

Effect of cognitive development on second-language acquisition and academic performance among secondary school students in Rwanda: A case study of Groupe Scolaire Kivumu, Muhanga District

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ABSTRACT

Rwanda's shift to English-medium instruction in 2009 placed heavy cognitive and linguistic demands on students whose home language is Kinyarwanda. How well students cope with those demands depends partly on how their minds have developed. This study looked at that question directly: does cognitive development affect how secondary school students at G.S. Kivumu in Muhanga District learn and perform in English? Three things were examined: how cognitively developed students are, what their English acquisition looks like in practice, and whether those two sets of findings are connected. The study used a mixed-methods descriptive survey design guided by Piaget's Theory of Cognitive Development. From a population of 400 (394 students in S1 to S3, four English teachers, and two administrators), 86 participants were selected through stratified random and purposive sampling. Structured questionnaires and interview guides were the main instruments, and data were analysed using descriptive statistics and thematic analysis. The results showed that three-quarters of students considered their memory skills good or excellent. Attention during general tasks was short, with 56% sustaining focus for only 10 to 20 minutes, but this picture changed notably when students were working on English specifically: 60% then maintained concentration for more than 20 minutes. Sixty percent of students regularly used memory-based vocabulary strategies, and 66% applied problem-solving strategies when learning English. In terms of language performance, 60% achieved a good grade in English, 81% were confident writers in English, and 83% understood written English well or very well. Career ambition was the driving motivation for 60% of students. Taken together, the findings suggest that cognitive development does shape how students acquire and perform in English, and that teachers who build cognitive skills deliberately into their lessons are likely to see better language outcomes. Policymakers should consider making metacognitive training an explicit part of Rwanda's ordinary-level English curriculum.

Keywords: Cognitive Development, English Language Performance, Muhanga District, Rwanda, Second Language Acquisition, Secondary School Students

I. INTRODUCTION

Language learning has never been purely a matter of exposure or effort. How a student thinks, how well they can hold information in mind, how quickly they can switch between ideas, and how aware they are of their own learning processes all play a role in how successfully they pick up a second language. This intersection of cognition and language acquisition has attracted sustained attention from researchers in applied linguistics and educational psychology, with consistent evidence that cognitive maturity shapes both the speed and depth of second language learning (Frolli et al., 2022; Shu et al., 2024).

In secondary schools globally, adolescents are at a significant cognitive turning point. Piaget described this as the formal operational stage, a period in which young people develop the capacity for abstract reasoning, logical deduction, and systematic problem solving. These same capacities are what make it possible to move beyond simply memorising words and phrases in a second language toward genuinely understanding how the language works and using it creatively and accurately (Malik & Marwaha, 2023). Research has also shown that executive functions, the cluster of mental skills that includes working memory, the ability to resist distraction, and cognitive flexibility, are closely tied to success in foreign language learning, with each reinforcing the other over time (Frolli et al., 2022; Morra et al., 2025).

In Africa, the picture is complicated by the reality of multilingualism. Students are often learning a second or third language in school while using an entirely different language at home and in their communities. In Rwanda, this tension was made sharper in 2009 when the government switched from French to English as the sole medium of instruction across public schools, a change that had significant consequences for both students and teachers, particularly outside the major urban centres (Mahoro & Ngabonziza, 2024). Research since then has consistently shown that students in rural Rwandan schools face serious gaps in English proficiency, largely because their contact with English is confined

almost entirely to the school day (Hategekimana, 2024; United Nations Children's Fund [UNICEF] Rwanda, 2024). Yet despite this well-documented pattern, the question of how students' own cognitive development shapes their English learning in these schools has received comparatively little attention.

G.S. KIVUMU in Muhanga District is a typical example of such a school. Its students come predominantly from Kinyarwanda-speaking homes, are taught through English from the beginning of secondary school, and have few meaningful opportunities to use or hear English outside class. Understanding what role their cognitive development plays in how they acquire and use English is not merely an academic exercise: it has direct implications for how teachers plan lessons, how school leaders think about student support, and how curriculum designers approach language instruction in rural Rwanda.

1.1 Statement of the Problem

English performance in Rwandan secondary schools has been a concern for years. The 2022 Learning Achievement report from the National Examination and School Inspection Authority (NESA) documented persistently low English literacy scores, with rural schools performing notably worse than their urban counterparts. Weaknesses were spread across all four language skills, and researchers have attributed them to a mix of limited English exposure, insufficient teaching resources, and inadequate teacher proficiency in English (Mahoro & Ngabonziza, 2024; UNICEF Rwanda, 2024).

