

Effectiveness of the Self-Schedule Strategy (K-W-L-H) in Understanding Reading and Academic Achievement among Students of the Second Intermediate Grade in the English Language

Ammar Kareem Jebur

Imam Kadhim Faculty of Islamic Sciences University

Zahraa Jabbar Falhi

University of Misan / College of Basic Education

Munadhil Adil Kiasm

Imam Kadhim Faculty of Islamic Sciences University

Abstract. This study evaluated the efficacy of the self-schedule strategy (K-W-L-H) on academic performance and reading proficiency in an English language course for intermediate-stage students in Masin Governorate. The researchers employed an experimental approach utilising a quasi-experimental design involving two groups (experimental and control) comprising a sample of 70 intermediate-stage students evenly divided between the two groups. Appropriate statistical analyses were conducted using statistical software to derive results. The findings indicated statistically significant differences at the (SPSS-24) social level between the dimensional averages of the experimental and the control group scores, favouring the experimental group at the (0.05) level in reading, listening and speaking skills, as well as in academic achievement. The total test outcomes favour the experimental group, according to the results. The researcher advocated for the implementation of the self-(K-W-L-H) table strategy and encouraged students to utilise it to enhance their English language skills. Additionally, organising a scientific symposium is essential for English language faculty members to gather their perspectives and attitudes regarding the utility and practicality of employing such advanced technologies in the development of English language skills.

Key words: Effectiveness, Self-Schedule, (K-W-L-H,) Academic Achievement, English.

Introduction

Contemporary pedagogical approaches aim to fulfil the requirements of enhancing students' critical thinking, cultivating their inclinations and competencies, and equipping them with the capability to discover solutions to the challenges they encounter (Tariq, 2024). The self-schedule technique, a contemporary teaching method, is a metacognitive approach that involves the cognitive processes employed by the learner prior to, during and following reading (Alsaadeh, 2020). These strategies underscore the significance of mental cultivation, the enhancement of cognitive processes through an educational milieu that fosters intellectual engagement and the necessity of equipping students with the resources and methodologies that enhance their capacity to navigate information effectively from diverse sources, facilitating improved learning by augmenting the student's ability to contemplate the challenges they encounter (Zhao, Zhao & Shi, 2023). It affords them with the opportunity to judiciously utilise their skills to enhance their performance while equipping them with crucial means to adapt better, regulate behaviour, and make informed judgements (Imjai, Aujirapongpan & Yaacob,

2024). The self-schedule strategy (K-W-L-H) enables students to assess their knowledge and gaps in understanding continuously. Students can concentrate their efforts on unfamiliar topics by acknowledging their areas of ignorance, thereby addressing obstacles to comprehension (Alsaideh, 2020). This approach not only affirms their existing knowledge but also facilitates the recognition of latent skills, thereby enhancing their confidence in their studies and increasing their prospects for achievement (Young & Wang, 2014). This strategy enhances teachers' effectiveness, facilitates student assessment during instruction and promotes advanced methods to improve the classroom learning environment (Orlich et al., 2012). It empowers students to tackle challenging subjects by activating prior knowledge and stimulating curiosity (Greenwood, 2019). It assists students in visually organising their ideas to enhance learning because the self-schedule creates a visual representation of knowledge, enabling the mind to perceive models and the interconnections among facts, terminology, ideas and concepts not found in conventional texts (Hazaymeh & Alomery, 2022). Hence, students can benefit from assessing their existing knowledge, identifying their learning objectives and deducing what they have acquired throughout their studies, which can be utilised in educational contexts to demonstrate cognitive development and comprehension. When taught effectively, the English language serves as a fertile ground for enhancing reading comprehension and academic success, particularly through student-centred learning approaches (Pastini & Lilasari, 2023). The concepts of reading comprehension and academic achievement have long engaged the intellects of scholars and philosophers, who have diligently sought to elucidate their characteristics (Wei, 2023). Aristotle stands among the pioneers who analysed the thinking process through the lenses of similarity, contradiction and juxtaposition, asserting that thinking involves the activation of prior cognitive processes, which persist until we can refer to them as experience (Goodman & Tastanbek, 2021). The prior concept leads to the emergence of the desired outcome, which is why our thoughts often revolve around elements within our grasp or their opposites (Orwell, 2023). Some contend that thinking has two modes: the first, deemed perilous and obstructive to human advancement, is referred to as superstitious thinking, while the second, foundational to the contemporary renaissance of modern science, is known as analytical comprehension and academic success (Joyce, 2023). Glover (2018) posits that organised mental energies are essential for surmounting life's intricate challenges, particularly for creative individuals who possess a fervour for employing these energies in adversarial circumstances to resolve issues and attain stability. Furthermore, it asserts that comprehension, reading and academic success constitute a cognitive approach grounded in the scientific method, characterised as a discerning mode of thought or a precise methodology for uncovering the truth, reliant primarily on rationality and compelling empirical evidence (Javali & Javali, 2024). Thus, scientific facts and concepts serve as instruments for reading comprehension and academic success (Magulod Jr, 2019). The self-schedule aids students in organising their ideas and objectives, prompting them to search the text for evidence to substantiate their information and beliefs, as well as the enquiries they pose. The ability to formulate questions illustrates the significance of inquiry and investigation as students seek the information necessary for their understanding (Wale & Bishaw, 2020). The capacity to generate diverse and pertinent questions is a crucial foundation for defining their learning goals. It is an effective cognitive exercise that enhances attention perseverance and fosters ongoing intellectual growth and development and analytical reasoning (Darling-Hammond et al., 2020). Reading comprehension and academic success among learners are primary objectives recognised by educational institutions globally (Yapp, de Graaff & van den Bergh, 2023). In Britain, the Nuffield Foundation (1967) has delineated several overarching goals for science education, including the enhancement of reading comprehension and academic performance through skills such as observation, classification, interpretation and prediction (Phillips Galloway & Uccelli, 2019). The self-schedule strategy is a prominent contemporary teaching approach that positions the student at the centre of the educational process, fostering active and effective engagement. Numerous studies have substantiated the significance of imparting modern teaching strategies to students, particularly the self-schedule method and educational models, while exploring their correlation with students' cognitive processes. Akram (2019) investigated the efficacy of training in metacognitive strategies for enhancing cognitive methods among Mathematics students at the College of Education in Saudi Arabia. The present study evaluates the efficacy of the K-W-L- H self-scheduling technique in

