

Academic Performance: Investigating the Impact of Multilingualism and Cognitive Development

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ABSTRACT

This study investigates the impact of multilingualism on cognitive development and academic performance among secondary school students in South Kivu, Democratic Republic of the Congo. Employing a quantitative research design, the study sampled 102 students from both monolingual and bilingual educational settings. Data were collected using a standardized cognitive assessment questionnaire and academic records and analysed using the statistical package for social sciences (SPSS) with descriptive and inferential statistics. The findings revealed that bilingual students outperformed monolingual peers in academic performance across the last semester and the previous academic year. However, bilingual students also reported higher levels of cognitive failures, including forgetfulness, distractibility, and false triggering. Inferential statistics indicated significant differences between monolingual and bilingual students in both academic outcomes and cognitive development components, with distractibility emerging as a key predictor of academic performance. These findings suggest that while bilingualism may enhance academic achievement, it also introduces cognitive challenges, potentially due to institutional factors within private bilingual schools. The study emphasizes the need for structured support systems in multilingual educational environments to optimize cognitive and academic development.

INTRODUCTION

The impact of multilingualism on academic performance and cognitive development continues to be a focal point of contemporary research. A considerable number of empirical studies have been carried out by delineating the relation between multilingualism and brain functioning as well as the relation with students' performances. Indeed, the functionality of the brain and the academic achievements of students may be contingent on the linguistic environment they are exposed to, whether monolingual or bilingual. Evidence suggests that languages influence humans' perceptions, cognitive thinking, problem-solving, reasoning, and memory (Vasumathi, 2022: 49).

Consequently, the term "executive functioning/working memory" is employed (Paradowski, 2011: 335). The Ethnologue's estimates over 7,000 spoken languages worldwide (Vasumathi, 2022; Ali, 2023) and suggest that individuals speaking two, three, and multiple languages is a prevalent phenomenon. The phenomenon of intense multilingualism, characterized by the use of multiple

languages by individuals or communities, can be attributed to various factors, including globalization (Ali, 2023; Crystal, 2003).

In the Democratic Republic of the Congo (DRC) which is a country with a rich tapestry of languages and cultures; the linguistic landscape is characterized by the presence of over 250 mother tongues, four of which are recognized as national languages: Swahili, Lingala, Tshibuba, and Kikongo. In addition to this linguistic array, English is taught and learned as any other school subject. Given its historical status as a former Belgian colony until 1960, French is widely spoken. Consequently, the medium of instruction and textbooks in schools and universities in the Democratic Republic of Congo (DRC) are in French. This linguistic diversity has led to a significant number of Congolese individuals being bilingual or multilingual. Despite French being the language of instruction, the new Educational Policy (République Démocratique du Congo, 2015: 62) recently issued an order for local language education by having national languages to be used in primary schools, especially P1 to P3. This policy is

indicative of a broader promotion of multilingualism within the educational system, as it ensures that every child has the opportunity to study and utilize at least two languages from an early age.

However, despite the multilingual landscape described above, poor learning outcomes have been reported in the DRC (UNESCO, 2021). A substantial body of research indicates that 97% of individuals fail to attain the capacity to read and understand age-appropriate text by age ten (World Bank, 2022). Further research shows that, unlike other countries where the literacy rate of primary school graduates is 59%, it is estimated at 47% in the DRC (UNICEF, 2020). Additionally, a significant proportion of students in higher grades, and even some graduates, still struggle with basic numeracy and literacy skills (USAID, 2021). Nevertheless, existing research has yet to explore this field with the objective of understanding the reasons behind poor educational outcomes in the Congolese context. It is in this framework that this investigation is conducted to explore the cognitive development and academic performance of secondary school students in the context of multilingualism. The central research question guiding this study is as follows: What is the impact of multilingualism on students' cognitive development and academic performance? This central research question is complemented by two sub-questions, which guide the research and facilitate the generation of findings that contribute to the development of knowledge in this domain, particularly in the less explored context of the DRC. These sub-questions are:

- How does multilingualism influence the development of cognitive functions and flexibility in secondary school-aged children?
- How does multilingual proficiency affect academic performance in Bukavu secondary schools?

Literature Review

The possession of multilingualism has been demonstrated to enhance cognitive abilities and promote critical thinking in human beings (Vasumathi, 2022, p. 54). In the following sections, an examination of pertinent literature will be conducted to facilitate the reader's comprehension of the present paper's content.

Evidence suggests that multilingualism can delay or prevent dementia (Tan & Xun, 2023; Vasumathi, 2022). However, Alisoy (2025: 33) proposes an opposing viewpoint, asserting that multilingualism enhances brain resilience and neuroplasticity over an individual's lifetime. This assertion is based on the premise that multilingual education fosters lifelong learning and shapes cognitive stimulation (Tan & Xun, 2023: 16), and based on this, the present section will examine the literature perspectives, the connection between multilingualism and education, and cognitive development

and academic performance.

Understanding Multilingualism

Multilingualism is seen as the ability of an individual to use multiple languages. A multitude of scholars have endeavored to define multilingualism, and it has been determined that it is the use of more than one language with the implication of cognitive, psychological, and affective effects and experiences that accompany this knowledge (Jessner, 2008). Wei (2008: 4) concurs this position and argues that multilingualism is the "potential for individuals to communicate in more than one language". This concept is regarded as both a complex and advantageous phenomenon, given its influence on individuals, societies, and cultures (Alisoy, 2025, pp. 28–29). It fosters increased cultural awareness and sensitivity, as exposure to multiple languages enables individuals to understand and appreciate diverse cultural contexts (Byram, 1997). Additionally, it enhances adaptability, empowering multilingual individuals to navigate varied linguistic and cultural environments (Dewaele & Wei, 2012). This flexibility and adaptability, facilitated by multilingualism, aligns with the competences deemed necessary for global citizenship in education (UNESCO, 2015). In today's multicultural and globally interconnected communities, teachers, besides their abilities to valorized and strengthened these positive values of multilingualism on students learning capacities are also faced with different challenges as they work to serve diverse populations linguistic abilities of students at their disposal (Balinda, 2024: 50).

