learners (61.1%) used taxis**,** followed by Noah vans (16.1%), Ipsum vans (13.9%), and buses (8.9%). Regarding occupancy, 33.3% of learners traveled with 10–15 children, 30% with 16–20, and 23.9% with more than 20, indicating high levels of congestion, particularly in taxis and Ipsum vans. Only 41.7% of learners reported feeling always comfortable, whereas 38.9% felt sometimes uncomfortable, 7.8% reported feeling squeezed or scared, and 11.7% were unsure.

Cross-tabulating vehicle type, occupancy, and comfort revealed that taxis and Ipsum vans are more likely to be overcrowded**,** with learners reporting moderate to high discomfort, whereas buses, despite lower occupancy, still had some instances of students feeling unsafe or squeezed. These findings suggest that overcrowding and discomfort are linked to vehicle type and van capacity, which may contribute to fatigue, reduced alertness, and lower academic engagement. The evidence highlights the importance of monitoring van occupancy and improving comfort levels, particularly for high-use vehicles like taxis.

4.3.4 Objective 4: Qualitative Strategies for Mitigating Negative Effects of School Van Schedules

This objective sought to identify practical and context-specific strategies proposed by learners, parents, van drivers, and school administrators to reduce the academic risks associated with long or irregular school van schedules. Qualitative data were drawn from open-ended questionnaire responses, Focus Group Discussions (FGDs), and interviews with key stakeholders, including a representative from the Municipal Education Department (MED).

Following Braun and Clarke's (2021) thematic analysis framework, transcripts and narrative responses were coded, grouped into patterned categories, and developed into the themes presented below. These themes were triangulated with quantitative data and interpreted using Bronfenbrenner's Ecological Systems Theory (EST) and Cognitive Load Theory (CLT), which emphasize the interconnected influence of home, transport, and school environments on children's learning capacity.

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Table 4.6: Summary of Suggested Strategies for Improving Van Scheduling

Theme	Description	Sources	Frequency / Respondents
1. Adjustment of Pick-up and Drop-off Times	Need for earlier, better coordinated, or staggered schedules to reduce lateness and early-morning fatigue	Learners, Parents, FGD	120 learners, 25 parents, 8 FGD participants
2. Reduction in Van Stops / Route Optimization	Calls to shorten routes, reduce stopovers, and improve trip planning	Learners, Parents	105 learners, 20 parents
3. Limiting Van Capacity / Ensuring Comfort	Requests to reduce overcrowding and improve seating conditions	Learners	90 learners
4. Communication and Feedback Systems	Need for timely updates on delays, emergencies, or route changes	Parents, FGD	22 parents, 7 FGD participants
5. Supportive Home Routines	Parental strategies such as earlier bedtimes, breakfast preparation, and structured homework	Parents	25 parents
6. Collaboration With School Authorities & Strengthening Oversight	Need for increased monitoring, more vans, and school–community coordination	FGD, MEO representative, Van Drivers	10 participants + MEO + drivers

Source: Primary data 2025

According to table 4:12, six (6) themes were developed with the findings below:-

Theme 1: Adjustment of Pick-up and Drop-off Times

Across FGDs and questionnaires, the most frequently mentioned strategy was the need to adjust pick-up and drop-off times to reduce early-morning fatigue and late-evening arrival. Learners expressed frustration with waking up very early, while parents emphasized the academic cost of late arrival. A parent stated:

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"These children wake up too early and still reach school tired. If schedules were adjusted, they would be more settled in class."

FGD participants echoed similar concerns, noting that early-morning fatigue affects concentration in the first lessons.

Theme 2: Reduction in Van Stops and Route Optimization

Many learners reported that vans make too many stops, prolonging travel duration. Parents noted that long routes contribute to lateness and unnecessary fatigue. A learner shared:

"Our van stops at almost every home. By the time we reach school, we are already tired."

Parents added that reducing stops would significantly cut travel time, thereby improving alertness during morning classes.

