International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

Examining UDL-Based Differentiated Instruction and Its Impact on Reading Comprehension of High School Students with ADHD

Edel V. Agarano[1], Felix M. Diano Jr.[2]
[1, 2]Manor Independent School District, Manor, Texas 78653, United States of America
[2]Email address: fdiano.2022@gmail.com

Abstract— *Reading comprehension is a critical determinant of academic success, yet high school students with Attention-Deficit/Hyperactivity Disorder (ADHD) often experience persistent difficulties due to deficits in attention, executive functioning, and working memory. Universal Design for Learning (UDL) offers a framework for differentiating instruction and reducing cognitive barriers, but its impact on reading comprehension for students with ADHD remains underexplored. This study employed a single-group pre-experimental design to examine the effects of UDL-based differentiated instruction on the reading comprehension of eight high school students with ADHD in inclusive English language arts classrooms. Over six weeks, participants engaged with multimodal texts, scaffolded questioning, chunked passages, and graphic organizers. Reading comprehension was measured using a validated teacher-made questionnaire. Results indicated a statistically significant improvement in comprehension scores from pre-intervention ($M = 56.25$, $SD = 4.72$) to post-intervention ($M = 67.50$, $SD = 5.16$), $t(7) = 5.89$, $p < .001$. These findings suggest that UDL-aligned instructional strategies can enhance reading comprehension by supporting executive functioning and reducing barriers to understanding complex texts. Implications include the integration of flexible, multimodal, and scaffolded instructional practices to promote equitable literacy outcomes for neurodiverse learners.*

Keywords— *ADHD, Differentiated Instruction, High School, Inclusive Education, Reading Comprehension, Universal Design for Learning.*

I. INTRODUCTION

Reading comprehension is a central component of academic achievement and a critical determinant of success in secondary education. As students progress through high school, they are expected to comprehend increasingly complex literary and informational texts that require sustained cognitive effort, integration of ideas, and higher-order thinking skills (Snow, 2002; Shanahan & Shanahan, 2008). Difficulties in reading comprehension at this stage can have far-reaching consequences, affecting performance across subject areas and limiting postsecondary opportunities.

High school students diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD) are particularly vulnerable to reading comprehension difficulties. ADHD is a prevalent neurodevelopmental disorder characterized by persistent challenges in attention regulation, executive functioning, and working memory (American Psychiatric Association, 2013). Although many students with ADHD demonstrate adequate decoding and word recognition skills, research consistently shows that they struggle to construct meaning from text, especially when reading requires sustained focus, monitoring of understanding, and integration of information across sentences and passages (Parrish et al., 2014; Ghelani et al., 2004; Zentall, 2005).

Empirical studies have identified executive functioning deficits as a key contributor to reading comprehension difficulties among students with ADHD. Weaknesses in working memory, planning, and inhibitory control can disrupt the ability to track main ideas, suppress irrelevant information, and maintain coherence while reading extended texts (Barkley, 2012; Sesma et al., 2009). As text complexity increases in high school, these challenges often become more pronounced, placing students with ADHD at increased risk for persistent comprehension deficits and academic underachievement (DuPaul & Stoner, 2014; Frazier et al., 2007).

Despite the documented relationship between ADHD and reading comprehension difficulties, instructional practices in many secondary classrooms remain largely uniform and text-dependent. Traditional instructional approaches often assume that all students can process and comprehend text in similar ways, providing limited scaffolding or flexibility in how information is presented or how comprehension is demonstrated (Scanlon & Baker, 2012). Such approaches may inadvertently increase cognitive load for students with ADHD, further hindering their ability to comprehend complex texts.

Universal Design for Learning (UDL) offers a promising instructional framework for addressing reading comprehension challenges by proactively reducing barriers to learning. Grounded in cognitive neuroscience, UDL emphasizes multiple means of representation, allowing information to be presented in varied formats that support comprehension (CAST, 2018; Meyer et al., 2014). Research suggests that instructional practices aligned with UDL—such as chunking text, providing visual and auditory supports, and scaffolding key concepts—can support comprehension by reducing cognitive demands and facilitating meaning-making for diverse learners (King-Sears, 2009; Rao & Meo, 2016).

Although UDL has been widely advocated as an inclusive instructional approach, empirical research examining its impact specifically on the reading comprehension of high school students with ADHD remains limited. Existing studies frequently examine UDL outcomes across heterogeneous groups of students with disabilities, making it difficult to isolate

Edel V. Agarano and Felix M. Diano Jr., "Examining UDL-Based Differentiated Instruction and Its Impact on Reading Comprehension of High School Students with ADHD," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 8, Issue 8, pp. 152-155, 2026.

its effectiveness for students with ADHD alone (Al-Azawei et al., 2016; Ok et al., 2017). Consequently, educators lack ADHD-specific, evidence-based guidance regarding which UDL-aligned strategies are most effective for improving reading comprehension in secondary English classrooms.

