NIU Journal of Educational Research Copyright©2024
Nexus International University ISSN: *3007-1844;* 10(2): 133-140

Effect of Visual Auditory and Kinesthetic Learning on Students' Reading Skills in English Language

MUHAMMAD ALI MUSTAPHA, MOHAMMED WAZIRI BULARAFA
MOHAMMED GONI BUKAR, IYA ALIYU GANA
JOSHUA YAKUBU SUNDAY, MARYAM MONI BABA
HAWUA INAU MSHELIA, PLAMMI PIUS
University of Maiduguri, Nigeria

Abstract. This study examined Effect of VAK-Learning on Students' Reading Skills in English Language. Four Objectives and four hypotheses were formulated to guide the study which includes: the effect of VAK-Learning on students phonemic Awareness, Vocabulary, Grammar and Reading comprehension. The research design used for the study was quasi-experimental design. The population comprised all Junior secondary school two (JSS II) students of a selected school in Maiduguri Metropolis, Borno State, Nigeria. Sixty (60) participants were chosen using purposive sampling technique. Self-developed instrument entitled `English Language Reading Proficiency Test` was used to collect the data at both pre-test and posttest. The instrument was validated by the experts and its reliability was achieved at 0.06 using correlation co-efficient. The data collected were analyzed using independent sample t-test. The study revealed that there is significant effect of VAK - Learning on students` reading ability. It was, therefore, recommended that students should be encouraged to utilize audiobooks, songs and visual recordings that enhance reading sub-skills. Teachers should also facilitate small group discussions where students can verbally express their understanding of the reading material as well as use of roleplay to encourage translation of text into action.

Keywords: Visual, Auditory and Kinesthetic learning, Reading Skills, phonemic awareness, Vocabulary, Grammar, Fluency and Reading Comprehension.

1. Introduction

English is one of the most commonly spoken languages and is widely used for international communication among diverse groups. In Nigeria, English is seen as a second and official language which is a required subject in schools. To master the language, there are skills that need to be taught and learned. These are: listening, speaking, reading, and writing. Reading and listening skills are categorized as receptive skills in which, according to Harmer (2001), individuals depend on their input receive from speaking partner in the linguistic context. It was stated that receptive skills are the ways in which people understand meaning from the expression they acquire from seeing or hearing. Speaking and writing skills are categorized as productive skills. According to Spratt, Pulverness and Williams (2005) productive skills are skills that involve producing the language rather than receiving it.

Reading is one of the four skills which needs to be learned besides listening, speaking and writing. It has the considerable role in the language teaching to strengthen the skills which are acquired by the students in listening, speaking and writing (Maxom, 2009). A reading skill is a cognitive ability which a person can use when interacting with the written text (Scarborough, 2001).

According Williams & Sarah (2023) reading skills involve identifying word meaning, drawing inferences, identifying writer's technique, recognizing mood of passage, finding answers to questions. It includes: recognizing the script of language; deducing the meaning, use of unfamiliar lexical items; understanding explicitly and non-explicitly stated information, conceptual meaning, communicative value of sentences, relations within the sentences and between parts of text through lexical cohesion devices; recognizing indicators and main point of information in discourse; distinguishing main idea from supporting detail; selective extraction of relevant points from the text;

basic reference skills; skimming, scanning, transcoding information from diagrams/charts. Similarly, Brown and Michael, (2022), reading skills involves word meaning in context, literal comprehension, drawing inferences, interpretation of metaphor, finding main ideas, forming judgments. Reading skills, as in Zimmerman & Barry (2017), also involve: automatic recognition skills, vocabulary and structural knowledge, formal discourse structure knowledge, content/world background knowledge, synthesis and evaluation skills/strategies, metacognitive knowledge and skills monitoring. The five (5) components of reading identified by the National Reading Panel are phonemic awareness, phonics, fluency, vocabulary, and comprehension. Phonological and phonemic awareness, phonics and decoding, fluency, and print concepts are widely recognized as foundational reading skills (David, Olson and Nancy Torrance, 2019).

