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A Comparison Study in the Achievement of EFL University Learners' Reading Comprehension according to Unimodal Versus Multimodal Learning Styles

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Abstract

This study investigates which type of learning style influences reading achievement among sophomore learners at the University Level: unimodal or multimodal learning. In other words, the study was designed to answer the question of who performed better in the reading comprehension subject: those who use a unimodal learning style or those who employ a multimodal learning style in their learning of reading. The sample consisted of one hundred forty-six sophomore male and female EFL learners enrolled in the Department of English at the College of Basic Education, University of Mosul. The study employed a quantitative method with a comparative research design, collecting data through a survey and reading comprehension achievement scores from a reading test that was administered by the instructor. Multiple Independent Samples T-test were used: first to identify the type of learning style(s) among sophomore learners, and second, to compare who performs better in reading comprehension based on mean and standard deviation. The findings showed that the Auditory and Read/Write learning style was the dominant multimodal learning style used by sophomores EFL learners at the Mosul University level. In contrast, the Visual and Kinaesthetic learning styles were the unimodal learning style among the learners. Moreover, the study concluded that sophomore learners with the multimodal (Auditory and Read/Write) learning style performed better than their peers who relied on unimodal learning styles(visual and kinaesthetic) in their reading comprehension.

دراسة مقارنة في تحصيل الفهم القرائي لدى المتعلمين للغة الإنكليزية كلغة اجنبية في الجامعة وفقًا لأنماط التعلم الأحادية مقابل أنماط التعلم المتعددة

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المستخلص:

تبحث هذه الدراسة في نوع أسلوب التعلم الذي يؤثر على التحصيل القرائي للمتعلمين في السنة الثانية على المستوى الجامعي: التعلم احادي النمط او متعدد الوسائط. بمعنى اخر، تم تصميم الدراسة   للإجابة على سؤال من كان اداؤه أفضل في فهم القراءة، أ أولئك الذين يستخدمون أسلوب التعلم احادي او أولئك الذين يستخدمون أسلوب التعلم متعدد الوسائط في تعلمهم للقراءة. تألفت العينة من مائة وستة وأربعين طالبا من طلاب السنة الثانية لمتعلمي اللغة الإنكليزية كلغة اجنبية مسجلين في قسم اللغة الإنكليزية في كلية التربية الأساسية بجامعة الموصل. استخدمت الدراسة طريقة كمية مع تصميم بحث مقارن وجمع البيانات من خلال مسح معدل ودرجات تحصيل الفهم القرائي من اختبار القراءة الذي يديره الأستاذ المحاضر. تم استخدام اختبار (ت) للعينات المستقلة عدة مرات: اولا لتحديد نوع أسلوب(أساليب) التعلم بين المتعلمين في السنة الثانية ، وثانيا لمقارنة من يؤدي أفضل في فهم القراءة بناء على المتوسط الحسابي والانحراف المعياري. أظهرت النتائج ان أسلوب التعلم السمعي والقراءة/الكتابة هو أسلوب التعلم متعدد الوسائط السائد الذي يستخدمه طلاب السنة الثانية على مستوى جامعة الموصل. في المقابل، كانت أساليب التعلم البصرية والحركية هي أساليب التعلم أحادية النمط المستخدم بين متعلمي اللغة الإنكليزية كلغة اجنبية. علاوة عن ذلك، خلصت الدراسة الى ان المتعلمين في السنة الثانية الذين لديهم أسلوب التعلم متعدد الوسائط (السمعي والقراءة/الكتابة) كان اداؤهم أفضل من اقرانهم الذين اعتمدوا على أساليب التعلم أحادية النمط (البصرية والحركية) في فهمهم للقراءة.