The capacity for a human to competently communicate in multiple languages is referred to as multilingualism, and an individual who can communicate in more than two languages is designated as a "polyglot" (Vasumathi, 2022, p. 49). It is noteworthy that the acquisition of multiple languages has been demonstrated to promote the development of empathy, cultural sensitivity, and intercultural competence in learners (Tan & Xun, 2023: 15–16). In this regard, multilingualism fosters tolerance and appreciation for inclusiveness and diversity.

Multilingualism is classified into two categories: passive and active multilingualism. An individual is classified as passive multilingual if they possess an understanding of multiple languages but primarily utilize only one, while an active multilingual is someone who proficiently employs more than one language in their daily life (Ali, 2023: 392–393). Conversely, other researchers have proposed a distinction between individual and societal multilingualism, with the former signifying an individual's capacity to communicate in multiple languages and the latter denoting the presence of numerous languages

within a community (Alisoy, 2025; Vasumathi, 2022). These two categories align with the context and situation of individual secondary school students in Bukavu.

Multilingualism in Education and its Benefits

In multilingual contexts, the simultaneous promotion of language development and knowledge acquisition through multilingualism is of paramount importance. This notion is further substantiated by Alisoy (2025), who, in his study, elucidates the cognitive benefits of multilingualism in education. He asserts that acquiring multiple languages enables learners to develop metalinguistic awareness. In a similar vein, Tan and Xun (2023: 15) posit that multilingual education, in addition to its significant role in the globalized world, has a profound impact on personal, academic, and societal growth. This position questions such importance of multilingualism in some contexts like Sub-Saharan Africa because much of what is written in African languages remains literally invisible and unseen in these conversations about the exchange between languages and its outcomes on the learning of students (Talento & Adejunmobi, 2025: 2). With the fast evolving and developing narrative of intercultural and global narratives of multilingualism and its importance on the cognitive benefits of learners, such a shift is probable.

The phenomenon of multilingualism has been demonstrated to engender specific benefits. A multitude of studies have sought to elucidate the cognitive advantages attributed to multilingual individuals. Research has demonstrated that individuals who are multilingual exhibit superior executive functions, attentional control, memory, and cognitive flexibility (Tan & Xun, 2023: 15). Engaging with multiple languages has been shown to stimulate cognitive processes, leading to enhanced cognitive outcomes. Consequently, the promotion of linguistic diversity and the valorization of local languages can be regarded as a means of preserving cultural heritage and preparing students for a global world with cross-cultural understanding (Tan & Xun, 2023; Alisoy, 2025).

A comparison of multilingual and monolingual students has yielded empirical findings indicating that multilingual students exhibit high working memory, enhanced flexibility, and profound inhibitory control (Andronic, 2024: 90). A further advantage of multilingualism is the mitigation of anxiety, as students who speak multiple languages report lower levels of communicative anxiety (Dewaele et al., 2008:915). This is attributable to the development of self-confidence and self-perceived competence in communication (Dewaele, 2007: 404). Moreover, multilingualism fosters the assimilation of novel perspectives and a conceptual restructuring and rearrangement of knowledge, thereby facilitating problem-solving (Paradowski, 2011: 338–339). Furtherance to this, multilingualism shapes proficiency, which may be found with monolinguals, given that multilinguals

incur advantages in further languages with possible cognitive benefits which intersect learning and academic achievement (Rutgers et al., 2024: 212). According to Calafato and Simmonds (2023), multilingualism has the potential to affect learning pattern factors, thereby influencing learning outcomes. However, this influence is moderated by students' self-regulation strategies.

In variance, some empirical findings report a negative impact of multilingualism on students' cognitive development and performance. In their study of monolingual and bilingual adults, Folke et al. (2016: 127) found that monolinguals exhibited superior metacognitive abilities compared to bilinguals. The researchers noted that these differences could not be attributed to variations in non-verbal reasoning, working memory, or age. Additionally, a study by Tang and Calafato found that school language teachers who were more multilingual were less likely to promote self-regulation among their students (Tang & Calafato, 2021).

Multi-lingualism in Congolese Secondary Schools.

As described in section 2.1, multilingualism can be individual or societal; with the latter meaning the presence of numerous languages within a community (Alisoy, 2025). The classification of educational institutions according to the languages utilized will thus be categorized under the broader concept of "societal mono- or multilingualism." To more effectively address this subject, it is imperative to also categorize secondary schools in the DRC according to their organizational structure. This categorization reveals four distinct types of schools. The first category is that of "public schools," which are operated by religious congregations (predominantly Catholic or Protestant) or the state, and funded by the government (World Bank, 2021). These services are typically free or low-cost, yet they encounter challenges such as inadequate funding and overcrowding. The second category is that of "private schools," which are operated by private entities, non-governmental organizations (NGOs), or individuals (UNESCO, 2020). It is evident that these institutions frequently offer educational programs of a higher standard; however, they often impose exorbitant tuition fees, thereby rendering them inaccessible to a specific segment of the population. Furthermore, their visibility is reduced in rural areas. The third category is that of "community or informal schools." These schools are operated by local communities, missionaries, or international organizations (De Herdt & Titeca, 2019). These schools are often located in rural or underserved areas and may not adhere strictly to the national curriculum. The fourth category is "specialized or vocational schools," which focus on specific skills such as

