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Using McCarthy' 4MAT Model to Develop English Writing Skills in Upper- Grade Primary Pupils

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Abstract

The current research paper investigates the impact of McCarthy's 4MAT model on developing writing skills among upper-grade primary pupils. Sixty-four pupils in six primary-stage grades were chosen as the study participants and were divided randomly into two matched groups (a control group and an experimental one). The researcher adopted the two-group quasi-experimental design. The experimental group 32 pupils from Omar Bin Abdalaz primary school in the Assuit regime, and the control group 32 pupils from Al-Zaher primary school in the Assuit regime in the second term of school year 2023-2024. The writing test with the scoring rubric was administered to the participants of both study groups to assess pupils' development in the specified writing skills before and after the experimental treatment. The data collection process included both quantitative and qualitative techniques. The researcher used statistical methods to analyze data, including the mean, standard deviations, and effect size. The study's results confirmed statistically significant changes, favoring the experimental group's post-testing at the 0.01 level. Thus, these results provide evidence of the educational value of integrating McCarthy's 4MAT model with the content of the curriculum. Future researchers could focus on integrating learning style applications in light of the 4MAT model into developing other skills.

Keywords: McCarthy's 4MAT model, learning styles, writing skills, primary stage pupils.

المستخلص

هدفت الورقة البحثية الحالية إلى استقصاء مدى أثر استخدام نموذج الفورمات لمكاري لتتمة مهارات الكتابة باللغة الإنجليزية لدى تلاميذ الصفوف العليا بالمرحلة الابتدائية. أربعة وستون تلميذا وتلميذة من تلاميذ الصف السادس الابتدائي تم اختيارهم كمشاركين في الدراسة البحثية. وقسموا بالتساوي إلى مجموعتي إحداهما تجريبية والأخرى ضابطة. اعتمدت الدراسة البحثية الحالية على التصميم شبه التجريبي ذي المجموعتين. المجموعة التجريبية 32 تلميذا وتلميذة من مدرسة عمر بن عبد العزيز الابتدائية بمحافظة أسيوط، و32 تلميذا وتلميذة من مدرسة الزهراء الابتدائية بمحافظة أسيوط كمجموعة ضابطة وقامت الباحثة بتطبيق اختبار قبلي - بعدي لمهارات الكتابة قبل وبعد مادة المعالجة التجريبية وذلك في الفصل الدراسي الثاني من العام الدراسي 2023-2024. واستخدمت الباحثة أساليب إحصائية متنوعة لتحليل البيانات منها: المتوسطات الحسابية، والانحرافات المعيارية، وحجم الأثر، وقد تم عرض النتائج. وتوصلت الدراسة البحثية الحالية إلى أنه هناك فروق ذات دلالة إحصائية (عند مستوى الدلالة 0.01) بين متوسطي درجات مجموعتي البحث في التطبيق القبلي والبعدي لاختبار الكتابة لصالح الاختبار البعدي في المجموعة التجريبية. وبذلك تم التحقق من فروض البحث الخاصة بمهارات الكتابة. كما أوصت الدراسة البحثية الحالية بعمل دراسات مستقبلية علي توظيف تطبيقات أنماط التعلم في ضوء نموذج الفورمات لمكاري في المنهج والمحتوى التعليمي، وكذلك البحث في تأثيرها على المهارات الأخرى.

الكلمات المفتاحية: نموذج مكاري، أنماط التعلم، مهارات الكتابة، المرحلة الابتدائية.

Introduction

The primary education stage is of utmost importance as it forms the foundation of a learner's life. It is responsible for providing education that ensures a complete, harmonious, and balanced development by actively engaging the learners in the learning process and equipping them with a general cultural understanding and sufficient theoretical knowledge. Furthermore, pupils require continuous support from their teachers to cultivate their passion for learning, foster cooperation and positive participation, build self-reliance and confidence, and acquire fundamental skills necessary to life.

Writing is a language skill used to convey ideas, emotions, and arguments through words and sentences. Maysuroh and Maryadi (2017) affirmed that writing is a critical communication skill that plays an essential role in acquiring a second language. According to Nalliveettil and Mahasneh (2017), the importance of teaching writing in the following (a) writing helps pupils focus on the correct use of language because they think when they write; (b) generally, writing enhances pupil's learning ability. Most learners obtain the language verbally and then write the new language shortly; (c) Writing helps pupils perform diverse kinds of activity (in both speaking and listening); (d) Writing does not have a specific time as the conversation. In the writing activities, the pupils learn a lot of thinking rather than in speaking activities.

Learning to write is not a natural extension of learning since writing is a complex skill that requires systematic instruction and practice. Mehrabi (2014) emphasized that writing requires an understanding of grammatical structure. Writing involves unique attributes in both practical and communicative senses, resulting in distinct inputs for language learning. Additionally, Nasser (2019) notes that composing a paragraph can be challenging due to the requirement for good spelling, punctuation, grammar, vocabulary, thesis statements, topic sentences, and coherent phrases. These challenges can impact pupils' understanding and performance.