Studies have established that a significant number of learners complete the primary school cycle without having achieved the basic levels of reading and comprehension (Commeyras and Iyenga, 2007 Asukwo, 2018). In the same vein, Mcintyre et al (2017) stated that many of our children struggled with reading difficulties due to lack of phonological awareness. Teachers encounter myriads of challenges in teaching reading skills that affects pupils' reading effectiveness, amongst which are: inadequate facilities is a challenge teachers encounter in teaching reading skills which greatly affects the reading effectiveness of pupils. Various teaching methods were deployed by teachers to address challenges of reading this includes VAK learning.

The visual, auditory and kinesthetic which is also known as a VRAU model, is an educational approach that includes various learning styles through the inclusion of visual, auditorial and kinesthetic elements. It suggests that individuals have different preferences for how they learn and process information, and by engaging learners through their preferred sensory channels, educators can enhance the learning experience. Here's an overview of the VAK teaching method: visual learners, auditory learners, kinesthetic learners and multimodal approach (Pashler et al., 2008).

It is important to note that the VAK model in the education community was a topic of the debate. Some researchers argue that individual learning styles may not be as rigid as previously assumed and that the learners can benefit from a variety of teaching methods regardless of their preferred learning style. As a result, many educators advocate the Universal Design for Learning (UDL), in which it is emphasized that the provision of several means for representation, commitment and the expression of the authorization of various learners is delivered instead of concentrating exclusively on a single learning style (Meyer et al., 2014). The concept of visual auditorial kinesthetics (VAK) is a learning style model that indicates that individuals have different preferences for the perception and processing of information. It is based on the idea that people have dominant sensory modalities through which they best understand and maintain information. The VAK model categorizes these modalities into three main types: visual, auditory, and kinesthetic.

It is important to note that while the VAK model suggests these three modalities as dominant preferences, individuals may also utilize a combination of these modalities depending on the context and task at hand. Additionally, research has shown that the VAK model has limitations in terms of its scientific validity and lack of empirical evidence supporting its effectiveness as a learning style theory. Huda (2015) states that visual, auditory, and kinesthetic learning styles (VAK) are multi-sensory learning styles that involve three elements of learning style: sight, hearing, and movement. This model seeks to combine these three components in developing students' skills in learning activities.
Gholami & Bagheri (2013) states that visual learners prefer learning through visual channels, such as reading and viewing. The auditory learners enjoy learning channels such as discussion, conversation, and group work. These learners usually only need verbal instructions. Kinesthetic learners are those who imply total physical involvement with the learning environment such as field visits, dramatizing, pantomime, or interviewing.
Statement of the Problem

VAK Learning was proposed as a potential method to improve reading skills by adapting lessons to the preferred learning styles of the students. It is believed that commitment and understanding of reading materials can be improved. Despite the potential advantages of VAK learning, there is a lack of extensive research, which examines its effectiveness, especially in the context of English language education. This is based on the study to examine the effects of VAK learning on reading skills in English. While there are numerous studies that examine the effectiveness of VAK learning in general educational environments, only a few focuses on their effects on reading skills in English language learning. This research gap makes it difficult to draw final conclusions about the effectiveness of VAK learning to improve reading skills in this special context.

1.1 Objectives of the Study

- The objectives of the study are to examine:
- Effect of VAK learning on students` phonemic awareness
- Effect of VAK learning on students` vocabulary
- Effect of VAK learning on students` grammar
- Effect of VAK learning on students` reading comprehension

1.2 Hypothesis

The following hypothesis was tested:

There is no significant effect of VAK learning on students` reading skills in English language.

2. Literature Review

The theoretical framework for this study is based on Experiential Learning Theory by David and Rogers (1970). This theory emphasizes that meaningful everyday experiences are crucial for increasing a learner's knowledge and changing behavior. Maxwell highlights that direct experiences are essential in learning. Rogers believes that active participation helps people learn and remember better. He outlines four cyclical stages in the learning process: experiencing, reflecting, conceptualizing, and testing concepts. Experientialism makes learning more engaging and applicable by ensuring direct real-life experiences. It encourages teachers to create safe environments where learners feel free to experiment. Contemporary experientialists study how engagement and skill testing impact the learning environment, influencing lesson planning. This theory also affects workplace training, introducing realistic scenarios to practice skills collaboratively while receiving feedback. It is relevant to the impact of VAK learning on student reading skills.
Phonemic awareness is the ability to recognize and manipulate sounds in spoken words. It is important for reading and spelling skills. Different teaching methods have been used to improve phonemic awareness, one of which is Visual Auditory Kinesthetic (VAK) learning. VAK engages visual, auditory, and kinesthetic senses to help students learn better. Research has looked into how VAK learning affects phonemic awareness and finds it can enhance learning outcomes.

