



# Influence of Cognitive Ability on Students' Academic Achievement in Public Secondary Schools in Arusha District Council, Tanzania

**Elizabeth D. Gemma**

*St. Gemma Primary School, Arusha*

Email: [gemmakisai@gmail.com](mailto:gemmakisai@gmail.com)

**Christine Elisante Mnjokava**

*St. Augustine University of Tanzania (SAUT), Arusha*

Email: [cmnjokava@yahoo.com](mailto:cmnjokava@yahoo.com)

**Abstract:** *The study investigated the influence of cognitive abilities among secondary school students towards their academic achievement. Specifically, the study focused on factors influencing various cognitive abilities among students in public secondary schools and measures for improving cognitive ability to students' academic achievement in public secondary schools. The study was guided by Social Intelligence Theory. The study employed convergent mixed methods approach. The study sample was 99 respondents that consisted of 9 school heads, 36 teachers and 54 students from a population of 945. Stratified random sampling technique was used to select teachers and students while purposive sampling was used for school heads. Data were collected by using questionnaires and interview guide. The validity of the study was attained through the guidance and advice of the researcher supervisor. Reliability index,  $TQR > 0.989$  and  $SQR = 0.989$ , was obtained using Cronbach Alpha Method. Data were analysed using descriptive statistics. The study established that personal interest in the subject matter, level of distractions in the learning environment, teachers' guidance and modeling and cultural background are factors influencing various cognitive abilities among students. In conclusion, creating conducive learning environments, fostering effective teacher-student interactions and promoting mental well-being are strategic measures to enhance cognitive abilities for improving students' academic achievement. The study recommends that stakeholders and teachers need to devise ways of motivating students through identifying each student's ability and employ enough teachers so as to create more student-teacher interaction.*

**Keywords:** *Cognitive, Academic, Achievement, Students, Schools, Tanzania*

## How to cite this work (APA):

Gemma, E. D & Mnjokava (2024). Influence of Cognitive Ability on Students' Academic Achievement in Public Secondary Schools in Arusha District Council, Tanzania. *Journal of Research Innovation and Implications in Education*, 8(3), 463 – 473. <https://doi.org/10.59765/73yt8ws>.

## 1. Introduction

Student ability refers to the cognitive, intellectual, and academic capabilities of an individual learner (Shi and Qu, 2021). It encompasses a range of skills, including but not

limited to critical thinking, problem-solving, comprehension, memory, creativity, and the ability to acquire and apply knowledge (Raslan, 2023). These abilities include subject-specific knowledge acquisition, and critical thinking whereby students are required to absorb complicated concepts, analyse information, and

apply problem-solving approaches (Darling-Hammond, et al., 2020). It also comprises interpersonal skills through collaboration, communication, and teamwork whereby students learn to navigate social dynamics, resolve problems, and nurture empathy (Nair and Fahimirad, 2019). Also, skills such as study habits, time management, and self-regulation, whereby students establish techniques to organize their workload, set objectives, and adapt to varied learning situations (Ilhan-Beyaztas and Metin, 2019).

According to Al-Muslimawi and Hamid (2019) in many countries, student's ability is influenced by some factors, such as innate aptitude and environment. For example, in Canada, there is a growing awareness that schools must prepare students for an increasingly complex world, impacted by rapid technological changes (Twinning et al., 2021). According to Huron (2023), secondary school education in Canada relies on developing practical abilities, beginning with everyday living skills of students and developing them with practice. Also, in the views of Wallin et al. (2021), secondary schools in Canada put more emphasis on creativity and involvement in the classroom, where students are permitted to gain knowledge themselves, and are required to go online or to the library to obtain a broad variety of resources and present visual reports.

Rieckmann (2018) revealed that Sweden puts focus on integrating global competencies into education systems, emphasising developing students' cognitive, intellectual, and academic capabilities. Moreover, according to Henrekson and Wennström (2022) Sweden has a Programme for International Student Assessment (PISA) of Creative Problem Solving. This is used to evaluate how effectively education systems prepare students for further education and for the future working life, and also focus on examining how relevant the content is to students in becoming creative problem-solving. In Sub-Saharan Africa, a country like Ghana, the conditions surrounding students' intellectual abilities, information literacy skills and their influence on education have been a subject of interest (Yidana, 2019). Aboagye et al., (2020) found that secondary school learners apply study skills methods on learning to a great level for all the subscale strategies in Ghana.

Similarly, in East Africa, assessing the student's academic abilities and grade scores has been a focus in countries like Uganda and Kenya (Aciro et al., 2023). According to Wakumire et al., (2022) in Uganda, one of the basic

primary skills to be mastered by students is critical thinking. Critical thinking skills must be built in every student to adapt to the increasingly complex difficulties, as well as the rise of science and technology, which are reconstructing contemporary society. In Tanzania, students' cognitive abilities have been a challenging issue since the capacity of a student is only measured through tests and examinations (Mazana, et al., 2020). The emphasis has been put on rote memorization learning and national examinations led to a narrow focus on academic achievement, neglecting the holistic development of students, (Kellaghan and Greaney, 2020). These abilities include critical thinking, problem-solving, creativity, and teamwork tasks. There is an uprising question from the society that the education delivered in Tanzania fails to develop skills that are relevant to the 21<sup>st</sup> century that can assist learners deal with ever-emerging issues in the society (Komba and Shukia, 2023). Therefore, from the foregoing background, there is a need to carry out this study on the influence of cognitive ability on academic performance in public secondary schools in Arusha district council, Tanzania.