Writing is a crucial component of education, and both teachers and pupils face numerous difficulties when teaching writing skills. The issues pupils face when learning to write often mirror the challenges teachers encounter during the teaching and learning process. According to Al-Qarala's (2018) study, the following problems are common among teachers and pupils: (a) lack of vocabulary, (b) grammar issues, (c) lack of motivation, and (d) learning environment. Moreover, Soliman (2018) pointed out that pupils usually acquire vocabulary and expressions but encounter confusion when transitioning to writing. Writing serves as a natural outlet for pupils' thoughts and reflections.

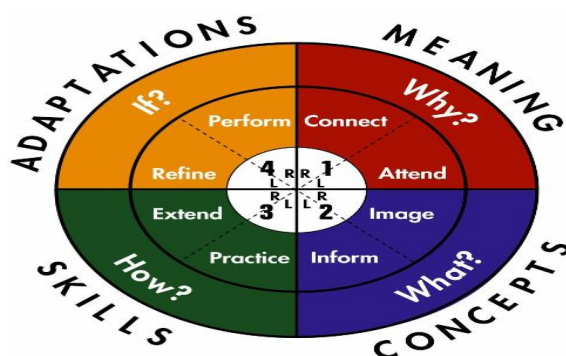
Writing is a complicated activity involving numerous aspects (linguistic, psychological, cognitive, and social skills). The mental activity of constructing properly written texts is part of ongoing learning experiences. According to Cohen (2003), successful implementation of cognitive factors and metacognitive processes to complete writing tasks depends on the overall patterns that give general direction to learning behaviors and preferred ways in which an individual approaches a task, a learning situation or tries to solve a problem, which is known as learners' learning styles. In other words, when pupils understand what they need to learn and why, they can strive to absorb knowledge that meets the specified criteria for the intended level of mastery.

Everyone has the potential to succeed in learning a foreign language differently. According to Fayambo (2015), learning styles are individuals' preferred ways of absorbing and understanding new information. Tezcan and Guvens (2017) assert that each person has a unique genetic composition and background, causing them to respond differently to the same teaching method and kinesthetic processes. People also differ in terms of their physiology and psychology. One of the learning style models that may align with pupils learning styles is the 4MAT model. This framework, created by McCarthy, is one of the significant instructional frameworks applied in education.

McCarthy's 4MAT model is one of her learning style models. It is named as such because it focuses on four learners' styles that overlap like fabric. The 4MAT model is an abbreviation for four mode application techniques of learning styles. According to McCarthy (2006), the 4MAT model is a teaching model that engages, informs, and

allows for practice and creative use of materials within each lesson. The pupils' journey through the learning process begins with four simple questions: 'Why?' (Learners looking for a reason or motivation to learn), 'What?' (Learners who identify and seek knowledge), 'How?' (Learners who actively try out and apply knowledge to understand how they will use what they are learning), and 'What if?' (Learners who create new experiences by extending their learning).

There are two stages in each of the four sections of the 4MAT model. "Examine" and "connect" are covered in the first quarter, and "image" and "define" are covered in the second. "Practice" and "extend" are the main themes of the third quarter, while "refine" and "integrate" dominate the fourth. People explore the fundamental question "Why?" when learning what an idea is in the first and second phases of the first quarter. The second quarter's third and fourth steps delve deeper into the concept, focusing on "What?" as their central inquiry. The core question shifts to "How?" in the fifth and sixth phases of the third quarter, which deal with putting the concepts into practice and customized learning.



The 4 MAT model McCarthy (2006)

Several theories have contributed to the emergence of the McCarthy (4MAT) model. According to McCarthy (1996), the following theories benefited McCarthy's model. The first is Dewey's theory, which uses the connections between past experiences and present experiences to support the concepts of efficacy and continuity by linking current experience to previous experience subsequent experience. Kolb's theories, which lead to successful learning, integrates the aspects of the learning cycle—direct experience, contemplative observation, concept creation, and active experimentation. The third theory used is Carl Jung's Psychological Theory, which

examines personality factors related to teaching and learning processes. Torrance's hypothesis of the functions of the left and right hemispheres in education forms the basis for the Fourth Learning style included in the 4MAT framework. The fifth Rogers-Sperry hypothesis splits the learning cycle's quarters into two halves. Herman's idea, the last theory, ties the characteristics of every learning pattern to the operations of every component of the brain. (Alshankyty, 2021).

The principles of this model are grounded in previous theories. According to Azam (2016), Daoud et al. (2017), and Alshankyty (2021), the McCarthy model emphasizes the importance of engaging learners' interest in the educational subject matter. This aim is achieved by encouraging activities such as self-reading, visiting libraries, conducting internet research, engaging in hands-on experiences, and interviewing specialists in the field. Additionally, learners are motivated to apply their knowledge through various tasks, including creating illustrative paintings and solving real-world problems. The key objectives include helping learners explore, create, and analyze information through projects, report writing, group activities, and more. Among the most important standards are teachers' considerations of learners' styles, planning skills, and purpose (ensuring a clear objective for educational activities) and fostering teachers' positive attitudes towards diverse teaching methods and strategies.