technical training. These initiatives are frequently associated with government-sponsored programs that involve collaboration with international organizations (USAID, 2022). The linguistic situation in the Congolese secondary education context is such that, in public schools, instruction is generally provided in French, which is the language of instruction for all courses except English (UNESCO, 2021). Nonetheless, in the context of private schools, the linguistic orientation is autonomously selected by the institutions' promoters/owners. Consequently, a number of these institutions function as bilingual schools, offering select courses in both French and English (Ndibu, 2020). This phenomenon can be attributed to the increasing global demand for English, which has been identified as a more open and international language (Crystal, 2003). It is noteworthy that the majority of these institutions are characterized by their opulence and the quality of their facilities, leading to envy among students and parents. The linguistic aptitude of students in these institutions is evidently superior to that of students in monolingual schools, which are predominantly state-run and overseen by religious denominations. In specialized and informal schools, however, the language may vary depending on the choice of the leaders and the category of students (De Herdt & Titeca, 2019).

Cognitive Development:—Enhancing Students Academic Performance?

In accordance with Bloom's taxonomy of the cognitive domain, the term "cognitive" is employed to encompass activities such as the recollection and application of knowledge, cognitive processing, problem-solving, and creative production (Bloom, 1956: 2). The cognitive domain, the focal point of Bloom's handbook, encompasses teaching objectives that are centered on the recollection or identification of knowledge, as well as the cultivation of intellectual aptitudes and competencies (p. 7).

The development of human cognition is influenced by numerous factors, with language being a significant element. The constant need to switch between languages entails cognitive flexibility, which requires students to constantly manage attention and focus (Kroll & Bialystok, 2013). The ability to switch between languages has been shown to indicate the adaptability of the human brain. This suggests that multilingual individuals may possess enhanced executive control abilities due to their experience with multiple linguistic systems (Andronic, 2024: 91). The phenomenon of multilingualism has been shown to yield cognitive benefits, including enhanced memory, multitasking abilities, and cognitive flexibility (Alisoy, 2025: 33). Vasumathi (2022: 54) posits that languages exert a pervasive influence on various domains of cognitive function, including perception, cognitive thinking, problem-solving, multitasking, and reasoning, as

well as memory. Furthermore, multilingualism exerts a significant impact on cognitive functions, particularly those associated with executive control, including attention, memory, and problem-solving (Andronic, 2024: 90). The contributions of Vasumathi and Andronic converge to affirm multilingualism as a catalyst for enhanced memory and problem-solving proficiency, a phenomenon that is facilitated by the preservation of culture and the diversity of language (Pavlenko, 2008; Duff, 2015). Andronic (2024: 90) further asserts that "multilingual individuals frequently demonstrate superior performance in a range of cognitive tasks when compared to their monolingual peers." Furthermore, children who acquire two or more languages from an early age exhibit altered brain development, particularly in terms of autonomy, which in turn facilitates their cognitive development (Ali, 2023; Bialystok, 2017). This phenomenon can be attributed to the lasting impact of early multilingual exposure on brain structure (Ali, 2023: 393).

The relationship between multilingualism and cognitive development is evident. Scientific research indicates that neuroimaging studies demonstrate the impact of multilingualism on structural and functional alterations in the brain (Andronic, 2024: 91). In a similar vein, multilingualism is theorized to enhance cognitive control by engaging brain regions implicated in attention and decision-making processes (Alisoy, 2025: 35). To further elucidate the intricacies of the brain's functionality in relation to linguistic usage, it is imperative to refer to the comprehensive meta-analysis report by Ali (2023: 393) as following:

As researchers continue to unravel the complexities of the bilingual brain, they are discovering that proficiency in multiple languages can offer cognitive advantages that extend from early childhood to late adulthood. Utilizing brain imaging techniques, researchers have examined the gray-matter mass in the inferior parietal cortex, a language-related region in the left hemisphere of the brain, in individuals proficient in two languages. The researchers' findings indicate that bilingual individuals exhibit greater gray-matter mass in this region, with the impact being most pronounced among those who are highly proficient in an additional language and among those who began learning an additional language before the age of five. These findings imply that bilingualism may offer cognitive advantages and that early exposure to multiple languages may engender enduring changes in brain structure.

In addition to the established link between multilingualism and cognitive development, scientific research has also elucidated the correlation between cognitive development and academic performance (Best

et al., 2011). The definition of cognitive development as the progression of mental processes, including but not limited to thinking, memory, problem-solving, attention, and language, is a fundamental element of scientific discourse (Anderson, 2002). This element is directly connected to the academic performance of learners. Theories such as Piaget's "cognitive development" postulate that children progress through distinct stages (ranging from sensorimotor to formal operational), with the acquisition of novel concepts being contingent on the maturation of their cognitive development (Piaget, 1972). This finding suggests a correlation between cognitive functioning and superior academic outcomes across various subjects (Diamond, 2013). Teachers are encouraged to promote interventions that target cognitive skills, differentiate instruction, and tailor assessment tools that target cognitive competences (Diamond & Lee, 2011). Consequently, the present triangular relationship (cognitive development-multilingualism-academic performance) is substantiated by scientific discourse. Multilingualism has been demonstrated to promote cognitive development (Bialystok & Barac, 2012), which in turn, is indispensable and foundational for better academic performance (Adesope et al., 2010).

METHODOLOGY

In order to adequately investigate the impact of multilingualism on students' cognitive development and academic performance, this study design employed quantitative research methods. The decision to employ a quantitative design was predicated on the necessity to assess

the relationship between multilingualism, cognitive development, and academic performance (Adesope et al., 2010). The objective was to gather numerical data from monolingual and multilingual schools; through a standardized cognitive test and academic records (Best et al., 2011). Subsequent to the collection of data; analysis and interpretation were conducted by comparing the results of participants from the two categories of schools in terms of academic performance and cognitive development. Consequently, the analysis gave the potential to facilitate the quantification of the cognitive developmental and academic performance benefits of multilingualism (Bialystok & Barac, 2012).