What has received less attention, however, is what is happening inside the learner. Internationally, there is substantial evidence that cognitive factors such as working memory capacity, attention span, metacognitive strategy use, and problem-solving ability are meaningful predictors of success in second language acquisition (Frolli et al., 2022; Mavrou, 2020; Shu et al., 2024). But these learner-level cognitive variables have rarely been studied in the specific context of rural Rwandan secondary schools. As a result, efforts to improve English outcomes in schools like G.S. KIVUMU have tended to focus on systemic issues, teacher training, and curriculum design, while the cognitive readiness of the learners themselves has remained largely unexamined. This study was designed to address that gap.

1.2 Research Objectives

- i. To assess the levels of cognitive development among students at G.S. KIVUMU.
- ii. To describe the patterns of English language acquisition and performance among students at G.S. KIVUMU.
- iii. To establish what relationship, if any, exists between students' cognitive development levels and their English acquisition and performance outcomes at G.S. KIVUMU.

1.3 Research Questions

- i. What are the levels of cognitive development among ordinary-level students at G.S. KIVUMU?
- ii. What patterns of English language acquisition and performance exist among students at G.S. KIVUMU?
- iii. What is the relationship between cognitive development levels and English second language acquisition and performance outcomes among students at G.S. KIVUMU?

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Piaget's Theory of Cognitive Development

This study is grounded in Piaget's Theory of Cognitive Development, which provides the conceptual tools for understanding how students' mental maturity shapes their ability to learn a second language. Piaget proposed that intellectual growth moves through four stages in a fixed order: sensorimotor (birth to two years), preoperational (two to seven years), concrete operational (seven to eleven years), and formal operational (eleven years and older). Secondary school students fall within the formal operational stage, and it is at this stage that the cognitive capacities most relevant to advanced language learning come online, including abstract reasoning, deductive logic, and the ability to consider multiple variables at once (NCBI, 2023; Simply Psychology, 2026).

Central to Piaget's account is the idea that learning happens through two complementary processes. Assimilation is what happens when a learner absorbs new information into an existing mental framework without fundamentally changing that framework. Accommodation is what happens when the new information does not fit the existing framework and forces the learner to revise it. In the context of second language acquisition (SLA), both processes are constantly at work. When a student encounters a new English word, they may assimilate it into their existing vocabulary schema. When they encounter an English grammar structure that works differently from Kinyarwanda, they must accommodate, adjusting their mental model of how language works. Students in the formal operational stage are better equipped for this accommodation because they can reason abstractly about language rather than simply reacting to it.

The theory's value for this study lies specifically in what it says about the relationship between cognitive maturity and the depth of language learning. Piaget's formal operational stage is not just about thinking more cleverly in general: it is about being able to engage with abstraction, to test hypotheses, and to reason systematically. These are precisely the capacities that allow a language learner to move beyond Basic Interpersonal Communicative Skills (BICS), basic conversational fluency, toward Cognitive Academic Language Proficiency (CALP), the kind of academic language proficiency needed for secondary school success. NCBI (2023) confirms that formal operational thinkers can work with logical abstractions, understand theories, and reason hypothetically, all of which are prerequisites for analytical reading, academic writing, and complex oral communication in a second language. This makes Piaget's framework an apt theoretical lens for interpreting the relationship between cognitive development indicators and English SLA outcomes observed in this study, and it is the lens applied throughout the empirical review that follows.

2.2 Empirical Review

2.2.1 Cognitive Development among Secondary School Learners

At its simplest, cognitive development refers to the gradual maturation of the mental processes used to think, reason, solve problems, and remember. The NCBI (2023) describes it as a lifelong process shaped by the interplay between biological development and the kinds of experiences a person has in their environment. What makes this particularly relevant for secondary school students is the nature of the cognitive changes that happen during adolescence, when formal operational thinking emerges, bringing with it the ability to reason abstractly, think in hypotheticals, and work through problems in a systematic rather than purely intuitive way (Simply Psychology, 2026).

Students aged 11 and above are, according to Piaget's framework, expected to be operating within the formal operational stage. Simply Psychology (2026) puts it well: formal operational thinkers can engage with 'what if' scenarios and reason about things they cannot see or touch directly. For language learning, this is significant. A student who can think abstractly can begin to analyse grammar rather than just imitate it, can infer the meaning of an unfamiliar word from context, and can construct a well-organised argument in writing rather than simply stringing sentences together. This makes the formal operational stage something of a threshold in second language development: before it, language learning is largely about exposure, imitation, and rote repetition; after it, learners can engage with the language at a structural and conceptual level, which opens up the possibility of much faster and deeper acquisition (NCBI, 2023).

