Failure to Follow Written Instructions: Am I the Problem or the Instructions?

Winson Jim M. Toledanes[1] Dama Cynheal S. Solis[2]
[1, 2] Central Philippine Adventist College

[1]winsonjim77@gmail.com, [2]solisdama@cpac.edu.ph

Abstract

Following written instructions is a crucial skill for academic success and beyond. It plays a significant role in completing complex assignments and tasks in college, ensuring safety, and avoiding costly mistakes in professional fields. Despite its importance, many students struggle with this skill, leading to academic difficulties and missed opportunities. This study aimed to understand better the factors affecting learners' inability to follow written instructions by exploring the personal and instructional factors to propose interventions addressing the leading causes of the problem. This qualitative exploratory case study investigates factors contributing to learners' inability to follow written instructions, focusing on a Central Philippine Adventist College student during the second semester of AY 2022-2023. Data were gathered through interviews and analysis of the students' outputs and the instructions provided via iLearn (LMS). Data were analyzed using Braun and Clarke's Reflexive Thematic Analysis for interview responses and a rubric for textual materials, allowing for a systematic exploration of themes. The study identified that learners struggle to follow written instructions due to working memory, concentration, cognitive load, external distractions, and complex tasks, with additional influences from environment, stress, motivation, and confidence. The instructional structure was generally effective but needed improvements in task specificity. Proposed interventions are fostering a supportive and collaborative learning environment, utilizing visual aids and technology, and providing strong teacher support. Emphasizing continuous learning and technological tools can enhance instruction clarity and help learners navigate tasks more confidently. These findings suggest that addressing learner-based factors and instructional improvements can significantly aid in following written instructions. Additionally, students may engage in integrated skills development programs and utilize recommended interventions to improve comprehension and adherence to written instructions.

Keywords: *written instructions, academic success, academic struggles, personal factor, instructional factor, interdisciplinary collaboration.*

INTRODUCTION

In college, following written instructions is a vital skill for academic success, yet many students face challenges in this area (Dunham et al., 2020). This issue extends beyond academics, as professionals in fields like healthcare and law rely on accurate adherence to instructions for safety and efficiency (Akyar, 2012). Research has shown that students who

struggle with understanding written instructions tend to perform poorly in their studies, leading to lower grades and reduced opportunities (Lodge et al., 2018). While most studies focus on younger students, there is limited research on how this issue affects college-level learners.

This gap in understanding how college students struggle with written instructions is significant. Studies from the Philippines, for example, show that students have trouble following instructions in subjects like science and math, leading to lower test scores (Locus, 2023). Similar trends are seen globally, highlighting the need to explore this problem at the college level further.

This study aims to identify the factors contributing to college students' challenges in following instructions and proposes targeted interventions to address these issues. By focusing on college students, this research seeks to fill the gap in existing literature and offer insights that can improve academic performance and long-term success.

LITERATURE REVIEW

The literature review provides an overview related to learner-based and instructional-based factors and possible interventions to enhance the ability to follow directions.

Learner-based Factors

The literature identifies several learner-based factors that affect the ability to follow written instructions, including working memory, poor reading comprehension, cultural and linguistic differences, and anxiety. Working memory, the ability to hold and manipulate information, plays a key role. Baddeley (2007) and Mcleod (2023) describe it as involving the phonological loop, visuospatial sketchpad, and central executive. Studies show that individuals with higher working memory perform better at following instructions (Panesi et al., 2022). Poor working memory hinders the ability to retain, prioritize, and organize information, leading to errors in task completion (Dunham et al., 2020).

Poor reading comprehension also affects the ability to follow instructions. Research by Gathercole and Alloway (2016) links working memory capacity to reading comprehension, and Swanson et al. (2022) found that students with poor comprehension struggle the most with written instructions.