Participants

Data was collected from students in grades 3-4 (aged between 11 and 30 years of age) from three secondary schools in the South Kivu province of the Democratic Republic of the Congo (DRC). The study's participants included 102 students who speak their languages at home, as well as the various languages they had been exposed to since their primary education. The sample included 26 boys (25.5%) and 76 girls (74.6%) who were administered the test for the present study. To comprehensively assess the impact of multilingualism on cognitive development and academic performance, the study incorporated schools implementing monolingual and bilingual educational systems, as delineated in the subsequent table.

Table 1: Respondents' Demographic Features.

Variable	Category	Frequency	Percentage
Gender	Male	26	25.5
	Female	76	74.6
	Total	102	100.0
Age	11-15	10	9.8
	16-20	85	83.3
	21-25	4	3.9
	26-30	3	2.9
	Total	102	100.0
Class	Third Class	46	45.1
	Fourth Class	56	54.9
	Total	102	100.0
Language	Monolingual	57	55.9
	Bilingual	45	44.1
	Total	102	100.0

As indicated in Table 1, the majority of respondents (56 i.e. 54.9%) were in Grade 4, while 46 of them (45.1%) were in Grade 3. Furthermore, 57 respondents (i.e. 55.9%) were from monolingual schools, while 45 (44.1%) were from bilingual schools.

Data source and instruments

For the present study, we used an approach that involved collecting student self-report data with the Cognitive Failures Questionnaire (CFQ). Based on the rationale that cognitive failures indicate poor cognitive development (Wallace, 2004; Carrigan & Barkus, 2016), we adapted this questionnaire from the original scale developed by Broadbent et al. (1982). We used the adapted questionnaire to determine the extent to which students experienced instances like forgetfulness, distractibility, and false triggering. The CFQ is a popular, reliable tool for evaluating subjective cognitive errors in daily life, indicating instability in cognitive development (Bridger et al., 2013). Its construct validity has been established through connections with psychological constructs, and its internal consistency is well-documented, with Cronbach's alpha values typically ranging from 0.89 to 0.95 (Volosin et al., 2023; Wallace & Chen, 2005). After adapting and translating the questionnaire for this study, we administered a pretest and found that the tool still yielded a strong Cronbach's alpha reliability score of 0.99. The data could be classified into three categories: forgetfulness, distractibility, and false triggering, which are sub-scales of the CFQ (Wallace et al., 2002). Therefore, analytical exploration employed data from the scale questionnaire to assess cognitive development, and self-reported school results from two previous terms to assess academic performance. The linguistic background was controlled through the selection of schools, which was done from two perspectives: monolingual and bilingual.

Data analysis was conducted by systematically entering the CFQ and academic records into the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were conducted at three main levels. First, the mean and standard deviation were calculated for CFQ scores. Second, the mean and standard deviation were calculated from students' self-reported term results for academic performance. Third, the mean and standard deviation were calculated to separate stats for monolingual and bilingual schools.

RESULTS

This chapter discusses the findings of this investigation in 3 main sub-sections. The first is the academic performance of students; the second is the level of academic performance, and finally the cognitive development and student academic performance.

Students' Academic Performance

The students' academic performance was investigated through their grade. The present section thus presents the findings on the level of students' last semester academic performance by type of school (monolingual or multilingual) and the level of students' last year academic performance by type of school.

Level of students' Last Semester Academic Performance by Language

Respondents were asked to indicate their performance in the last semester and the findings are presented in Table 2.

Table 2: Level of students' Last Semester Academic Performance by Type of Language.

		Academic performance			
		Failure (-50)	Satisfactory (50-69)	Distinction (70-79)	High distinction (80+)
Monolingual	Frequency	2	55	0	0
	Percentage	2.0	53.9	0.0	0.0
Bilingual	Frequency	0	7	37	1
	Percentage	0.0	6.9	36.3	1.0
Total	Frequency	2	62	37	1
	Percentage	2.0	60.8	36.3	1.0

Findings in Table 2 indicate that in the last semester, 2 (2.0%) monolingual students failed, 55 (53.9%) monolingual

students got satisfactory (50-69). Bilingual students got neither distinction nor high distinction. On the other hand, Table 2 indicates that no bilingual students failed, and 7 (6.9%) got satisfaction, 37 (36.3%) got distinction and only one student (1.0%) got high distinction. The findings imply that in the last semester bilingual students performed better than monolingual students.

Level of students' Last Year Academic Performance by Type of Language

The study also examined the last year academic performance of both monolingual and bilingual students and the findings are presented in Table 3. Findings in Table 3 indicate that in last year, all monolingual students got satisfaction (50-69), and none of them got distinction (70-79) nor high distinction (+80). On the other hand, Table 3 indicates that only 4 (4.9%) bilingual students got satisfaction (50-69), and 41 (91.9%) got distinction (70-79). The findings imply that in the last year bilingual students performed better than monolingual students.

Table 3: Level of students' Last Year Academic Performance by Type of Language.

		Performance	
		Satisfactory (50-69)	Distinction (70-79)
Monolingual	Frequency	57	0
	Percentage	100	0.0
Bilingual	Frequency	4	41
	Percentage	8.9	91.9
Total	Frequency	61	41
	Percentage	59.8	40.2

The study examined whether the academic performance of students in last year and last semester differed according to

their types of languages (Monolingual and Bilingual), and the findings are presented in Table 4.

Table 4: T-test on Difference in Academic Performance Based on the types of Languages.