Among the cognitive skills that researchers have linked most consistently to SLA success, working memory and executive functions stand out. Froli et al. (2022) carried out a systematic review that confirmed a two-way relationship between these cognitive capacities and foreign language learning: not only do stronger executive functions support better L2 (second-language) acquisition, but learning a second language also appears to strengthen executive functions over time. Building on this, Morra et al. (2025) showed that different executive functions mature at different rates during adolescence, with working memory and executive functions undergoing measurable differentiation during the ages of 8 to 14, and the ability to update working memory contents becoming especially central in early adolescence. This matters a great deal for second language acquisition, because encoding new vocabulary, tracking grammatical structures, and self-correcting in real time all make demands on exactly this system. At the level of specific language tasks, Mavrou (2020) narrowed this general claim to writing, finding that working memory capacity was positively associated with the quality of L2 writing, particularly on complex tasks that require students to hold grammatical rules, vocabulary choices, and argument structure in mind simultaneously. Read together, these three studies build a cumulative case: executive functions support language learning at a general level (Froli et al., 2022), this support is grounded in specific, age-linked neurocognitive changes (Morra et al., 2025), and it translates into measurable differences in a concrete language skill (Mavrou, 2020).

Metacognition, the ability to think about and regulate one's own thinking, has attracted growing attention in SLA research. A synthesis of this work presented in Shu et al. (2024) confirmed that metacognitive strategies, including planning before a task, monitoring comprehension during reading, and reflecting on what went well or poorly afterwards, all make a measurable positive difference to L2 outcomes, including reading comprehension, writing quality, and overall proficiency. More specifically, Muhid et al. (2020, as cited in University of Cambridge, 2022) found that metacognitive reading strategies improved academic comprehension in L2 contexts among secondary school students. What is important for this study is that metacognitive skill is not fixed: it can be taught. Students who are explicitly shown how to plan, monitor, and evaluate their own language learning tend to outperform those who are left to develop these strategies on their own (Teng, 2020, as cited in University of Cambridge, 2022).

2.2.2 Second Language Acquisition and English Performance

Second language acquisition (SLA) refers to the process through which someone develops meaningful competence in a language other than their first (Saville-Troike & Barto, 2017). In the Rwandan setting, this means English, since Kinyarwanda is the mother tongue of almost the entire population (Mahoro & Ngabonziza, 2024). English

is learned almost entirely through formal instruction, which makes the quality and cognitive demands of classroom teaching a critical factor.

Cummins (2000) distinction between BICS and CALP is worth understanding here. BICS is the kind of everyday conversational fluency that students can pick up relatively quickly, often within about two years of regular exposure. CALP, however, is something quite different: it is the ability to use language for academic purposes, to read and interpret complex texts, construct arguments in writing, and engage with subject-specific vocabulary. Developing CALP takes far longer, typically five to seven years even under good conditions, and the timeline is longer still in environments where English is rarely heard outside school (NSW Department of Education, 2025).

The 2009 shift to English-medium instruction was one of the most sweeping education policy changes in Rwanda's recent history, and the evidence on its effects is mixed. Mahoro and Ngabonziza (2024), studying primary schools in Rubavu District, found that the transition initially coincided with a decline in student performance, which they attributed partly to teachers' own limited command of English and partly to students not yet having the cognitive-linguistic resources to learn content in a language they barely knew. NESA's 2022 report confirmed that English literacy scores remain low, particularly at the primary level, though subsequent policy interventions have brought some improvement. At secondary level, Hategekimana (2024) found that students in Rwandan schools reported low English fluency, anxiety when asked to speak English, and real difficulty with academic vocabulary. This is exactly what Cummins' BICS/CALP distinction would predict: students who appear to manage day-to-day interactions in English may still lack the academic language proficiency needed to write a coherent essay, analyse a literary text, or follow an advanced content lesson. The NSW Department of Education (2025), drawing on Cummins' original framework, notes that CALP development may take up to six years even with consistent support, and longer in contexts where English is restricted to the school environment. Taken together, these studies point to the same conclusion from different angles: the 2009 policy shift created a genuine, well-documented performance gap, and that gap is best explained not by a single cause but by the compounding effect of limited teacher proficiency, limited exposure, and the slow, cognitively demanding nature of CALP development itself.

2.2.3 Relationship between Cognitive Development and English SLA

The argument that cognitive development and second language acquisition are connected is well supported internationally. Frolli et al. (2022) placed attention, working memory, and problem-solving at the heart of this relationship, arguing that these cognitive abilities shape both the pace at which students learn a new language and how deeply they internalise it. Antón et al. (2019) provided converging evidence from a different angle, showing that bilingual young adults outperformed monolinguals on specific working memory tasks, suggesting that managing two languages both draws on and strengthens the same cognitive systems. Gillet et al. (2021) extended this further, finding that after five years of bilingual immersion, students showed significantly greater cognitive flexibility than non-immersed peers, even when the second language was not their dominant one. And Mavrou (2020), focusing specifically on writing, established a positive link between working memory capacity and both the accuracy and syntactic complexity of L2 written production. Across these four studies, the relationship between cognition and SLA appears bidirectional and self-reinforcing: stronger cognitive capacities support faster, deeper language learning, while sustained engagement with a second language appears, in turn, to strengthen those same cognitive capacities.