## 1.1 Research Questions

The following research questions guided the study:

1. What are the factors influencing various cognitive abilities among students in public secondary schools in Arusha district?
2. What are the strategic measures for improving cognitive ability to students' academic achievement in public secondary schools in Arusha district?

## 2. Literature Review

The theoretical and empirical literature was reviewed with reference to themes created from research questions. The study was anchored on Social Cognitive Theory by Albert Bandura.

### 2.1 Social Cognitive Theory

This study was grounded on Social Cognitive Theory. According to Miller et al., (2022) Social Cognitive Theory started as the Social Learning Theory in the 1960s by Albert Bandura. It developed into Social Cognitive Theory in 2023 and posits that learning occurs in a social context within a dynamic and reciprocal interaction of the person, environment, and behaviour. The unique feature of Social

Cognitive Theory is the emphasis on social influence and its emphasis on external and internal social reinforcement (Bandura, 2023). Social Cognitive Theory considers the unique way in which individuals acquire and maintain behaviour, skills and capabilities while also considering the social environment in which individuals perform the behaviour (Luszczynska and Schwarzer, 2020).

### **2.1.1 Strengths of Social Cognitive Theory**

Social Cognitive Theory is a broad approach to analyzing individual ability and behaviour. It stresses the dynamic connection between people, their environment, and their behaviour for knowledge construction. Social Cognitive Theory offers a complete framework for describing how habits and skills are learnt and maintained (Manjarres-Posada, et al., 2020). This helped this study to explore numerous elements of students' cognitive abilities and behaviours on secondary school academic performance.

### **2.1.2 Application of the Theory to the Current Study**

The theory served as a framework, for revealing the roles of social influence and internal cognitive processes. Furthermore, considering past experiences, cognitive skills, and social reinforcements, the theory helps stakeholders to reveal how students' cognitive abilities are shaped through interactions with the educational environment. Also, the theory helps in identifying various factors that lead students to acquire knowledge and skills such as modelling and reinforcement.

## **2.2 Empirical Review**

This section presents the empirical studies with respect to research themes derived from research questions.

### **2.2.1 Factors Influencing Various Cognitive Abilities among Students**

A study by Cao-Thi (2023) in Vietnam analysed factors that affect the numeracy skills of secondary school students from mountainous and ethnic minority regions in Vietnam from the perspective of the students to create suitable strategies for teachers, parents, and the government to enhance their numeracy skills. Data from 755 students in 8 secondary schools in 8 provinces in the northern region of Vietnam were analysed. The results showed eight factors that impact the numeracy levels of secondary students in mountainous regions. Student's efforts and language skills were most influential, and teachers did not have a substantial effect. Ponomarioviene and Jakavonyte-Staškuvien (2024) analysed what personal goals primary

school pupils are able to set on their own and how they achieve them on decision-making process, thereby developing competence in learning to learn. On work, the reader is able to get acquainted with the theoretically grounded concept of the development of competence in learning and the possibilities of developing this competence in primary schools. In addition, it provides practical tools for the quality development of students' learning competence, where students not only set personal goals and plan the steps to achieve them but also reflect on experiences. Based on the study findings, it is evident that fourth-grade students exhibit distinct patterns in individual goal setting, action-planning, and reflection processes. The analysis presented in the paper analyses the general highlights and overarching themes and provides specific instances of goals, activity tasks, and reflections, offering insight into the cognitive processes of fourth-graders and their perceptions regarding the benefits and challenges of learning.

Rubab, et al, (2024) researched on the Social and Emotional Self-Awareness Skills among Students: A Case Study. The main purpose of the study was to look at the self-awareness and practices of students within the classroom. Based on the results of the innovation configuration map on a list of potential participants, three schools were chosen. The study results revealed that knowledge, abilities, and good communication among students, teachers, family and community are the best skills and practices indicated for decision-making. Curriculum designers should revisit the self-awareness competencies and practices in the curriculum. The study concluded that, self-awareness is the competency of how feelings, ideas, and moral principles affect an individual's performance in various settings, including the family or the classroom. The study in Kenya by Onyango and Aloka (2023) investigated the relationship between social cognitive skills and delinquent behaviour modification among students in secondary schools in Kenya. The Correlational Research design within the Positivist paradigm was adopted. The accessible population comprised of 3,740 students who had undergone counseling in 26 secondary schools in Rongo sub-county of Kenya. The finding indicates that only 15.7% of the variability in behaviour modification among the secondary school students is explained by social cognitive abilities. Also, school counselors should use person centred counseling techniques to enhance social cognitive skills among students.