enhancing reading comprehension and academic performance among second-grade intermediate students in English. Consequently, the significance of the findings is outlined as follows. First, the study employs a contemporary approach to enhance reading comprehension and academic performance among pupils via self-scheduling. Second, it generates innovative ideas from students in the English language, regarded as a crucial scientific discipline marked by innovation, information and ongoing data and emphasises significant scientific principles.

Literature Review

Research Problem

At the onset of the twenty-first century, educational institutions employ conventional pedagogical approaches for instructing English and other disciplines across diverse academic tiers (Paschal & Gougou, 2022). These approaches are marked by learner passivity, teacher-centricity, inadequate information retention, diminished cognitive engagement, lack of attentiveness, student isolation, and an emphasis on rote memorisation (Abdullah, Hussin & Ismail, 2019). Most educators depend on the conventional approach, which is confined to the memorisation and retrieval of material. The prevalence of contemporary educational strategies aimed at enhancing reading comprehension and academic success among students is hindered by unfamiliarity or apprehension stemming from insufficient support from administration and supervisors (Hedgcock & Ferris, 2018). These issues result in a deficient and ineffective approach that prioritises content over learner engagement, often fostering a negative mindset towards the information presented. Educators frequently provide pre-packaged answers for memorisation rather than instructing students on how to investigate the material critically to enable them to consider the perspectives of others, depend on them, and advocate for them inside the group (Kandirali, 2019). English educators stated that they lack knowledge of reading comprehension skills and academic achievement, causing them to fail to incorporate these elements into their teaching or study plans and students not being equipped to use them in learning English (Al-Jarrah & Ismail, 2018). Taboada Barber et al, (2018) corroborated this view by highlighting the inadequacy of conventional methods in encouraging learners to adopt reading comprehension skills and academic success. Consequently, this study investigates the efficacy of the self-schedule technique (K-W-L-H) in enhancing reading comprehension and academic performance among second-grade pupils in English. The issue can be delineated by addressing the subsequent inquiry: What is the efficacy of the self-schedule technique (K-W-L-H) in enhancing reading comprehension and academic performance among second-grade pupils in English?

Research Objective

1. The research aims to identify the effectiveness of the self-schedule strategy (K-W-L-H) in understanding reading and academic achievement among second-grade students in English.

Research Hypotheses

The objective of this study is verified through the following hypotheses:

1. There are statistically significant differences at the level of (0.05) between the dimensional averages of the experimental group scores and the control group scores in reading skills after adjusting the pre-test.
2. There are statistically significant differences at the level of (0.05) between the dimensional averages of the experimental group scores and the control group scores in the listening skills after adjusting the pre-test.
3. There are statistically significant differences at the level of (0.05) between the academic achievements of the experimental group that studied using mobile learning and the control group that studied using the traditional method in the pre-and post-applications of the achievement test.
4. There are statistically significant differences at the level of (0.05) between the dimensional averages of the experimental group scores and the control group scores in the speaking skills after adjusting the pre-test.
5. There are statistically significant differences at the level of (0.05) between the dimensional

averages of the experimental group scores and the control group scores in academic achievement (total test results) after adjusting the pre-test.