الكلمات المفتاحية: أساليب التعلم، أسلوب التعلم المتعدد الوسائط، التحصيل القرائي، نموذج VARK

1. ## 1. Introduction

2. Weak language learning is a common issue in education, and one effective way to assess learners' success in this process is by evaluating their learning outcomes or achievement. Arsana (2011) confirmed the major role of learning styles in influencing language learning achievement, as they reflect physical, emotional, psychological, and environmental factors. Sadler-Smith (1996) defined learning styles as a distinctive and habitual manner of acquiring information and skills through study or experience. Moreover, Fleming & Mills in 1992 referred to the learning style as preferred ways in which learners process information, and they are often classified into different models, such as the VARK model, which includes Visual, Auditory, Reading/Writing and Kinaesthetic learning styles.

3. The VARK model, developed by Fleming and Mills (1992), identifies four distinct learning styles: visual learners, who absorb knowledge through images; auditory learners, who favors listening; while learners with a preference to read/write style prefer written and textual information as their primary learning method, and kinaesthetic learners prefer hands-on activities and physical movement. Understanding these differences is fundamental for educators aiming to tailor instructional methods according to learners' individual needs, thereby optimising academic learning achievement (Tuken & Pasinggi, 2018; Zagoto et al., 2019)

4. Reading skill proficiency, especially for learners learning English as a foreign language (EFL), is a critical indicator of overall language proficiency (Komiyama, 2009). Reading is a crucial academic skill for university-level EFL students and a gateway to broader educational opportunities. Given the significance of learning styles and reading proficiency, this study aims to identify the multimodal learning style "VARK" in reading comprehension among university EFL learners, and compare its use with the use of unimodal learning style concerning the performance of the learners. In line with the background of the study, learners struggle with reading comprehension due to unawareness of their learning styles, limited language knowledge of English reading skills, and difficulty in understanding, interpreting, and connecting information in texts. They also face difficulties in realising keywords and drawing conclusions from passages.

5. ## 2. Research Question and Hypothesis

6. The current study is guided by the following question and hypothesis:

7. Q1) Do EFL sophomore learners with unimodal learning styles perform better in reading than those with multimodal learning style?

8. Based on the research question mentioned above, the following hypothesis was proposed:

9. 1) EFL sophomore learners who use a multimodal learning style perform significantly better in reading comprehension than those who use a unimodal learning style.

10. 3. Review of Related Literature

11. 3.1 Learning Style

12. Understanding how learners process and acquire language is significant for developing effective teaching methodologies in Second Language Acquisition (SLA) because it significantly improves learners' attitudes toward learning and enhances academic performance (Al-Nazeer, 2015; Alwan, 2012). One core factor influencing language acquisition is learning style. According to Oladele (2024), learning style refers to individuals' distinct preferences and tendencies in perceiving, processing, and retaining information. These preferences are believed to significantly influence one's optimal learning environment and instructional methods, thereby playing a crucial role in overall academic performance. Moreover, Researchers in educational psychology and second language (L2) studies have observed that learners vary significantly in how they approach learning, with the term "learning styles" used to describe these differences. It is clear that individuals learn in different ways, and a method that applies for one learner may not be effective for another learner (Schmitt, 2010).

13. Although various learning style frameworks exist, the present study will concentrate on Fleming and Mills's 1992 VARK model, which classifies learners based on their preference for one or more learning styles: Visual, Auditory, Read/Write, and Kinaesthetic.

14. 3.1.1 Fleming and Mills's VARK (Visual, Auditory, Read/write and Kinaesthetic) Learning Model (1992)

15. The VARK model was developed by Neil Fleming in 1987, building on the earlier development of the VAK (Visual, Auditory, Kinaesthetic) model, which has its roots in early 20th-century cognitive and psychological studies, evolving from studies on mental imagery and word recall conducted in 1910. Over the decades, researchers have refined the VAK model. In 1992, Fleming and Colleen Mills expanded this model to create the VARK model (Fleming & Mills, 1992). The VARK model is considered one of the most widely accepted frameworks for understanding learning styles. It helps educators design lessons that cater to learners' individual learning preferences and provides a pedagogical framework for understanding how people perceive and process information effectively (Benmeddour, 2015; Oladele, 2024). According to this Model, Fleming & Mills (1992) categorize learning styles into: Visual (V), Auditory (A), Read/Write (R), and Kinaesthetic (K) learning styles.

