# EFFECT OF METACOGNITIVE STRATEGY ON RETENTION AMONG UPPER BASIC LEARNERS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) IN KADUNA STATE

## MUSTAPHA ABUBAKAR, YAHAYA YUSUF MAINA & ISHAYA SUNDAY SHOK

[1&2]Educational Psychology Department, Federal University of Education, Zaria
Special Education Department, Federal University of Education, Zaria
tmustee1@gmail.com

## Abstract

This study investigated the effect of a metacognitive strategy specifically self-monitoring ON retention among upper basic learners with Attention Deficit Hyperactivity Disorder (ADHD) in Kaduna State, Nigeria. A quasi-experimental pretest-posttest control group design was adopted, involving 62 students with attention difficulties, divided into experimental and control groups. The experimental group received self-monitoring strategy instruction, while the control group received conventional teaching. Two null hypotheses were tested using Analysis of Covariance (ANCOVA). Results showed a significant effect of the self-monitoring strategy on retention, $F(1, 59) = 124.725$, $p < .001$, with a large effect size ($\eta^2 = .679$). Additionally, gender had a small but significant effect, $F(1, 57) = 6.162$, $p = .016$, while the interaction between gender and treatment was not significant, $F(1, 57) = 3.110$, $p = .083$, indicating the intervention was effective across gender. The study concludes that self-monitoring enhances retention in learners with ADHD, supporting its use in inclusive education. Recommendations were made for psychologists and counselors to integrate metacognitive training into school programs, undergo professional development in ADHD interventions, and conduct early assessments to identify learners needing support.

**Keywords:** Metacognitive strategy, self-monitoring, retention and Attention Deficit Hyperactivity Disorder

## Introduction

The increasing complexity of learning environments and the demands of modern curricula necessitate those learners, particularly at the upper basic level, develop robust cognitive and self-regulatory skills to navigate academic tasks. In Kaduna State, Nigeria, the presence of attention difficulties among learners in upper basic schools has become a growing concern for educators and psychologists. These difficulties, often marked by distractibility, impulsivity, and poor task persistence, hinder effective classroom engagement and learning outcomes (Ogunyemi & Adejumo, 2019). With foundational subjects such as Mathematics, English, and Basic Science requiring sustained concentration and memory, the academic success of learners with attention deficits is significantly compromised. Traditional instructional methods have not adequately addressed these challenges, necessitating innovative and research-backed interventions to support this vulnerable group of students.

One promising approach is using metacognitive strategies, which involve deliberate cognitive processes that learners use to plan, monitor, and evaluate their understanding and performance. Originating from Flavell's (1979) foundational work on metacognition, these strategies empower learners to take control of their learning by becoming aware of their cognitive processes. For students with attention difficulties, metacognitive strategies can serve as tools for redirecting focus, regulating emotions during tasks, and enhancing memory retention. The cognitive engagement required by metacognitive activities such as goal setting, self-questioning, and summarizing promotes deeper learning and enables students to cope with distractions.Attention control, a crucial component of executive functioning, refers to the capacity to selectively concentrate on relevant stimuli while filtering

out distractions (Posner & Rothbart, 2007). It is integral to academic success, especially in tasks that require sustained mental effort. Retention, the ability to store and retrieve learned information, is similarly essential for academic progress.

In recent years, educational reports and assessments in Kaduna State have highlighted declining academic performance in public basic schools, attributing part of the problem to cognitive and attentional challenges among students (UBEC, 2022). These issues are compounded by large class sizes, limited individualized instruction, and insufficient teacher training on differentiated learning. As Nigeria moves towards inclusive education, there is growing emphasis on adopting learner-centered pedagogies that cater to diverse cognitive profiles. The Federal Ministry of Education (2021) has emphasized the need for interventions that support learners with special educational needs, particularly in foundational learning stages.