Motivation also enters this picture as an important mediating factor. Liu and Dong (2023) found that intrinsic motivation to learn English was positively and significantly linked to achievement, whereas motivation that was more controlled or externally driven showed a weaker and sometimes negative association. Gardner's (2010) socio-educational model draws a distinction between integrative motivation (a genuine interest in the language and its community) and instrumental motivation (learning for practical goals like employment). Both types are found among Rwandan students, but the literature suggests that intrinsic or integrative motivation tends to sustain engagement and produce stronger long-term outcomes than instrumental motivation alone. Read alongside the cognitive evidence above, this suggests that cognitive capacity and motivation are not competing explanations for SLA success but interacting ones: cognitive ability determines how efficiently a student can process and internalise a second language, while motivation determines how consistently and deeply that capacity gets used.

2.3 Research Gap

Research on SLA in Rwanda has mostly examined the system rather than the learner. Studies have looked at language policy, the quality of English instruction, and the conditions teachers work under, but comparatively few have asked what is happening cognitively for the students themselves. Frolli et al. (2022) and Shu et al. (2024) both noted that African educational contexts are underrepresented in the international literature on the relationship between executive functions and language learning. This is a theoretical and contextual gap: the theoretical mechanisms linking cognition and SLA are well established internationally, but they have rarely been tested empirically in a rural sub-Saharan African, English-as-medium-of-instruction setting. By focusing specifically on learner-level cognitive variables

at a rural Rwandan secondary school, this study aims to contribute evidence that is grounded in the local context while also speaking to broader debates in the field.

III. METHODOLOGY

3.1 Research Design

A mixed-methods descriptive survey design was used. This meant collecting both numerical data through structured questionnaires and qualitative data through semi-structured interviews, then bringing the two together during analysis. The quantitative strand made it possible to measure cognitive development indicators and English performance across a reasonably large sample and to express the results in frequencies and percentages that could be compared across groups. The qualitative strand added depth, allowing for the kind of explanation and interpretation that numbers alone cannot provide. As Creswell and Creswell (2018) argued, combining methods in this way strengthens findings because the researcher can check whether patterns identified in one strand hold up in the other. The descriptive survey design was appropriate here because the study was not trying to manipulate variables experimentally but to describe and explain relationships as they actually exist in a real school.

3.2 Study Area

The research took place at G.S. KIVUMU, a public ordinary-level secondary school in Musengo Village, Kivumu Cell, Cyeza Sector, Muhanga District, Southern Province, Rwanda. The school is representative of rural Rwandan secondary schools in key respects: students come predominantly from Kinyarwanda-speaking homes, English is used almost exclusively within the school compound, and the school operates with the resource constraints typical of rural public schools in the country. These characteristics make it a meaningful setting for a study concerned with the cognitive and linguistic challenges of English-medium instruction in rural Rwanda.

3.3 Target Population

The study population consisted of everyone at G.S. KIVUMU who was directly involved in English language learning and teaching: 394 students enrolled in the nine ordinary-level classes from S1A through S3C, four English teachers, and two administrative staff members, giving a total of 400 individuals. Table 1 shows how the student population was distributed by class.

Table 1

Distribution of Target Population at G.S. KIVUMU

Class	Male	Female	Total
S1A	20	24	44
S1B	21	23	44
S1C	25	20	45
S2A	17	18	35
S2B	19	25	44
S2C	20	25	45
S3A	23	21	44
S3B	20	25	45
S3C	20	28	48
Student sub-total	185	209	394
English Teachers	2	2	4
Administrative Staff	2	0	2
Grand Total	189	211	400

Source: G.S. KIVUMU School Records (2025)

3.4 Sample Size and Sampling Techniques

The student sample was calculated using Yamane (1967) formula: $n = N / (1 + Ne^2) = 394 / (1 + 394 \times 0.01) = 394 / 4.94 \approx 80$ students. This gave a student sample of 80. Stratified random sampling was then applied to select students from each of the nine class streams in proportion to that stream's share of the total student population, so that no class was over or under-represented. The four English teachers and two administrators were selected through purposive sampling because of what they knew about the study's variables. The total sample was therefore 86 participants. Table 2 shows the full breakdown.