Search Limits

The search is limited to the following:

1. Students of the second intermediate grade in the schools of Bin Al-Razi and Iraq Al-Samoud in the centre of Misan Governorate.
2. The last three chapters of the English language book for the second intermediate grade for the year 2023.
3. The second semester of the academic year (2023–2024).
4. Reading comprehension skills and academic achievement scale prepared for current research.

Methodology

Research Methodology and Procedures

Experimental Design

The experimental design is a scheme that helps the researcher in the work of research procedures and guarantees the possibility of overcoming the difficulties that appear when conducting statistical analysis; that is, it refers to planning the conditions and factors surrounding the phenomenon being studied in a certain way and observing what is happening (Curtis et al, 2018). Therefore, the researchers have chosen an experimental design with partial control, containing two groups: experimental and control. The first group (experimental) was exposed to the independent variable, which is the subjective table. The second group (control) studied in the usual way, and was randomly selected. Table 1 illustrates the design.

Table 1: Experimental design of research

Groups	Per -test	Independent variable	Dependent variable	Post-Test
Experimental	Reading comprehension skills and academic achievement	Self-Schedule	Reading comprehension skills and academic achievement	Reading comprehension skills and academic achievement
	Reading comprehension skills and academic achievement	Traditional way	Reading comprehension skills and academic achievement	Reading comprehension skills and academic achievement

Research Community and Sample

The researchers selected the girls' middle and secondary schools (30 schools scattered throughout the central areas) located in the centre of Misan Governorate for the academic year 2023–2024. A random selection approach was used, and Al-Razi Intermediate and Iraq Al-Samoud schools were chosen. Al-Razi Intermediate comprises five divisions for the second intermediate grade, namely A, B, C, D, and E. The researchers employed a simple random selection procedure for choosing divisions B and D as representatives of the sample, with Division B serving as the experimental group subjected to the self-schedule strategy and Division D functioning as the control group analysed by conventional methods. The total enrolment in the two divisions amounted to 82 students. Subsequently, the researchers eliminated data pertaining to all students who failed due to their prior experience with the subjects to be studied during the experimental period to mitigate any potential influence on the dependent variable and the accuracy of the results. Following this exclusion, the sample size was reduced to 70 students, comprising 35 students from Division B as the experimental group and 35 students from Division D as the control group. The exclusion was statistically justified during the analysis of results because these students were permitted to remain throughout the experimental

period to preserve the integrity of the system. The school comprises two divisions, one of which serves as a sample for research purposes.

Table 2: Students in the two research groups before and after exclusion.

Groups	Students before exclusion	Enslaved students	Students after exclusion
Experimental	41	6	35
Control	41	6	35
Total	82	12	70

Equivalence of the two research groups

Before commencing the experiment, the researchers statistically equated the students of the two research groups across several variables deemed influential on the experiment's safety. These variables include the students' chronological age measured in months, their mid-year English language exam grades, parental academic achievement, and pre-test results in reading comprehension skills. Data on these variables were acquired from the school administration. The following is an elucidation of the statistical equivalence processes for the variables between the two research groups: A – Chronological age computed in months: The mean age of the experimental group students was 162.76 months, whereas the mean age of the control group students was 162.23 months. A T-test for two independent samples revealed that the difference in ages between the two groups is not statistically significant at the 0.05 level because the calculated T value was 0.76, which is less than the critical T value of 1.99 with 66 degrees of freedom. This result indicates that the experimental and control groups are statistically equivalent in chronological age.

Table 3: T-test results for the ages of the students of the two research groups.

Groups	Volume Sample	M	Contrast	df	The two values of T	Sig
Experimental	35	162.76	8.49	68	Calculated 3.15	Tabular 1.99
Control	35	162.23	7.63			0.076

Academic achievement of parents

Table 4 demonstrates that the experimental and control research groups exhibit statistical equivalence in parental academic achievement. The calculated value of the Chi-square statistic (3.15) is less than the critical value (8.49) at the 0.05 significance level with four degrees of freedom, indicating equivalence in this variable between the two groups.

Table 4: Chi-square value for differences in parents' academic achievement between the two research groups

Groups	Volume Sample	Academic achievement						df	Value (Ka2)		Sig
		Not reads and writes	reads and writes	Primary	Medium	Preparatory or Institute	university and above		Calculated	Tabular	
Experimental	35	1	3	2	5	11	13	34	3.15	9.49	0.019
Control	35	2	4	3	7	9	10	34			

Academic achievement of mothers

Table 5 demonstrates that the experimental and control research groups exhibit statistical equivalence in maternal academic achievement. The chi-square analysis yielded a calculated value of (Ka2) at

(3.54), which is below the tabular value of (Ka2) at (9.59) for a significance level of (0.05) with four degrees of freedom.