### **2.2.2 Strategic Measures for Improving Cognitive Ability to Students' Academic Achievement in Public Secondary Schools**

A study conducted in India by Ramganes and Reddy (2021) ascertained the extent of logical reasoning of

standard nine students as predictor of their academic performance in mathematics and to find out the significant relationship between logical reasoning and academic performance in Mathematics. The descriptive method with a survey design was adopted. The tools developed by the investigators were Logical Reasoning as questionnaire for High School Students that consists of 25 items. Findings revealed that as many as 67.8% of variances could be predicated from students' Logical reasoning on academic performance of students in Mathematics and significant correlation between logical reasoning and academic performance in Mathematics.

Ananda and Hastini (2023) conducted a study on self-confidence impact of English as lingua franca students' speaking in Chilean public schools. The research method was a descriptive qualitative method. The results shows that students' lack of confidence is caused by some factors, which are fear of making mistakes when they speak, lack of vocabulary, lack of grammar, feel of under pressure every time the teacher asks them to speak, shyness, nervous, feel of uncomfortable, not enjoying when they attempt to speak, insecurities of their friends who have the good ability more than them. This study concluded that, there is need for developing students' confident ability to solve problems by speaking and what factors contribute to their self-doubting. Moreover, teachers should treat students so they can participate actively in class to enhance with self-confidence ability.

Quasi-experimental research was conducted by Listiana, et al., (2023) on enhancing cognitive retention of different academic abilities of undergraduate students through problem-based learning. The research design used a pre-test-post-test non-equivalent control group design. The sample of this study was all first-year biology students of academic year 2020/2021 with a total of 115 people spread over 4 classes. Student cognitive retention was measured by using essay questions. Research data were analysed by using descriptive and inferential statistics with two-way covariate analysis. The results showed that the Problem-Based Learning Readiness Questionnaire strategy was an effective learning strategy to increase students' cognitive retention. The percentage of improvement in students' retention from pre-test to post-test through the Problem-Based Learning Readiness Questionnaire and traditional strategy was 4.57% and 0.57%, respectively. The test showed differences in cognitive retention and the interaction of Problem-Based Learning. Based on the results of the study, it was concluded that the Problem-Based Learning Readiness Questionnaire could increase the cognitive retention of students with different academic abilities.

In Tanzania, Saqware (2024) conducted a study on the Anxiety's Impact on Mathematics Ability in Tanzanian

Secondary School Students: A Case Study of Singida District. The study's sample consisted of 1150 students who were selected from twelve secondary schools in the Singida region. The data was gathered using standardized questionnaires with closed-ended questions. The study made use of the respondents' terminal examination results in mathematics. To examine the gathered data, both descriptive and inferential statistics were applied. Overall, the findings demonstrated a statistically significant (0.025-two tailed) impact of mathematics anxiety on students' academic performance in mathematics. It was recommended that Mathematics teachers remain cognizant of the potential for their students to have arithmetic anxiety in light of the findings.

### 3. Methodology

This study employed convergent mixed methods approach whereby both qualitative and quantitative data were collected simultaneously for the purpose of gaining more understanding about the research problem. The advantage of this design is that it combines the virtues of both qualitative and quantitative data whereby quantitative data allows generalization and qualitative data provides information about the context (Creswell and Creswell 2022). The two data sets were later merged by bringing the separate results together in the interpretation. The target population for this study was 39 public secondary schools, 945 respondents that comprised 39 heads of school, 362 secondary school teachers and 544 secondary school students (MoEST, 2023). A sample size was chosen from 9 public secondary schools which is (24% of 39 secondary schools), 54 students (10% of 544 students) and 36 teachers (10% of 362). Therefore, a sample size of this study comprised 99 respondents. Stratified random sampling technique was used to select teachers and students while purposive sampling was used for head of schools. Gender was considered to avoid biasness in this current study. This study employed questionnaires, and interview guides to collect data from respondents. The validity of the study was attained through the guidance and advice of the researcher supervisor. The reliability test was done through split half method to obtain reliability correlation coefficient as per Cronbach alpha. A reliability index,  $TQR > 0.989$  and  $SQR = 0.989$ , was obtained using Cronbach Alpha Method to indicate high internal reliability (George and Mallery 2023). Descriptive statistics data analysis technique was used to analyse the quantitative data using computer software SPSS-Version 25. The results were presented in tables of frequencies and percentages. On the other hand, qualitative data obtained from open-ended questionnaires and during interviews were thematically coded into themes for easy narration. By using content analysis technique,

major concepts or themes were identified with reference to the research questions and objectives which had been formulated.

## 4. Results and Discussion

The findings were discussed according to themes derived from research questions.

