

## Impact of Flipped Video-based Learning on Attention Span and Retention among Upper Basic Learners with Attention Difficulties (ADHD) in Kaduna State, Nigeria

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### ABSTRACT

*This study examined the impact of flipped video-based learning on attention span and retention among upper basic learners with Attention Deficit Hyperactivity Disorder (ADHD) in Kaduna State, Nigeria. The study employed quasi-experimental design with a pre-test post-test control group. A total of 62 students diagnosed with ADHD were purposively selected from public schools with ICT facilities, divided into experimental (30 students) and control (32 students) groups. The experimental group received flipped video-based English instruction for four weeks, while the control group was taught through traditional lecture-based methods. Data were collected using the Attention Span Rating Scale (ASRS), English Retention Test (ERT), and English Performance Test (EPT). The results indicated a statistically significant improvement in both attention span ( $F(1, 59) = 43.548, p < .000$ ) and retention ( $F(1, 59) = 121.810, p < .001$ ) in the experimental group. The findings support the use of flipped video-based learning as an effective strategy for enhancing attention and retention among learners with ADHD. The study is underpinned by Cognitive Load Theory and Self-Regulated Learning Theory, highlighting the benefits of learner autonomy, and reduced cognitive overload. Based on these results, the study recommends the integration of flipped learning into school curricula for students with ADHD, and collaborative efforts from educational psychologists and counselors to support personalized learning strategies.*

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### INTRODUCTION

The growing concern over students' attention span and retention, particularly among learners with Attention Deficit Hyperactivity Disorder (ADHD), continues to challenge contemporary educational practices. ADHD is a neurodevelopmental disorder characterized by persistent inattention, hyperactivity, and impulsivity, which often impedes academic achievement and classroom behaviour (American Psychiatric Association [APA], 2022). In Nigeria, upper basic learners (ages 11–14) diagnosed with attention difficulties often struggle to adapt to traditional, teacher-centered instructional methods, which fail to engage their cognitive needs effectively (Okonkwo & Yusuf, 2021). In Kaduna State, this challenge is compounded by large class sizes and limited specialized instructional support,

highlighting the need for more inclusive, flexible, and learner-centered approaches.

The introduction of digital technologies in education presents new opportunities for addressing the diverse needs of students, including those with ADHD. Among these innovations, flipped video-based learning has emerged as a promising approach for enhancing cognitive outcomes, such as attention span and retention (Hew & Lo, 2018; Zainuddin & Halili, 2019). In a flipped classroom model, learners engage with new content via pre-recorded videos outside the classroom, followed by interactive, problem-solving activities during class time (Bergmann & Sams, 2014; O'Flaherty & Phillips, 2015). This method allows for self-paced learning and repeated exposure to instructional content, which has been shown to improve attention and retention,

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particularly for students who need more time and varied input to process information (Zainuddin & Halili, 2019).

Students with ADHD often face difficulties in sustaining attention, organizing tasks, and processing information at the pace typically required in traditional classrooms (APA, 2022). Research has shown that these learners benefit from instructional methods that offer flexibility, repetition, and multimedia engagement (Almalki, 2021). The flipped learning model, which allows learners to access pre-recorded lessons before class and engage in active learning during class time, is ideally suited for meeting these needs (Bergmann & Sams, 2014). The ability to pause, replay, and review videos at their own pace gives ADHD learners more control over their learning process, reducing cognitive overload (Lo & Hew, 2021).

Attention span is essential for learning, particularly for upper basic students transitioning to more complex concepts. Hussein et al. (2021) found that flipped classrooms promote increased student engagement through interactive and multimedia-rich activities, which significantly improve attention span. Uzoegwu and Adediran (2022) also observed that ADHD students in flipped classrooms showed greater focus during class activities compared to those in traditional lecture-based environments, suggesting the positive impact of this model on attention. Retention, the ability to store and recall information is often compromised for students with attention difficulties due to poor initial encoding of information (Friedman et al., 2020). Video-based learning, which provides visual and auditory stimuli, aids memory by offering dual coding opportunities, thus improving the likelihood of long-term retention (Mayer, 2021). Abubakar and Musa (2023) found that upper basic students with ADHD in Nigeria retained science concepts more effectively after repeated exposure to flipped video lessons than after traditional textbook-based instruction.

Several studies have highlighted the benefits of flipped video-based learning in improving academic performance and cognitive engagement among students with attention difficulties. In a study conducted by Abubakar and Musa (2023) in Kaduna State, ADHD students exposed to flipped video-based

science lessons demonstrated significantly better attention and retention compared to those taught using traditional methods. These findings emphasize the importance of technology-enhanced learning in promoting inclusive education, particularly in low-resource environments. Similarly, Uzoegwu and Adediran (2022) observed better content recall and engagement among upper basic learners with learning difficulties in south-eastern Nigeria when they participated in flipped video lessons.