Studying English may be associated with the 4MAT model. Language skills are not independent; they are interconnected. To effectively acquire language, pupils learn productive (speaking and writing) and receptive (listening and reading) skills. Learning language involves learning appropriate vocabulary, grammar, and pronunciation. Furthermore, McCarthy presented a comprehensive framework for guiding the organization of all areas of knowledge and instruction by incorporating the general structure of the learning and teaching process in the 4MAT model. English as a foreign language can be taught effectively and methodically by utilizing the 4MAT model. While some pupils pick up languages more rapidly through listening and observing, others might gain more from writing.

The 4MAT model offers various benefits in the learning process. According to Aktas and Bilgin (2015), this model emphasizes learning in line with the natural

formation of the brain to learn. Constructivism serves as its foundation, providing pupils with opportunities to understand the particulate nature of matter through modeling, visualization, theoretical knowledge, application, showcasing individual creativity, integrating these opportunities, and transferring knowledge through engagement with activities. Kaewkiriya (2017) argues that teaching using the 4MAT model promotes efficient and engaging learning. Additionally, teaching using this model is successful at fostering metacognitive thinking.

Some studies used the 4MAT model of teaching and learning foreign languages (Salem, 2019; Saleh, 2020). For example, Saleem (2019) found that the 4MAT teaching model significantly contributed to teaching English. Additionally, the processes within the learning loop can be valuable for pupils to utilize English terminology in real-life situations. The 4MAT model helps pupils acquire knowledge and experience in a field beginning from concrete experiences. In addition, a study by Saleh (2020) found that the use of the 4MAT model was effective in enhancing the reading and critical thinking abilities of preparatory school pupils. Ahmed's (2021) research explored the 4 MAT model in language education to improve English dyslexia treatment and academic success among pupils at Technology College.

There is extensive evidence supporting the effectiveness of the 4MAT model in teaching and learning writing skills (e.g., Alshankyty, 2021; Al-Reheem, 2021; Ibrahim, 2022). Alshankyty (2021) employed the McCarthy model to improve college pupils' reflective thinking and creative writing abilities. The results of (ANCOVA) revealed the existence of statistically significant differences between the averages of the study groups in both tools in favor of the experimental group of the two tools in favor of the experimental group. Similarly, Al-Reheem's (2021) research sought to demonstrate the McCarthy model's success by utilizing a telegram application in teaching the English language to enhance pupils' functional writing skills and learning motivation for eighth-grade primary pupils study's findings on the McCarthy 4MAT model indicated statistical differences between the experimental group's writing skills at the 0.05 level.

Moreover; the new education system aims to achieve sustainable development through a learner-centered approach. Its goal is to develop lifelong learning and

twenty-first-century skills. The purpose is to build the personality of learners capable of learning, critical thinking, and creativity. It also includes deepening knowledge and enabling multidisciplinary learning. Moreover, it focuses on problem-solving, mastering continuous participatory learning, and enhancing life skills, including decision-making abilities. When teaching a lesson, educators should consider the individual differences of the learners when arranging learning activities.

The Ministry of Education was keen to prepare the new curriculum (2.0) by Egypt's Vision 2030. It included a clear vision and a constructive strategy to combine national identity and respect for cultural privacy, adopt global trends in educational quality methods, balance between modernizing curricula and reviving heritage and providing multiple activities that deepen self-confidence, acceptance of others, and link education to local, Arab and international labor market. The Ministry of Education and Technical Education has developed a general framework for the pre-university education curriculum for 2018-2030. This framework includes a set of specifications that the learner must possess, which prepares him for a successful life and efficient work in the twenty-first century. These specifications summed up the learner as a persistent, creative thinker. In teaching and learning, he is an effective and positive leader, coexists with others, has competitive ability, and believes in work values. (Mohmed, 2019 & Maghowry, 2021).

McCarthy's educational model philosophy, as demonstrated by 4MAT, shares several key similarities with the new education philosophy:

- It promotes the concepts of efficacy and continuity by linking current experiences with past ones to foster expertise.
- It focuses on creativity and critical thinking in learners by engaging them in discussions and presenting real-life issues related to educational subjects.
- It emphasizes planning skills and purpose in educational activities and practices.
- It highlights the positive role of the learner in the educational process.
- It aims to enhance essential 21st-century skills such as communication, cooperation, critical thinking, and creativity.

Today's curricula acknowledge the differences among learners through the influence of the constructivist approach. When teaching a lesson, teachers create learning situations that cater to the diverse needs of their pupils. The 4MAT model is

advantageous as it allows all learners to embrace their unique learning styles. Therefore, exercises are given item by item, and the assertive learning style is determined based on the pupils' preferences for these exercises. Thus, the researcher carried out this study as a step toward pupils' writing skills by implementing McCarthy's 4 MAT model.

Background of problem

As a primary English teacher, the researcher observed that many pupils faced challenges with writing. They had difficulty organizing their ideas and expressing them clearly in writing. In addition, they often make mistakes in their writing; they do not have sufficient opportunities to practice writing. Furthermore, non-native English speakers found it especially difficult to write insightful paragraphs due to disparities in background knowledge compared to native English speakers.