16. • **Visual learners:** The visual learning style includes learners absorbing information through sensory processes and visual aids like text, images and pictures. Students who favor this style tend to feel more at ease learning by observing text presented in books, on whiteboards, or computer screens (Ab Kadir et al., 2022).

17. • **Auditory learners** outperform with spoken explanations and lectures. The auditory mode is characterised by a preference for information that is "heard". Learners with an auditory style engage with the material through listening, benefiting from lectures, discussions, and oral explanations (Fleming & Mills, 1992).

18. • **Read/Write learners** rely on written materials and note-taking (Hidayat et al., 2024). Learners with a preference for graphical and symbolic representations of information show a strong inclination towards learning from lists, essays, reports, textbooks, definitions, manuals, readings, web pages, and notes (Mabelinea Valle-Escobedo et al., 2024).

19. • **In contrast with other learning styles, kinaesthetic** learners thrive through activities and physical engagement, such as role-playing or interactive tasks. These learners require movement and practical engagement to absorb information effectively, and often learners with this style struggle to learn in a traditional lecture-based environment (Fleming & Mills, 1992). David (1984) asserted the importance of experiential learning, noting that learners engaged in physical tasks tend to remember information more effectively.

20. These unimodal learning styles reflect a single preferred mode: Visual, Auditory, Read/Write, and Kinaesthetic. What is mentioned in the next section represents a multimodal learning style, which involves a combination of two or more modes

21. **3.1.2 Multimodal Learning Style**

22. According to Kumassah et al. (2024), learners can be classified as unimodal, bimodal, trimodal, or quad-modal depending on how many learning styles they prefer. A unimodal learner prefers one mode of learning, while a bimodal learner favors two, in line with other learners, a trimodal learner favors three, and a quad-modal learner favors four modes of learning. So, according to this point, multimodal learning style involves incorporating or applying multiple learning styles to improve the educational experience (Rafiq et al., 2024). Additionally, learners may have multimodal learning styles with equal preferences, allowing learners to learn or adapt through diverse styles (Ghobain & Zughaibi, 2024).

23. According to Dressman (2019), multimodal learning style also includes combining various forms of expression, like visual, auditory, read/write, and kinetic elements, which are used to enhance understanding. For instance, applying multimodal pedagogy in EFL lectures involves significant challenges. Instructors must adapt to changing communication modes, understand their implications, and address the demands of integrating multiple modalities (Laadem & Mallahi, 2019).

24. **3.2. Reading Comprehension Achievement and Learning Styles**

25. Achievement, especially in the context of reading, is known as the extent to which learners comprehend a given text and the measurable outcomes they achieve, typically evaluated through tests. The reading achievement reflects successful comprehension and serves as a key indicator of learners' language learning proficiency (Shirfa, 2023). Engaging learners in language learning activities, especially in reading tasks, can significantly promote their reading performance. Reading engagement plays an integral role in fostering effective text comprehension and academic success. Thus, it is fundamental to investigate this factor within the context of language instruction to enhance learners' reading comprehension achievement (Zenebe & Kebede, 2024).

26. Effective reading instruction is important for enhancing academic achievement, especially in Foreign Language contexts (Shirfa, 2023). However, many learners face difficulty with reading comprehension, as shown by declining performance in both internal and external examinations. Poor teaching methods and the lack of specialized reading instruction contribute significantly to these difficulties, with traditional approaches failing to address learners' needs and resulting in widespread comprehension failures (Akubo et al., 2024).

27. Engaging learners in language learning activities, particularly reading tasks, can improve their reading achievement, given the importance of reading engagement in fostering effective text comprehension and academic success (Zenebe & Kebede, 2024). This success is not only rooted in core reading skills but also in the use of specific strategies that simplify deeper comprehension and retention (Dana & Utami, 2021). Performance indicators, such as "score A", are considered markers of success in reading, while lower scores point to areas needing improvement (Gustiana et al., 2018). Various factors, including learners' interest in school, family literacy environment, and parental economic status, also influence reading achievement among them (Aulia et al., 2014; Dawkins, 2017; Fitri, 2024).