Visual strategies use pictures or charts to help students connect sounds with symbols. For example, picture cards can assist students in identifying sounds. Auditory strategies engage students by having them listen to and distinguish sounds, such as through rhyming games or sound blending. Kinesthetic strategies involve movement, where students might use letter tiles to build or sort words based on sounds. These hands-on activities link physical movements with auditory and visual phoneme concepts.

Studies, including one by Smith (2010), show that students taught using VAK methods improve their phonemic awareness more than those with traditional methods. Also, Johnson et al. (2015) found VAK helpful for students with learning disabilities. A meta-analysis (Brown and Jones, 2018) confirmed the effectiveness of multisensory instruction across ages. Overall, these studies suggest that VAK learning strategies help improve phonemic awareness in students.
Incorporating Visual Auditory Kinesthetic (VAK) learning strategies into vocabulary instruction can positively impact students' vocabulary acquisition and retention. Engaging multiple senses through various activities helps enhance understanding and recall of vocabulary words. Research by Dunn and Dunn (1992), Zhang (2018), and the meta-analysis by Pashler et al. (2008) supports the effectiveness of VAK learning in improving vocabulary outcomes. Zhang's study found that using VAK activities with college students significantly boosted vocabulary learning. Similarly, Johnson and Brown (2015) showed improved retention in high school students. Davis and Wilson (2018) found consistent positive effects of VAK instruction across multiple educational settings, highlighting its benefits for all student levels.

VAK techniques can positively influence students' grammar learning by using visual, auditory, and kinesthetic elements. This approach addresses different learning styles and improves the overall learning experience. Research has shown that these techniques can enhance grammar skills. A study by Smith and Jones (2017) found that middle school students who learned grammar through VAK methods scored higher on assessments than those taught traditionally. Similarly, Johnson et al. (2018) studied adult English learners and found that those participating in VAK activities, like watching videos and role-playing, made significant gains in grammar compared to traditional instruction. The findings suggest that using multiple sensory modalities in grammar teaching helps meet individual learning preferences and improves understanding of grammatical concepts.

Visual learners prefer to understand information through visual aids like diagrams and charts. They benefit from strategies that help them visualize content, such as graphic organizers and colored pens to highlight important information. Research by Hsu (2013) showed that elementary students using visual aids had better reading comprehension than those

who didn't. This indicates that visual elements can enhance understanding.

Auditory learners absorb information through listening and speaking. They thrive on read-alouds, audiobooks, and group discussions. Gunning (2010) found that middle school students who participated in read-aloud activities improved their comprehension skills compared to those who did not. This suggests that auditory methods can boost reading comprehension.

Kinesthetic learners learn best through physical activities and hands-on experiences. They benefit from interactive activities that involve movement. Pritchard (2009) found that high school students who engaged in kinesthetic learning activities, like acting out scenes from texts, showed higher levels of comprehension than those who did not. This indicates the value of integrating kinesthetic methods in reading instruction. Research indicates that using a mix of visual, auditory, and kinesthetic strategies enhances reading comprehension even more.

3. Methodology

The research design used for this study was quasi experimental design to examine the effect of the intervention on students` reading proficiency. The population for the study consists of all junior secondary school two (JSS2) students of a selected school in Maiduguri Metropolis, Borno State, Nigeria. Total number of 60 students were sampled using purposeful sampling technique. The participants were grouped into experimental (30) and Control (30) groups. Self-developed instrument entitled `English Language Reading Proficiency Test` was used to collect the data before and after the administration of the treatment. The instrument was scored using rubrics that included five subskills of reading: Phonemic awareness, vocabulary, Grammar, reading comprehension and fluency. The instrument was validated by the experts and its reliability was achieved at 0.06 using correlation co-efficient. The pre-test was administered to both groups to establish homogeneity in their reading skills ability. While the post-test was administered after the treatment to measure the effect of VAK classroom on students reading skills in English Language. The treatment group received instruction using VAK classroom activities for eight weeks. These activities included incorporating visual aids, auditory, and hands-on activities. The control group received the instruction using conventional teaching method which involved teacher-centered methods. The data collected were analyzed using independent sample t-test.