Theme 3: Limiting Van Capacity and Improving Comfort

Overcrowding emerged as a major concern. Learners described discomfort, squeezing, and sometimes fear during transit. Overloading was linked to fatigue, body pain, and stress, all of which align with CLT's concept of extraneous cognitive load. One learner noted:

"When we are too many, we get squeezed and reach school tired."

A van driver admitted the challenge:

"School administrations need to provide multiple vans to reduce overloading."

This confirms that systemic support not just driver discipline is required.

Theme 4: Strengthening Communication and Feedback Mechanisms

Parents emphasized the need for timely communication, especially during delays or breakdowns. Communication gaps often caused anxiety and extended waiting periods for children. As one parent put it:

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"Schools should always communicate with parents in case of any delays to avoid our children overwait."

FGD participants recommended mobile alerts, WhatsApp groups, or designated communication officers for transport updates.

Theme 5: Supportive Home Routines

Parents discussed several home-based strategies to mitigate fatigue and stress, including earlier bedtimes, preparing breakfast ahead of time, organizing homework early, minimizing screen time before bed, These routines correspond with EST's microsystem factors that directly influence learner functioning.

Theme 6: Collaboration with School Authorities & Strengthening Oversight

A strong cross-cutting recommendation was the need for schools and local authorities to play a more active role in regulating and supervising school vans. A representative from the Municipal Education Department (MED) emphasized:

"In fact, there is need for a policy regarding van usage in schools."

He further added:

"The education departments need to also check on the nature and status of school vans."

These comments highlight a recognition at policy level that van operations are not merely logistical issues but also educational and child-welfare concerns. FGD participants emphasized the need for collective responsibility:

"Schools must work together with drivers and parents to ensure safe and timely transport."

4.4 Integrated Interpretation

The themes reveal that the challenges of school transport are systemic, involving home routines, van operations, and school management practices. This aligns with Bronfenbrenner's Ecological Systems Theory (EST), showing how different environmental layers (home, school, transport network, municipal authorities) interact to affect learning. It also reflects Cognitive Load Theory (CLT)**:** excessive fatigue, fear, and discomfort increase extraneous cognitive load, reducing the learner's capacity to focus, remember, and participate in class.

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Sumarily, qualitative findings highlight practical and actionable strategies that stakeholders believe can significantly reduce the negative academic impacts of irregular or poorly coordinated van schedules. The themes reflect strong consensus across learners, parents, school staff, and municipal officials, demonstrating the need for collaborative and policy-driven solutions.

4.5 Inferential Analysis (Group-Level Approach)

Because learners' questionnaires and academic performance records were obtained from independent random samples, individual-level matching was not feasible. In line with established mixed-methods practice (Creswell, 2021; Cohen et al., 2018), hypotheses were therefore tested using group-level analytical comparison, triangulating patterns from questionnaire data, academic records, and qualitative evidence from parents, teachers, drivers, and FGDs. This approach allows valid inference where direct linkage between datasets is methodologically or ethically constrained.

4.5.1 Hypothesis One (H_{01}): Commute Duration and Academic Performance

H_{01}: There is no significant relationship between total commute duration and the academic performance of primary school learners.

Key Group-Level Evidence;

Analysis of commute indicators showed that 45% of learners were picked up before 6:00 a.m., while over 80% returned home after 5:00 p.m., including 11% after 7:00 p.m., indicating prolonged daily travel exposure. Academic records (N = 50) revealed a moderate mean score of 62.51% (SD = 21.2), with considerable variability across subjects, particularly lower performance in Social Studies.

Qualitative data consistently linked early departures and late returns to learner fatigue, sleepiness, and reduced attentiveness during morning lessons. Teachers reported diminished engagement among learners arriving very early, while parents and learners described persistent tiredness before and after school.

Interpretation and Decision;

When examined collectively, extended commute duration is associated with increased fatigue and reduced learning readiness, corresponding with uneven academic performance. Basing on this convergent group-level evidence, from descriptive quantitative patterns and corroborating qualitative findings rather than individual-level statistical testing, **H_{01} is rejected**

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4.5.2 Hypothesis Two (H_{02}): Number of Van Stops and Academic Performance

H_{02}: The number of pick-up and drop-off stops has no significant effect on the academic performance of primary school learners.