### 4.1 Factors Influencing Various Cognitive Abilities among Students in

## Public Secondary Schools in Arusha District

The study determined the factors influencing various cognitive abilities among students in public secondary schools in Arusha District. The respondents were required to indicate their level of agreement with the items in the questionnaire. Questionnaires were administered to 54 student leaders and 36 teachers in public secondary schools in Arusha district. Table 1 shows the data on the factors influencing various cognitive abilities among students in public secondary schools in Arusha district.

**Table 1: Responses on the Factors Influencing Various Cognitive Abilities among Students in Public Secondary Schools in Arusha District**

Student (n=54)	f	%	Teachers(n=36)	f	%
Parental Involvement	53	98.1	Genetics	33	91.7
Conducive classroom environment	49	90.7	Teaching Methods	31	86.1
Sleep quality	46	85.2	Teaching resources	32	88.9
Early Childhood Experiences	51	94.4	Teachers' guidance and modeling	25	69.4
Supportive family environments	43	79.6	Quality of teachers during teaching and learning process	34	94.4
Cultural background and exposure to diverse perspectives	45	83.3	Exposure to diverse perspectives and experiences	28	77.8
Language practice and proficiency	42	77.8	Discipline of students during learning process	30	83.3
Physical Exercise	52	96.3	Regular review and repetition	31	86.1
Emotional intelligence factor	48	88.9	Peer group influencing students	29	80.6
Good library with variety of books	47	87	Family factors	32	88.9
Good nutrition	52	96.3			

**Source: Field Data (2024)** Key: f = frequency, % = percentages, values in brackets are percentage of students and teachers who agreed with the statement. Those with contrary opinion to the statement are implied.

The data in table 1 show that 98.1% of student agreed that parental involvement influences cognitive abilities. This implies that active engagement by parents in their children's education can foster cognitive growth through encouragement and provision of learning materials. On the other hand, these are strengthened by Higson-Smith (2023) in the Social Cognitive Theory that considers many levels of the social-ecological model in addressing behavioural change and cognitive ability in individuals. It also explains

the environment as the factor influencing knowledge acquisition. Social Cognitive Theory is a broad approach to analysing individual ability and behaviour. It stresses the dynamic connection between people, their environment, and their behaviour for knowledge construction. Social Cognitive Theory offers a complete framework for describing how habits and skills are learnt and maintained (Manjarres-Posada, et al., 2020). Therefore, environment is

a crucial factor that influences the development of cognitive abilities among students.

From the results, majority of students indicated that conducive classroom environment positively influences cognitive abilities. This was identified as a factor that influences cognitive abilities by 90.7% of students. A quiet and conducive classroom environment enhances focus and improves learning outcomes which support effective teaching and learning. When the environment is conducive, students get interested in what they are learning, they are more likely to engage actively, retain information better, and show higher levels of critical thinking and problem-solving skills. In line to these findings, Ayoub and Roberts (2020) have shown that, factors such as individual traits and habits (interests), environment, resources availability, individual resilience, personal efficacy and cognitive capacity, demographic characteristics, pedagogical approaches, personality and instructional tactics are determinants for variation of student ability on academic performance, which brings the complexity in evaluating students' abilities. Also, concerns such as the persistence of educational methods to cater for varied student capabilities are vital to grasping the diverse skills of students (Sanger, 2020). This finding indicates the importance of making the curriculum relevant and engaging to students' interests to foster better cognitive development.

Also, the results show that, 92.6% of student acknowledged the importance of sleep quality in influencing cognitive abilities. Adequate rest is crucial for memory strength, attention, and overall cognitive function. Lack of sleep or poor-quality sleep leads to lack of effective mental function, such as impaired attention, slower processing speed, and reduced problem-solving abilities. Sufficient and quality sleep is essential for cognitive processes like memory consolidation, attention, and learning. On the contrary, Pascoe et al., (2020) posted that academic-related stress is a prominent problem for secondary schools' education and postsecondary school students. The persistent stress connected to schooling has shown a negative influence on students' learning ability, academic performance, and employment achievement, sleep quality and quantity, physical health, mental health and substance use consequences. In addition, it has increased students' stress-management abilities as well as skills are a key goal for progress. Therefore, schools and parents should ensure students have sufficient time for rest to optimize their cognitive performance.

In addition, early childhood experiences item was approved by 94.4% of students as a factor that influences cognitive abilities. Exposure to rich language, nurturing environments, and cognitive stimulation in early childhood can greatly impact cognitive abilities in later life. Family

involvement influences cognitive abilities. Family factors have been reported by 79.6% of teachers that, family factors affect cognitive growth. The respondents revealed that, supportive family environments that value education provide emotional and practical support, resources, and encouragement, which enhances cognitive growth. On the other side, family issues such as instability, lack of support, or negative attitudes towards education hinder students' cognitive development and academic performance. These are also observed in the study by Li and Qiu (2020) which showed that students' cognitive skills are positively related to their parents' socioeconomic status. The study stressed that family cultural resources and environment determine children's educational aspirations and performances. Therefore, family factor is among the factors influencing students' cognitive abilities whereby supportive families tend to enhance children's cognitive growth and vice versa. The response from school head indicated that:

*"...most of the parents especially young ladies who are single mothers do not care about their children behaviour change. Their children also become irresponsible when they join secondary education level hence this upbringing affects much of their academic achievement as well..."*  
(Personal interview on 3<sup>rd</sup> of May, 2024).