Cultural and linguistic differences can also cause confusion due to unfamiliar vocabulary or cultural expectations (Abu-Arqoub & Alserhan, 2019). Finally, anxiety and stress impair working memory and attention, further complicating instruction-following (Lukasik et al., 2019).

Instructional-Based Factors

The ability of learners to understand and follow written instructions is closely related to the comprehensibility and organization of the instructions provided. When instructions are unclear or ambiguous, learners may find it difficult to follow them accurately. In contrast, clear and well-organized instructions can facilitate understanding and compliance (Lodge et al., 2018). In contrast, clear and organized instructions that provide examples and visuals can support learners' understanding and compliance with instructions (Gathercole & Alloway, 2016).

Instructional design is significant to instructional comprehensibility, significantly affecting learners' ability to follow written instructions. Various research studies have explored the impact of instructional design on the comprehensibility of instructions and a learner's ability to follow them. According to Shabiralyani et al. (2015), instructional design features, such as using concise and comprehensible language, appropriate organization of information, and inclusion of visual aids, significantly enhance a learner's ability to follow instructions.

In addition, Williams (2018) investigated the influence of text coherence and structure on the comprehension and execution of written instructions. They found that well-structured instructions resulted in better understanding and task performance than poorly structured instructions. Similarly, Gray and DiLoreto (2016) reported that learners were more successful in following instructions when the instructions were presented in a clear and organized manner, with relevant information highlighted and unnecessary information omitted. Moreover, Vaughn and Fletcher (2021) discovered that integrating visual cues and explicit instructions significantly impacts learners' ability to follow instructions. Also, Houston (2017) suggested that visual aids can help compensate for working memory deficits in some learners. The findings of various studies indicate that the comprehensibility of instructions is a critical factor in learners' ability to follow written instructions.

Possible Interventions

The literature presents various interventions to support learners struggling with written instructions. Simplifying instructions with clearer language and shorter sentences improves comprehensibility (Malamed, 2024). Visual aids, like diagrams and animated videos, can enhance understanding and compensate for working memory deficits (Shabiralyani et al., 2015). Feedback helps learners adjust strategies and improve performance (Kuklick & Lindner, 2023). Scaffolded instruction and self-regulated learning strategies, like goal setting, also boost task accuracy (Brenner, 2022). Mindfulness-based interventions improve working memory and comprehension (McBride & Greeson). While these strategies can improve performance, their effectiveness may vary based on individual abilities and instruction complexity.

Theoretical Framework

This research is anchored in two primary theories: Baddeley and Hitch's (1994) model of working memory and Jerome Bruner's Theory of Instruction. These theories provide a comprehensive understanding of the cognitive processes and instructional strategies influencing the ability to follow written instructions.

Baddeley and Hitch's model highlights the importance of the visuospatial sketchpad in visual and spatial processing, which is crucial for following written instructions. Bruner's theory (1966) points out the instructional strategies that can enhance the effectiveness of written instructions, which can also, the other way around, negatively affect a learner's ability to follow written instructions when not effectively applied.

METHODS

This exploratory case study seeks to identify factors that cause a student's inability to follow written instructions. Rather than testing specific hypotheses, it aims to provide insights into a particular case (Bhat, 2023), focusing on a student at Central Philippine Adventist

College who struggled academically due to this issue. The study investigates both personal and instructional factors, using data from the student and iLearn instructions. Braun and Clarke's Reflexive Thematic Analysis is employed to analyze interview responses and a rubric to evaluate textual materials, making this method appropriate for the study (Politz, 2024).