Key Group-Level Evidence;

Data indicated that 32% of learners experienced more than ten stops, while 22% reported seven to ten stops, suggesting frequent interruptions during transit. Academic performance patterns reflected moderate achievement with substantial variability.

Parents and teachers reported that multiple stops contributed to lateness, missed early lessons, and learner fatigue. FGDs confirmed that learners from vans with numerous stops often arrived less alert and disengaged during initial lessons.

Interpretation and Decision;

The aggregated evidence indicates that frequent van stops prolong travel time and increase fatigue, thereby reducing punctuality and classroom readiness. Accordingly basing on convergent group-level evidence from descriptive quantitative patterns and corroborating qualitative findings rather than individual-level statistical testing., **H_{02} is rejected**.

4.5.3 Hypothesis Three (H_{03}): Van Capacity Utilization and Academic Performance

H_{03}: Van capacity utilization does not significantly affect the academic performance of primary school learners.

Key Group-Level Evidence;

Findings showed that 54% of learners traveled in vans carrying 16–20 children, while 24% reported more than 20 occupants, reflecting high congestion levels. Learners reported discomfort, sleepiness, and fatigue, particularly during morning travel.

Teachers observed reduced attentiveness and slower classroom participation among learners from overcrowded vans. Academic records reflected moderate performance, with lower outcomes in concentration-intensive subjects such as Science and Social Studies.

Interpretation and Decision;

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Taken together, high van occupancy is associated with discomfort, fatigue, and reduced alertness, which align with observed academic performance patterns. Consequently, **H_{03} is rejected** based on convergent group-level evidence from descriptive quantitative patterns and corroborating qualitative findings rather than individual-level statistical testing.

4.6 Summary of Key Findings

The study established consistent group-level patterns linking school van schedules to learners' academic experiences. Long commute durations, frequent pick-up and drop-off stops, and high van occupancy levels were associated with fatigue, reduced alertness, and moderate academic performance. Triangulation of quantitative and qualitative evidence strengthens confidence in these findings, demonstrating that school transport logistics play a significant role in shaping learners' readiness to learn and academic engagement.

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CHAPTER FIVE

DATA DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Discussion of Findings

This study examined the effects of school van schedules on the academic performance of primary school learners in Nansana Division, Wakiso District. Because learner questionnaires and academic records were sampled independently, the analysis relied on group-level quantitative trends triangulated with qualitative insights from parents, teachers, Focus Group Discussions (FGDs), van drivers, and municipal education officials. The discussion is structured according to the study objectives and hypotheses, integrating empirical findings with Bronfenbrenner's Ecological Systems Theory (EST) and Cognitive Load Theory (CLT), while situating the results within existing literature.

5.1.1 Commute Duration and Academic Performance

Findings indicated that extended commute durations, characterized by early morning pick-ups before 6:00 a.m. (45%) and late evening arrivals after 5:00 p.m. (81%), with 11% returning after 7:00 p.m., were associated with learner fatigue, reduced alertness, and uneven academic performance. Academic records (N = 50) revealed a mean score of 62.51% (SD = 21.2), indicating moderate achievement with substantial variability. Performance was lowest in Social Studies (Mean = 59.84%), with only a few learners attaining scores above 80%.

Qualitative data supported these patterns. Parents and teachers reported that learners who departed home very early arrived at school tired, sleepy, and less attentive during initial lessons. Learners themselves described fatigue and difficulty concentrating, particularly in morning sessions.

These results are consistent with prior studies showing that long commutes can reduce learner attentiveness and classroom engagement (Huang et al., 2020; Swanson & Schneider, 2019). Cognitive Load Theory explains that prolonged commuting adds extraneous cognitive load through physical exhaustion and reduced sleep, diminishing mental resources available for learning (Sweller, 2011). Within EST, commute duration functions within the learner's microsystem and mesosystem, linking home routines, transport conditions, and school readiness.