28. Learning style significantly impacts reading achievement by forming how learners engage with instructional materials. Individual variations in learning approaches affect how effectively learners interact with texts (Costa et al., 2020). Research indicates that awareness of learners' learning styles significantly influences their achievement across various subjects and skills, including listening, writing, and reading. Therefore, understanding their learning style is essential to optimize their learning outcomes and achieve the best outcomes (Aprilia et al., 2022)

29. 3.3. Previous Studies

30. Maqbool et al. (2018) conducted a study to explore the effects of the traditional lecture method and a multi-sensory approach on English Language Teaching (ELT). It contains four groups: two control groups taught using the traditional lecture method and two experimental groups taught using the multi-sensory approach, with 200 participants from two universities. Unlike this current study, which uses the VARK model, this study used the VAK Learning Styles Self-Assessment Questionnaire to identify students' dominant learning styles. Descriptive statistics and correlation analysis instruments were employed to assess the improvements between pre-test and post-test results. The results explored that 24% of the students were visual learners, 24% auditory learners, 40% kinaesthetic learners, and 4% had mixed learning styles. Unlike the control groups, the experimental groups represented a significant improvement in post-test results, with a 22% better performance. The study concluded that the multimodal approach was more effective in enhancing learners' academic achievement in English Language Teaching than the traditional lecture method.

31. In addition, the research conducted by Marantika (2022) investigates three variables: learners' learning styles and gender, and learning outcomes focusing on identifying learners' learning preferences from a gender perspective and understanding strategies that enhance diverse classroom environments. This study used a descriptive research design with a correlational approach. In line with the current study, the data of this study were gathered through a questionnaire. The participants included 30 second-semester students (15 males and 15 females) aged 18 to 20 years, randomly chosen from the German Language Department at Pattimura University, Ambon. After analysing the data, the findings revealed that female students showed tendency towards kinaesthetic and visual learning styles, whereas male students showed a preference for auditory learning styles, multimodal tendencies were observed in both groups, with students using multiple sensory modalities for information processing. The findings confirmed the role of active and creative teaching methods in FLL (Foreign Language Learning), particularly German, which encouraged students to adopt diverse learning strategies.

32. Hazriviena's (2023) research aimed to explore the relationship between students' learning styles and their achievement in interpretive reading courses at the English Education Department of Sultan Syarif Kasim Riau State Islamic University. The research utilized a quantitative descriptive

design, involving 30 second-semester students from the English Education Study Program. Data were collected through questionnaires on learning style preferences and documentation of their academic performance in interpretive reading during the 2020/2021 academic year. The findings revealed a significant correlation between students' learning styles (56.6 % were visual, 23.3% auditory, 6.6% kinaesthetic, and 13.3% had multiple learning styles) and their achievement, indicating that learning styles play an important role in students' academic success.

33. Prasetyo et al. (2024) examined the influence of learning styles on student achievement in a beginner-level Nihongo (Japanese) course, emphasizing the role of grammar in language acquisition. The study, conducted with 104 undergraduate students in the Japanese Language Education Program at the State University of Surabaya, aimed to determine if learning styles, categorized by the VARK model, impacted students' performance. The study concludes that 65% of students use Kinaesthetic as unimodal learning style, In addition, there are multiple learning styles identified, including Auditory and Kinesthetic, about 7%, with a notable distinction in learning style preferences across genders female students tended to prefer combined learning styles more than male students. Despite these differences, the correlation between students' learning styles and final course outcomes was minimal, classifying the relationship as very weak. Thus, learning style did not appear to affect academic outcomes in the Nihongo course significantly.