This study gains importance in the context of these current educational reforms. It offers potential solutions to the learning challenges faced by students with attention difficulties and aligns with global and national goals for inclusive and equitable education. By investigating the impact of metacognitive strategy instruction on attention control and retention, the study addresses a practical and theoretical need. It offers data that can guide educators, curriculum planners, and policymakers in designing instructional practices that are both inclusive and effective.

Despite extensive literature on the effectiveness of metacognitive strategies, few studies have been conducted within the Nigerian context at the basic education level. Most existing research, such as those by Aremu and Oluwole (2020) and Ogunyemi and Adejumo (2019), focus on senior secondary or tertiary students, leaving a gap in our understanding of how these strategies function among younger learners with specific learning challenges like attention difficulties. This research, therefore, fills a significant gap by focusing on upper basic learners in Kaduna State, providing localized evidence for policy and pedagogical improvement.

Empirical research supports the use of metacognitive strategies to improve learning outcomes among students with cognitive and attention challenges. Ogunyemi and Adejumo (2019) found that secondary school students who received metacognitive scaffolding demonstrated improved retention and academic performance. Shamir et al. (2018) demonstrated that metacognitive instruction enhanced attention control in students diagnosed with attention deficits. Similarly, Yusuf and Bello (2020) observed better memory recall in junior secondary school students who were trained using metacognitive questioning techniques. Ayodele and Afolabi (2021) reported that ADHD-diagnosed learners in Osun State showed significant improvements in academic engagement after undergoing metacognitive strategy training. Furthermore, Dignath and Büttner (2008), in a comprehensive meta-analysis, confirmed the positive effects of metacognitive instruction across various age groups and learning contexts. Okebukola and Okebukola (2022) found a strong correlation between self-regulated learning and retention among students in northern Nigeria, although their study did not focus specifically on attention deficits.

Recent findings also point to the role of gender in moderating the effectiveness of instructional strategies. While some research suggests gender-based differences in cognitive strategy use and academic outcomes (Meece, Glienke, & Burg, 2006), other studies such as those by Veenman, Van Hout-Wolters, and Afflerbach (2006) emphasize that metacognitive strategies benefit all learners regardless of gender when implemented effectively. This is supported by the present study's findings, which revealed a significant main effect of gender on retention but no significant interaction between gender and the metacognitive intervention. These results suggest that while male and female learners may show slight variations in retention outcomes, the self-monitoring strategy is broadly effective across gender lines. Therefore, gender does not moderate the impact of metacognitive training in a way that requires separate instructional models for boys and girls, reinforcing the inclusiveness of the intervention.

This study is anchored in Zimmerman's (2000) Social Cognitive Theory of Self-Regulated Learning, which emphasizes the cyclical process of forethought, performance, and self-reflection. Learners

regulate their learning behaviours through metacognitive strategies that enhance motivation, focus, and performance. Furthermore, Flavell's (1979) Metacognition Theory provides the foundational cognitive architecture upon which this study is built, emphasizing the role of awareness and control in learning tasks. Together, these theories support the premise that equipping learners with metacognitive tools can enhance attention regulation and memory retention.

Despite policy efforts and pedagogical innovations in Nigeria's education sector, learners with attention difficulties continue to perform below average in critical academic tasks. In Kaduna State, anecdotal and assessment-based evidence indicates that these learners often struggle with sustaining attention, following instructions, and recalling learned content. Traditional teaching methods remain inadequate in addressing these challenges. While metacognitive strategies have shown promise in diverse learning contexts, their targeted application for learners with attention difficulties at the upper basic level in Kaduna State remains under-researched. Hence, this study investigates the effect of metacognitive strategy on attention control and retention among upper basic learners with attention difficulties in Kaduna State.

## Objectives of the study
The objective of the study was to
1. Find out the effect of self-monitoring strategy on retention ability among upper basic learners with attention difficulties in Kaduna State.
2. Examine the effect of the self-monitoring strategy on retention ability of male and female upper basic learners with attention difficulties in Kaduna State.