Performance	Language	N	Mean	SD	df	t	Sig.
Performance last year	Monolingual	57	2.00	0.10	100	23.93	0.000
	Bilingual	45	2.91	0.28			
Performance last semester	Monolingual	57	1.96	0.18	100	14.96	0.000
	Bilingual	45	2.87	0.40			

The findings presented in Table 4 show that bilingual students in last year performed significantly better than the monolingual students ($t = 23.93, p = .000 < 0.05$) and in the last semester ($t = 14.96, p = .000 < 0.05$). Thus, there is a significant difference between the academic performance of monolingual and bilingual students. This difference was in favor of bilingual students.

This section describes the students' levels of students' cognitive development. These are categorized into forgetfulness (9 items), distractibility (8 items) and false triggering (7 items). The descriptive statistics on students' cognitive development ranged from 1= never to 5= very often. Table 5, gives an overview of different types of cognitive development of students.

Level of students' cognitive development

Table 5: General Level of students' cognitive development

Components	Never	Very rarely	Occasionally	Quite often	Very often					
	n	%	n	%	n	%	n	%	n	%
Forgetfulness	16	15.9	22	21.6	13	13.0	30	29.0	21	20.2
Distractibility	18	17.2	16	16.0	14	13.3	27	26.1	28	27.2
False Triggering	17	16.8	18	18.0	14	13.5	31	29.9	22	21.5

In Table 5, 15.9% of students reported never having forgotten, 21.6% reported very rarely, 13.0% reported occasionally, 29.0% reported rather often, and 20.0% reported very often. According to the results, 49.1% of students had experienced forgetfulness at some point in their life. Regarding distractibility, Table 5 shows that 16.0% of students indicated that they experienced it very rarely, 13.3% occasionally, 26.1% quite often and 27.2% indicated that they experienced it very often. The findings imply that 53.3% of students experienced distractibility. According to the data in the same Table 5, 18.0% of students had false triggering rarely, 13.5% occasionally, 29.9% quite often, and 21.5% very often. The

results suggest that false triggering occurred for 51.4% of students.

The study also examined whether the cognitive development of students differed according to their types of languages and the findings are presented in Table 6. As shown in Table 6, 32.5% of bilingual students experienced forgetfulness while only 3% of monolingual students experienced it. Therefore, the findings imply that monolingual students experienced less forgetfulness than bilingual ones.

Table 6: Students' cognitive development by Type of Language.

Components	Language	Never		Very rarely		Occasionally		Quite Often		Very often	
		n	%	n	%	n	%	n	%	n	%
Forgetfulness	Monolingual	20	19.3	28	27.7	6	6.2	3	3.0	0	0.0
	Bilingual	0	0.0	3	3.0	8	7.5	18	17.5	16	15.0
Distractibility	Monolingual	25	24.0	19	18.5	6	5.7	1	0.1	0	0.0
	Bilingual	5	4.6	6	6.0	6	6.0	13	12.9	16	15.3
False Triggering	Monolingual	22	21.1	28	27.7	7	6.5	0.0	0.0	0	0.0
	Bilingual	0	0.0	2	2.3	7	7.0	18	17.6	17	16.8

In the same Table 6, 28.2% of bilingual students indicated that they experienced distractibility compared to 1.0% of monolingual students who experienced it. This implies that monolingual students experienced less distractibility compared to bilingual students. The findings in Table 6 also show that 34.4% of bilingual students experienced false triggering while none of monolingual students who experienced it. The findings imply that the bilingual students

experienced more false triggering than monolingual students.

The study also investigated whether significant differences exist between monolingual and bilingual students in terms of cognitive development. To achieve this, an independent sample t-test was computed and the results are presented in Table 7.

Table 7: T-test on Difference in cognitive development Based on the types of Languages.

Components	Language	N	Mean	SD	df	t	Sig.
Forgetfulness	Monolingual students	57	1.85	.74	100	14.83	0.000
	Bilingual students	45	4.06	.75			
Distractibility	Monolingual students	57	1.73	.58	100	16.97	0.000
	Bilingual students	45	3.95	.73			
False triggering	Monolingual students	57	1.87	.68	100	15.09	0.000
	Bilingual students	45	4.06	.78			

Results in Table 7 indicate that students' cognitive development varied by the type of language where bilingual students ($M = 4.06$, $SD = 0.74$) experienced more forgetfulness than monolingual students ($M = 1.85$, $SD = 0.75$). In particular, a statistically significant difference was found between monolingual and bilingual students in their experienced forgetfulness [$t(100) = 14.83$; $p < 0.05$], where bilingual students experienced more forgetfulness than monolingual ones. Conversely, there was a statistically significant difference between monolingual and bilingual students ($p < 0.05$) in terms of forgetfulness to the detriment of bilingual students. These findings infer that bilingual students experienced forgetfulness than monolingual students.

In addition, the findings in Table 7 show that monolingual students ($M = 1.73$, $SD = 0.58$) experienced less distractibility than bilingual students ($M = 3.95$, $SD = 0.73$). Specifically, a statistically significant difference was found between monolingual students and bilingual students in their experienced distractibility [$t(100) = 16.97$, $p < 0.05$]. Therefore, there was a significant difference between monolingual students and bilingual students in terms of experienced distractibility in favour of monolingual students. Moreover, Table 7 shows that monolingual students ($M = 1.87$, $SD = 0.67$) experienced less false triggering than bilingual

students ($M = 4.06$, $SD = 0.78$). Specifically, a statistically significant difference was found between monolingual students and bilingual students in their experienced false triggering [$t(100) = 15.09$, $p < 0.05$]. Therefore, there was a significant difference between monolingual students and bilingual students in terms of experienced false triggering in favour of monolingual students.