After examining previous research on language acquisition problems, the researcher found that the most prevalent educational difficulties were associated with writing skills. Writing is particularly troublesome in education. According to several studies (Al Agery, 2023; Tamer, 2022; Ahmed, 2022; Emara, 2022), learners' difficulty in writing meaningfully stems from not having the same language background as native speakers when they start learning. Non-native Arabic speakers of English make errors in writing, especially in sentence structure, usage, and mechanics. As a result, pupils find writing more challenging than reading and listening and often make a series of errors in their writing.

To confirm the problem's existence, the researcher conducted a pilot study. The researcher administered a writing test to 32 primary-six pupils at Omar-Bin Abul Al Azeez School in Assiut Governorate. The test results indicated that the pupils had difficulties with writing skills.

Statement of the Research Problem

After reviewing the relevant studies and the writing test, the research problem can be defined as follows: some pupils in the upper grades of primary school struggle with

writing skills. Therefore, this research aimed to enhance these pupils' writing abilities by employing McCarthy's MAT model.

Research Question

The current research is an attempt to answer the following question:

What is the effect of using McCarthy's 4MAT Model on developing English writing skills among upper primary pupils?

Definition of Research Terms

Writing skills

Writing skills are the abilities that enable pupils to express their thoughts and ideas effectively in written form. These skills require both physical and mental engagement from writers. For the specific purpose of the research, the researcher defines writing skills as the abilities that support upper grades primary stage pupils' composition of a paragraph and appropriate word choice to convey their ideas and thoughts, and this can be measured through test.

The 4 MAT model

McCarthy(2013) defines it as a set of teaching procedures based on integrating the four basic learning styles and the functions of the right and left hemispheres of the brain in proportion of their learn preferences, starting from the sensory perception process and ending with the performance process.

The researcher defined The 4MAT Model as a set of steps and procedures that helps learners treat the information actively and interact with the information in meaningful ways; in addition, it assists learners in looking for both relationships and differences between the new information and other information that is already in long-term memory, and link them together; taking into account four types of learners.

Objectives of the Research

This research aimed to develop upper primary-stage pupils' English writing skills using McCarthy's 4MAT model.

Significance of the Research

The researcher provides a detailed theoretical background about the 4MAT model in teaching the English language; therefore, the present research practically might be significant for many reasons:

- it may contribute to developing upper grade primary-stage pupils' writing skills;
- using the 4MAT model can help teachers develop primary pupils' writing skills;
- it emphasizes the difficulties experts face in English as a Foreign Language (EFL) ;and
- it may inspire more researchers to use the 4MAT model to study how Pupils develop other skills such as speaking and listening.

Research Delimitations

There were 32 elementary school pupils in the studies experimental and control groups. The experimental group was from Omar bin Abdul-Aziz Primary School, while the control group was from Al Zaher Primary School. Some basic writing skills and paragraph writing skills (generating ideas, using punctuation marks, using correct sentences- avoiding mistakes in writing, writing topic sentences, supporting sentences. Concluding sentences, organizing ideas)

Research Methodology

The current research used two research groups and a pre-post quasi-experimental design (see Table 1 below). The researcher adopts this design to avoid the defects of one group design, as Bedsat et al. (2005:230)explains, " Researchers adopt this design to avoid the defects of one group design; more than one group are used when applying the experimental factor on one of them and leaving the other in its natural circumstances. Thus, the difference will be the result of the experimental factor effect on the experimental group provided that the groups are completely equivalent except for the experimental variable which affects the experimental". So, the researcher depended on the following design to test the study hypotheses as shown in Table 1.

Table 1: *Main Research Design*

Random grouping	Experimental group	Pre – tests	Experimental group taught using the 4MAT model	Post- tests
	Control group		Control group taught in the commonly used way	

Both groups were subjected to a pre-test t to measure their performance levels in writing before the 4 MAT model implementation. Then, the experimental group trained in a writing using the 4MAT model designed. After using the 4MAT model, the two groups were subjected to the post-administration of the same writing skills test to measure their writing skills. The researcher used the writing pretest to ensure that the sample subjects' proficiency in the English language was comparable. The individuals' results were noted and subjected to a t-test for statistical analysis. The means and standard deviations for each group in the writing pretest is displayed in Table 2 below

Table 2: *T-test Results of the Differences between the control and experimental groups in writing test before using the 4MAT model*

Variable	Group	N	Mean	Std.deviation	T value	Sig. level
Basic writing	Control	32	3.09	1.49	1.13	not sig.
	Experimental	32	2.69	1.36		not sig.
Paragraph writing	Control	32	2.38	1.52	0.438	not sig.
	Experimental	32	2.53	1.33		not sig.
Total score	Control	32	10.06	5.41	0.377	not sig.
	Experimental	32	9.59	4.51		not sig.

The results show that the T value is not statistically significant differences between the experimental and control groups' average writing test scores prior to the program. This suggests that both groups' writing skills were comparable before the proposed program's instruction.

Research Instruments & Materials

A-Data collection instruments:

To collect data, the researcher developed the following instruments:

- Writing skills list appropriate for primary - six pupils.

B- Measurement instruments:

The researcher prepared the following measurement instruments:

- Writing test
- Writing skills rubric

Materials:

The researcher prepared the following materials:

- Teacher's guide according to McCarthy's 4MAT model; and
- Pupil's activity book relating to McCarthy's 4MAT model.