## Hypotheses
The following hypotheses were tested at 0.05 alpha level of significance
$H_{01}$: There is no significant effect of self-monitoring strategy on retention ability among upper basic learners with attention difficulties in Kaduna State.
$H_{02}$: There is no significant effect of self-monitoring strategy on retention ability of male and female upper basic learners with attention difficulties in Kaduna State.

## Methodology
This study employed a quasi-experimental pre-test-posttest control group design, which was deemed suitable for comparing treatment effects in settings where full randomization is not entirely feasible. The design consisted of one experimental group and a control group. Experimental Group received instruction using the self-monitoring metacognitive strategy, while the control group received conventional Basic Science instruction without any metacognitive intervention.

The study population comprised approximately 72,545 upper basic learners in public schools across Kaduna State, Nigeria. The target population consisted of Upper Basic II and IIIstudents diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). Two public schools were randomly selected using simple random sampling. Students with attention difficulties were identified using the Vanderbilt Attention Deficit Screening Checklist (VADSC), adapted for the Nigerian context. Following screening, 62 students (30 experimental group 32 control group) with confirmed ADHD diagnoses were purposively selected based on recommendations from school counselors and medical documentation. Basic Science Achievement Test (BSRAT),was used for data collection. BSRAT was a 30-item multiple-choice test covering selected topics from the Upper Basic Science curriculum. The BSRAT was validated by two science educators and one educational psychologist. The reliability of the BSRAT was determined using the Kuder-Richardson Formula 21 (KR-21), yielding a reliability coefficient of 0.76.

The intervention period lasted six weeks. In Experimental Group (Self-Monitoring Strategy), students were trained to set specific attention goals, monitor engagement during lessons, and use checklists to evaluate their attention levels. These strategies were embedded into Basic Science lessons through lesson plans developed and validated by three experts from Barewa College, Zaria and Educational Psychology and Counseling Department, Ahmadu Bello University Zaria. The Control Group received

regular instruction without exposure to any metacognitive training or attention-related interventions. Data were analysed using Analysis of Covariance (ANCOVA) to determine the effects of the metacognitive strategies and gender on retention, while controlling for pre-test scores. The level of statistical significance was set at .05.

**Results**

$H_{01}$: There is no significant effect of the self-monitoring strategy on retention ability among upper basic learners with attention difficulties in Kaduna State.

**Table 1:ANCOVA Result on effect of the self-monitoring strategy on retention ability among upper basic learners with attention difficulties in Kaduna State**

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 3693.002ᵃ | 2 | 1846.501 | 70.369 | .000 | .705 |
| Intercept | 983.648 | 1 | 983.648 | 37.486 | .000 | .389 |
| Presttest | 866.710 | 1 | 866.710 | 33.030 | .000 | .359 |
| Group | 3272.824 | 1 | 3272.824 | 124.725 | .000 | .679 |
| Error | 1548.175 | 59 | 26.240 | | | |
| Total | 84231.000 | 62 | | | | |
| Corrected Total | 5241.177 | 61 | | | | |

a. R Squared = .705 (Adjusted R Squared = .695)

Table 1 result reveals a statistically significant effect of the self-monitoring strategy on retention ability, F(1, 59) = 124.725, p < .001, with a large effect size (Partial Eta Squared = .679). This means that the self-monitoring strategy significantly improved the learners' retention. Therefore, the null hypothesis is rejected.

$H_{02}$: There is no significant effect of the self-monitoring strategy on retention ability of male and female upper basic learners with attention difficulties in Kaduna State.