Table 1

Method of Analysis: Reflexive Thematic Analysis (Interview Responses for SOP1 and SOP3)

Steps in Reflexive Thematic Analysis	Description
Step 1: Data Preparation	The researcher will gather and organize interview responses and textual materials into a unified format for analysis.
Step 2: Familiarization	The researcher will review the data sources to become familiar with the content and understand the overall dataset.
Step 3: Coding	The researcher will assign codes to meaningful sections or variables within each data source. Capture the essence or content of each section.
Step 4: Generating initial themes	The researcher will group related codes from all data sources and identify potential themes. Also, look for patterns, similarities, and connections across the different sources.
Step 5: Reviewing themes	The researcher will evaluate and refine the initial themes by considering the entire dataset and incorporating all data sources. Also, look for connections, variations, or sub-themes that emerge collectively.
Step 6: Defining and naming themes	The researcher will clearly define each theme and assign descriptive names that accurately reflect their content and meaning. Also, ensure the names capture the essence of the data from all the sources they represent.
Step 7: Writing the narrative	The researcher will craft a coherent narrative that describes each theme in detail, incorporating evidence and examples from all data sources. Also, support interpretations with relevant quotes, data points, or excerpts.
Step 8: Reflexivity	The researcher will reflect on how assumptions, biases, and experiences influenced the analysis across the different data sources and document reflections to enhance transparency and trustworthiness.
Step 9: Finalizing the analysis	The researcher will conduct a final analysis review, ensuring accuracy, rigor, and relevance to the research question and integrating all data sources.
Step 10: Writing up the report	Present findings in a structured manner, summarizing the analysis process, key themes, and supporting evidence. Include relevant data points, quotes, or excerpts to illustrate integrated themes.

Note: This rubric used to analyze the written instructions was prepared based on a description by Saunders in her article, Evaluating and Improving Instruction.

Table 2

Rubrics for the Analysis of Written Instruction (SOP2)

Criteria	Poor (1)	Fair (2)	Good (3)	Very Good (4)	Excellent (5)
Clarity of Performance Task Instructions	Instructions are convoluted and unclear, hindering understanding of the task.	Instructions are generally clear but may lack precision in conveying task expectations.	Instructions are clear and straightforward, providing a solid foundation for task comprehension.	Instructions are consistently clear, offering precise guidance on task requirements.	Instructions are obvious, leaving no room for misinterpretation and ensuring a solid task understanding.

Technical Language Usage	Technical terms are used without explanation, potentially confusing.	Some technical terms are present, but definitions are provided to enhance comprehension.	Technical language is avoided chiefly, and clear definitions are provided for understanding when used.	Technical terms are entirely avoided, or when necessary, they are well-defined to ensure accessibility.	Performance instructions consistently avoid technical jargon, prioritizing understanding.
Completeness of Task Resources	Task resources are incomplete and missing important information needed for successful completion.	Resources are partially complete, providing some but not all necessary information.	Resources are primarily complete, covering most aspects needed to engage with the task.	Task resources are comprehensive, including all relevant information required for successful completion.	Task resources are not only fully comprehensive but also exceptionally well-organized.
Clarity of Performance Criteria	The criteria for evaluating performance are overlapping or ambiguous, making it challenging to understand expectations.	The criteria are somewhat clear, but there is room for improvement in distinguishing between different performance levels.	The criteria are generally clear, with distinct differences between performance levels, but minor room for improvement may exist.	The criteria are apparent, making distinguishing between different performance levels easy.	The criteria are clear, leaving no room for misinterpretation and ensuring precise performance evaluation.

RESULTS AND DISCUSSION

The study determines the learner-based and instructional-based factors contributing to the subject's inability to follow written instructions. Determining these factors leads to an intervention proposal to address the existing problem.

Learner-based Factors

The learner-based factors cover the themes, ranging from distractions affecting working memory to the impact of personal circumstances on concentration. The table below presents the data related to learner-based factors.

Table 3

Learner-based Factors contributing to the inability to Follow Written Instructions.