Procedures of the Research

The steps that followed to accomplish the research objective and address the study's question:

1. Reviewing the literature related to learning styles, McCarthy's 4MAT model, and writing skills;
2. Preparing a list of writing skills needed by upper grades primary pupils and submitting them to the jury members;
3. Making the appropriate adjustments according to the opinions of the jury members;
4. Preparing a teacher guide based on McCarthy's MAT model for teaching English to enhance the writing skills of upper-grade primary pupils which include:
 - objective of the guide
 - content of the guide
 - Selecting appropriate teaching aids during the application of the 4MAT model.
 - Selecting evaluation methods which match with the 4MAT model.
5. Preparing the writing pre-post test and submitting it to some jury members, then modifying it according to the jury members' feedback;
6. Piloting the tools of the research;
7. Selecting the groups of the study research among sixth-year primary pupils;
8. Pre-testing the writing test;
9. Implementing the 4MAT model in teaching each skill ;
10. Post-testing the writing test after teaching using the 4MAT model to investigate its effect;
11. Collecting and analyzing data statistically
12. Interpreting and discussion the results, providing conclusions, recommendations and suggestions for further researches.

Research participants

The current research included 32 male and female participants aged twelve to thirteen. The participants were pupils from Omar bin Abdul-Aziz Primary School in the Assiut region. Additionally, there was a control group of 32 pupils from Al Zaher Primary School. All participants had five years of experience learning English and came from similar economic, social, and cultural backgrounds.

The Writing pre-post test

- **The objective of the test**

The primary goal of the writing skills test was to assess pupils writing.

- **Construction of the Test**

The researcher designed the test based on her expertise as a teacher, the prior curriculum, the new curriculum, and English textbooks. Before seeking the advice and comments of educators, practitioners, and educational specialists, the researcher also examined the literature and earlier studies. The test uses predetermined guidelines.

- Reviewing literature related to writing skills and some tests;
- Writing down the prime binary draft of the test;
- Submitting the test to some jury members to verify the validity of the test, its suitability for the pupils, and the grade and the accuracy of items and recommendations to improve the test according to the feedback obtained from the jury members and ensure the validity of the test.
- **Validity of the test**

To ensure the authenticity of the exam content, a panel of specialists in English as a Foreign Language (EFL) and Teaching English as a Foreign Language (TEFL) consulted. They evaluated the relevance of the test items to the assessed topics, the clarity of the language used, and the effectiveness of the items in meeting the stated objectives. The experts confirmed that the test aligned with these objectives and deemed it relevant and applicable. Additionally, internal consistency is a criterion for assessing the test's validity. A strong correlation was found between individual test items and the overall results, reaching significance at the 0.01 level.

Reliability of the test

The researcher used various statistical techniques to ensure the validity of the writing test. To assess its reliability, the researcher calculated the Cronbach's alpha correlation

between the two halves of the test scores, resulting in a coefficient of 0.773. This high value indicates that the test is reliable and consistent.

Table 3: *Alpha cronbach coefficient and split- half for all the domains of the writing test*

Domain	Alpha Cronbach	Spearman's coefficient	Sig. level
Basic writing	0.758	0.814	0.01
Paragraph writing	0.784	0.823	0.01
Total	0.773	0.828	0.01

According to Table 3, the test showed high accuracy. The writing test's use is supported by its strong reliability, as indicated by the Alpha Cronbach value of 0.773.

Scoring the test

Two raters, the researcher and an English language teacher, were involved in the grading task. Prior to formally rating each writing sample, the two raters met and discussed the rating scale. They also graded a few samples together to establish reliability. Since there were two raters evaluating the writing, the average of the two raters' scores was used as the actual score of each collaborative writing sample. The correlation coefficients were computed after grading to calculate the degree of agreement between the two raters. A writing scale was used which is mainly based on an analytical scoring procedure. According to this scale the writing test should be evaluated against a set of eight criteria or subcategories (vocabulary and meaning, grammar, mechanics, technicalities of writing and organization). This rubric consist of a 32-point scheme for the basic writing and paragraph writing which are 4 points to vocabulary, 4 points to meaning, 4 points to grammar, 4 points to mechanics, 4 points to technicalities of writing, 4 points to organization, 4 points to topic sentence, and 4 points to conclude sentence. The total score of the test is 32 marks.

Data Analysis

The researcher employed several statistical techniques with the statistical package for social sciences (SPSS23) to compute and guarantee the psychometrics' effect and

validate the proposed hypotheses. Using the statistical package for social sciences (SPSS23), the researcher employed several statistical techniques to compute and ensure the psychometrics' effect and validate the given hypotheses.

Results and Discussion

Based on the objective, the current research attempted to answer the following question:

- What is the effect of using the McCarthy 4MAT model on developing English writing skills among upper primary pupils?

This question is represented in the hypothesis as follows:

There would be statistically significant differences at 0.01 between the mean scores of the experimental and control group in the post-administration of writing skills test in favor of the experimental group.

Based on the hypothesis above, the following minor hypotheses were derived and tested:

1. There would be statistically significant differences at 0.01 between the mean scores of the experimental and control group in the post-administration test of basic writing skills in favor of the experimental group.
2. There would be statistically significant differences at 0.01 between the mean scores of the experimental and control group in the post-administration test of paragraph writing skills in favor of the experimental group.