34. The study by Muegna & Mamonong (2024) aimed to explore the role of learning style preference and lexical inferencing strategies on the reading comprehension of first-year English major students in state colleges and universities in the Davao region. This explanatory sequential mixed-methods research used a quantitative approach with a survey questionnaire administered to 300 respondents, selected through stratified random sampling. Additionally, 17 informants participated in a qualitative method that included 10 in in-depth interviews and 7 in focus group discussions. This study found that students had a high preference for multiple combinations visual, auditory, and kinaesthetic(VAK) learning styles and frequently employed lexical inferencing strategies, particularly intralingual and contextual strategies. However, their reading comprehension was rated moderately in terms of literal, interpretive, and evaluative levels, with a low rating for creative comprehension. The quantitative results showed no significant relationship between learning style preference and reading comprehension, while lexical inferencing strategies significantly influenced reading comprehension. The qualitative findings supported the quantitative results, confirming the high levels of learning style preference and lexical inferencing strategies, as well as the moderate levels of reading comprehension. Data integration demonstrated a connecting confirmation nature, except for the relationship between learning style preference and reading comprehension, which showed a connecting expansion nature.

35. 4. Methodology

36. 4.1. Research Design

37. A quantitative comparative research design was used to investigate two variables: learning style as the independent variable and the learner's reading comprehension achievement as the dependent variable. By focusing on this research method, the study aims to investigate whether there is a difference in the reading performance of EFL learners based on their use of unimodal vs. multimodal learning styles.

38. 4.2. Sample

39. The study's sample consisted of sophomore learners who were enrolled in the Department of English at the College of Basic Education, University of Mosul, Iraq, during the academic year

2024-2025. One hundred forty-six participants were chosen for the study, comprising 84 female and 115 male learners. These learners' ages are between 19 and 22 years. The purposive sampling method was used for this study because it allowed for the identification of learner who were most related to the research aim, particularly those engaged in developing their reading comprehension skills.

40. **4.3 Data Collection**

41. Data for this study were collected using two primary instruments: the VARK Survey, used to identify the type of learning style, whether it is an unimodal or multimodal learning style based on their responses, and a Reading Comprehension Test used to measure learners' reading achievement.

42. **4.3.1. The Survey**

43. For this study, an adapted survey was used from: 1) the VARK inventory and 2) a survey of Benmeddour (2015) and Girón-García & Gargallo-Camarillas (2020). The modifications embed rephrasing questions into statements and incorporate or adapt specific items from the VARK Inventory (Fleming & Mills, 1992). This adaptation maintained the original VARK questions but incorporated additional ones tailored to the educational context of EFL learners. The modifications aimed to pick up more detailed insights into learners' learning style and reading achievement.

44. **The survey contains two scales:**

45. **The Unimodal Scale** is the first part of the survey that has been used to identify learners' dominant learning style (unimodal) in reading comprehension. Participants are asked in this part to respond to 16 items on a five-point Likert Scale: from "To a very Large Extent", to " Very Low Extent".

46. **The Multimodal Scale** is the second part of the survey used to identify the multimodal learning styles of learners. It consisted of 12 items that allow participants to identify their preferred learning styles, which may include one, two, three, or more styles. These styles range from Visual, Auditory, Reading/Writing and Kinaesthetic.

47. **4.3.2. The Reading Comprehension Test**

48. The test was developed based on the Reading Comprehension curriculum of the Iraqi Ministry of Higher Education and Scientific Research. The test was designed by the instructor of the subject and reviewed by the researcher and her supervisor to evaluate its questions. The test measured learners' competence in written texts, with scores ranging from 0 to 30.

49. **5. Data Analysis**

50. To investigate the research question concerning whether Iraqi EFL sophomore learners perform better with unimodal or multimodal learning styles in reading comprehension, percentages were used as a preliminary step to identify the multimodal learning styles among the learners based on the number of learners. Then, based on the participants' scores and the survey, an Independent Sample T-test was used to determine whether sophomore EFL learners perform better when using unimodal or multimodal learning styles in reading comprehension. The scores were distributed on the learning styles by the statistician based on the learners' names and under their scores, which were obtained from the department.

51. **5.1 Results and Discussion**

52. The research question investigated whether learners who employ a unimodal learning style or utilise a multimodal learning style perform better in reading comprehension among sophomore learners at the College of Basic Education.

53. An independent Sample T-test has been used to analyse the data obtained from the learners' scores in reading comprehension and their responses on the survey concerning multimodal learning styles. The results of the test are shown in Table 1 below.