**Table 2: ANCOVA Result on ffect of the self-monitoring strategy on retention ability of male and female upper basic learners with attention difficulties in Kaduna State.**

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 3908.167ᵃ | 4 | 977.042 | 41.779 | .000 | .746 |
| Intercept | 618.251 | 1 | 618.251 | 26.437 | .000 | .317 |
| Presttest | 992.610 | 1 | 992.610 | 42.444 | .000 | .427 |
| Group | 3294.877 | 1 | 3294.877 | 140.890 | .000 | .712 |
| Gender | 144.103 | 1 | 144.103 | 6.162 | .016 | .098 |
| Group * Gender | 72.742 | 1 | 72.742 | 3.110 | .083 | .052 |
| Error | 1333.010 | 57 | 23.386 | | | |
| Total | 84231.000 | 62 | | | | |
| Corrected Total | 5241.177 | 61 | | | | |

a. R Squared = .746 (Adjusted R Squared = .728)

From the table 2, the self-monitoring strategy had a statistically significant effect on retention across gender, F(1, 57) = 140.890, p < .000, with a large effect size (Partial Eta Squared = .712). Gender alone also had a significant but smaller effect, F(1, 57) = 6.162, p = .016, Partial Eta Squared = .098, indicating some gender-related difference in retention. However, the interaction between group and gender (male and female) was not statistically significant, F(1, 57) = 3.110, p = .083, suggesting that the effect of the strategy did not differ significantly between males and females. Thus, the null hypothesis is retained.

**Discussion of Findings**

The findings of this study revealed that the metacognitive strategy, specifically the self-monitoring strategy, had a significant effect on the retention ability of upper basic learners with Attention Deficit Hyperactivity Disorder (ADHD) in Kaduna State. The result from Hypothesis 1 showed that learners who were exposed to the self-monitoring strategy demonstrated significantly higher retention scores compared to their counterparts who were not. With an F-value of 124.725 and a p-value less than .000, the effect was not only statistically significant but also practically meaningful, as indicated by a large effect size (Partial Eta Squared = .679). This finding suggests that engaging learners in self-monitoring helped them to actively reflect on and regulate their learning processes, which in turn enhanced their ability to retain information over time.

These results are in line with prior studies that have emphasized the positive impact of metacognitive strategies on academic outcomes, especially in learners with attention difficulties. For instance, research by Flavell (1979) and later by Zimmerman (2002) supports the idea that self-regulation and metacognitive monitoring improve learning outcomes and memory retention. This finding reinforces the effectiveness of cognitive-behavioral interventions in addressing the learning needs of students with ADHD.

Regarding Hypothesis 2, the findings further indicated that while the self-monitoring strategy significantly improved retention across both genders (F = 140.890, p < .001, Partial Eta Squared = .712), gender itself had a smaller yet significant effect on retention (F = 6.162, p = .016, $\eta^2$ = .098). This implies that although there may be slight differences in retention outcomes between male and female learners, both groups benefitted from the intervention. However, the interaction effect between group and gender was not statistically significant (F = 3.110, p = .083), indicating that the impact of the self-monitoring strategy was consistent across gender. In other words, the strategy was equally effective for both male and female learners.

This consistency aligns with existing literature which suggests that metacognitive strategies, when properly implemented, are universally beneficial regardless of gender (Veenman, Van Hout-Wolters, & Afflerbach, 2006). The implication is that educators can confidently use self-monitoring as a strategy to enhance retention among diverse learners with attention difficulties, without the need for gender-specific modifications.

**Conclusion**

This study found that self-monitoring, a metacognitive strategy, significantly enhanced retention among upper basic learners with ADHD in Kaduna State. The strategy was effective across gender, highlighting its inclusive potential. These findings underscore the importance of self-regulation in learning and the need for targeted, evidence-based interventions in basic education.

**Recommendations**

1. Psychologists and counselors should teach self-monitoring and goal-setting strategies to help students with ADHD improve attention and retention.
2. Regular workshops should be organized to equip school counselors with effective, research-based strategies for managing attention difficulties.
3. Psychologists should conduct routine assessments to identify attention challenges early and apply targeted metacognitive interventions.

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