This implies that many young single mothers do not adequately address their children's behavioural issues, leading to these children becoming irresponsible when they reach secondary school. This irresponsibility negatively impacts their cognitive abilities and academic performance, indicating the critical role of parental involvement in influencing children's cognitive abilities and educational success. This is supported by Higson-Smith (2023) Social Cognitive Theory which considers many levels of the social-ecological model in addressing behavioural change and cognitive ability in individuals. It also explains the environment as a factor influencing knowledge acquisition.

On the other hand, 91.7% teachers reported that genetics influences cognitive abilities of students. Inherited traits can influence aspects of cognitive abilities such as memory, problem-solving skills, and language development. Teaching methods as a factor that influences cognitive abilities was supported by 88.9% of the teachers. Interactive and student-centered approaches to teaching can enhance cognitive skills like creativity, analytical thinking, and comprehension.

#### **4.1 Findings on the Strategic Measures for Improving Cognitive Ability to Students' Academic Achievement in Public Secondary Schools in Arusha District**

The study also established the strategic measures for improving cognitive ability to students' academic achievement in public secondary schools in Arusha district. The respondents were required to indicate their level of agreement with the items in the questionnaire.

Questionnaires were administered to 54 student leaders and 36 teachers in public secondary schools in Arusha district. Table 2 shows the data on the strategic measures for improving cognitive ability to students' academic achievement in public secondary schools in Arusha district.

**Table 2: Responses on the strategic measures for improving cognitive ability to students' academic achievement in public secondary schools in Arusha district**

<b>Student (n=54)</b>	<b>f</b>	<b>%</b>	<b>Teachers(n=36)</b>	<b>f</b>	<b>%</b>
Active Learning Techniques	50	92.6	Active Learning Techniques	31	86.1
Metacognitive Strategies	48	88.9	Metacognitive Strategies	28	77.8
Use of Technology in Learning	51	94.4	Use of Technology in Learning	32	88.9
Differentiated Instruction	49	90.7	Differentiated Instruction	30	83.3
Memory-Enhancing Techniques	53	98.1	Memory-Enhancing Techniques	29	80.6
Problem-Based Learning (PBL)	50	92.6	Problem-Based Learning (PBL)	33	91.7
Cognitive Training Exercises	48	88.9	Cognitive Training Exercises	31	86.1
Scaffolded Learning	37	68.5	Scaffolded Learning	32	88.9
Mindfulness and Stress-Reduction Techniques	52	96.3	Mindfulness and Stress-Reduction Techniques	33	91.7
Encouraging Growth Mindset	47	87	Encouraging Growth Mindset	34	94.4

**Source: Field Data (2024)** Key: *f* = frequency, % = percentages, values in brackets are percentage of students and teachers who agreed with the statement. Those with contrary opinion to the statement are implied.

The data indicates that 92.6% of student and 86.1% teachers agreed that active learning techniques are essential in understanding and interpreting information which influence academic achievement. This suggests that active learning improves student engagement and retention. Students who can grasp and understand teaching and learning presented to them through active learning are better equipped to perform academic tasks. This allows the students to make foundation of learning, allowing students to process information accurately and apply it in various areas. Therefore, enhancing students' cognitive skills leads to improved academic outcomes, and it is important to apply teaching and learning strategies that focus on developing students' cognitive abilities. In concurrence, Freeman et al. (2024) conducted a meta-analysis revealing that students in active learning environments performed better than those in traditional lectures. By participating in discussions, group work, and problem-solving tasks, students engage multiple cognitive processes, fostering deeper understanding and critical thinking. Moreover,

Gekara et al., (2021) added that schools should strengthen information literacy skills through active learning however since most secondary school students are not information literate as they depended on teachers to help them understand class tasks. Therefore, imparting information literacy skills to secondary school students is vital to the effective and efficient use of school resources for developing an individual's education ability to understand and interpret teaching and learning tasks.

In table 2 the data shows that 88.9% of student and 77.8% of teachers cited metacognitive strategies as a measure for improving cognitive ability of students. In essence, teaching metacognitive strategies, such as self-regulation, planning, and monitoring, significantly improves learning outcomes. Cognitive ability allows students to concentrate and complete their assignments and quizzes within the time given, which improves time management. A study by Dignath and Büttner (2021) supports this finding but further mentions that students who received metacognitive

training exhibited enhanced problem-solving skills and academic performance across various subjects. In line with this current finding, the previous study by Asaph and Raja (2019) observed that cognitive abilities, brain-based skills allow to perform simple and complex tasks. Cognitive abilities categorized into lower order cognitive abilities include perception, attention and memory and higher order cognitive abilities include problem solving, decision making and critical thinking. This implies that strategies to improve students' focus, such as self-regulation in a structured learning environment, will enhance their academic performance.