Table 5: Chi-square value for differences in maternal academic achievement between the two research groups

Groups	Volume Sample	Academic achievement						fd	Value (Ka2)		Sig
		Not reads and writes	reads and writes	Primary	Medium	Preparatory or Institute	university and above		Calculated	Tabular	
Experimental	35	3	5	4	11	7	5	34	3.54	9.59	0.034
Control	35	4	4	6	7	6	8	34			

Mid-year grades for English for the academic year (2023–2024)

The researchers collected the English language grades of students from the two research groups over a half-year period. The experimental group had an average score of 67.32 with a standard deviation of 24.68, while the control group had an average score of 65.14 with a standard deviation of 25.06. A T-test for two independent samples was conducted to assess the significance of the difference in English language grades between the groups. The results indicated the difference was not statistically significant at the 0.05 level because the calculated T value was 1.79, which is less than the critical T value of 1.99 with 68 degrees of freedom. The result suggests that the two research groups are equivalent in this variable, as illustrated in Table 6.

Table 6: Results of the T-Test for the mid-year grades of the English language for students of the two research groups

Groups	Volume Sample	M	Contrast	df	The two values of T		Sig
Experimental	35	66.4	71.2	68	Calculated	Tabular	0.029
Control	35	65.73	115.05		1.01	1.99	

Intelligence:

The Raven test for sequential matrices was utilised to assess the significance of the difference in intelligence levels between the experimental and control groups, as it is appropriate for the age group of the research sample and is noted for its reliability, stability, and suitability for the Iraqi context (Raven, 2003). The test was administered to both groups during the initial week of the experiment. The researchers employed the T-test for two independent samples to ascertain the significance of the difference between the average scores of the students in the two groups, resulting in findings consistent with those presented in Table 7.

Table 7: Results of the T-Test for the intelligence test for the students of the two research groups.

Groups	Volume Sample	M	Contrast	df	The two values of T		Sig
Experimental	35	33.08	113.02	68	Calculated	Tabular	0.087
Control	35	32.19	105.28		0.02	1.99	

The reading comprehension abilities and pre-academic performance were assessed through the reading comprehension and academic achievement assessment tool developed by the researchers. The tool is used to ensure equivalence between the two groups, encompassing the skills of observation,

classification, measurement, forecasting, interpretation and generalisation. This assessment was reviewed by experts and evaluators and administered on February 23, 2024. Upon evaluating the students' responses against the model answer, the overall test score was 34 degrees. The arithmetic means and variance of the scores for each group were calculated. Utilising the T-test for two independent samples, the findings indicated no statistically significant differences at the significance level of 0.05 and a degree of freedom of 66. Consequently, the two groups are deemed equivalent in terms of reading comprehension skills and academic achievement, as illustrated in Table 8. The researchers employed the T-test for two independent samples to assess the statistical significance of the disparity between the arithmetic means of the scores from the two research groups (experimental and control) in the pre-test of the reading comprehension skills and academic achievement scale, as illustrated in Table (8).

Table 8: Results of the T-test for two independent samples in the pre-test of the scale of reading comprehension skills and academic achievement for the experimental and control groups.

Groups	Volume Sample	M	Contrast	df	The two values of T		Sig
Experimental	35	24	7.24	68	Calculated	Tabular	0.143
Control	35	23	6.65		1.43	1.99	

Adjust Variables

The internal validity of the equivalence procedure among the students from the two research groups was maintained through the following factors: age in months, mid-year exam scores in English, parental academic attainment, intelligence and cardiac assessments for reading comprehension skills and academic performance. The external validity of the research variables was ensured as follows:

1. To mitigate the influence of teaching expertise, one researcher personally instructed both research groups during the experiment.
2. The research instrument was utilised to assess reading comprehension skills and academic performance under comparable procedures and conditions.
3. The weekly lesson schedule for the two research groups is structured to provide equitable time distribution across all lessons.
4. The two research groups were not subjected to simultaneous occurrences, experimental extinction or maturity factors that impeded the execution of the experiment and influenced the dependent variables.
5. The experiment spanned ten weeks, commencing on Monday, February 26, 2024, and concluding on Wednesday, April 29, 2024, for both groups.