Table 2*Sample Size Distribution by Class Stream*

Class	Class Size	Calculation	Sample n	Method
S1A	44	44×80/394	9	Stratified
S1B	44	44×80/394	9	Stratified
S1C	45	45×80/394	9	Stratified
S2A	35	35×80/394	7	Stratified
S2B	44	44×80/394	9	Stratified
S2C	45	45×80/394	9	Stratified
S3A	44	44×80/394	9	Stratified
S3B	45	45×80/394	9	Stratified
S3C	48	48×80/394	10	Stratified
English Teachers	4	—	4	Purposive
Administrative Staff	2	—	2	Purposive
Total	400	—	86	—

Source: Primary data (2025)

3.5 Data Collection Instruments

Three instruments were used. The main one was a structured questionnaire given to 80 students and four teachers, organized into six sections covering background information, cognitive development indicators (memory, attention, and problem-solving confidence), critical thinking habits, English learning patterns, self-assessed language performance, and the strategies students used when learning English. The questionnaire combined closed-ended items and five-point Likert scale questions. The second instrument was a semi-structured interview guide used with the two administrators. These conversations were less constrained than the questionnaire, leaving room for follow-up questions and for participants to raise issues the researchers had not anticipated. Third, the researchers consulted school records and relevant academic literature throughout the study, both to contextualize the school's situation and to help interpret what the primary data were showing.

3.6 Validity and Reliability

Content validity was addressed by having the instruments reviewed by an expert before use. A pilot test with a small number of students outside the sample helped identify questions that were unclear or easy to misread, and these were revised before the main data collection. Reliability was supported by using the same instrument consistently across all 80 student respondents and by triangulating the quantitative findings against the interview data to check whether the two told the same story.

3.7 Data Analysis

Quantitative data were summarised using frequency counts and percentages, calculated in Microsoft Excel and presented in numbered tables corresponding to each research objective. Qualitative data from the interviews were analysed inductively: the researchers read through the transcripts, identified recurring ideas, grouped these into themes, and interpreted them in light of the study's objectives and theoretical framework. The findings and discussion that follow bring the two strands together, using each to deepen and challenge the other.

IV. FINDINGS & DISCUSSION

4.1 Demographic Profile of Respondents

Of the 80 student respondents, 54% were female and 46% male, which broadly reflects the school's overall gender distribution. The largest single age group (40%) was 14 to 15 years old, consistent with the expected age range for S1 to S3. In terms of grade level, 30% were at Level 8 and 27% at Level 7. This age distribution places most respondents at the boundary between Piaget's concrete and formal operational stages, which makes them an appropriate population for a study focused on the cognitive underpinnings of language learning.

4.1.1 Levels of Cognitive Development

This section presents findings on the key variable of cognitive development, measured through three indicators: memory capacity, attention span, and problem-solving confidence, and discusses each against the theoretical and empirical literature reviewed in Section II. Memory Capacity: Students were asked to rate their own memory skills. As Table 3 shows, 74% rated their memory as good or excellent, and no student described their memory as poor. This finding suggests that most respondents felt cognitively capable of holding and retaining information, which is the baseline requirement for vocabulary acquisition and for internalizing grammar patterns.

Table 3*Students' Self-Rating of Memory Skills (n = 80)*

Rating	Frequency	Percentage (%)
Excellent	27	34
Good	32	40
Average	21	26
Poor	0	0
Total	80	100

Source: Primary data (2025)

These ratings should be interpreted with some caution, since self-reported memory assessments do not always correspond with objective measures. Even so, the consistently positive picture across most respondents is broadly consistent with what Piaget's framework would predict for this age group: students in the formal operational stage should be developing stronger capacities for encoding and retrieving information, and this is borne out by how students described themselves. Morra et al. (2025) add neurological detail to this picture, showing that working memory is not simply maturing in a general sense during early adolescence but is differentiating in specific ways, with the capacity to update and refresh mental content becoming increasingly central. This kind of dynamic working memory is exactly what is needed to hold a sentence structure in mind while checking it against grammar rules, or to track an argument through a reading passage while keeping vocabulary meanings active, which is why this finding is a meaningful, if indirect, indicator of cognitive readiness for language learning.

Attention Span: The data on attention span revealed a more complicated picture. When students were asked how long they could concentrate during general academic tasks, 56% said only 10 to 20 minutes, and just 16% could sustain attention for longer than 30 minutes (Table 4).

Table 4*Students' Attention Span on General Tasks (n = 80)*

Duration	Frequency	Percentage (%)
Less than 10 minutes	5	6
10-20 minutes	45	56
20-30 minutes	17	22
More than 30 minutes	13	16
Total	80	100

Source: Primary data (2025)

This relatively short attention window is consistent with what developmental research tells us about adolescent concentration, which is easily disrupted by noise, social concerns, and electronic devices (Morra et al., 2025; UNICEF Rwanda, 2024). Notably, this picture changes substantially once the same question is asked specifically about English learning tasks rather than academic tasks in general; that comparison, and its implications, is examined in Section 4.4.3 as part of the evidence on the relationship between cognitive development and English SLA.

Problem-Solving Confidence: Most students (68%) described themselves as neutral in terms of problem-solving confidence, and only 21% felt genuinely confident or very confident. Table 5 shows the full distribution.