Again, the majority of respondents (98.1% student and 80.6% teachers) reported that memory-enhancing techniques facilitate retention and recall of important information. The respondents added that memory plays a critical role in academic success as it enables students to store and remember knowledge when needed, such as during examinations, tests or in practical experiments. In agreement, Roediger and Butler (2021) while reviewing the benefits of spaced repetition and testing, concluded that these strategies significantly improve long-term retention of information compared to traditional massed learning approaches. Hafeez, et al. (2024) weighed in by advancing the argument that the way humans interact with surroundings and other people with meaning depends on the knowledge and understanding he/she has. This knowledge depends on the memorization of what have been learnt. In daily life, human takes new information and store it in the brain, maintaining it and recalling it depending on the needs. This happens because the brain has the capability of learning new skills and experiences, storing what has been learned and reusing the stored knowledge. These capabilities of storing and reusing experiences and skills are informally known as the human memory system. Everything a human being does or thinks depends on the memory, which is active every moment, receiving new information from senses, updating existing knowledge using focus and attention, retrieving the stored experiences and skills, and planning for future activities. This indicates that memory enhancement techniques, such as regular review sessions, and practical experiments should be incorporated into the teaching methodology to support students' academic achievements.

During the interviews, one school head noted that:

*Cognitive abilities influence students in academic achievement by enabling students to grasp concepts quickly during teaching and learning. Yes, it is a general agreement among teachers that quick understanding allows students to progress through the curriculum appropriately thereby enhancing their understanding for better scores (Personal interview on 3<sup>rd</sup> of May, 2024).*

The excerpt confirmed that cognitive abilities provide opportunities to develop new skills and broaden one's knowledge base. Student thoughts on learning and achievement are evoked by cognitive abilities. Therefore, educational strategies that promote fast and efficient understanding, such as interactive and engaging teaching methods are beneficial in improving students' academic performance. Likewise, Khan et al. (2023) in a research of cognitive learning theory and development: Higher education case study, found that it is beneficial for learners to take courses that link to their cognitive abilities, as this will help them to develop more positively.

In addition, according to table 2, overwhelming majority of students (92.6%) and teachers (91.7%) identified Problem-Based Learning (PBL) as a measure for improving cognitive ability of students. Students engaged in PBL showed improved problem-solving skills and were better able to transfer knowledge to real-world situations. Various cognitive abilities help students stay engaged in learning activities which is vital for academic achievement. The study found that various cognitive abilities make students motivated, attentive, and active in teaching and learning process. While giving support, Savery (2019) reviewed the impact of PBL on student learning, finding that it fosters cognitive development by encouraging critical thinking, collaboration, and deep learning. Hence, creating engaging and interactive learning environments, using different teaching and learning methodologies and integrating students into lessons will significantly improve students' cognitive ability and enhance academic success.

During interviews with heads of schools, it was evident that the proper planning in the mindset not only enhances cognitive resilience but also leads to better academic achievement, as students focus on learning rather than fear of failure. This was responded by head of one public secondary school who remarked that;

*Cognitive abilities help to achieve academic goals for academic success. This is achieved by setting and achieving academic goals through planning, problem-solving, and self-regulation. Social skills are important for collaborative learning and creating a positive school environment (Personal interview on 4<sup>th</sup> of May, 2024).*

These responses, imply that goal-setting practices, combined with cognitive training, support students in reaching their academic objectives, thereby enhancing overall educational outcomes. Further, the results are supported by the study by Shi and Qu (2022) who showed that cognitive ability can significantly and positively affect academic achievement, while self-monitoring can significantly moderate the effect of cognitive ability on academic performance, with a significant moderating



effect on math subjects and English subjects among achievement subjects.

Another interviewed head mistress from one school said that:

*“Teachers in my school are very few. The limited number of teachers leads to less regularly interaction with students due to being overloaded with too much work; hence, they fail to give attention to every student. Too much work sometimes makes teachers lose interest in their teaching work as seen in attending classes late or not at all hence students register low achievements” (Personal interview, 3<sup>th</sup> May, 2024).*

This indicates that, a shortage of teachers leads to excessive workloads, preventing student-teacher interactions. This overload results in teachers losing interest in their duties, causing them to attend classes late or miss them altogether, ultimately contributing to poor thinking ability and student performance. This implies that it is necessity for adequate staffing to maintain teacher engagement and improve students' cognitive ability and student outcomes. This is supported by Abd Rahim and Noor (2021) who reported that through social interaction, children develop their ability to think, to make judgment, to reason out, to negotiate, to regulate their emotion, to deal with conflicts resolution in and outside the school.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

Based on the findings of the current study, the following conclusions were drawn:

This study concludes that there are multiple factors significantly influencing students' cognitive abilities, including genetical, environmental stimuli, personal motivation, teaching methodologies, and family factors. These factors collectively shape students' cognitive development and consequently, their academic performance. Addressing these factors basically helps in creating an optimal learning environment that supports cognitive growth and academic achievement.