Themes	Codes
Working Memory	Easily distracted by outside factors
	Difficulty staying focused
	Difficulty with complex tasks/subjects
Cognitive Load	Difficulty in comprehending complex tasks
	Lack of visual understanding
	Difficulty understanding complicated or ambiguous ideas
Personal Factor	Household chores and responsibilities
	Taking care of sick family members
	Experience stress and anxiety
	Lack of motivation

	Time constraints
	Unable to ask questions confidently
Learning Environment	Preference for face-to-face learning

Table 3 enumerates the four learner-based factors attributed to the inability to follow instructions. The factors are categorized into four themes: Working Memory, Cognitive Load, Personal Factors, and the Learning Environment.

Working Memory encompasses the cognitive aspects of the challenge. It becomes evident that learners vary in their ability to concentrate and retain information. Some are easily distracted by external factors, while others find it challenging to stay focused. The subject acknowledged, *"There are times while I am doing my tasks, I get distracted due to outside factors (Noisy neighborhood, tempted to use social media, etc.), and I tend to get out of focus and be unable to continue what I have been working on, so later, my answers or outputs would reach a point where it becomes unrelated to the instruction or question, thus affecting my overall output."* Additionally, tackling complex tasks or subjects can strain working memory, causing learners to stray from the instructions or task, leading to difficulties in comprehending and following instructions.

Cognitive Load further complicates the scenario. Learners may grapple with instructions that involve intricate or ambiguous ideas. Visual materials, often used to enhance comprehension, can sometimes become sources of confusion, especially when they introduce complex diagrams or charts. The subject expressed, *"It is hard for me when the task is complex, and I don't know how I should understand its instructions and be able to imagine or have a visual understanding of what I am supposed to do."* Moreover, the inherent complexity of tasks and limited cognitive load capacity can overwhelm learners. This overload of cognitive resources can hinder their ability to decipher instructions effectively, as they may become mentally fatigued or lose track of critical details when instructions are overly convoluted.

Personal Factors delve into the individual circumstances and emotions learners bring to their study sessions. Household responsibilities, such as chores and caregiving duties, can interrupt a learner's study time, making it challenging to focus on instructions. The subject remarked, *"I was doing a lot of household chores and was responsible for my younger siblings and my sick uncle, who suffered from TB of the bones and was unable to move and take care of himself."* Stress and anxiety can also be substantial barriers, as they can impair cognitive functioning and lead to decreased concentration. Furthermore, factors like motivation, time constraints, and confidence play pivotal roles in determining a learner's commitment to the task. When learners need more motivation or are pressed for time, they may skip instructions hastily, missing critical details. The subject voiced, *"The problem was a lot of things were on my shoulder, responsibilities, and obligations at home, leading me to suffer from stress and anxiety, and so, I was unable to carefully read, analyze, understand, and follow the written instructions, just doing outputs on a rush and submitting them right off the bat."* Additionally, if they lack confidence in their abilities, they may hesitate to seek clarification when instructions are unclear, further exacerbating the challenge.

The Learning Environment is a contextual factor that influences learners' experiences. Some learners prefer face-to-face learning to interact with instructors and seek immediate clarification when instructions are unclear. The subject declared, *"Now, in a face-to-face*

setting, I have the opportunity to clarify things with the teacher and better understand the instructions." In contrast, in online or remote learning environments, where such immediate interactions may be limited, learners may face additional challenges in deciphering instructions, especially when guidance is primarily text-based and lacks the real-time support of a physical classroom.

During the pandemic, students faced major learning disruptions, including environmental distractions, anxiety, depression, poor internet service, and difficult home learning conditions, particularly affecting marginalized and remote students (Barrot et al., 2021). Copeland et al. (2021) noted negative impacts on behavioral and emotional functioning, with attention issues worsened by isolation. Seddon (2023) stressed the need to avoid cognitive overload to support learning. Fawaz et al. (2021) highlighted concerns over heavy task loads, technical issues, and the need for flexible learning environments. These challenges have negatively impacted students' ability to follow written instructions accurately.

Instructional-based Factors

Instructional-based factors focus on the written instructions from iLearn, which do not align with the participant's submitted work. The study evaluates the instruction's structure using a rubric to assess its effectiveness and determine if it contributes to the participant's difficulty following instructions.