Although some studies suggest academic performance is primarily shaped by school quality and home learning environments, the present findings indicate that in urban and peri-urban contexts like Nansana, commute duration acts as an additional environmental stressor that may reduce learning readiness. Consequently, the study concludes that extended commute durations are meaningfully associated with fatigue, reduced engagement, and moderate

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declines in academic performance, leading to the rejection of H_{01}. This rejection is based on convergent group-level patterns rather than formal statistical testing.

5.1.2 Number of Van Stops and Academic Performance.

The study further found that the number of pick-up and drop-off stops influences learner punctuality, fatigue, and classroom readiness. Approximately 32% of learners experienced more than ten stops, while 22% experienced seven to ten stops daily. Frequent stops prolonged travel time, contributed to lateness, and increased exhaustion.

Feedback from parents and FGDs indicated that learners transported on routes with multiple stops often arrived late, missed initial lessons, and exhibited lower alertness during early classroom activities. Teachers reported that such learners required additional time to settle into academic tasks.

These observations align with Daniels and McGrath (2021) and Alhassan et al. (2022), who found that repeated transit interruptions heighten stress and reduce cognitive engagement among school-age children. Ecologically, excessive stops represent structural inefficiencies in the transport environment that weaken the linkage between home and school, diminishing learning readiness (Bronfenbrenner, 1979).

Although route complexity may be unavoidable in densely populated areas, the evidence indicates that poorly planned routes exacerbate fatigue and disrupt academic engagement. Accordingly, frequent van stops are meaningfully associated with reduced learning readiness, supporting the rejection of H_{02}.

5.1.3 Van Capacity Utilization and Academic Performance.

Van capacity utilization emerged as a critical determinant of learner comfort and attentiveness. Findings showed that 30% of learners traveled with 16–20 peers, while 24% traveled with more than 20 learners per van, indicating substantial overcrowding. Learners reported discomfort, squeezing, sleepiness (54%), and difficulty concentrating (39%). Teachers observed reduced participation and slower responsiveness, particularly in cognitively demanding subjects such as Science and Social Studies.

Qualitative accounts reinforced these patterns. Learners described fatigue and discomfort during transit, while van drivers acknowledged operational pressures that necessitate overloading due to limited fleet sizes.

These findings are consistent with Kimani and Ochieng (2020) and Martinez et al. (2021), who found that overcrowded transport negatively affects children's cognitive engagement. Cognitive Load Theory explains that physical discomfort and stress increase extraneous load, impairing attention and working memory (Sweller, 2011).

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From an EST perspective, van overcrowding constitutes a negative microsystem condition that directly influences learner well-being and academic functioning.

Although some stakeholders view overloading as an economic necessity, the evidence indicates that excessive capacity utilization compromises learner comfort and learning readiness. Therefore, high van occupancy is meaningfully associated with reduced academic performance, leading to the rejection of H_{03}.

5.1.4 Strategies for Mitigating Negative Academic Effects of School Van Schedules.

Qualitative analysis identified several strategies to reduce academic risks associated with prolonged or irregular van schedules. Participants emphasized:

1. Adjusting pick-up and drop-off times to reduce early-morning fatigue.
2. Optimizing routes to minimize stops and travel time.
3. Limiting van capacity to enhance comfort.
4. Strengthening communication between schools, parents, and van operators.
5. Supporting home routines, including early bedtimes, breakfast preparation, and structured homework.
6. Strengthening oversight by schools and municipal authorities.

A Municipal Education Department representative stated:

"There is need for a policy regarding van usage in schools… education authorities must monitor the nature and status of school vans."

These strategies align with EST, highlighting coordinated action across home, school, transport systems, and regulatory structures. CLT suggests that reducing transport-related stressors preserves learners' cognitive capacity for learning tasks.

Empirical literature supports these recommendations. Chakrabarti and Roy (2021) reported that route optimization reduces commute time and enhances alertness, while UNICEF (2021) advocates structured transport planning in urban contexts. Mendelson et al. (2022) demonstrated that modest schedule adjustments can improve sleep quality and early-lesson performance. Collectively, the evidence suggests that mitigating transport-related academic risks requires collaborative, multi-level interventions rather than isolated actions.