Table 5*Students' Problem-Solving Confidence (n = 80)*

Level	Frequency	Percentage (%)
Very confident	1	1
Confident	17	20
Neutral	54	68
Not very confident	6	8
Not confident at all	2	3
Total	80	100

Source: Primary data (2025)

On its face, this low confidence level sits in tension with the relatively active use of problem-solving strategies in English learning reported later in Section 4.4.2, where 66% of students said they regularly applied such strategies. As Cambridge researchers have noted, children's implicit metacognitive skills can positively predict L2 outcomes even before they have developed explicit awareness of those skills (University of Cambridge, 2022). Read against that

evidence, the discrepancy at G.S. KIVUMU is best explained not as a contradiction but as a sign that students have more metacognitive capability than they realise: they may be using problem-solving strategies without recognising them as such, or they may distinguish between academic problem-solving in general and the specific strategies they apply to language tasks. The implication is that targeted metacognitive instruction could help students convert what they are already doing instinctively into deliberate, self-directed learning habits.

4.1.2 English Language Acquisition and Performance Patterns

This section presents findings on the second key variable, English language acquisition and performance, covering academic performance, self-assessed proficiency, and performance across the four language skills, discussed against the empirical literature on SLA in Rwanda and internationally. Academic Performance in English: No student in the sample reported excellent performance in English, and none reported failing. Sixty percent described their performance as good (B grade) and 40% as average (C grade), as shown in Table 6.

Table 6

Self-Reported Performance in English Classes (n = 80)

Grade	Frequency	Percentage (%)
A – Excellent	0	0
B – Good	48	60
C – Average	32	40
D – Below Average	0	0
F – Failing	0	0
Total	80	100

Source: Primary data (2025)

The complete absence of the highest and lowest performance bands is unusual and is worth explaining rather than simply noting. One interpretation is that it reflects a real performance plateau: students who have moved beyond basic incompetence in English but have not yet reached the level of academic language proficiency associated with excellent results. This reading is consistent with Cummins' (2000) BICS/CALP framework: these students are likely well past the point of struggling with basic conversational English, but the academic language demands of secondary school subjects, particularly in writing and extended reading, may still be pushing against the limits of their CALP. Hategekimana (2024) described exactly this pattern in Rwandan secondary schools more broadly, noting anxiety around academic English tasks and difficulty with vocabulary at the academic level, and the NSW Department of Education (2025) notes that even under favourable instructional conditions, CALP development takes five to seven years, a timeline that extends further when English is not used outside school. Most of the students in this study are likely still within that CALP development window, which would account for a cluster of results in the middle bands rather than at the extremes. A second, non-exclusive interpretation is that the clustering partly reflects a tendency toward modest or cautious self-assessment, particularly regarding academic performance.

Self-Assessed English Proficiency: When students were asked to rate their overall English proficiency, 40% placed themselves at the intermediate level and another 40% at advanced. Twenty percent identified as beginners, and no student described themselves as fluent (Table 7).

Table 7

Self-Assessed English Proficiency Level (n = 80)

Level	Frequency	Percentage (%)
Beginner	16	20
Intermediate	32	40
Advanced	32	40
Fluent	0	0
Total	80	100

Source: Primary data (2025)

The fact that no student claimed fluency reinforces the CALP-related explanation offered above and is plausible given the research context: these students have limited exposure to English outside school and have not had the sustained high-level contact with the language that fluency typically requires (NSW Department of Education, 2025). Performance across the Four Language Skills: In speaking, 72% of students reported feeling comfortable or very comfortable using English in front of others. Teachers attributed this partly to regular classroom debates and oral presentations, which give students repeated practice in public speaking. In listening, 70% said they understood spoken English well or very well. Reading produced the strongest results: 83% of students understood written English texts well or very well, as shown

in Table 8. Writing confidence was also high, with 81% describing themselves as confident or very confident in writing in English (Table 9).

Table 8

Students' Comprehension of Written English Texts (n = 80)

Level	Frequency	Percentage (%)
Very well	32	40
Well	34	43
Neutral	11	13
Poorly	3	4
Very poorly	0	0
Total	80	100

Source: Primary data (2025)

Table 9

Students' Confidence in L2 Writing (n = 80)

Level	Frequency	Percentage (%)
Very confident	34	43
Confident	30	38
Neutral	9	11
Not very confident	7	8
Not confident at all	0	0
Total	80	100

Source: Primary data (2025)

Outside school, English practice was notably frequent: 81% of students reported practising English daily, mainly through school subjects that are taught in English, and the remaining 19% practised several times a week. The relatively high scores in reading comprehension and writing confidence sit interestingly against the earlier absence of any A-grade performers. One possibility is that students have genuine receptive and productive skills in English that formal examinations do not fully capture, perhaps because examinations assess other dimensions of academic language use, such as critical analysis or argumentation. Another possibility is a degree of optimism bias in self-assessment, which is not uncommon when students are asked to rate their own skills. Either way, the high rate of daily English practice, driven primarily by the school's English-medium instruction policy, is encouraging and likely contributes meaningfully to the functional proficiency levels observed across the four skills.