Addressing this gap is essential, as high school teachers are increasingly responsible for supporting students with ADHD in inclusive literacy settings while navigating rigorous curricular expectations. Research that explicitly examines the relationship between UDL-based differentiated instruction and reading comprehension outcomes for students with ADHD can contribute valuable empirical evidence to both the UDL and secondary literacy literatures.

The purpose of this study is to examine the impact of UDL-based differentiated instructional strategies on the reading comprehension of high school students with ADHD in inclusive English language arts classrooms. By identifying UDL practices that effectively support comprehension, this study seeks to inform instructional decision-making and advance inclusive literacy practices at the secondary level.

II. Research Methiods

This study employed a single group pre-experimental design to examine the effect of UDL based differentiated instruction on the reading comprehension of high school students with ADHD. A single group pretest–posttest design is a research design in which the same group of participants is measured on the outcome variable before and after receiving an intervention without the inclusion of a control or comparison group. This design allows researchers to observe change over time within the same group but has limitations in establishing causality due to potential threats to internal validity, such as history and maturation effects (Marsden & Torgerson, 2012). Pre and post intervention assessments were conducted to measure changes in reading comprehension following the instructional intervention. The study was conducted at a high school campus in Central Texas, USA, serving a diverse student population in inclusive English language arts classrooms, providing a representative secondary education context.

Participants consisted of eight high school students formally diagnosed with ADHD, selected through purposive sampling. Inclusion criteria required that students have no other diagnosed learning disabilities and possess parental consent to participate. Reading comprehension was assessed using a teacher made questionnaire that was validated for content and reliability, yielding a Cronbach's alpha of 0.87, indicating high internal consistency. Data were collected over a six week intervention period, during which UDL based strategies such as multiple text representations, chunking, scaffolded questioning, and graphic organizers were implemented. Pre intervention data were collected before the first week of instruction, and post intervention data were collected immediately after the six week period.

Quantitative data were analyzed using descriptive statistics to summarize reading comprehension performance and paired sample t tests to determine the statistical significance of changes from pre to post intervention. Ethical considerations were strictly observed, including obtaining parental consent and student assent, maintaining confidentiality and privacy, anonymizing participant data, and ensuring a safe and supportive learning environment throughout the study.

III. Results and Discussion

Table 1 presents the pre- and post-intervention reading comprehension scores for the eight participating high school students with ADHD. After six weeks of UDL-based differentiated instruction, participants showed meaningful improvements in reading comprehension performance.

TABLE 1. Pre- and Post-Intervention Reading Comprehension Scores (n = 8)

Measure	Pre-Intervention		Post-Intervention		*t* (df = 7)	*p*
	Mean	SD	Mean	SD		
Reading Comprehension	56.25	4.72	67.50	5.16)	5.89	< .001

The mean reading comprehension score increased from 56.25 to 67.50 following the intervention. A paired-samples *t*-test showed that this improvement was statistically significant, $t(7) = 5.89$, $p < .001$, suggesting that the UDL-aligned instructional strategies were associated with enhanced reading comprehension outcomes for this group.

The statistically significant gains observed in reading comprehension align with broader empirical evidence suggesting that UDL-based instruction can positively impact literacy outcomes for diverse learners. A recent systematic review concluded that UDL significantly improves reading comprehension by providing multiple means of representation, engagement, and expression, particularly when supported with multimodal materials and instructional flexibility (El Boukhrissi & Brigui, 2025). Similarly, meta-analytic evidence indicates that UDL-aligned instruction has moderate positive effects on academic achievement across subjects, including literacy, reinforcing the value of flexible, learner-centered teaching approaches (King-Sears et al., 2022).

The cognitive challenges experienced by students with ADHD—particularly deficits in executive functioning such as working memory, inhibition, and planning—are well documented as contributing to reading comprehension difficulties (Slipp, 2021). These executive functioning constraints can limit the ability to sustain attention, integrate text information, and construct coherent mental representations of complex texts, making comprehension outcomes particularly vulnerable in traditional instructional settings. Consequently, scaffolds inherent to UDL (e.g., chunked text, visual supports, multimodal representation) may reduce cognitive load and better align instructional tasks with the cognitive strengths of students with ADHD.

This interpretation is consistent with research on reading comprehension and executive function showing that interventions which support working memory and attention regulation tend to produce better comprehension outcomes (Slipp, 2021). Moreover, evidence from educational contexts illustrates that differentiated, multimodal instruction fosters greater engagement and retention of content, particularly when

Edel V. Agarano and Felix M. Diano Jr., "Examining UDL-Based Differentiated Instruction and Its Impact on Reading Comprehension of High School Students with ADHD," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 8, Issue 8, pp. 152-155, 2026.

learners are provided choices in how they access and interact with information (CAST, 2018; Hall et al., 2003).