5.1.5 Integrated Interpretation

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Across all objectives, commute duration, number of van stops, and van capacity utilization interact to influence learner fatigue, alertness, and academic performance. Triangulation of quantitative trends with qualitative insights strengthens the credibility of these findings and confirms school transport scheduling as a meaningful environmental determinant of learning outcomes in urban Ugandan contexts and specifically to primary learners in Nansen division.

5.2 Conclusions

Based on the integrated analysis of quantitative and qualitative data, the study concludes that:

1. Extended commute durations are consistently associated with increased learner fatigue, reduced classroom engagement, and moderate declines in academic performance.
2. Frequent van stops contribute to lateness, missed instructional time, and moderate academic achievement.
3. Overcrowded vans compromise learner comfort, alertness, and cognitive functioning, particularly in cognitively demanding subjects.

School van scheduling and transport conditions are therefore important determinants of primary school learners' academic performance. Improving travel efficiency, reducing stop frequency, and regulating van capacity can enhance learner readiness and academic outcomes.

5.3 Recommendations

For Schools

- Adjust pick-up and drop-off schedules to minimize early-morning fatigue.
- Optimize transport routes to reduce unnecessary stops and travel time.
- Monitor van capacity to prevent overcrowding and ensure learner comfort.

For Parents

- Collaborate with schools to improve transport planning and communication.
- Support children through adequate rest, early bedtimes, and structured home routines.

For Policy Makers and Education Authorities

- Develop context-appropriate guidelines regulating school van capacity, route planning, and travel duration based on local school transport needs.

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- Strengthen inspection and monitoring of school transport systems to safeguard learner welfare.

For Future Research

- Conduct longitudinal studies linking individual commute characteristics with academic outcomes to address limitations of group-level analysis.
- Explore alternative transport models and their educational implications in urban and peri-urban settings.

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APPENDICES

Appendix I: Parent/Guardian Questionnaire

Instructions:

This questionnaire is for research purposes only. Your responses will be kept confidential and used solely to understand how school van scheduling affects your child's academic performance. Kindly tick the most appropriate response and answer all sections honestly.

SECTION A: Background Information

1. Relationship to child:
   ☐ Mother ☐ Father ☐ Guardian
2. Age bracket:
   ☐ Below 25 ☐ 26–35 ☐ 36–45 ☐ 46 and above
3. Occupation: _____
4. Level of education:
   ☐ No formal education ☐ Primary ☐ Secondary ☐ Tertiary/Higher
5. Number of school-going children in your household: _____
6. Name of your child's school: _____
7. Child's class: ☐ P1 ☐ P2 ☐ 3 ☐ P4 ☐ P5 ☐ P6 ☐ P7

SECTION B: School Transport Arrangements

8. Does your child use a school van for transport? ☐ Yes ☐ No
9. Which vehicle usually picks and drops your child
   ☐ Bus ☐ Coaster ☐ Taxi ☐ Noah ☐ Ipsum
10. If your child uses a school van, who arranges it?
    - School administration ☐
    - Private operator (individual/company) ☐
    - Parent group ☐
    - Other: _____ ☐

11. What time is your child picked up in the morning?
    1. Before 5:30 a.m. ☐

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2. 5:30 a.m. – 6:00 a.m. ☐
3. 6:00 a.m. – 6:30 a.m. ☐
4. After 6:30 a.m. ☐

12. What time does your child usually return home?
    1. Before 5:00 p.m. ☐
    2. 5:00 p.m. – 6:00 p.m. ☐
    3. After 6:00 p.m. ☐
13. How do you describe the distance between you home and your child's school
    1. Very near ☐
    2. Near ☐
    3. Far . ☐
    4. Very far . ☐
14. Approximately how many stops does the van make before reaching school?