The overall rating of the written instruction based on the rubric is excellent. It shows that the written instructions indicate high performance across all criteria. Each area of the written instructions is discussed below:

Clarity of Performance Task Instructions: All three instructions are rated "Very Good" for clarity, providing generally understandable directives. However, minor improvements in precision could be made. Instruction #1 could specify the types of discourses, while Instruction #2 would benefit from mentioning the literary theory from Module 1. Instruction #3 could enhance clarity by specifying the nature of the two-word reaction.

Technical Language Usage: The technical language across all instructions is excellent, using clear, accessible terms and avoiding unnecessary jargon. Instruction #1 effectively guides students in discourse creation, while Instructions #2 and #3 maintain clarity, even in complex tasks like literary analysis.

Completeness of Task Resources: Task resources are mostly complete across all instructions. Instruction #1 provides thorough details, while Instruction #2 could improve by referencing the literary theory from Module 1. Instruction #3 is mostly complete but could enhance clarity by explaining the two-word reaction.

Clarity of Performance Criteria: The performance criteria are clearly outlined in all instructions. Instruction #1 specifies steps for assessing discourses, Instruction #2 provides criteria for analyzing folk literature, and Instruction #3 offers clear guidance for creating a T-chart and story. Clarity and completeness in educational instructions are key for successful task completion, as emphasized by Elder and Federation University Australia

Possible Interventions

Determining the learner-based and instructional-based factors leads to finding a solution to the problem. The subject of the study suggests possible interventions to help

students follow instructions correctly despite the level of difficulty of tasks. The discussion centers on creating a supportive environment to address challenges in understanding written instructions. The possible interventions were determined by analyzing and interpreting the participant's interview responses.

As presented in the table below, several interventions can help aid learners' struggles, difficulty, and inability to follow written instructions.

Table 4
Suggested Interventions of the Subject of the Study

Themes	Codes
Supportive Environment	Visual Learning Support
	Teacher Support and Clarifications
	Encouraging Questions and Help
	Collaborative Learning
Technological Assistance	Use of Internet Tools
Continuous Learning	Continuous Learning and Improvement

Supportive Environment is a central theme in alleviating learners' challenges when deciphering written instructions. This theme encompasses a suite of interventions tailored to cultivate an environment conducive to learning. *Visual Learning Support* harnesses the potency of visual aids, such as diagrams and graphs, to augment instruction clarity, offering an alternative mode of comprehension (Shabiralyani et al., 2015). The subject confessed, "*I am a visual learner, and I can better understand instructions when there are visual aids, visual presentations, or visual demonstrations.*" This statement implies that by using visual aids can assist learners in comprehending instructions. *Teacher Support and Clarifications* underscore the indispensability of teacher involvement, where accessible educators provide elucidations when needed, empowering students to approach assignments with greater confidence. The subject claimed, *"I ask for clarifications from the teacher so that I can understand it more clearly with the help of the teacher's verbal explanations." Encouraging Questions and Help* creates a nurturing space that enables learners to seek assistance without hesitation, validating their queries and eradicating fears of uncertainty.

Finally, *Collaborative Learning* extols the benefits of peer interaction, capitalizing on group dynamics to illuminate obscure instructions through collaborative efforts and group discussions. The subject remarked, *"I think the best support will always be through the help of teachers and other people who are more knowledgeable than me."* Collectively, these interventions foster an inclusive atmosphere where learners feel supported and empowered in their quest to navigate instructions with clarity and confidence.

Technological Assistance introduces a contemporary dimension in tackling instruction-related hurdles by harnessing the potential of digital tools. Within this theme, *the Use of Internet Tools* strategically leverages the abundance of digital resources at learners' disposal (Alenezi, 2023). This includes online tutorials, interactive modules, and communication platforms, which extend accessibility and support. The subject confirmed, *"I use several*

internet tools like Google Search, YouTube, online dictionaries, etc., to learn and gather more information about the tasks I am supposed to do." This proposed intervention underscores the role of technology in enhancing the accessibility and clarity of instructions, aligning with the evolving educational landscape.