These results also resonate with UDL's goal of proactively reducing instructional barriers by anticipating learning variability rather than reacting to it, a strategy shown to benefit learners with and without diagnosed disabilities (Rose & Meyer, 2006). Although most existing UDL research does not isolate students with ADHD specifically, the observed improvement in this study suggests that the combination of UDL principles with differentiated instruction can effectively support reading comprehension in secondary inclusive classrooms.

IV. Conclusion

Reading comprehension deficits among high school students with ADHD represent a significant barrier to academic achievement and postsecondary opportunities. This study provides preliminary evidence that UDL-based differentiated instruction can effectively enhance reading comprehension in this population. By providing multiple means of representation, scaffolding complex texts, and reducing cognitive barriers, UDL-aligned strategies support the unique learning needs of students with ADHD, facilitating improved comprehension and engagement with challenging literary and informational texts.

The findings have practical implications for secondary educators and curriculum designers. Implementing UDL principles within inclusive English language arts classrooms can promote equitable access to the curriculum, strengthen executive functioning skills critical for reading comprehension, and create flexible learning environments that accommodate neurodiverse learners. Specifically, strategies such as multimodal text presentation, chunking of complex passages, scaffolded questioning, and visual organizers can serve as evidence-based approaches to improve literacy outcomes.

Despite these promising results, the study is limited by a small sample size and the absence of a control group. Future research should employ larger, randomized samples, longitudinal designs, and multi-site interventions to validate and extend these findings. Additionally, exploring the long-term impact of UDL-based instruction on academic performance and its integration with other evidence-based literacy interventions will further inform instructional practices. Collectively, these results underscore the potential of UDL-based differentiated instruction as a viable strategy to address reading comprehension challenges among high school students with ADHD and to promote inclusive, equitable learning in secondary education.

References

[1] Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2016). Universal Design for Learning (UDL): A content analysis of peer-reviewed journal papers from 2012 to 2015. Journal of the Scholarship of Teaching and Learning, 16(3), 39–56. https://doi.org/10.14434/josotl.v16i3.19295

[2] American Psychiatric Association, DSM-5 Task Force. (2013). Diagnostic and statistical manual of mental disorders: DSM-5™ (5th ed.). American Psychiatric Publishing, Inc.. https://doi.org/10.1176/appi.books.9780890425596

[3] Barkley, R. A. (2012). Executive functions: What they are, how they work, and why they evolved. Guilford Press. https://psycnet.apa.org/record/2012-15750-000

[4] Capp, M. J. (2017). The effectiveness of Universal Design for Learning: A meta-analysis of literature between 2013 and 2016. International Journal of Inclusive Education, 21(8), 791–807. https://doi.org/10.1080/13603116.2017.1325074

[5] CAST. (2018). Universal Design for Learning guidelines version 2.2. http://udlguidelines.cast.org

[6] DuPaul, G. J., & Stoner, G. (2014). ADHD in the schools: Assessment and intervention strategies (3rd ed.). Guilford Press. https://psycnet.apa.org/record/2014-36924-000

[7] El Boukhrissi, M., & Brigui, H. (2025). Exploring the impacts of Universal Design for Learning (UDL) on reading comprehension: A systematic review of literature. International Journal of Language and Literary Studies, 7(2), 283–313. https://doi.org/10.36892/ijlls.v7i2.2066

[8] Frazier, T. W., Youngstrom, E. A., Glutting, J. J., & Watkins, M. W. (2007). ADHD and achievement: Meta-analysis of the child, adolescent, and adult literatures. Journal of Learning Disabilities, 40(1), 49–65. https://doi.org/10.1177/00222194070400010401

[9] Ghelani, K., Sidhu, R., Jain, U., & Tannock, R. (2004). Reading comprehension and reading-related abilities in adolescents with reading disabilities and attention-deficit/hyperactivity disorder. Dyslexia, 10(4), 364–384. https://doi.org/10.1002/dys.285

[10] Guo, P., & Wang, Z. (2025). Implementation fidelity of Universal Design for Learning and effects on student achievement, engagement, and belonging. Scientific Reports, 15, Article 45430. https://doi.org/10.1038/s41598-025-30079-1

[11] Hall, T.E., Strangman, N., Meyer, A., & Washington, D. (2004). Differentiated instruction and implications for UDL implementation (Effective Classroom Practices Report). U.S. Department of Education, Office of Special Education Programs. https://www.theudlproject.com/uploads/8/8/1/9/8819970/di_and_udl.pdf