- 1–3 ☐
- 4–6 ☐
- 7–10 ☐
- More than 10 ☐

11. How many children are usually in the van during transit?

- Fewer than 10 ☐
- 10–20 ☐
- 21–30 ☐
- More than 30 ☐

Section C: Effects on the Child's Routine

12. Has your child ever complained about early morning fatigue due to transport schedules?

- Yes ☐
- No ☐

13. Does your child show signs of tiredness after returning home from school?

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- Always ☐
- Sometimes ☐
- Never ☐

14. On average, how many hours does your child sleep on school days?

- Less than 6 hours ☐
- 6–7 hours ☐
- 8–9 hours ☐
- More than 9 hours ☐

15. Has your child ever fallen asleep while doing homework or studying in the evening?

- Frequently ☐
- Occasionally ☐
- Never ☐

Section D: Academic and Behavioral Observations

16. In your opinion, how does the school van schedule affect your child's:

Aspect	Positively	Negatively	No effect
Concentration at school	☐	☐	☐
Academic performance	☐	☐	☐
| Class attendance	☐	☐	☐
Punctuality	☐	☐	☐
Behavior at home	☐	☐	☐

17. Do you believe school van congestion (too many children in the van) affects your child's comfort and readiness to learn?

- Yes ☐
- No ☐
- Not sure ☐

18. Have you ever raised a concern about the school van schedule with the school or van operator?

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- Yes ☐
- No ☐ If yes, what was the response? _____

Section E: Suggestions and Mitigation Strategies

19. What would you recommend to improve your child's commuting experience?

20. What other strategies do you think schools or parents can implement to reduce the negative effects of long van schedules on learners' academic performance?
21. What time-saving strategies have you adopted at home to cope up with school schedules?
22. Do you have any other concerns or suggestions related to your child's school transport?

END

Appendix II: Learner Questionnaire (P4–P7)

Purpose: To gather information on van commuting experiences and how they may affect learners' academic performance.

Note to Learner: This is not a test. There are no right or wrong answers. Your answers will help the school and researchers understand how transport affects your learning. Your answers will be private.

SECTION A: Personal Information

1. Age: _____
2. Gender: ☐ Boy ☐ Girl
3. Class: ☐ P4 ☐ P5 ☐ P6 ☐ P7
4. Name of School: _____

SECTION B: Transport Details

5. Do you use a school van or taxi to come to school?
   ☐ Yes ☐ No
6. Which type of vehicles usually picks you from home

   ☐ Bus ☐ coaster ☐ Taxi ☐ Noah ☐ Ipsum ☐ Noah

7. Do you sit comfortably or do you feel squeezed or unsafe during the ride to and from school

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☐ Always comfortable ☐ sometimes uncomfortable

☐ sometimes squeezed and scared ☐ not sure

8. What time are you picked up in the morning?

☐Before 5:30 a.m. ☐ 5:30 a.m. – 6:00 a.m. ☐ 6:01 a.m. – 6:30 a.m. ☐ After 6:30 a.m.

9. What time do you reach school?

☐Before 7:00 a.m. ☐7:00 – 7:30 a.m. ☐7:31 – 8:00 a.m. ☐ After 8:00 a.m.

10. What time do you leave school to go back home?

☐Before 3:30 p.m. ☐3:30 – 4:00 p.m. ☐4:01 – 4:30 p.m. ☐After 4:30 p.m.

11. What time do you reach home in the evening?

☐Before 5:00 p.m. ☐5:00 – 6:00 p.m. ☐6:01 – 7:00 p.m. ☐After 7:00 p.m.

12. About how many other children are in the van with you?
☐ Less than 10 ☐ 10–15 ☐ 16–20 ☐ More than 20
13. How many stops does the van make before reaching your school?
☐ 1–3 stops ☐ 4–6 stops ☐ 7–10 stops ☐ More than 10 stops
14. How do you feel when you arrive at school?
☐ Fresh and ready to learn
☐ A little tired
☐ Very tired and sleepy
15. Do you sometimes sleep or feel sleepy in the van?
☐ Yes ☐ No
16. How many days per week do you arrive late at school

☐ 0 ☐ 1–2 days ☐ 3–4 days ☐ every day

17. Are you ever late to school because of van delays?
☐ Yes ☐ No

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SECTION C: Learning and School Performance