4.1.3 Relationship between Cognitive Development and English SLA

This section addresses the third objective directly, examining how the cognitive development indicators reported in Section 4.2 relate to the English acquisition and performance patterns reported in Section 4.3. Memory Technique Use in Vocabulary Learning: When asked how often they used memory-based strategies such as mnemonics or flashcards to learn English vocabulary, 40% of students said they always did so and 20% said they often did, giving a combined 60% who regularly used these techniques (Table 10).

Table 10

Frequency of Memory Technique Use in L2 Vocabulary Learning (n = 80)

Frequency	Count	Percentage (%)
Always	32	40
Often	16	20
Sometimes	32	40
Rarely	0	0
Never	0	0
Total	80	100

Source: Primary data (2025)

This is one of the clearest indicators in the data of a direct connection between cognitive functioning and language learning behaviour: students who rely on deliberate memory strategies are actively bringing cognitive resources to bear on their language acquisition rather than learning passively through exposure alone. This is consistent with the international evidence from Frolli et al. (2022), who found that working memory and executive functions directly support L2 acquisition, and from Mavrou (2020), who linked working memory capacity specifically to writing

quality. The G.S. KIVUMU data extend this evidence to vocabulary learning in a rural, low-exposure setting that the existing literature, drawn mostly from Europe and Asia, has not previously examined.

Problem-Solving Strategy Use in Language Learning: Table 11 shows that 49% of students always used problem-solving strategies such as breaking down complex sentences when learning English, and 17% did so often. The combined 66% who regularly applied these strategies is notably higher than the 21% who described themselves as generally confident in problem-solving (Section 4.2.3).

Table 11

Frequency of Problem-Solving Strategy Use in L2 Learning (n = 80)

Frequency	Count	Percentage (%)
Always	39	49
Often	14	17
Sometimes	27	34
Rarely	0	0
Never	0	0
Total	80	100

Source: Primary data (2025)

This gap between reported strategy use and self-assessed confidence, discussed already in relation to Objective One, is one of the study's most thought-provoking findings when read as evidence for Objective Three specifically: it suggests that students are doing more metacognitive work in language learning than they realise or credit themselves for, and that this hidden competence is a genuine, if under-recognised, driver of their English acquisition.

Attention Span during Language Learning: One of the more striking findings of the study concerns the difference in attention span between general tasks and English learning tasks specifically. As shown earlier in Table 4, only 16% of students could sustain attention on general academic tasks for more than 30 minutes. But when the question was about focusing specifically on English learning, that proportion rose to 36%, and 60% overall sustained concentration for more than 20 minutes, compared with 38% on general tasks (Table 12).

Table 12

Students' Sustained Attention during L2 Learning Tasks (n = 80)

Duration	Frequency	Percentage (%)
Less than 10 minutes	15	19
10-20 minutes	17	21
20-30 minutes	19	24
More than 30 minutes	29	36
Total	80	100

Source: Primary data (2025)

This shift is a meaningful piece of evidence for Objective Three. It suggests that when students are motivated and when tasks feel meaningful, their cognitive capacity for sustained attention is actually greater than their default behaviour on general tasks would suggest. This is not a contradiction of the cognitive account but a reminder that attention is not a fixed trait: it is partly a response to how engaging the learning experience is, and it complicates a purely cognitive explanation for the relationship being examined here, since motivation appears to be doing real work alongside cognition. **Motivation for Learning English:** Career ambition was by far the most common reason students gave for learning English: 60% cited career opportunities as their primary motivation (Table 13). Academic requirements came second at 20%, travel at 15%, and personal interest at just 5%. No student reported cultural interest as a motivating factor.

Table 13

Students' Motivations for Learning English (n = 80)

Motivation	Frequency	Percentage (%)
Career opportunities	48	60
Academic requirements	16	20
Travel	12	15
Personal interest	4	5
Cultural interest	0	0
Total	80	100

Source: Primary data (2025)

Students who see English as a pathway to career advancement may be bringing qualitatively different cognitive engagement to English tasks than to other academic work, which would help explain the extended attention span reported in Section 4.4.3. Gardner (2010) and Liu and Dong (2023) both suggest that motivation and cognition are not independent factors in SLA but interact: the motivation to succeed drives the kind of sustained cognitive effort that produces language growth. At the same time, the predominantly instrumental motivation found at G.S. KIVUMU, while it appears to support engagement, may have limits. Gardner's (2010) socio-educational model suggests that integrative or intrinsic motivation, learning English because one is genuinely interested in it rather than because it leads to a job, is more robustly associated with long-term proficiency than instrumental motivation alone.