Lastly, this study concludes that there are various strategic measures to enhance cognitive abilities for improving students' academic achievement. These measures include active learning techniques, memory-enhancing techniques, creating conducive learning environments, fostering effective teacher-student interactions, promoting mental well-being and encouraging innovative thinking.

Implementing these strategies helps students to manage stress, engage more deeply with their studies, and at the end achieve better academic results.

### 5.2 Recommendations

Based on the study finds the following recommendations were made;

1. For the government, it is important to training teachers in methodologies that enhance students' cognitive abilities, such as critical thinking, logical reasoning, and effective communication. Investing in educational resources that support various teaching and learning methods and providing a conducive learning environment can significantly improve students' cognitive abilities and academic performance.
2. Teachers should adopt a student-centered approach that caters for the diverse cognitive abilities of students. This involves using varied teaching methods to engage students with different learning styles and providing individual feedback to help students improve their cognitive skills.
3. Parents and guardians should play a crucial role in supporting their children's cognitive development. They should create a conducive home environment for learning by ensuring adequate rest, proper nutrition, and minimal distractions. Encouraging children to engage in activities that stimulate cognitive skills, such as reading, puzzles, and educational games, can further enhance their academic performance.

## References

- Abd Rahim, S.N.F. and Noor, N.A. (2021). *Towards Enhancing Children Cognitive Development: Learning through Social Interactions*. SSRN e-Library.
- Aboagye, G.K., Amponsah, K.D. and Johnson, E.A., (2020). Analysis of Study Skills Employed by Ghanaian High School Science Students. *Cypriot Journal of Educational Sciences*. 15(4), 634 – 650.
- Aciro, R., Oriangi, G., Onen, D., Malinga, G.M., Ezati,

- B.A., and Openjuru, G.L. (2023). The Relationship between Entry Grades of Students Admitted to Public Universities in Uganda under Direct Entry Schemes and Their Academic Performance: Implications for Admission Policies. *East African Journal of Education Studies*, 6(1), 373-388.
- Ananda, N. and Hastini, H. (2023). A Study on Self-Confidence Impact of English as Lingua Franca Students' Speaking. *Journal of General Education and Humanities*, 2(3), 237-246.
- Ayoub, M. and Roberts, B.W. (2020). *Environmental Conditions and the Development of Personality*. In: Zeigler-Hill, V., Shackelford, T.K. (eds) *Encyclopaedia of Personality and Individual Differences*. Cham: Springer.
- Bandura, A. (2023). *Social Cognitive Theory: An Agentic Perspective on Human Nature*. Wiley & Sons, Inc.
- Cao-Thi, H., Tuan, A.L., Bich, T.N. and Thi Phuong, P. (2023) Factors Affecting the Numeracy Skills of Students from Mountainous Ethnic Minority Regions in Vietnam: Learners' Perspectives. *Cogent Education*, 10 (1), 1-17.
- Creswell, J. W. and Creswell, J.D. (2022). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (5<sup>th</sup> Edition). Thousand Oaks, CA: SAGE Publications
- Darling-Hammond, L., Flook, L., Channa, C. Barron, B. and Osher, D. (2020) Implications for Educational Practice of the Science of Learning and Development. *Applied Developmental Science*, Vol. 24:2, 97-140.
- Dignath, C., and Büttner, G. (2018). Components of fostering self-regulated learning among students: A meta-analysis on intervention studies at primary and secondary school level. *Metacognition and Learning*, 3(3), 231-264. <https://doi.org/10.1007/s11409-008-9029-x>
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., and Wenderoth, M. P. (2024). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410-8415. <https://doi.org/10.1073/pnas.1319030111>
- Gekara M.M., Namande B.W and Makiya C.R (2021). Information Literacy Competencies in Secondary Schools in Kenya. *Journal of Education*, 4(1) pp. 51-75.
- George, D., and Mallery, P. (2023). *SPSS for Windows Step by Step: A Sample Guided Reference 11.0 Update*. (4<sup>th</sup>ed). Boston: Allyn & Bacon.
- Hafeez, U.A., Kamel, N. and Malik, A.S. (2024). *Memory Retention and Recall Process*. United States: CRC Press.
- Henrekson, M., and Wennström, J. (2022). *Educational Performance in Swedish Schools—What Are the Facts? In: Dumbing Down*. Cham: Palgrave Macmillan.
- Higson-Smith, C. (2023). *Violence and Traumatic Stress. Psychology: An Introduction*. Cape Town, South Africa: Oxford University.
- Huron, O. (2023). *Why Choose to Study at a Canadian High School?* Canada: Huron International School.
- Ilhan-Beyaztas, D., and Metin, E. N. (2019). Learning Approaches, Self-Regulation Skills, Learning Strategies of Gifted Students and Factors Affecting Their Learning Characteristics. *International Online Journal of Educational Sciences*, 11 (5), 119-133.
- Khan, M., Perwez, S.K., Gaddam, R.P., Aiswarya, R., Basha, M.A., Malas, A., Haque, S. Ahmad, F. (2023). Mind Matters: Exploring the Intersection of Psychological Factors and Cognitive Abilities of University Students by Using an Artificial Neural Network Model. *Neuropsychiatric Disease and Treatment*, 20 137-148.
- Komba, A. and Shukia, R. (2023). *An Analysis of the Basic Education Curriculum in Tanzania: The Integration, Scope, and Sequence of 21<sup>st</sup> Century Skills*. Dar-es-salaam: RISE Working Paper Series.
- Li, Z. and Qiu, Z. (2020). How does family background affect children's educational achievement? Evidence from Contemporary China. *Journal of Chinese Sociology*, 5(13) 20-40.
- Listiana, D., Wang, C.K., and Edwards, D. (2023). *Psychology: An Introduction for Students in*