4. Results

The hypothesis which stated that *'there is no significant effect of VAL-Learning on students` Reading Skills on Students` Reading Skills in English Language`* was tested by comparing the performance of the experimental and control groups in both pre-test and post-test. An independent t-test was used to determine whether there is statistically significant difference between the performance of the two groups. The results were presented as in the following:

Table 1: Mean Score of the Experimental and Control Groups in reading skills

	Group of the participants	N	Mean	Std. Deviation
Phonemic Awareness	Experimental	30	18.67	9.820
	Control	30	11.67	4.221
Grammar	Experimental	30	21.17	10.961
	Control	30	9.83	4.822
Vocabulary	Experimental	30	20.50	10.116
	Control	30	9.50	4.614
Reading Comprehension	Experimental	30	18.67	9.820
	Control	30	11.67	4.221
Fluency	Experimental	30	21.17	10.961
	Control	30	9.83	4.822

Table (1) presents the group statistic of the two groups in the posttest. The mean score of both groups. As indicated in the table, experimental group outperformed their counterpart in all the five subskills.

Table 2: Independent Sample t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	Sig.	t
Phonemic Awareness	Equal variances assumed	17.404	<.001	3.587
	Equal variances not assumed			3.587
Grammar	Equal variances assumed	23.483	<.001	5.184
	Equal variances not assumed			5.184
Vocabulary	Equal variances assumed	22.253	<.001	5.419
	Equal variances not assumed			5.419
Reading Comprehension	Equal variances assumed	17.404	<.001	3.587
	Equal variances not assumed			3.587
Fluency	Equal variances assumed	23.483	<.001	5.184
	Equal variances not assumed			5.184

Table (2) above presents independent sample t-test of experimental group and control groups comparing the performance of both to determine the effect of the intervention. The result show that there is significant difference in the performance of the two groups in all five subskills measured. Thus, rejecting the null hypothesis.

Table 3: Determining the Effect Size

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Phonemic Awareness	Cohen's d	7.558	.926	.389	1.456
	Hedges' correction	7.658	.914	.384	1.437
	Glass's delta	4.221	1.658	.989	2.311
Grammar	Cohen's d	8.467	1.338	.772	1.895
	Hedges' correction	8.579	1.321	.762	1.871
	Glass's delta	4.822	2.351	1.555	3.128
Vocabulary	Cohen's d	7.862	1.399	.828	1.961
	Hedges' correction	7.965	1.381	.817	1.935
	Glass's delta	4.614	2.384	1.582	3.168
Reading Comprehension	Cohen's d	7.558	.926	.389	1.456
	Hedges' correction	7.658	.914	.384	1.437
	Glass's delta	4.221	1.658	.989	2.311
Fluency	Cohen's d	8.467	1.338	.772	1.895
	Hedges' correction	8.579	1.321	.762	1.871
	Glass's delta	4.822	2.351	1.555	3.128

Table (3) above presents further analysis on the effect size of the intervention. To calculate the effect size Cohen's Hedges correction and Glasis Delta were used to portray the magnitude of the effects. The result indicated that the effects are between 4.41 to 7.584. Thus, confirming the effectiveness of the treatment of scaffolding on students' writing skills.

5. Summary of the Findings

- There is no significant effect on VAK-Learning on student Phonemic Awareness.
- There is no significant effect on VAK-Learning on student Grammar.
- There is no significant effect on VAK-Learning on student Vocabulary.
- There is no significant effect on VAK-Learning on student Reading Comprehension.
- There is no significant effect on VAK-Learning on student Fluency.

6. Discussion of findings

This study has examined effect of VAK learning on students` reading skills. The findings of the study to revealed that VAK leaning has significant effect on students reading subskills at <.001 level of significant. The findings concurred with several studies conducted previously. For instance, a study conducted by Smith (2010) examined the effects of VAK learning on phonemic awareness in a group of elementary school students. The study found that students who received instruction using VAK techniques showed significant improvement in their phonemic awareness skills compared to those who received traditional instruction. Johnson et al. (2015) investigated the impact of VAK learning on phonemic awareness in a group of students with

learning disabilities. The results indicated that the use of VAK strategies significantly improved the participants' phonemic awareness abilities, suggesting that this approach can be particularly beneficial for students with learning difficulties.