4.2 Synthesis: The Connection between Cognitive Development and English SLA

Taken together, the data on memory strategy use, problem-solving strategy application, and the extension of attention span during language tasks all point in the same direction: cognitive development and English SLA are functionally linked at G.S. KIVUMU. Students who draw on cognitive strategies actively in their language learning appear to sustain engagement with English tasks more successfully than the general attention data alone would predict, which directly answers Research Question Three and confirms, in this rural Rwandan setting, the pattern that Frolli et al. (2022) and Mavrou (2020) documented internationally. The evidence also shows, however, that the relationship is not purely cognitive: motivation, and specifically the largely instrumental, career-driven motivation reported in Section 4.4.4, mediates how that cognitive capacity gets used. This is consistent with Piaget's theoretical framework, in which formal operational capacities create the potential for abstract, self-directed language learning, while how fully that potential is realised depends on the learning conditions, including motivation, in which it is exercised.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study asked a simple but important question: does cognitive development affect how secondary school students at G.S. KIVUMU acquire and perform in English? The answer, based on data from 86 participants across three groups, is yes, and in ways that are consistent with both Piaget's theoretical framework and the wider international literature on cognitive factors in SLA. Across all three objectives, students who showed stronger cognitive engagement, whether through self-assessed memory, regular use of memory and problem-solving strategies, or sustained attention during English tasks specifically, also showed patterns of English acquisition and performance consistent with functional, if not yet advanced, proficiency. The extension of attention span during English learning tasks compared with general tasks was especially telling: it suggests that when students are motivated and when tasks are made meaningful, their cognitive engagement with language learning improves, and that this is not a given but depends on how English is taught.

The most significant cognitive constraint identified in the study is the short general attention span reported by the majority of students, combined with the predominantly instrumental motivation that drives their engagement with English. Both point to the same underlying challenge: students at G.S. KIVUMU are engaged enough to function in English but may not yet be building the deep, sustained engagement with the language that leads to genuine fluency. At the same time, the reading comprehension and writing confidence findings suggest that structured classroom instruction has yielded real results, even in a limited-English environment. Cognitive development is not a background variable in language learning. It is an active force that shapes how efficiently students learn, how deeply they process new language, and how long they persist with difficult tasks. Making that force more deliberate, through targeted metacognitive instruction and cognitively stimulating language activities, is within reach for schools like G.S. KIVUMU.

5.2 Recommendations

The recommendations below follow directly from the findings and conclusion above and are addressed to the stakeholders best placed to act on them. For English teachers, the study found that 66% of students were already using problem-solving strategies in their English learning and 60% were using memory techniques regularly, but most of them could not describe what they were doing or why. This matters because implicit strategy use is less flexible and less transferable than deliberate, conscious strategy use. Teachers at G.S. KIVUMU, and in comparable rural secondary schools, should move from relying on students' instinctive metacognitive habits toward explicitly teaching them: showing students how to plan their approach to a reading or writing task before they start, how to monitor their comprehension while they work, and how to reflect on what went well and what did not when they are done. Think-aloud reading exercises, structured vocabulary sessions using mnemonics and spaced repetition, and guided self-assessment activities are practical ways to start.

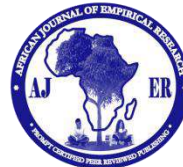
For school leadership and the Rwanda Education Board, the finding that 56% of students could only sustain attention for 10 to 20 minutes during general tasks suggests that lesson structures built around extended passive listening are a poor fit for this population. Lessons should incorporate varied, interactive activities at regular intervals, giving students different things to do and different ways to engage with the material. Increasing access to reading materials, language games, and audio resources would also help create a more cognitively stimulating English environment and extend practice opportunities beyond what the classroom alone can provide.

For MINEDUC, metacognitive skills training should be made an explicit part of the national English curriculum at the ordinary level, not left to individual teachers to introduce if and when they think of it. Students in rural schools, where cognitive and linguistic support from the home environment is limited, are the ones who most need this kind of scaffolded instruction. Policy guidelines should also help teachers assess whether students have the cognitive-linguistic readiness for English-medium content instruction before assuming they can simply absorb subject matter in a language they are still learning, and a clearer, more structured transition pathway from Kinyarwanda-supported to English-medium learning would benefit both students and teachers.

For parents and communities, career motivation is the primary reason most students at G.S. KIVUMU are learning English, and parents who understand the practical value of English proficiency are better placed to reinforce that motivation at home. Simple actions can make a difference: encouraging children to read anything available in English, asking them to share what they learned in English class, and supporting the idea that making mistakes in English is a normal part of learning and not something to be embarrassed about. Community English clubs or parent engagement sessions run through the school could serve as concrete mechanisms for extending English practice beyond the school day.

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