- **Testing the Hypothesis**

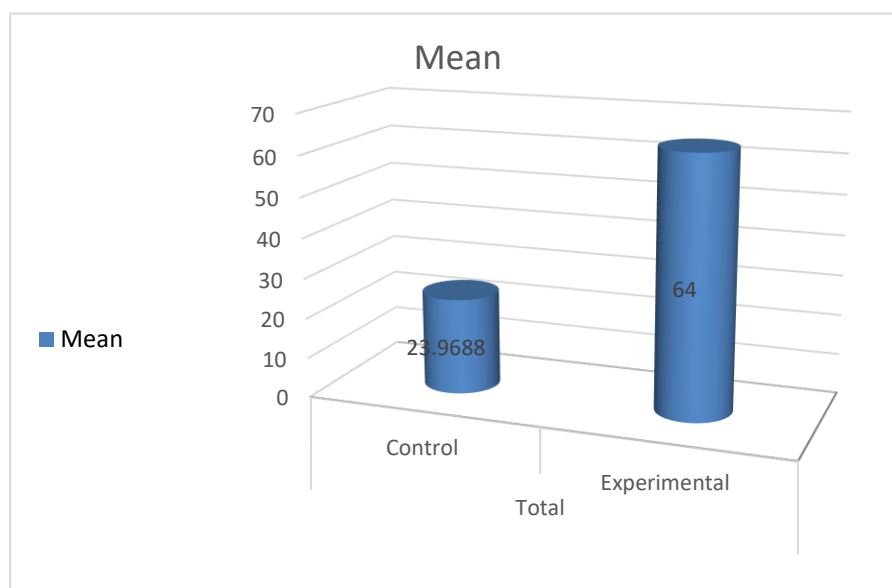
To test the hypothesis, which states that there would be statistically significant differences at 0.01 between the mean scores of the experimental and control group in the post-administration of writing skills test in favor of the experimental group, the researcher used a parametric- T-test and the results came as illustrated in the table 4below:

Table 4: *Differences between the mean scores of the experimental group and control group in pre-post writing test*

The test	Group	N	Mean	Std. Deviation	T	Sig. (2-tailed)	Effect size in <i>Eta squared</i>
Total	Control	32	23.9688	2.14753	105.44	0.01	0.997
	Experimental	32	64.0000	.00000			

The table above (Table 2) indicates statistically significant differences at the 0.01 level between the mean scores of the experimental group and control group in the post-administration of the writing skills test, favoring the experimental group. The t-value was 105.44, leading to the acceptance of the hypothesis regarding the writing test administration. Additionally, Figure 1 below presents the mean scores of the experimental and control groups in the writing test.

Figure 1 *The differences between the Mean scores of the experimental group and control group in the writing skills post test.*



By comparing the participants in the experimental group with those in the control group, the researcher found that the participants in the experimental group were

gradually able to generate as many words about a specific topic as their counterparts in the control group. When the researcher asked participants from both groups to list as many words as possible, the results varied. The responses from the participants in the experimental group were superior to those of the control group.

- **Testing the minor hypotheses**

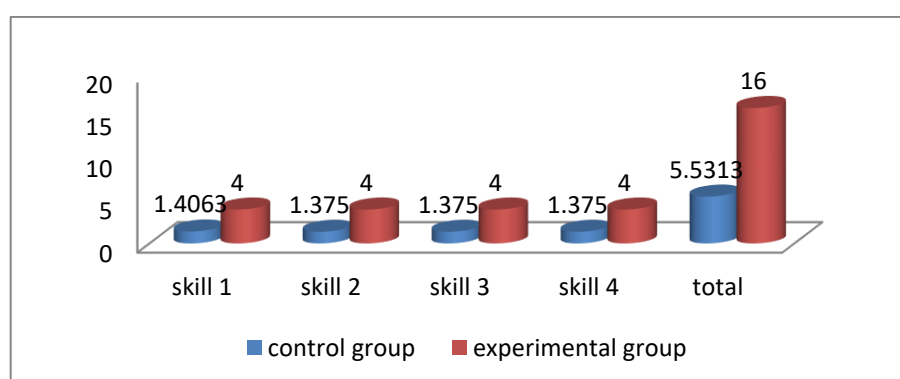
To test the first minor hypothesis, which states that there would be statistically significant differences at 0.01 between the mean scores of the experimental and control groups in the post-administration test of basic writing skills, (1) generate ideas, (2) write correct sentences. (3) Using punctuation marks, (4) avoiding mistakes in spelling; in favor of the experimental group, the researcher used a parametric t-test whose results came as shown in Table 4.2below:

Table 5:*The differences between the mean scores of the writing basic writing pre-post test administrated to the experimental group*