Continuous Learning underscores the enduring value of students' ongoing quest for knowledge to enhance their proficiency in following written instructions. Continuous Learning and Improvement signifies the commitment to persistent self-improvement within this theme. It entails students actively seeking knowledge and refining skills through continuous learning and independent research. The subject confessed, *"I plan to keep reading, learning, and becoming more knowledgeable each day to develop my skill in reading and comprehending written texts, including written instructions."* This dedication to self-enhancement is vital in bolstering their ability to comprehend and execute written directives accurately, as it fosters a proactive approach to improving their instructional literacy.

In response to challenges, students used coping mechanisms such as seeking help from teachers and relatives. Visual aids, as advocated by Shabiralyani et al. (2015), improved instruction clarity, while Internet tools, highlighted by Alenezi (2023), provided digital resources to address challenges. These strategies reflect a multifaceted approach, combining personal coping, innovative teaching, and technology integration.

CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

The learner-based factors contribute more to a subject's inability to follow written instructions than the instruction, for the instructions show a minimal deficiency. Yet, the subject of the study failed to follow the written instructions accurately. Notably, the subject shares personal experiences and struggles, shedding light on the factors contributing to their challenges in adhering to instructions. These factors also lead to the conclusion that the factors contributing to the learner's inability to follow written instructions are not solely based on the cognitive domain of the learner but also on the learner's affective and psychological domain. Furthermore, the subject of the study is self-aware of the reasons behind the challenges in following instructions and possesses the knowledge to overcome these obstacles. The study focused on a single student enrolled in one course under a specific professor. Written instructions were provided exclusively through the LMS, limiting direct interaction for clarification.

Learners may embrace recommended interventions like cultivating a supportive environment, utilizing technological assistance, and committing to continuous learning. Teachers may adapt strategies to address working memory variations, reduce cognitive load, and create a supportive learning environment to enhance students' ability to follow instructions. Clear and explicit instructions in instructional materials are crucial. Future research should focus on related areas to expand upon these findings. By collaborating with psychologists, technology experts, and other professionals, educators can develop comprehensive and interdisciplinary approaches to address identified challenges.

ACKNOWLEDGEMENTS

This paper acknowledges the significant individuals who made this paper possible:

Mr. and Mrs. Winnie Toledanes, the panel members, and friends. These individuals have supported and motivated the researcher to complete this paper. Thank you to all of you.

REFERENCES

Alenezi, M. (Jan. 2023) "Digital Learning and Digital Institution in Higher Education." *Education Sciences*, vol. 13, no. 1, Multidisciplinary Digital Publishing Institute, p. 88, doi:10.3390/educsci13010088.

Akyar, I. (2012). "Standard Operating Procedures (What Are They Good For?)." *InTech eBooks*. https://doi.org/10.5772/50439.

Baddeley, A. D. (2007) "Visuospatial Short-term Memory." *Oxford University Press eBooks*, pp. 63–84. https://doi.org/10.1093/acprof:oso/9780198528012.003.0004.

Baddeley, A. D., & Hitch, Graham J. (1994). "Developments in the Concept of Working Memory." *Neuropsychology*, vol. 8, no. 4, pp. 485–93. https://doi.org/10.1037/0894-4105.8.4.485.

Barrot, J. S., et al. (May 2021). "Students' Online Learning Challenges During the Pandemic and How They Cope With Them: The Case of the Philippines." Education and Information Technologies, vol. 26, no. 6, pp. 7321–38. https://doi.org/10.1007/s10639-021-10589-x.

Bhat, A. (July 2023). "Exploratory Research: Types & Characteristics." *QuestionPro*. www.questionpro.com/blog/exploratory-research.