Cognitive Development and Students' Academic Performance Association

In order to determine the association between each cognitive development components and academic performance, Pearson correlation analysis was used. Furthermore, the study used multiple regression models to scrutinize the combined effects of cognitive development components serving as independent variables and the academic performance as dependent one. In addition, standardized regression coefficients (β) were observed to determine the cognitive development components that account significantly and to explain the variance in students' academic performance. Table 8 displays the findings.

Table 8: The Correlation and Multiple Regression Analyses for Associations between Students' Performance and academic performance levels.

Components	Performance last year		Performance last semester	
	<i>r</i>	β	<i>r</i>	β
Forgetfulness	.830**	0.115	.829**	0.114
Distractibility	.855**	0.674**	.847**	0.575**
False Triggering	.835**	0.074	.835*	0.170
Multiple Regression (R^2)		0.733**		0.724**
F		89.85**		85.76**

** $p < 0.01$; $N = 102$

The results in Table 8 indicate that a positive and significant relationship exists between each of the components of cognitive development and academic performance of students. More specifically, there was a positive significant correlation between forgetfulness and students' academic

performance of last year ($r = 0.830$, $p = 0.000$), distractibility ($r = 0.855$, $p = 0.000$) and false triggering ($r = 0.835$, $p = 0.000$). In addition, there was a positive significant correlation between forgetfulness and students' academic performance of the last semester ($r =$

0.829, $p=0.000$), distractibility and academic performance of the last semester ($r= 0.847$, $p=0.000$) and false triggering ($r= 0.575$, $p=0.000$). The findings imply that the more students develop cognitive abilities, the more their academic performance increases.

Moreover, the findings in Table 8 indicate that the first multiple regression model results were significant ($F= 89.85$, $p< 0.05$). This model accounts for approximately 73.3% of the variation in students' academic performance in (Adjust $R^2= 0.733$). In addition, Table 8 shows that student academic performance in the last year was statistically significantly predicated by distractibility ($\beta= 0.575$, $p< 0.05$). The findings imply that students' last year performance increased with the amount of perceived distractibility.

Furthermore, the findings in Table 8 indicate that the second multiple regression model results were significant ($F= 85.76$, $p< 0.05$). This model accounts for approximately 72.4% of the variation in students' academic performance in (Adjust $R^2= 0.724$). In addition, Table 8 shows that student academic performance in the last semester was statistically significantly predicated by distractibility ($\beta= 0.674$, $p< 0.05$). The findings imply that students' performance in the last semester increased with the amount of perceived distractibility.

DISCUSSION

The findings indicate a favorable and substantial correlation between the various components of cognitive development and the academic performance of students. The cognitive assessment questionnaire used in this study was developed by Broadbent et al. (1982) to assess the frequency with which individuals experience cognitive failures. This instrument has been widely recognized for its ability to capture subtle lapses in cognition, such as memory slips or attentional distractions. The finding that students in bilingual schools experience more frequent cognitive failures than those in monolingual schools suggests that cognitive development is more successfully achieved in monolingual schools than in bilingual schools, as seen in Table 6 above. These cognitive failures include common issues such as forgetfulness, distractibility, and false triggering. Monolingual students at the level of forgetfulness, distractibility, and false triggering indicated 0.0%, while their counterparts in bilingual schools show between 15–16% of the same indicators. This is contradictory to the argumentation of Bialystok & Barac (2012) and Adesope et al. (2010), on the strengths of multilingualism and its benefits on the academic achievements of learners. The contradiction raises important questions about the contextual variables that might influence the outcomes of bilingual education. With such results, there is evidence to verify thoroughly the veracity of such claims to ascertain their authenticity.

The findings further underscore the notion that bilingual

individuals often possess superior metacognitive abilities. However, this assertion seems at odds with the data presented in this study. As previously highlighted by Folke et al. (2016:127) and the findings of this study (Table 8), there is also a positive correlation with monolingual individuals. This suggests that the advantages of metacognitive abilities may not be uniformly distributed among bilinguals, and that the context and method of instruction may play a significant role. However, despite the positive significant correlation between forgetfulness and students' academic performance of last year ($r = 0.830$, $p = 0.000$), distractibility ($r = 0.855$, $p = 0.000$), and false triggering ($r = 0.835$, $p = 0.000$), in addition to a positive significant correlation between forgetfulness and students' academic performance of the last semester ($r = 0.829$, $p = 0.000$), distractibility and academic performance of the last semester ($r = 0.847$, $p = 0.000$), and false triggering ($r = 0.575$, $p = 0.000$) between monolingual and bilingual individuals, it implies that students' consistent development of cognitive abilities is a sequel of the increase of their academic performance. This trend illustrates a reinforcing cycle between academic success and cognitive resilience. Unfortunately, cognitive abilities that transcend the other indicators are skewed with bilingual individuals but very strong with monolingual learners and further dismiss the argumentation of Adesope et al. (2010) as well as question scientific discourse and other organizations like Balinda (2024) and UNESCO (2015). These findings necessitate a re-evaluation of the widely held assumptions about bilingual education. This is particularly pertinent in the context of educational settings, where bilingual students frequently encounter challenges in areas such as executive functions, attentional control, memory, and cognitive flexibility. These outcomes align with the findings of Folke et al. (2016:127), who, through their research, demonstrated that monolinguals exhibit superior metacognitive abilities compared to bilinguals. This discrepancy can be attributed to variations in non-verbal reasoning, working memory, and compensatory strategies for multilingual learners, and for monolingual learners, resilience and determination. Such cognitive strategies could play a pivotal role in bridging gaps in academic performance.