18. How do you feel during the first lesson of the day?
    ☐ I understand well
    ☐ I feel tired but try
    ☐ I am too tired to concentrate
19. How often do you complete your homework?
    ☐Always ☐ Sometimes ☐ Rarely ☐ Never
20. Do you sometimes miss lessons because you arrive late?
    ☐ Yes ☐No
21. Do you find it hard to revise or read after reaching home?
    ☐ Yes ☐ No
22. How do you usually perform in class tests and exams?
    ☐ Very good ☐ Good ☐ Average ☐ Poor

SECTION D: Your Suggestions

20. What can be done to make your journey better and help you perform better at school?

END

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Appendix III: Focus Group Discussion Guide

Purpose: To explore shared experiences, challenges, and perceptions related to school van schedules and their effects on academic performance.

Note to Moderator: FGDs should last 30–45 minutes and be conducted in a quiet, non-threatening environment. Encourage participants to express their views freely. Record responses (with consent) and take notes.

SECTION A: Introduction (Moderator Script)

"Welcome and thank you for participating in this discussion. We are here to talk about school vans how children travel to and from school and how this may affect their studies, rest, and performance in school. There are no right or wrong answers. Please feel free to share your honest opinions. Your names will not be shared anywhere."

SECTION B: Opening Questions

1. How do most children in your school (or your children) travel to and from school each day?
2. What time do they usually leave home and get back home?

SECTION C: Key Discussion Themes

1. Commute Duration and Fatigue

- How long does the journey to school take?
- How do learners feel when they reach school in the morning?
- Do learners seem tired, sleepy, or distracted in class because of the journey?
- How does the evening journey affect their homework or revision time?

2. Number of Stops and Route Experiences

- Are there many stops along the van route?
- Does this delay children?
- Do children complain about waiting for others to be picked or dropped off?

3. Van Capacity and Comfort

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- How crowded are the vans usually?
- Are learners able to sit comfortably?
- Have there been any issues with van behavior or safety?

4. Academic Performance Perceptions

- Do you think the school van routine affects academic performance? How?
- Have you noticed any changes in learning or concentration related to van usage?

5. Coping Strategies and Suggestions

- What do you or your children do to cope with the long journey or tiredness?
- What do you think can be done to improve the school van system for better academic performance?

SECTION D: Closing Remarks

"Thank you all for your time and opinions. This information will help us understand how school travel affects learning and how to improve the experience for children."

Appendix IV: Classroom Observation Checklist (P1–P3)

Title: Classroom Observation Checklist for Early Grade Learners (P1–P3)
Purpose: To gather observational data on learners' attentiveness, punctuality, fatigue, and general classroom behavior especially as it may relate to long or early van commutes.

Instructions for Observer:
Use this checklist during morning lessons (first 2–3 periods). Observe silently and objectively for 30–45 minutes per class. Use the rating scale or tick boxes. Take brief field notes where applicable. Repeat observations across multiple days if possible.

Section A: General Information

School Name	**Details**
Class Level (e.g., P1, P2, P3)	
Date of Observation	

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Time of Observation	
Observer Name	

Section B: Learner Punctuality and Arrival Behavior

Observation Item	Yes	No	Notes
Majority of learners arrived before lessons started	☐	☐	
Some learners arrived late and disrupted the class	☐	☐	
Learners appear settled and ready to learn upon arrival	☐	☐	

Section C: Indicators of Fatigue or Sleepiness

Behavior Observed	Not at All	Occasionally	Frequently	Notes
Yawning	☐	☐	☐	
Head resting on desk	☐	☐	☐	
Eyes drooping or closing	☐	☐	☐	
Learners falling asleep briefly	☐	☐	☐	
Learners showing signs of drowsiness during active lessons	☐	☐	☐	

Section D: Learner Attentiveness and Participation

Behavior Observed	Not at All	Occasionally	Frequently	Notes
Learners respond actively when called upon	☐	☐	☐	

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Learners follow teacher instructions without delay	☐	☐	☐	
Learners appear focused during individual work	☐	☐	☐	
Learners are engaged during group activities	☐	☐	☐	

Section E: Physical and Behavioral Signs

Observation Item	Yes	No	Notes
Learners appear restless or fidgety	☐	☐	
Learners request to go outside frequently	☐	☐	
Learners display signs of irritability or withdrawal	☐	☐	
Learners show signs of hunger or dehydration	☐	☐	

Section F: Additional Notes

Use this space for any important observations that do not fit into the checklist above:

END

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Appendix V: Interview Guide for Key Informants

Title: Key Informant Interview Guide – (Teachers, Headteachers, and Van Operators)
Purpose: To gather expert perspectives on how school van schedules influence learner punctuality, alertness, class participation, and academic performance.