- Southern Africa*. Johannesburg, South Africa: Lexicon Publishers.
- Luszczynska, A., and Schwarzer, R. (2020). *Changing Behaviour Using Social Cognitive Theory*. London: Cambridge University Press.
- Manjarres-Posada, N.I., Onofre-Rodríguez, D.J. and Benavides-Torres, R.A. (2020). *Social Cognitive Theory and Health Care: Analysis and Evaluation*. Mexico: Redfame Publishing.
- Mazana, M.Y., Montero, C.S. and Casmir, R.O. (2020). Assessing Students' Performance in Mathematics in Tanzania: The Teacher's Perspective. *International Electronic Journal of Mathematics Education*, Vol. 15, No. 3, 0589.
- Miller, S.A., Laura, O. and Lang, D. (2022). *Social Learning Theory: Observational Learning*. Montreal: Pressbooks.
- MoEST, (2023). *Secondary Education Statistics in Tanzania*. Dodoma: PORALG.
- Nair, P.K and Fahimirad, M. (2019). A Qualitative Research Study on the Importance of Life Skills on Undergraduate Students' Personal and Social Competencies. *International Journal of Higher Education*, Vol. 8, No. 5; pp. 71-83.
- Onyango, T.K.O. and Aloka, P.J.O. (2023). Social Cognitive Skills and Delinquent Behavior Modification among Students in Secondary Schools in Kenya. *International Journal of Current Science Research and Review*, 6(1), 645-657.
- Pascoe, M.C., Hetrick, S.E. & Parker, A.G. (2020). The Impact of Stress on Students in Secondary School and Higher Education. *International Journal of Adolescence and Youth*, 25:1, 104- 112.
- Ponomarioviene, J. and Jakavonyte-Staškuvien, E.D. (2024). Solutions for Independent Goal Setting and Implementation of Primary School Students Fostering the Competence of Learning to Learn. *Education Sciences*, 2024, 14, 368.
- Ramganesh, E. & Reddy, T.S. (2021). Logical Reasoning of School Students as Predictor of their Academic Performance in Mathematics. *International Journal of Management*, 12(1), 707-712.
- Raslan, G. (2023). *Critical Thinking Skills Profile of High School Students in Chemistry Learning*. Switzerland: Springer Nature.
- Rieckmann, M. (2018). *Learning to Transform the World: Key Competencies in Education for Sustainable Development*. Paris: UNESCO.
- Roediger, H. L., and Butler, A. C. (2021). The critical role of retrieval practice in long-term retention. *Trends in Cognitive Sciences*, 15(1), 20–27. <https://doi.org/10.1016/j.tics.2010.09.003>
- Rubab, U. E., Parveen, N., Jafari, S.M., and Yousuf, M.I. (2024). Social and Emotional Self Awareness Skills among Students: A Case Study. *Qlantia Journal of Social Sciences and Humanities*, 5(1), 336-343.
- Saqware, J.F. (2024). Anxiety's Impact on Mathematics Ability in Tanzanian Secondary School Students: A Singida District Case Study. *International Journal of Scientific Research and Management*, 12 (1), 457-466.
- Shi, Y.Q. and Qu, S.W. (2021) Cognitive Ability and Self-Control's Influence on High School Students' Comprehensive Academic Performance. *Frontiers Psychology*, 12 (78), 36-73.
- Twining, P., Butler, D., Fisser, P. (2021). Developing a Quality Curriculum in a Technological Era. *Educational Technology Research and Development*, 69, 2285–2308 (2021).
- Wakumire, R. Nkundabakura, P., Mollel, A. D., Nazziwa, C. and Wakhata, R. (2022). Impact of Project -Based Learning on Students' Critical Thinking Skills in Kinematics in Mbale District, Uganda. *East African Journal of Education and Social Sciences*, 3(3), 160-170.
- Wallin, D., Young, J. and Levin, B. (2021). *Understanding Canadian Schools: An Introduction to Educational Administration* (6<sup>th</sup> Edition). Montreal: Pressbooks.
- Yidana, P. (2019). The Influence of Gender and Intellectual Ability on Students Time Utilisation and Academic Achievement. *Journal of Communications, Media & Society*, 4, 109-132.