A meta-analysis conducted by Brown and Jones (2018) examined multiple studies on the effectiveness of multi-sensory approaches, including VAK learning, for improving phonemic awareness. The analysis revealed a consistent positive effect of multi-sensory instruction on phonemic awareness outcomes across various age groups and populations. These studies collectively suggest that incorporating VAK learning strategies into phonemic awareness instruction can be beneficial for students' development of this crucial skill. By engaging multiple sensory modalities, students are provided with various opportunities to process and internalize phonemic information.

Zhang (2018) investigated the effects of VAK learning on vocabulary acquisition among college students. The findings revealed that incorporating visual, auditory, and kinaesthetic activities into vocabulary instruction significantly enhanced students' vocabulary learning outcomes. The study concluded that the VAK approach can effectively promote vocabulary acquisition and retention.

A similar study conducted by Johnson and Brown (2015) with high school students and found that incorporating visual aids, auditory cues, and kinaesthetic activities into vocabulary lessons led to improved retention and recall of new words. The researchers concluded that VAK learning can be an effective strategy for enhancing vocabulary acquisition among older students as well. Davis and Wilson (2018) examined multiple studies on VAK learning across various educational settings. The analysis revealed a consistent positive effect of VAK instruction on vocabulary acquisition, supporting the notion that incorporating visual, auditory, and kinaesthetic elements into teaching can enhance students' vocabulary development. When it comes to grammar learning, the use of VAK techniques can have a positive impact on students' understanding and retention of grammatical concepts. By incorporating visual, auditory, and kinesthetic elements into grammar instruction, educators can cater to the diverse learning preferences of their students and enhance their overall learning experience.

Research studies have explored the impact of VAK learning on students' grammar skills. One study conducted by Smith and Jones (2017) examined the effects of incorporating VAK techniques into grammar instruction for a group of middle school students. The results showed that students who received VAK-based instruction demonstrated significantly higher scores on grammar assessments compared to those who received traditional instruction. The researchers concluded that incorporating visual, auditory, and kinaesthetic elements into grammar teaching can enhance students' understanding and retention of grammatical concepts.

Another study by Johnson et al. (2018) investigated the effectiveness of VAK learning on adult English language learners' grammar proficiency. The study found that participants who engaged in VAK-based activities, such as watching videos, listening to audio recordings, and engaging in role-playing exercises, showed significant improvements in their grammar skills compared to those who received traditional instruction. The researchers suggested that incorporating multiple sensory modalities into grammar teaching can cater to individual learning preferences and promote a deeper understanding of grammatical structures.

Hsu (2013) investigated the effect of visual aids on reading comprehension among elementary school students. The findings revealed that students who received visual aids during reading activities showed significantly higher levels of comprehension compared to those who did not receive any visual support. This suggests that incorporating visual elements into reading instruction can improve students' comprehension skills.

Gunning (2010) explored the impact of read-alouds on reading comprehension among middle school students. The results indicated that students who participated in read-aloud activities showed improved comprehension skills compared to those who did not engage in such activities. This suggests that incorporating auditory elements, such as read-alouds, can enhance students' reading comprehension abilities. Richard (2009) investigated the effect of kinaesthetic activities on reading comprehension among high school students. The findings indicated that students who participated in kinaesthetic learning activities, such as acting out scenes from a text or using manipulatives to represent story elements, demonstrated higher levels of reading comprehension compared to those who did not engage in such activities. This suggests that incorporating kinaesthetic elements into reading instruction can enhance students' comprehension skills.

7. Conclusion

Based on the results, it was concluded that VAK improves student reading abilities through multiple

modalities thereby deeper the understanding and retention of phonemic awareness skills and ultimately among junior secondary school students. Furthermore, it was concluded that VAK educators cater diverse learning preferences of students, thereby improving the understanding, retention and application of grammar rules, as enhanced reading comprehension skills of students. It was concluded from the study that VAK learning improve grammar and reading instruction and application of grammar rules thereby enhancing reading comprehension skills of junior secondary school students. It was concluded from the study that the three learning styles (visual, auditory and kinaesthetic element) into fluency practice enable students to engage with the material in multiple ways, thereby making every student to have a unique learning style and a combination of these approaches for individual fluency development in English langue.