The test	Group	N	Mean	Std. Deviation	T	Sig. (2-tailed)	Effect size in Eta squared
1-skill 1	Control	32	1.4063	.55992	26.21	0.01	0.957
	Experimental	32	4.0000	.00000			
2 skill 2	Control	32	1.3750	.55358	26.82	0.01	0.959
	Experimental	32	4.0000	.00000			
3-skill 3	Control	32	1.3750	.49187	30.19	0.01	0.967
	Experimental	32	4.0000	.00000			
4-skill 4	Control	32	1.3750	.49187	30.19	0.01	0.967
	Experimental	32	4.0000	.00000			
Total	Control	32	5.5313	2.04757	28.92	0.01	0.964
	Experimental	32	16.0000	.00000			

It is clear from the above table that the value of "t" amounted to 26.21, 26.82, 30.19, and 28.92, respectively, for the test as a whole, which are statistically significant at the level 0.01. This indicates that there are statistical differences at the level 0.01 level between the mean scores of control and the experimental group in basic writing in favor of the post-test. Besides, Figure 2 below:

Figure 2 *The Differences between the Mean scores of the experimental group and control group in basic writing skills*



As for basic writing, the mean score of the experimental group was 16.0000, and the "t" value calculated for these skills reached 28.92, and this was a significant value at the level of 0.01. To calculate the "t" value and its significance, it is clear that there are statistically significant differences between the average scores of the pupils in the experimental group and the control basic writing skills. The pupils learned basic writing skills through the 4MAT model units, which consist of four lessons, each of which consists of eight activities about basic writing. These activities also give the pupils a wealth of vocabulary and ideas that help them write more fluently. The pupils use these skills to write using activities and the best use of words. The 4MAT model also allowed pupils to participate effectively through group activities. The continuous feedback that pupils receive after the end of each lesson enables them to master the basic skills.

To test the second minor hypothesis, which states that there would be statistically significant differences at 0.01 between the mean scores of the experimental and control groups in the post-administration test of paragraph writing skills ; (1) writing topic sentence;(2) writing supporting details; (3) writing concluding sentence; (4)

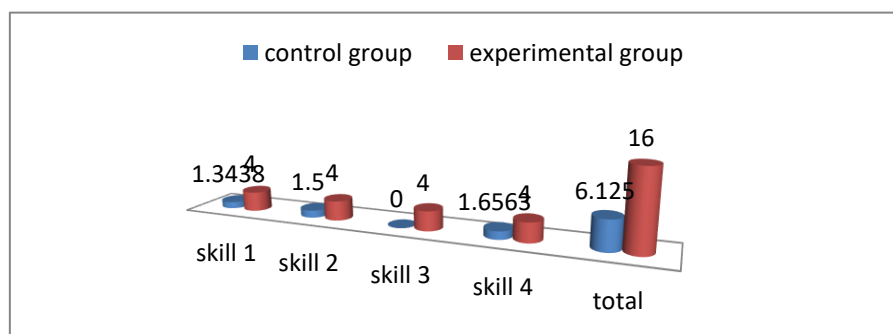
organizing ideas in favor of the experimental group. The researcher used a parametric t-test whose results in the table 6 below:

Table 6: *the differences between the mean scores of control and experimental group in paragraph writing skills the writing pre-post test administrated to the experimental group*

The test	Group	N	Mean	Std. Deviation	T	Sig. (2-tailed)	Effect size in Eta squared
1-skill 1	Control	32	1.3438	.48256	31.13	0.01	0.969
	Experimental	32	4.0000	.00000			
2-skill 2	Control	32	1.5000	.50800	27.84	0.01	0.962
	Experimental	32	4.0000	.00000			
3-skill 3	Control	32	1.5313	.50701	27.45	0.01	0.960
	Experimental	32	4.0000	.00000			
4-skill4	Control	32	1.6563	.48256	27.47	0.01	0.961
	Experimental	32	4.0000	.00000			
Total Paragraph writing	Control	32	6.1250	.70711	79.00	0.01	0.995
	experimental		16.0000	.00000			

The test's "t" values were shown in the table as 31.13, 27.84, 27.45, and 79.00. At the 0.01 level, these results are statistically significant, suggesting that the experimental and control groups differ significantly.

Figure3 *The Differences between the Mean scores of paragraph writing skill in experimental and control group in the post test*



The figure indicates that pupils in the experimental group outperformed those in the control group on the writing test administered after the intervention. Overall, their performance showed a slight improvement. Furthermore, the chart indicates that the experimental group's scores were higher in all areas of writing skills, as well as in the overall scores, after the implementation of the 4MAT model.

The effectiveness may arise from several factors: (a) the advantages of the 4MAT model, which helps learners, learn according to their learning styles, thus facilitating their learning. The experimental group of pupils confirmed that the 4MAT model makes learning more enjoyable, motivating, and exciting because classroom activities address their needs and expectations. Also, it helped them connect new information to previously learned information, analyze and practice the new lessons through writing about different topics; (b) the 4MAT model focuses on encouraging discussion, accepting others' ideas and viewpoints, and practicing activities. Continuous encouragement to the learner's ideas and questions and practicing activities increased their motivation and confidence; (c) the worksheets and the various activities practiced by pupils helped them connect ideas and meaningful vocabulary and use them in real-life situations; in addition, they were involved in pair as well as group work activities and receive various types of feedback.