Hussein and Cheong (2021) found that repeated access to video lessons helped students in Malaysian secondary schools absorb content more effectively and retain information longer. A systematic review by Almalki (2021), which examined studies on flipped learning for students with learning disabilities, concluded that this approach contributed to improved attention management, increased motivation, and enhanced academic performance, especially when multimedia content was designed to meet learners' needs. Okonkwo and Yusuf (2021) also reported that students with attention difficulties in northern Nigeria responded positively to video-based lessons, demonstrating greater focus and willingness to participate in class.

This study is grounded in Cognitive Load Theory (CLT) by Sweller (1988) and Self-Regulated Learning (SRL) Theory by Zimmerman (1989), which provide a framework for understanding how flipped video-based learning can support attention and retention in learners with ADHD. Cognitive Load Theory posits that working memory is limited, and excessive cognitive demands can hinder learning, particularly for students with attention difficulties. By allowing students to control the pace of content delivery, flipped video-based learning reduces extraneous cognitive load, enhancing focus and retention (Sweller, Ayres, & Kalyuga, 2011; Mayer, 2021). Self-Regulated Learning Theory emphasizes the importance of students taking an active role in managing their learning through goal setting, self-monitoring, and reflection (Zimmerman, 2002). The flipped classroom model fosters self-regulation by providing ADHD learners with flexibility, autonomy, and repeated access to instructional materials, supporting their ability to stay attentive and retain knowledge more effectively (Schunk & Greene, 2018).

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Upper basic students with ADHD face significant challenges in sustaining attention and retaining information due to cognitive, behavioural, and environmental factors. These difficulties often result in poor academic performance, low classroom participation, and heightened frustration. In many public schools in Kaduna State, teaching is largely lecture-based, with few opportunities for individualized learning, repetition, and self-paced instruction. Flipped video-based learning offers a flexible, learner-centered approach that may help address these issues by enabling students to access video lessons before class and engage in active learning during class time.

While the flipped classroom model has shown positive outcomes internationally, its effectiveness for students with ADHD in Nigeria remains underexplored, especially in public upper basic schools. This study aims to fill this gap by investigating the impact of flipped video-based learning on attention span and retention among upper basic learners with ADHD in Kaduna State, with the goal of informing inclusive teaching strategies and improving educational outcomes for students with special attention needs.

### Objectives of the study

The objective of the study is

1. To determine the effect of flipped video-based learning on the attention span of upper basic learners with ADHD in Kaduna State.
2. To examine the effect of flipped video-based learning on the retention of upper basic learners with ADHD in Kaduna State.

### Hypotheses

**H<sub>01</sub>:** There is no significant effect of flipped video-based learning on the attention span of upper basic learners with ADHD in Kaduna State.

**H<sub>02</sub>:** There is no significant effect of flipped video-based learning on the retention of upper basic learners with ADHD in Kaduna State.

### METHODOLOGY

This study adopted a quasi-experimental design, specifically the pre-test post-test control group design. This design was appropriate as it enabled the comparison of

learning outcomes namely attention span and retention between students exposed to flipped video-based learning and those receiving traditional instruction, without requiring random assignment. The study population comprised 72,545 upper basic learners in Kaduna State. The target population included Basic 7 and 8 students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) in public schools. Schools were selected from both urban and semi-urban areas with existing digital infrastructure. A total of 62 students diagnosed with ADHD were purposively selected for the study (30 in the experimental group and 32 in the control group), based on recommendations from school counsellors and medical documentation confirming ADHD diagnosis. Selection also considered schools with ICT resources and willingness to participate.

Three instruments were employed: the Attention Span Rating Scale (ASRS) a standardized tool adapted from the ADHD diagnostic criteria to measure attention levels before and after intervention; the English Retention Test (ERT) a researcher-developed test based on lesson content; and the English Performance Test (EPT). All instruments were validated by experts in educational psychology, special education, and measurement and evaluation at Ahmadu Bello University. Reliability was confirmed using Cronbach's alpha, yielding an index of 0.76.

During the four-week intervention, the experimental group received flipped video-based English instruction, with weekly video lessons accessible via mobile devices or computers. In-class activities emphasized group discussions, exercises, and teacher-facilitated clarification. The control group was taught using conventional lecture-based instruction without access to video materials. Data were analysed using Analysis of Covariance (ANCOVA) to determine the effects of flipped video-based learning on attention span and retention, while controlling for pre-test scores. All hypotheses were tested at the 0.05 level of significance.