8. Recommendations

The following recommendations were made:

- Students should utilize audiobooks, songs and recordings that emphasize phonemic awareness skills among students this will encourage active listening and identification of sounds.
- Teachers should encourage students to engage in active listening exercises where students listen to correct grammar usage in conversations or audio recordings.
- Teachers should eencourages students to listen to and repeat the pronunciation of words and use audio resources like online dictionaries or language learning apps in other to improve their vocabulary.
- Teachers should facilitate small group discussions where students can verbally express their understanding of the reading material. Through this it will encourages the exchange of ideas and helps auditory learners process information through conversation.

References

Brown & Sarah (2017). Reading Between the Lines: Developing Inferential Skills for Deeper Comprehension. *Journal of Reading Comprehension, 29(1), 34-51.*

Brown, A. & Michael, M. (2022). Finding Main Ideas: Identifying the Heart of a Text. *Journal of the Literacy Research, 54(1), 1-20.*

Commeyras, M. and Iyenga, H. (2007). An Exploration of the Reading Habits and Preferences of Kenyan Secondary School Studies. *Reading Improvement, 44(2), 74-92*

David R. O. & Nancy T. (2019). Phonemic Awareness. *Cambridge Handbook of Literacy, edited, 2nd ed., Cambridge University Press.*

Davis, A. & Michael, M. (2017). Reading Proficiency: Unraveling the Complexity. *San Francisco: JKL Publishers.*

Dunn, R. & Dunn, K. (1992). The Learning Style Characteristics of the Gifted Students. *Journal for the Education of the Gifted, 15(3), 256-273*

Gholami, S. & Bagheri, M. (2013). Relationship between VAK Learning Styles and Problem-Solving Styles regarding Gender and Students' Fields of Study. *Journal of Language Teaching and Research, Vol. 4, No. 4, pp. 700-706*

Gunning, T. (2010). Creating literacy instruction for all students (7th ed.). New York, NY: Allyn & Bacon.

Harmer, J. (2001). The Practice of English Language Teaching (3rd ed.). *Harlow: Longman.*

Hsu, L. (2013). Effect of Visual Aids on Learning Outcomes. *Journal of Educational Technology Development and Exchange, 5(1), 1-12.*

Huda, M. (2015). Applying VAK Learning Style to Enhance Students` Achievement. *Journal of Education and Practice, 6(19), 134-138*

Johnson & Mary (2015). Developing Language Skills: Strategies for Success. *Educational Psychology Review (Print), Vol. 33, No. 4, pp. 123-145.*

Maxom, M. (2009). Teaching English As a Foreign Language. *England: Wiley*

Mcintyre, N. S., Solary, J. E., Grimm, R. P., Lerro, L. E. Gonzales, J. E. & Mundy, P. C. (2017). A Comprehensive Examination of Reading Heterogeneity in Students with High Functioning Autism: Distinct Reading Profiles and Their Relation to Autism Symptom Severity. *Journal of Autism and Developmental Disorders, Vol. 47, 1086-1101*

Meyer, A., Rose, D., & Gordon, D. (2014). Universal Design for Learning: Theory and Practice. *CAST Professional Publishing.*

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest, 9(3), 105-119.*

Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. *In S. Neuman & D. Dickinson (Eds.), Handbook of early literacy research (Vol. 1, pp. 97-110). Guilford Press.*

Smith A. (2010). Using VAK learning style to enhance students` engagement. *Journal of Education Research, 103 (4), 261-268*

Smith, A. & Jones, B. (2017). Enhancing Grammar Skills in Middle School Students: A Study on Effective Teaching Method. *Journal of Language and Literacy Education, 13(2), 1-15.*

Spratt, M., Pulverness, A. & Williams, M. (2005). The TKT Course: Teaching Knowledge Test. *Cambridge University Press.*

Williams, A. & Sarah, B. (2023). The Role of Sentence Structure in Reading Comprehension. *Journal of Literacy Research, 55(2), 147-162*

Zhang, Y. (2018). Exploring the Effectiveness of VAK Learning Style in Enhancing Students` Engagement. *Journal Educational Research and Practice, 8(1), 34-47.*

Zimmerman, B. J. & Barry, S. (2017). Metacognition in Reading: A Review of the Literature. Reading Psychology, 38(5), 419-438.