Research Requirements

1. **Identification of the scientific material:** The scientific material of the research topics was determined by the last three chapters (seventh, eighth, and ninth) of the English language book for the second intermediate grade.
 - Chapter VI.
 - Chapter VII.
 - Chapter VIII.
2. **Formulation of behavioural goals:** A written statement delineating the anticipated performance of the learner upon the completion of a certain educational unit and outlining the ultimate educational and behavioural outcomes of the learner was provided. Behavioural goals are essential foundations that must be considered to attain maximum effectiveness with minimal effort in teaching and learning processes (Stronge, 2018). Consequently, the researchers established a series of behavioural objectives categorised according to Bloom's taxonomy into three levels: remembering, understanding, and applying. They subsequently presented this list to the evaluators to ensure the precise formulation of each behavioural objective and its

corresponding measurement level. Several objectives were revised based on the evaluators' feedback, resulting in 39 objectives: 13 for the remembering level, 19 for the understanding level, and 7 for the applying level, distributed across the last three chapters.

3. **Teaching Plans:** The researchers prepared the teaching plans for the subjects of the English language that will be studied during the experiment, according to the course, its behavioural objectives, the self-schedule strategy for the students of the experimental group and the usual method for the students of the control group. These plans were presented to a group of experts and specialists in the English language and teaching methods to improve the formulation of those plans and ensure the success of the experiment. the necessary amendments were made after considering the opinions and proposals expressed by the experts to ensure that the plans are ready for implementation.

Reading Comprehension and Academic Achievement Skills

This study aims to identify the effect of employing the self-schedule method on enhancing reading comprehension abilities and academic performance, followed by an elucidation of the procedures for constructing this instrument. Proficiencies in reading comprehension and academic performance. The researchers developed a test aligned with the research objectives after reviewing the literature on reading comprehension skills and academic achievement. The absence of a pre-existing test tailored to assess reading comprehension skills and academic achievement appropriate for the second intermediate grade level and the subject matter. The researchers adhered to the following methodology:

1. **Determine the domains assessed by the test:** The researchers developed a preliminary questionnaire to evaluate reading comprehension skills and academic performance encompassed in the test, subsequently presenting it to several experts and specialists in education and pedagogical methods. Six fundamental reading comprehension skills deemed appropriate for second-intermediate-grade kids were identified: observation, classification, measurement, prediction, interpretation, and generalisation.
2. **Construction of test paragraphs:** Following the researchers' evaluation of reading comprehension measures and academic achievement across various disciplines and their review of pertinent sources, including Elleman and Oslund (2019) and prior studies, such as Follmer (2018) and Naderi and Akrami (2018), the reading comprehension skills test and academic achievement paragraphs were finalised. This test comprises 34 objective items (multiple choice) categorised into five skills: observation, classification, measurement, prediction, interpretation, and generalisation. The assessment was administered to a cohort of experts and professionals in the English language, pedagogical techniques and psychology.
3. **Formulate test instructions:** Specific guidelines have been created for students to respond to the test paragraphs, detailing the methodology to minimise errors that could result in grade deductions, along with the allocation of grades across questions and the allotted time for answering the test paragraphs.
4. **Essential component of the standard response:** The criteria for evaluating test paragraphs were assessed and a score of one for correct responses and zero for incorrect ones was assigned.
5. **Exploratory application of the test:** The test was administered to an exploratory sample of 87 students from the second intermediate grade at Al-Razi Intermediate School and Iraq Al-Samoud on February 2, 2024, to ascertain the clarity of the items and the instructions for response, identify ambiguous items for rephrasing, and evaluate the time required for completion.
6. **Test correction:** Upon completion of the survey application, responses were evaluated by assigning one point for right answers and zero points for incorrect or omitted responses.
7. **Authenticity of the test:** Honesty is a fundamental attribute that must be present in a research instrument, which is deemed honest if it fulfils its intended purpose. An honest instrument is one

that accurately measures what it was designed to assess (Clark & Watson, 2019). Consequently, the researcher adhered to the protocols for test validity, as outlined below:

- a. **Apparent honesty:** To ascertain the test's validity, the researchers depended on the arbitrators' sincerity in evaluating the extent to which the paragraphs accurately reflect the measured aspects, the coherence of the wording, the consistency of the alternatives, the clarity of the forms and graphics, and the paragraphs were revised based on their feedback.
 - b. **Integrity of construction:** The semantics of the test's truthfulness were validated through the calculation of the discriminatory power of each item, as noted by Shanmugam, Wong, and Rajoo (2020). The discriminatory strength of the test items serves as an indicator of the integrity of construction (Wu, Tio & Ortega, 2022). It was determined that this strength falls within an acceptable range, thereby affirming the test's integrity and constructive nature of the final assessment of 34 items evaluating reading comprehension skills and academic success for second-grade intermediate pupils.
 - c. The test's stability was assessed using the Kuder-Richardson-20 formula (Akçay & Önal, 2023), yielding a stability coefficient of 0.73, which is deemed satisfactory for non-standardised tests (Abdalqadr, 2009). Non-standardised tests are deemed effective if their stability coefficient ranges from 60.0 to 80.0.
 - d. **Coefficient of difficulty:** The difficulty coefficient of a paragraph is defined as the percentage of respondents who answer the paragraph properly from a sample (Giang, Dan & Han, 2023). The difficulty coefficient of each paragraph was determined using the difficulty equation, revealing a range between 0.35 and 68.0. This percentage reflects the proportion of satisfactory tests, characterised by a difficulty coefficient ranging from 20% to 80% (Weir, 2005).
 - e. **Discriminatory force:** It refers to the capacity to differentiate between pupils with high scores and those with low scores in the characteristic assessed by the exam. According to Azkiyah and Faiza (2018), the discrimination coefficient equation reveals that the strength of discrimination for the paragraphs ranges from 0.33 to 0.62. Ebel asserts that a paragraph is considered good if its discriminatory ability is 30% or higher (Salwa, 2012).
8. **Application of the experiment:** The researchers examined individual themes from the English language textbook in collaboration with the subject school at a pace of one topic per week, commencing on February 26, 2024, and concluding on April 29, 2024.

Statistical Methods:

The following statistical methods were used: t-test for two independent samples; chi-square; paragraph difficulty coefficient, paragraph discrimination coefficient and Kywder-Richardson's equation -20.

Results

Verification of the homogeneity of the two groups in the pre-test

Understanding the degree of commonality between the two groups prior to initiating the research application is essential to ascertain the disparities in the pre-achievement test between the control and experimental groups across all skills. Levene's test was employed to assess the homogeneity of variance alongside the independent samples t-test. Table 9 presents the outcomes of Levene's test and the t-tests, elucidating the differences in the overall pre-test scores between the control and experimental groups across all skills.

Table 9: Levitz test results and test (T)

Skills	Check homogeneity		No	M	SD	MF	T	Sig
	F	Sig						
Reading	0.015	0.898	35	3.29	1.29	0.165	0.284	0.766
			35	3.12	1.20			
Listen	0.034	0.840	35	3.44	1.48	0.299	0.675	0.423

			35	3.26	1.44			
speak	0.047	0.816	35	2.51	1.37	0.132	0.229	0.818
			35	2.39	1.24			
Overall Test	0.032	0.852	35	3.0	1.33	0.175	0.396	0.669

Table 9 demonstrates that Levene's test is not significant, signifying that the assumption of homogeneity of variance is satisfied and no disparities were observed in the total pre-test scores between the control and experimental groups because the significance level for all skills exceeded 0.05, indicating the equivalence of the two groups in the pre-test.

Answering questions and testing research hypotheses

Examination of the first hypothesis: Statistically significant differences at the level of (0.05) were observed between the dimensional average of the experimental group's scores and that of the control group's scores in reading skills after adjusting the pre-test. The covariance analysis test was used to verify the hypothesis. Table 10 shows the results of the covariance analysis test to identify the differences in the post-test between the control and experimental groups for reading skills after adjusting the pre-test.

Table 10: Adjusted arithmetic averages for the experimental and control groups (Reading skills)

Contrast source	Sum of squares	df	Sum of squares	F	Sig
Pre-test	9.358	1	9.358	5.048	0.27
Group	113.184	1	113.184	107.229	0.000
Error	116.853	67	2.060		
Total	271.09	70			
Group Debugger		69			

Table 10 shows the disparities between the control and experimental groups in reading proficiency following the pre-test adjustment, as evidenced by a (P) value of 107.229 and a significance level below 0.05, thereby validating the difference. The adjusted arithmetic means were reviewed to ascertain the nature of these discrepancies. Table 11 presents the modified arithmetic means for the reading skills of the experimental and control groups.

Table 11: Adjusted arithmetic averages for the experimental and control groups Reading skills

Groups	Average arithmetic average
Control	4.47
Experimental	8.44

The data presented in Table 11 unequivocally demonstrates that the disparities observed between the control and experimental groups in reading proficiency, following pre-selection adjustments, favoured the experimental group, which achieved a mean score of 8.44. This outcome underscores the efficacy of mobile learning applications in enhancing English reading skills among the experimental group of students. Furthermore, these findings align with Shoukat, Usman and Faheem (2024), who identified statistically significant differences in reading rates and fluency in expressive reading, favouring the experimental group.