Bruner, J. (1966). "Toward a Theory of Instruction." *The Belknap Press of Harvard University Press Cambridge*. https://tinyurl.com/3xna3xpb.

Copeland, W. E., et al. (Jan. 2021). "Impact of COVID-19 Pandemic on College Student Mental Health and Wellness." Journal of the American Academy of Child and Adolescent Psychiatry, vol. 60, no. 1, pp. 134-141.e2. https://doi.org/10.1016/j.jaac.2020.08.466.

Dunham, S., et al. (February 2020). "The Psychology of Following Instructions and Its Implications." *The American Journal of Pharmaceutical Education*, vol. 84, no. 8, pp.1052-1056. https://doi.org/10.5688/ajpe7779.

Fletcher, J. & Vaughn, S. (1 June 2021). "Explicit Instruction as the Essential Tool for Executing the Science of Reading." PubMed Central (PMC). www.ncbi.nlm.nih.gov/pmc/articles/PMC9004595.

Gathercole, S. E., & Alloway, T. P. (2016). "Working Memory and Learning: A Practical Guide for Teachers." Sage Publications. https://tinyurl.com/yc7nzyzr.

Gray, J. A., & DiLoreto, M. (May 2016). "The Effects of Student Engagement, Student Satisfaction, and Perceived Learning in Online Learning Environments." NCPEA International Journal of Educational Leadership Preparation, vol. 11, no. 1. files.eric.ed.gov/fulltext/EJ1103654.pdf.

Houston, L (September 2017). "Working Memory Difficulties: Strategies for the Classroom." *LD@School*. www.ldatschool.ca/working-memory-difficulties.

Kuklick, L. & Lindner, M. A. (April 2023) "Affective-motivational Effects of Performance Feedback in Computer-based Assessment: Does Error Message Complexity Matter?"

Contemporary Educational Psychology, vol. 73, p. 102146. https://doi.org/10.1016/j.cedpsych.2022.102146.

Locus, S. (Dec. 2023). "Pinoy Learners Lagging in Math, Science, Reading - Study." *GMA News Online*, 5. www.gmanetwork.com/news/topstories/nation/890495/pinoy-learners-lagging-in-math-reading-study/story.

Lodge, J. M., et al. (June 2018) "Understanding Difficulties and Resulting Confusion in Learning: An Integrative Review." *Frontiers in Education*, vol. 3, Frontiers Media. https://doi.org/10.3389/feduc.2018.00049.

Malamed, C. (20 June 2024). "Six Strategies You May Not Be Using to Reduce Cognitive Load." *The eLearning Coach.* theelearningcoach.com/learning/reduce-cognitive-load.

Mcleod, S. (November 2023). "Working Memory Model (Baddeley and Hitch)." *Simply Psychology*. www.simplypsychology.org/working-memory.html.

Shabiralyani, G., et al. (January 2015). "Impact of Visual Aids in Enhancing the Learning Process Case Research: District Dera Ghazi Khan." *Journal of Education and Practice*, vol. 6, no. 19, IISTE, pp. 226–33. www.files.eric.ed.gov/fulltext/EJ1079541.pdf.

Politz, D. (26 Mar. 2024). "Reflexive Thematic Analysis (RTA) in Qualitative Research — Delve." Delve. delvetool.com/blog/reflexive-thematic-analysis.

Swanson, H. L. et al. (October 2022). "What Mediates the Relationship Between Growth in Math Problem-solving and Working Memory in English Language Learners?" *Journal of Educational Psychology*, vol. 114, no. 7, pp. 1608–32. https://doi.org/10.1037/edu0000718.

Williams, J. P. (September 2018). "Text Structure Instruction: The Research Is Moving Forward." Reading & Writing, vol. 31, no. 9, pp. 1923–35. https://doi.org/10.1007/s11145-018-9909-7.