As for basic writing, the "t" value calculated for these skills reach 28.92, and this a significant value at the level of 0.01. To calculate the "t" value and its significance, it is clear that there are statistically significant differences between the average scores of the pupils in the study group in pre-and post –and applications of basic writing skills. The pupils learned basic writing skills through the 4 MAT model units, which consist of four lessons, each of eight activities about basic writing. These activities also give the pupils a wealth of vocabulary and ideas that help them write more fluently. The pupils use these skills to write using activities and the best use of words. The 4MAT model also allowed pupils to participate effectively through group activities. The continuous feedback that pupils receive after the end of each lesson enables them to master the basic skills.

As for the paragraph, the "t" value calculated for theses skills reach 79.00, and this significant value at the level of 0.01. To calculate the "t" value and its significance, it

is clear that there are statistically significant differences between the average scores of the pupils in the study group in pre-and post –and applications of paragraph writing. The research group consisted of sixth-grade primary school pupils after applying the 4MAT model. The fact that the pupils acquired through the 4MAT model pupils builds on their prior knowledge and new information. They perform exercises about subject sentences, supporting, and ending during the four lessons of the paragraph unit, and they learn how to distinguish between ideas. Through activities designed to make the most use of this language, pupils write the sign using a variety of vocabulary that increases their linguistic wealth. The 4MAT model also allowed pupils to participate effectively through group activities. The continuous feedback pupils receive after the end enables them to master basic writing and paragraph writing.

The reasons also might be that after being taught units using the 4MAT model 8 steps method of the 4MAT model, the pupils have learned some essential knowledge in English writing; step1 is creating experience using vocabulary; step2 is analyzing experience; step3is adapting experience and conceptual expression; step4 is developing theory, concepts and additional learning; step5 from the previous steps the pupils learned how to share and present their knowledge of vocabulary that they can implement in their writing. Grammar, structure, and punctuation were reviewed and employed in writing practice in step five; step 6 is where pupils learn. Step7 is the analysis and application of the components in English writing, and step 8 pupils exchange their writing with friends in the English classroom. Through these steps, the pupils had opportunities to learn.

The results mentioned above are consistent with Benchochineda's (2012) findings. The study's objectives were to assess sixth-grade pupils' attitudes toward English writing while using the 4MAT model and compare their writing abilities before and after using the model. The results showed a significant improvement in the student's English writing abilities, with a p-value of .01. Similarly, Alraheem (2021) conducted a study to demonstrate the effectiveness of the McCarthy model through a telegram application in teaching the English language to improve functional writing skills and motivation among eighth-grade primary pupils. The study results indicated statistical differences at a 0.01 level in writing skills for the experimental group when using the McCarthy model.

The significance of using the 4MAT model to enhance English as a Foreign Language (EFL) writing skills is highlighted by Ahmed (2021). Ahmed's research examined the effectiveness of the 4MAT model in developing argumentative writing skills among EFL majors at the Faculty of Education, Al-Azhar University. The results revealed statistically significant differences between the mean scores of the experimental group and the control group, indicating the effectiveness of the 4MAT model in improving argumentative writing skills. Additionally, it helped increase pupils' self-confidence and laid a foundation for lifelong learning.

Conclusions

The 4MAT model proved effective in improving primary pupils' writing skills. It gave the participants more chances to learn English vocabulary and practice writing skills. It made the participants more active and engaged in learning. It transferred the pupils' roles from passive receivers to active thinkers. Pupils practiced brainstorming to generate the English vocabulary, stimulating the learning process and increasing their self-confidence using the 4MAT model. It enabled them to generate as many words as possible about the topic, vary in the categories of words, conceive new words, participate in class activities, and become active learners. The findings of this study hold significant theoretical and practical implications for EFL course planners, researchers, textbook developers, and teachers. The enhancement of pupils' writing and vocabulary skills due to the 4MAT model may lead to improved academic writing outcomes. Additionally, this study demonstrated the effectiveness of the 4 MAT model in enhancing the writing skills among six elementary school children.

In light of the research study results mentioned above, the researcher recommends the following:

1. "Implementation of the 4MAT Model": Utilize programs based on the 4MAT model to teach English writing skills at the elementary level and throughout all educational stages, as it has proven effective in enhancing writing skills.
2. Considering different learning styles is crucial when teaching English and assessing student performance at various education levels.
3. "Teacher Training": Training for pre-service and in-service English language teachers on learning style models, such as the MAT model, is essential.

4. "Encouraging Versatile Teaching Approaches": Teachers are encouraged to adopt programs based on the 4MAT model when teaching various aspects of the English language, as this model is versatile and applicable to any area of language instruction.
5. "Curriculum Integration": Course designers and decision-makers should integrate the 4MAT model into curricula and the design of educational materials.

Suggestions for future studies

1. Investigating the effectiveness of a program based on the 4MAT model delivered via Telegram in developing speaking skills and critical thinking among six primary-stage pupils.
2. Assessing the effectiveness of a program based on the 4MAT model delivered via Google Classroom in enhancing grammar skills and critical thinking among six primary-stage pupils.
3. Designing a curriculum based on the 4MAT model to promote integration among four language skills and increase motivation for learning among primary-stage pupils.
4. Investigating the effectiveness of a digital curriculum based on the 4MAT model in developing writing skills among six primary-stage pupils.

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