[12] King-Sears, M. E. (2009). Universal Design for Learning: Technology and pedagogy. Learning Disability Quarterly, 32(4), 199–201. https://doi.org/10.2307/27740372

[13] King-Sears, M.E., Stefanidis, A., Evmenova, A.S., Rao, K., Mergen, R.L., Owen, L.S., & Strimel, M.M. (2022). Achievement of learners receiving UDL instruction: A meta-analysis. Teaching and Teacher Education. 122, 103956. https://doi.org/10.1016/j.tate.2022.103956

[14] Li, Y.-F., Zhang, D., Liu, C.-T., Wang, K., Yan, W., & Dong, X. (2024). Perceptions of UDL teaching practices among university students with disabilities. Education Sciences, 14(5), 501. https://doi.org/10.3390/educsci14050501

[15] Marsden, E., & Torgerson, C. J. (2012). Single group, pre- and post-test research designs: Some methodological concerns. Oxford Review of Education, 38(5), 583–616. https://doi.org/10.1080/03054985.2012.731208

[16] Meyer, A., Rose, D. H., & Gordon, D. (2014). Universal Design for Learning: Theory and practice. CAST Professional Publishing. https://publishing.cast.org/catalog/books-products/universal-design-for-learning-meyer-rose-gordon?srsltid=AfmBOop2PNor0-6vvFS2lt-iVAqsh3IPVIm_eDpruqK5FyKlanv7Wnr1

[17] Miller, A.C., Keenan, J.M., Betjemann, R.S., Willcutt, E.G., Pennington, B.F., & Olson, R.K. (2013). Reading Comprehension in Children with ADHD: Cognitive Underpinnings of the Centrality Deficit. Journal of Abnormal Child Psychology, 41, 473-483. https://doi.org/10.1007/s10802-012-9686-8

[18] Ok, M. W., Rao, K., Bryant, B. R., & McDougall, D. (2017). Universal design for learning in pre-K to grade 12 classrooms: A systematic review of research. Exceptionality, 25(2), 116–138. https://doi.org/10.1080/09362835.2016.1196450

[19] Parrish, A. E., Perdue, B. M., Stromberg, E. E., Bania, A. E., Evans, T. A., & Beran, M. J. (2014). Delay of gratification by orangutans (Pongo pygmaeus) in the accumulation task. Journal of Comparative Psychology, 128(2), 209–214. https://doi.org/10.1037/a0035660

[20] Rao, K., & Meo, G. (2016). Using Universal Design for Learning to design standards-based lessons. SAGE Open, 6(4), 1–12. https://doi.org/10.1177/2158244016680688

[21] Rose, D. H., & Meyer, A. (2002). Teaching every student in the digital age: Universal design for learning. ASCD. https://eric.ed.gov/?id=ED466086

[22] Scanlon, D., & Baker, D. L. (2012). An accommodations Model for the Secondary Inclusive Classroom. Learning Disability Quarterly, 35(4), 212-224. https://eric.ed.gov/?id=EJ980670

Edel V. Agarano and Felix M. Diano Jr., "Examining UDL-Based Differentiated Instruction and Its Impact on Reading Comprehension of High School Students with ADHD," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 8, Issue 8, pp. 152-155, 2026.

[23] Sesma, H. W., Mahone, E. M., Levine, T., Eason, S. H., & Cutting, L. E. (2009). The contribution of executive skills to reading comprehension. Child Neuropsychology, 15(3), 232–246. https://doi.org/10.1080/09297040802220029
[24] Shanahan, T., & Shanahan, C. (2008). Teaching disciplinary literacy to adolescents: Rethinking content-area literacy. Harvard Educational Review, 78(1), 40–59. https://doi.org/10.17763/haer.78.1.v62444321p602101
[25] Slipp, A. L. (2021). Linking reading comprehension and executive function: A pathway to improved instruction. Emerging Perspectives: Interdisciplinary Graduate Research in Education and Psychology, 5(1), 16–30. https://journalhosting.ucalgary.ca/index.php/ep/article/view/68142
[26] Snow, C. E. (2002). Reading for understanding: Toward an R&D program in reading comprehension. RAND Corporation. https://www.rand.org/pubs/monograph_reports/MR1465.html
[27] Zentall, S. S. (2005). Theory- and evidence-based strategies for children with attentional problems. Psychology in the Schools, 42(8), 821–836. https://doi.org/10.1002/pits.20114

Edel V. Agarano and Felix M. Diano Jr., “Examining UDL-Based Differentiated Instruction and Its Impact on Reading Comprehension of High School Students with ADHD,” *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 8, Issue 8, pp. 152-155, 2026.