### RESULT

**H<sub>01</sub>:** There is no significant effect of flipped video-based learning on the attention span of upper basic learners with ADHD in Kaduna State.

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**Table 1:** ANCOVA result on effect of flipped video-based learning on the attention span of upper basic learners with ADHD

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1372.981a	2	686.491	34.196	.000	.537
Intercept	1927.799	1	1927.799	96.029	.000	.619
<b>GROUP</b>	<b>874.236</b>	<b>1</b>	<b>874.236</b>	<b>43.548</b>	<b>.000</b>	<b>.425</b>
Pretest	564.248	1	564.248	28.107	.000	.323
Error	1184.438	59	20.075			
Total	101278.000	62				
Corrected Total	2557.419	61				

**a. R Squared = .537 (Adjusted R Squared = .521)**

The analysis showed that flipped video-based learning had a statistically significant effect on posttest attention span,  $F(1, 59) = 43.548$ ,  $p < .001$ , with a large effect size (partial eta squared = .425), indicating that flipped video-based learning accounted for 42.5% of the variance. The pre-test scores (Pre-test) also significantly influenced outcomes. The model explained 53.7% of the variance

(Adjusted  $R^2 = 52.1\%$ ). Thus,  $H_{01}$  is rejected, confirming that flipped video-based learning significantly improved attention span among upper basic learners with ADHD.

**H<sub>02</sub>:** There is no significant effect of flipped video-based learning on the retention of upper basic learners with ADHD in Kaduna State.

**Table 2:** ANCOVA Result on effect of flipped video-based learning on the retention of upper basic learners with ADHD

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4141.205a	2	2070.602	65.903	.000	.691
Intercept	1731.491	1	1731.491	55.110	.000	.483
Pre-test	418.204	1	418.204	13.311	.001	.184
<b>GROUP</b>	<b>3827.149</b>	<b>1</b>	<b>3827.149</b>	<b>121.810</b>	<b>.000</b>	<b>.674</b>
Error	1853.715	59	31.419			
Total	89033.000	62				
Corrected Total	5994.919	61				

**a. R Squared = .691 (Adjusted R Squared = .680)**

The effect of flipped video-based learning on retention was highly significant,  $F(1, 59) = 121.810$ ,  $p < .001$ , with a very large effect size (partial eta squared = .674), indicating that flipped video-based learning accounted for 67.4% of the variance in retention scores. Pre-test scores (Pre-test) also had a significant but smaller effect. The model explained 69.1% of the variance (Adjusted  $R^2 = 68.0\%$ ). Thus,  $H_{02}$  is rejected, confirming a strong positive effect of flipped video-based learning on retention among upper basic learners with ADHD.

## DISCUSSION OF FINDINGS

The results of this study revealed that flipped video-based learning had a statistically significant and positive effect on both the attention span and retention of upper basic learners with Attention Deficit Hyperactivity Disorder (ADHD) in Kaduna State. Specifically, the analysis of hypothesis  $H_{01}$  indicated a significant effect of flipped video-based learning on attention span,  $F(1, 59) = 43.548$ ,  $p < .000$ , with a large effect size (partial  $\eta^2 = .425$ ), suggesting that the intervention accounted for 42.5% of the variance in learners' attention span. The high adjusted  $R^2$  of 52.1% further confirms the model's predictive strength.

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Therefore, the null hypothesis was rejected, affirming that the intervention meaningfully enhanced the learners' ability to sustain attention during instruction.

This finding aligns with Abubakar and Musa (2023), who reported that junior secondary school students with ADHD in Kaduna State demonstrated improved attention levels when taught using flipped video-based instruction. Similarly, Hussein et al. (2021) and Almalki (2021) found that flipped learning strategies helped learners, particularly those with attention difficulties, manage their cognitive focus more effectively by minimizing extraneous cognitive load.

Regarding hypothesis  $H_{02}$ , the result also showed a highly significant effect of flipped video-based learning on retention,  $F(1, 59) = 121.810$ ,  $p < .001$ , with a very large effect size (partial  $\eta^2 = .674$ ), accounting for 67.4% of the variance. The adjusted  $R^2$  of 68.0% highlights the robustness of the model in explaining the variance in retention outcomes. Thus,  $H_{02}$  was rejected, confirming that flipped video-based learning significantly improved the retention of content among learners with ADHD.

This outcome corroborates the findings of Uzoegwu and Adediran (2022) and Hussein and Cheong (2021), both of whom noted that learners exposed to flipped instructional methods were better able to recall information and maintain long-term comprehension of academic content. According to these studies, video-based resources allow repeated viewing, which reinforces memory consolidation an essential support for learners with short attention spans or processing delays.