Alternatively, as posited by Tang and Calafato (2021), the observed differences may be attributable to the linguistic background of the instructors. Specifically, language teachers who possess a greater number of languages are less inclined to promote self-regulation among their students. This could suggest that teacher training and pedagogical approaches also play a critical role in shaping students' cognitive profiles. In the context of bilingual secondary schools in Bukavu, it is noteworthy that these institutions are predominantly private. It is important to

acknowledge that these institutions are indeed autonomous. They possess the flexibility to effectively address students' needs and adapt to the demands of a constantly changing society. Such autonomy, while beneficial in some respects, also presents challenges in standardizing educational outcomes. Notably, these institutions are not funded by the local or national government, and thus, operate according to the vision and initiatives of their respective promoters. Consequently, the operational models of private schools vary considerably, impeding the estimation of the probable causes of cognitive failures reported in bilingual schools. Further research may be necessary to isolate the effects of school governance and curriculum design on the cognitive outcomes of students in bilingual environments.

CONCLUSION

This study examined the relationship between multilingualism, cognitive development, and academic performance, with a particular focus on secondary school students in Bukavu. The findings indicated a significant correlation between cognitive development, measured through cognitive failures such as forgetfulness, distractibility, and false triggering, and academic performance. Notably, while these cognitive traits were found to be associated with academic outcomes, students enrolled in bilingual educational institutions reported experiencing more frequent cognitive failures in comparison to their peers in monolingual institutions. Specifically, the study recorded a 0.0% incidence of cognitive failures among monolingual students, compared to 15–16% among bilingual students across all three indicators, a difference supported by statistically significant correlation coefficients ($r = 0.830$ to 0.855 , $p = 0.000$).

The findings of this study call for further consideration of the cognitive demands placed on bilingual students. While extant literature has previously emphasized the metacognitive strengths of bilingual individuals, this study posits that the educational context, particularly the structure and support systems within bilingual institutions, plays a crucial role in shaping cognitive outcomes. The data suggest that cognitive development is not solely a function of language exposure but is also influenced by school governance, teacher preparation, and institutional consistency. The autonomy and operational diversity characteristic of private bilingual schools may contribute to inconsistent pedagogical practices, particularly in areas related to cognitive development and self-regulation. As such, this study contributes to the growing discourse on how multilingual educational environments interact with cognitive development and learning performance.

Finally, it is worth noting that while multilingualism presents cognitive and cultural advantages, the findings underscore the importance of structured support for cognitive development within bilingual settings. Future research should further investigate the instructional methodologies, institutional

structures, and teacher training strategies that can optimize cognitive development and academic performance in multilingual educational environments. Such research could help clarify the apparent contradictions between this study's findings and previous claims regarding the cognitive advantages of bilingualism, ensuring that educational strategies are evidence-based and contextually responsive.

REFERENCES

- Adesope, O. O., Lavin, T., Thompson, T., & Ungerleider, C. (2010). *A systematic review and meta-analysis of the cognitive correlates of bilingualism*. Review of Educational Research, 80(2), 207–245.
- Ali, A. M. (2023). The Effect of bilingualism on children cognitive development. *Alustath Journal*, 62(4), 387–404. <https://doi.org/10.36473/ujhss.v62i4.2278>
- Alisoy, H. (2025). Multilingualism: Cognitive, social, and educational dimensions in a globalized world. *Journal of Azerbaijan Language and Education Studies* 2(2), 28–38.
- Anderson, J. R. (2002). *Cognitive psychology and its implications* (6th ed.). Worth Publishers.
- Andronic, C. (2024). The impact of multilingualism on cognitive development and brain plasticity: A holistic perspective. *Multilingvism și Interculturalitate în Contextul Globalizării Ediția a IV-a*, 90–93. <https://doi.org/10.53486/micg2024.10>
- Best, J. R., Miller, P. H., & Naglieri, J. A. (2011). *Relations between executive function and academic achievement from ages 5 to 17 in a large, representative national sample*. Learning and Individual Differences, 21(4), 327–336.
- Bialystok, E. (2017). The bilingual adaptation: How minds accommodate experience. *Psychological Bulletin*, 143(3), 233–262.
- Bialystok, E., & Barac, R. (2012). *Cognitive effects of bilingualism*. In V. S. Ramachandran (Ed.), *The encyclopedia of human behavior* (2nd ed., Vol. 1, pp. 561–567). Academic Press.
- Bloom, B. S. (1956). *Taxonomy of educational objectives, Handbook 1*. Michigan: Addison Wesley Publishing Company.
- Bridger, R. S., Johnsen, S. Å. K., & Brasher, K. (2013). Psychometric properties of the Cognitive Failures Questionnaire. *Ergonomics*, 56(10), 1515–1524.
- Byram, M. (1997). *Teaching and assessing intercultural communicative competence*. Multilingual Matters.
- Calafato, R., & Simmonds, K. (2023). The impact of multilingualism and learning patterns on student achievement in English and other subjects in higher