Instructions for Researcher:

This is a semi-structured interview guide. Use open-ended probing where necessary. Seek consent before recording or note-taking. Maintain confidentiality and anonymity.

Section A: Interview with Class Teachers / Subject Teachers

Background

- Name (optional): _____
- School: _____
- Class/Subjects Taught: _____
- Number of years teaching: _____

Questions

5. What time do most learners arrive at school in the morning?
6. Are some learners consistently late? If yes, what reasons do they give?
7. Have you noticed any relationship between early van pick-ups and learners' classroom concentration or performance?
8. Do some learners appear fatigued, sleepy, or distracted during morning lessons? If yes, how often?
9. In your opinion, how does the length of commuting time affect learners' participation and attentiveness in class?
10. Do you think learners who use school vans perform differently from those who walk or use other means? Please explain.
11. Have you observed any changes in homework quality or submission among van-commuting learners?
12. What observational differences have you noticed between van learners who come from far distances and those coming from nearby distances
13. What support strategies (if any) have you or your school implemented to help fatigued or

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late learners?

14. What recommendations do you have to reduce the negative academic effects of long commutes?
15. Any other additional observations and suggestions?

Section B: Interview with Headteachers or Directors of Studies

Background

- Name (optional): _____
- School: _____
- Role: Headteacher / Director of Studies
- Years in leadership: _____

Questions

1. How is school transport organized in your school? Who manages it?
2. What is the earliest time learners start arriving at school?
3. Are there challenges related to van scheduling, route planning, or punctuality?
4. Have parents raised concerns about van-related fatigue or academic performance?
5. What is the school's observation regarding the impact of van schedules on performance trends or learning behavior?
6. Do you track attendance and punctuality differences between van users and other learners?
7. How does the school address complaints or concerns related to long commutes or overcrowded vans?
8. What policy or practical improvements would you suggest to ensure school transport supports learning outcomes?

Section C: Interview with Van Drivers or Conductors

Background

- Name (optional): _____

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- Van Operator (position): _____
- Years of Experience: _____
- Number of Learners per Trip: _____

Questions

5. What is the type of vehicle do you operate?
6. At what time do you begin picking up learners in the morning?
7. On average, how many stops do you make per route?
8. Do you face challenges that make you delay picking up or dropping learners?
9. How long does it take to complete a full round in the morning and afternoon?
10. What are your observations about the children's mood or behavior when they enter and leave the van?
11. Do some learners sleep in the van during the journey?
12. What challenges do you face in terms of van capacity, road conditions, or route length?
13. Do you receive feedback from parents or teachers about the learners' commuting experience?
14. What ideas do you have to improve the school van system for the benefit of the children?

END

Appendix VI: Document Review Template for Academic Records

Title: Academic Records Review Template – Primary School Learners (P4–P7)

Purpose: To systematically collect and organize academic performance data for learners participating in the study.

Instructions for Researcher:

- Obtain official termly report cards or cumulative performance summaries from school administrators.
- Ensure data confidentiality and use coded identifiers for each learner to maintain anonymity.
- Record scores in key subjects consistently for all learners.

Learner ID	Class (P4-P7)	Mathematics Score	English Score	Science Score	Social Studies Score	Average Score	Date of Report	Comments (e.g., observed

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								changes, anomalies)
Teachers comment								

Notes:

- Average Score can be computed as the mean of the core subjects' scores.
- Comments may include notes on any irregularities such as absenteeism affecting scores or observed improvements/declines.
- Ensure each learner's data aligns with the corresponding data from questionnaires and interviews for triangulation.

Appendix VII: Introductory letter and field approvals

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