Examination of the second hypothesis: "Statistically significant differences were observed at the level of (0.05) between the dimensional average of the experimental group's scores and that of the control group's scores in listening skills after adjusting the pre-test. and to verify this hypothesis, Covariance analysis test (ANOVA) was used to verify this hypothesis. Table 12 shows the results of the pre-analysis test of common variance to identify the differences in the post-test between the control and experimental groups in terms of listening skills after adjusting the test.

Table 12: Adjusted arithmetic averages for the experimental and control groups Listening skills.

Contrast source	Sum of squares	df	Sum of squares	F	Sig
Pre-test	11.840	1	11.840	4.130	0.43
Group	229.184	1	229.184	70.717	0.000
Error	159.505	67	2.707		
Total	2066.09	70			
Group Debugger		69			

Table 12 indicates the disparities between the control and experimental groups in listening skills after the pre-test adjustment. The value of (P) is 70.717, and the significance level is less than (0.05), indicating that the difference is accepted. The adjusted arithmetic means shows the direction of these differences. Table 13 presents the adjusted arithmetic means of the experimental and control groups regarding reading skills. The pattern of these discrepancies was determined after consulting the adjusted arithmetic means, as illustrated in Table 13, which depicts the adjusted arithmetic means of the experimental and control groups on listening skills.

Table 13: Adjusted arithmetic averages for the experimental and control groups Listening skills.

Groups	Average arithmetic average
Control	3.44
Experimental	6.38

Table 13 clearly indicates that after adjusting for the pre-test, the differences observed between the control and experimental groups in listening skills favoured the experimental group, which achieved a mean score of 6.38. This outcome underscores the efficacy of mobile learning applications in enhancing English listening skills among the experimental group students. These findings align with that of Abu Rumman Hamdi (2018), who revealed statistically significant differences in average listening test scores attributable to the teaching method, favouring the experimental group that employed the subjective Table (K-W-L-H).

Examination of the third hypothesis: Statistically significant differences were observed at the level of (0.05) between the dimensional average of the experimental group's scores and the control group's scores in the speaking skill after adjusting the pre-test. Covariance analysis test was used to verify this hypothesis. Table 14 shows the results of the covariance analysis test to identify the differences in the post-test between the control and experimental groups in relation to speaking skill after adjusting the pre-test.

Table 14: Modified arithmetic averages for the experimental and control groups of speaking skill

Contrast source	Sum of squares	df	Sum of squares	F	Sig
Pre-test	2.013	1	2.013	0.655	0.307
Group	166.068	1	166.068	47.162	0.000
Error	162.109	67	2.038		
Total	1308.09	70			
Group Debugger	1638.28	69			

Table 14 indicates disparities between the control and experimental groups in speaking proficiency following pre-test adjustments, with a (P) value of 47.162 and a significance level below 0.05, thereby validating the difference. The adjusted arithmetic means, as illustrated in Table 15 depicting the modified arithmetic means for the speaking skills of both groups, can be used to ascertain the nature of these differences. The modified arithmetic means can be used to determine the direction of these

discrepancies. Table 15 presents the adjusted arithmetic means of the experimental and control groups in relation to speaking skills.

Table 15: Adjusted arithmetic averages for the experimental and control groups. Speaking skills

Groups	Average arithmetic average
Control	2.32
Experimental	5.78

Table 15 shows that the differences that could be observed between the control and experimental groups in the listening skills after adjusting the pre-test were in favour of the experimental group with the arithmetic average. The highest rate is 5.78, indicating the effectiveness of mobile learning applications in developing English speaking skills among students of the experimental group.

Examination of the fourth hypothesis: After adjusting the pre-test, statistically significant differences could be observed at the level of (0.05) between the dimensional average of the experimental group's scores and that of the control group's scores in total academic achievement results.

Table 16: Adjusted Arithmetic Averages for the Experimental and Control Groups Academic Achievement (Total Test Results)

Contrast source	Sum of squares	df	Sum of squares	F	Sig
Pre-test	505.62	1	505.62	43.84	0.000
Group	2884.25	1	2884.25	176.52	0.000
Error	838.45	67	16.91		
Total	2891.26	70			
Group Debugger	5269.89	69			

Table 16 highlights the disparities in academic achievement between the control and experimental groups after adjusting for the pre-test, with a value of (P) 176.52 and a significance level below (0.05), validating the difference. The modified arithmetic means are referenced to determine the nature of these disparities. Table 17 presents the modified arithmetic means for academic achievement of the experimental and control groups. The pattern of these discrepancies was determined after consulting the adjusted arithmetic means, as illustrated in Table 17, which shows the adjusted arithmetic means of the experimental and control groups in relation to study achievement.

Table 17: Adjusted Arithmetic Averages for the Experimental and Control Groups Dramatic Achievement (Total Test Results).