- education. *Cambridge Journal of Education* 53(5), 705–724. <https://doi.org/10.1080/0305764X.2023.2206805>
13. Carrigan, N., & Barkus, E. (2016). A systematic review of the cognitive failures questionnaire: Are structural and correlational properties replicable? *Psychological Reports*, 119(3), 864–882.
 14. Crystal, D. (2003). *English as a Global Language* (2nd ed.). Cambridge University Press.
 15. Crystal, D. (2003). *English as a global language*, 2nd ed. Cambridge: Cambridge University Press.
 16. De Herdt, T., & Titeca, K. (2019). *Negotiating Educational Spaces in the DRC: Between Informality and Institutionalization*. *International Journal of Educational Development*, 65, 12–22.
 17. De Herdt, T., & Titeca, K. (2019). *Negotiating Educational Spaces in the DRC: Between Informality and Institutionalization*. *International Journal of Educational Development*, 65, 12–22.
 18. Dewaele, J.-M. (2007). The effect of multilingualism, sociobiographical, and situational factors on communicative anxiety and foreign language anxiety of mature language learners. *International Journal of Bilingualism*, 11(4), pp. 391–409.
 19. Dewaele, J.-M., & Wei, L. (2012). Multilingualism, empathy and multicompetence. *International Journal of Multilingualism*, 9(4), 352–366.
 20. Dewaele, J.-M., Petrides, K.V. & Furnham, A. (2008). The effects of trait emotional intelligence and sociobiographical variables on communicative anxiety and foreign language anxiety among adult multilinguals: A review and empirical investigation. *Language Learning*, 58(4), pp. 911–960.
 21. Diamond, A. (2013). *Executive functions*. *Annual Review of Psychology*, 64, 135–168.
 22. Diamond, A., & Lee, K. (2011). *Interventions shown to aid executive function development in children 4 to 12 years old*. *Science*, 333(6045), 959–964.
 23. Duff, P. A. (2015). Transnationalism, multilingualism, and identity. *Annual Review of Applied Linguistics*, 35, 57–80.
 24. Folke, T., Ouzia, J., Bright, P., De Martino, B., & Filippi, R. (2016). A bilingual disadvantage in metacognitive processing. *Cognition*, 150, 119–132. <https://doi.org/10.1016/j.cognition.2016.02.008>
 25. Jessner, U. (2008). A DST model of multilingualism and the role of metalinguistic awareness. *The Modern Language Journal*, 92(2), 270–283. <https://doi.org/10.1111/j.1540-4781.2008.00718.x>
 26. Ndibu, M. (2020). *Language Policy in Congolese Private Education: Autonomy and Innovation*. *Journal of African Education Studies*, 12(2), 45–59.
 27. Paradowski, M. B. (2011). Multilingualism – Assessing benefits. In H. Komorowska (Ed.). *Issues in promoting multilingualism teaching – learning – assessment*, pp. 331–350. Warsaw: Foundation for the Development of the Education System.
 28. Pavlenko, A. (2008). Emotions and multilingualism. *Language in Society*, 37(1), 115–118.
 29. Piaget, J. (1972). *The psychology of the child*. Basic Books.
 30. République Démocratique du Congo (2015). *Stratégie sectorielle de l'éducation et de la formation 2016-2025*, Kinshasa.
 31. Rutgers, D., Evans, M., Fisher, L., Forbes, K., Gayton, A. & Liu, Y. (2024). Multilingualism, multilingual identity and academic attainment: Evidence from secondary schools in England. *Journal of Language, Identity & Education*, 23(2), 210–227. <https://doi.org/10.1080/15348458.2021.1986397>
 32. Tan, Y. Z. & Xun, M. Y. (2023). The Impact of Multilingual Education on Students' Cognitive Development: Evidence from the China. *Journal of Education*, 6(2), 13–21. <https://doi.org/10.53819/81018102t4158>
 33. Tang, F., & Calafato, R. (2021). Multilingual, bilingual, and monolingual Arabic teachers' development of learner self-regulation and language awareness in the Emirates. *Foreign Language Annals*, 54(1), 233–254. <https://doi.org/10.1111/flan.12515>
 34. UNESCO. (2015). *Global citizenship education: Topics and learning objectives*. UNESCO Publishing.
 35. UNESCO. (2020). *Private Education in Sub-Saharan Africa: Developments and Challenges*. <https://unesdoc.unesco.org>
 36. UNESCO. (2021). *Global education monitoring report 2021/2: Non-state actors in education: Who chooses? Who loses?* UNESCO Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000379875>
 37. UNESCO. (2021). *Language of Instruction and the Quality of Basic Education in Sub-Saharan Africa*. <https://unesdoc.unesco.org>
 38. UNICEF. (2020). *Education in the Democratic Republic of the Congo*. United Nations Children's Fund. <https://www.unicef.org/drcongo/en/what-we-do/education>
 39. USAID. (2021). *Education: Democratic Republic of the Congo*. United States Agency for International Development. <https://www.usaid.gov/democratic-republic-congo/education>
 40. USAID. (2022). *Technical and Vocational Education and Training (TVET) in the DRC*. <https://www.usaid.gov>
 41. Vasumathi, R. (2022). Multilingualism and cognition. In T.S. Sanjayan, A. Kosenko & K.S.N. Prasangani (Eds.). *Praxis and practices in ELT and philology* (pp. 48–57). New Delhi: Taran Publication.
 42. Volosin, M., Hallgató, E., & Csábi, E. (2023). Validation of the Hungarian version of the Cognitive Failures Questionnaire (CFQ). *Heliyon*, 9(1).
 43. Wallace, J. C. (2004). Confirmatory factor analysis of

- the Cognitive Failures Questionnaire: Evidence for dimensionality and construct validity. *Personality and Individual Differences*, 37(2), 307–324.
44. Wallace, J. C., & Chen, G. (2005). Development and validation of a work-specific measure of cognitive failure: Implications for occupational safety. *Journal of Occupational and Organizational Psychology*, 78(4), 615–632.
45. Wallace, J. C., Kass, S. J., & Stanny, C. J. (2002). The Cognitive Failures Questionnaire revisited: Dimensions and correlates. *Journal of General Psychology*, 129(3), 238–256.
46. Wei, L. (2008). Research perspectives on bilingualism and multilingualism. In L. Wei & M. G. Moyer (Eds.), *The Blackwell handbook of research methods on bilingualism and multilingualism* (pp. 3-17). Blackwell Publishing.
47. World Bank. (2021). *Education Sector Analysis: Democratic Republic of Congo*. <https://www.worldbank.org>
48. World Bank. (2022). *Learning poverty: The crisis of education quality*. <https://www.worldbank.org/en/topic/education/brief/learning-poverty>