54. **Table 1**

55. *Learners' Multimodal Learning Style*

Type (I)	Type (II)	Mean Difference	P-value
	A	13.5	0.000
V	R/W	13.7	0.000
	K	13.12	0.000
A	R/W	3.7	0.824
	K	14.1	0.000
R/W	K	14.3	0.000

56.

57. The result in Table 1 indicates that there were statistically significant differences between the three learning styles: Auditory, Read/Write, and Kinaesthetic learning styles, and the Visual one with a p-value of 0.000, indicating that learners use these learning styles as unimodal learning styles. On the other hand, the combination of Auditory with Read/Write was non-statistically significant with a p-value of 0.824, which is greater than 0.05, indicating that learners employ these two styles together as a multimodal learning style in learning reading comprehension.

58. Similarly, Auditory and Read/Write learning styles were compared with the kinaesthetic learning style. The p-value result was 0.000, indicating that these learning styles had statistically significant differences in reading comprehension, suggesting that they have been used separately. In conclusion, learners often used the combination of Auditory and Read/Write styles (A R\W) as a multimodal learning style, while they used the others as unimodal learning styles.

59. The Independent Sample T-test has been employed again to analyse the data collected from sophomore learners' scores in reading comprehension, as well as their responses to the second part of the survey. This analysis aimed to compare the usage of multimodal learning style of (A and R/W) among sophomore EFL learners versus their unimodal learning styles (V or K) as illustrated in Tables 2 and 3.

60. **Table 2**

Auditory and Read/Write Vs. Visual

Learning style	Mean	Std.	T-test	P-value
A and R/W	27.84	1.73	31.10	0.000
V	14.92	1.93		

61. The results in Table 2 showed a statistically significant difference, with a p-value of 0,000 between the means of learners using the multimodal learning style of (A and R\W) (27.8) and those using the (V) unimodal learning style (14.9). In other words, learners who use the multimodal learning style achieved higher performance than those who used the (V) style alone.

62. **Table 3**

Auditory and Read/Write Vs. Kinaesthetic

Learning style	Mean	Std.	T-test	P-value
A and R/W	27.84	1.73	13.39	0.000
K	23.43	1.11		

Table 3 illustrates the findings of comparing the means of learners who used the (A and R\W) multimodal learning style and those who relied on the unimodal Kinaesthetic learning style. The result submitted indicates a statistically significant difference (P-value is less than 0.05 = 0.000) between the means of learners who use the (A and R\W) multimodal learning style and those who rely solely on the (K) learning style as a unimodal one. The means of learners who use (A and R\W) multimodal learning style is 27.84, which is higher than the mean of 23.43 for learners who rely on only the (K) learning style. This result indicates that learners who use the reading test through different learning styles (using physical aids and active reading\ writing) perform better in reading comprehension than those who use only kinesthetic aids.

63. Conclusion and Implications

64. This study shows that EFL sophomore university students tend to do better in reading comprehension when they use a multimodal learning style, that is, when they combine different ways of learning, like reading, listening, watching, or doing, rather than sticking to just one method. Students who engaged with information in more than one way seemed to understand and remember what they read more effectively. These results highlight the value of a more flexible and varied learning approach, especially in something as complex as learning a new language.

65. The results of this study carry meaningful implications for both language educators and learners. For instructors and curriculum developers, the clear advantage of multimodal learning underscores the need to rethink traditional teaching methods that rely heavily on a single mode of instruction. Incorporating a variety of resources, such as videos, audio recordings, images, interactive activities, and real-life language use, can create richer and more inclusive learning environments. By doing so, educators can better cater to the diverse learning preferences within a classroom and help students engage with reading materials more deeply.

66. For students, the findings highlight the importance of becoming more aware of how they learn best and being open to exploring new strategies. Students might benefit from combining different approaches to reinforce their understanding instead of relying solely on one method, such as reading or listening. Developing the ability to learn through multiple modes enhances comprehension and builds adaptability, an essential skill for language learners navigating complex texts and real-world communication.

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