Groups	Average arithmetic average
Control	2.36
Experimental	6.69

Table 17 presents the disparities between the control and experimental groups in the overall test following pre-test adjustments. The results favoured the experimental group, which achieved the highest arithmetic mean of 28.15. This outcome demonstrates the efficacy of the self-scheduling technique (K-W-L-H) on academic performance and the enhancement of reading skills in the English language curriculum for middle school pupils in Masin (Ahmed et al., 2021; Ali, 2022; Rahoomi, Dehham, & Al-Wahid, 2019). The findings align with Hussein, Dehham, and Nayif Hasan (2019) research, which identified statistically significant differences in students' attitudes towards learning English through the self-schedule strategy (K-W-L-H), favouring the experimental group due to the teaching method. Conversely, these findings contradict that of Rashid and Asghar (2016), who indicated that students' smartphone usage had a significant and persistent negative impact on their academic performance, resulting in a general decline in achievement and learning.

Discussion of results

The analysis of the results presented in Tables 14–17 demonstrates the superiority of the experimental group, which utilised the self-schedule strategy, over the control group, which employed the conventional method in terms of reading comprehension skills and academic achievement. The enhanced performance of the experimental group students compared to the control group in reading comprehension and academic achievement can be attributed to the self-schedule strategy. This active cognitive approach emphasises learner engagement and positivity because information is not delivered directly; instead, students are guided to acquire it within a functional context. Furthermore, the strategy incorporates a variety of continuous activities wherein learners plan, execute and gather evidence of their knowledge. The lesson designed using the self-schedule strategy enables learners to cultivate various reading comprehension and academic skills, including observation, prediction, measurement, reasoning, experimentation and hypothesis formulation, which facilitate the acquisition of reading comprehension abilities and academic success. Employing the self-schedule strategy (K-W-L-H) fosters active student engagement by rectifying misconceptions entrenched in their cognitive frameworks, allowing them to learn from their errors and enhancing their comprehension of scientific content. The self-schedule technique (K-W-L-H) facilitates self-directed learning, empowering students to take initiative and achieve substantial advancement in their educational framework (Alsaideh, 2020). Instructing students to pose various questions enhances their understanding of scientific content, directs their concentration, facilitates new predictions, highlights essential information and improves reading comprehension and academic performance (Vaughn et al., 2017). The self-scheduling strategy effectively captures students' attention, stimulates their interest in the lesson and enhances motivation. This approach facilitates ongoing student engagement and encourages enquiries related to the school. Furthermore, the implementation of the self-scheduling strategy (K-W-L-H) is straightforward, which is particularly desirable in the context of teaching English.

Conclusions

The following recommendations are proposed based on the research findings that highlighted the significance of the self-scheduling approach (K-W-L-H) on academic performance and the enhancement of reading skills in the English language curriculum for middle school pupils in Misan Governorate:

1. The implementation of the self-schedule technique (K-W-L-H) was proven effective in instructing second-year intermediate students in English language courses.
2. The self-schedule technique (K-W-L-H) modified mental representation to align with the pupils' updated cognitive framework.
3. The implementation of the self-schedule technique (K-W-L-H) enhanced students' motivation and enthusiasm while directing their attention towards the newly introduced educational topics.
4. Students' reading comprehension and academic accomplishment are enhanced when contemporary pedagogical techniques that focus on the development and formation of meaning are employed.
5. The implementation of the self-schedule technique (K-W-L-H) in education enhances students' capacity for self-directed learning.

Recommendations

Based on the obtained results, the following recommendations are proposed:

1. English language educators should be motivated to implement the self-schedule technique (K-W-L-H) in instruction because it empowers students to utilise their skills in guiding their cognitive and learning processes, fostering personal accountability in education, in accordance with the notion of self-directed learning.
2. Choosing English language courses to enhance reading comprehension abilities and academic performance across various levels.

3. The language of pedagogical approaches in faculties of education, basic education, and teacher training institutes, incorporating contemporary teaching tactics beyond mere knowledge, such as the self-schedule strategy (K-W-L-H).
4. English language educators and their instructors should engage in developmental courses on the use of the self-schedule technique (K-W-L-H) in the instruction of designated subjects.

Propositions

To augment the research conclusion, the researchers propose to undertake the following:

1. Assess the efficacy of the self-schedule approach (K-W-L-H) in the English language concerning various characteristics, including motivation, critical thinking and attitudes.
2. Evaluate the efficacy of the self-scheduling technique (K-W-L-H) across various disciplines and educational levels.
3. A comparison of the subjective schedule (K-W-L-H) with the PQ4R technique concerning the variables of achievement, reading comprehension, and academic performance.

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