Furthermore, the findings support Cognitive Load Theory (Sweller, 1988), which suggests that learners benefit when instruction reduces unnecessary cognitive burden and presents information in manageable segments. Flipped video-based learning achieves this by allowing learners to process content at their own pace, pause and replay explanations, and focus without classroom distractions. Similarly, Self-Regulated Learning Theory (Zimmerman, 2002) reinforces the role of flipped learning in promoting autonomy, metacognitive monitoring, and motivation factors that are essential for learners managing attention difficulties.

Finally, the local classroom context in Kaduna State, where traditional teacher-

centered methods dominate, underscores the relevance of this intervention. As Okonkwo and Yusuf (2021) found, students with attention challenges in northern Nigeria responded positively to video-based and ICT-enhanced instructional strategies. In a similar vein, this study demonstrated that such learners showed enhanced classroom participation, sustained focus, and improved retention when engaged through flipped video-based strategies.

## CONCLUSION

The study revealed that flipped video-based learning significantly improved attention span and retention among upper basic learners with ADHD in Kaduna State. The approach, grounded in Cognitive Load and Self-Regulated Learning theories, provided a flexible, student-centered alternative to traditional methods, supporting learners' cognitive engagement and memory retention. These findings underscore the value of integrating technology-enhanced, inclusive strategies in public schools to meet the needs of students with attention difficulties.

## RECOMMENDATIONS

1. Schools should integrate flipped learning as a standard strategy for supporting students with ADHD, allowing them to engage with content at their own pace before class.
2. Educational psychologists and counsellors should lead professional development programs that equip teachers with tools for creating and using flipped video content effectively for learners with attention challenges.
3. Counsellors and psychologists should collaborate to design personalized learning and behavioural support plans that combine flipped learning with self-regulation and attention-management strategies.

## REFERENCES

- Abubakar, M. A., & Musa, A. S. (2023). Technology-enhanced learning and cognitive support for learners with ADHD in Nigerian junior secondary schools. *African Journal of Educational Technology*, 7(1), 45–58.  
<https://doi.org/10.4314/ajet.v7i1.45>

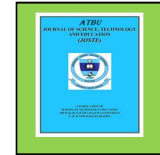
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- Almalki, M. (2021). The effectiveness of flipped classrooms for students with learning difficulties: A systematic review. *Journal of Special Education Technology*, 36(3), 143–154. <https://doi.org/10.1177/0162643420955748>
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.).
- Bergmann, J., & Sams, A. (2014). *Flipped learning: Gateway to student engagement*. International Society for Technology in Education.
- Friedman, S. R., Klassen, A. F., & Bulotsky-Shearer, R. (2020). Cognitive flexibility, working memory, and academic performance in children with ADHD. *Child Neuropsychology*, 26(7), 861–879. <https://doi.org/10.1080/09297049.2020.1725821>
- Hew, K. F., & Lo, C. K. (2018). Flipped classroom improves student learning in health professions education: A meta-analysis. *BMC Medical Education*, 18(1), 38. <https://doi.org/10.1186/s12909-018-1144-z>
- Hussein, M. H., Ow, S. H., & Cheong, L. S. (2021). The effectiveness of flipped classroom strategy in enhancing students' learning and retention. *Education and Information Technologies*, 26(3), 2825–2847. <https://doi.org/10.1007/s10639-020-10386-1>
- Lo, C. K., & Hew, K. F. (2021). Empirical research on flipped learning in K-12 education: A review of literature. *Educational Research Review*, 34, 100402. <https://doi.org/10.1016/j.edurev.2021.100402>
- Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press.
- Okonkwo, C. E., & Yusuf, M. O. (2021). Exploring learner-centered approaches for inclusive classrooms in Nigeria. *Nigerian Journal of Educational Psychology*, 19(2), 78–89.
- O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *The Internet and Higher Education*, 25, 85–95. <https://doi.org/10.1016/j.iheduc.2015.02.002>
- Schunk, D. H., & Greene, J. A. (2018). *Handbook of self-regulation of learning and performance* (2nd ed.). Routledge.
- Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory*. Springer.
- Uzoegwu, P. N., & Adediran, O. A. (2022). Flipped learning and academic engagement among students with learning difficulties: A Nigerian case study. *Journal of Inclusive Pedagogy*, 4(2), 112–128.
- Zainuddin, Z., & Halili, S. H. (2019). Flipped classroom research and trends from different fields of study. *International Review of Research in Open and Distributed Learning*, 20(2), 1–21. <https://doi.org/10.19173/irrodl.v20i2.3985>
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64–70. [https://doi.org/10.1207/s15430421tip4102\\_2](https://doi.org/10.1207/s15430421tip4102_2)