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Classroom in Developing Argumentative  
Writing Skills among EFL Majors**

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#### **ABSTRACT:**

The present research aimed at empirically investigating the effectiveness of 4MAT model via Google Classroom in developing argumentative writing skills among EFL majors at the Faculty of Education, Al-Azhar University. To fulfil the purpose of the research, the experimental method was adopted (pretest - posttest control group design). An argumentative writing test with a scoring rubric was developed by the researchers for collecting the target data after assuring its validity and reliability. The participants, totalling 49, were randomly selected from the fourth year EFL majors at the Faculty of Education, Al-Azhar University and assigned into two groups: the experimental group (N= 25) and the control one (N= 24). The statistical analysis of the data elicited using independent samples *t*-tests revealed that there was a statistically significant difference between the mean scores attained by the experimental group and the control one underscoring the effectiveness of 4MAT model via Google Classroom in developing argumentative writing skills as the effect size was large (Cohen's  $d = 1.47$ ). The researchers developed a number of recommendations and suggestions for the future researchers.

*Keyword:* 4MAT Model, Google Classroom, Argumentative Writing.

## فاعلية نموذج مكارثي عبر فصول جوجل في تنمية مهارات الكتابة الجدلية لدى طلاب شعبة اللغة الإنجليزية كلغة أجنبية

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### المستخلص:

تمحور الهدف الرئيس للبحث الحالي حول استقصاء فاعلية نموذج مكارثي 4MAT من خلال بيئة فصول جوجل في تنمية مهارات الكتابة الجدلية لدى طلاب شعبة اللغة الإنجليزية كلغة أجنبية بكلية التربية، جامعة الأزهر، وقد تبني البحث المنهج التجريبي من خلال استخدام تصميم المجموعة الضابطة ذي الاختبارين القبلي والبعدي، وتمثلت أداة البحث في اختبار للكتابة الجدلية ومقياس تقدير متدرج لجمع البيانات؛ حيث تم تطبيقه قبليًا وبعديًا على طلاب عينة البحث بعد التأكد من صدقه وثباته، وتكونت عينة البحث من 74 طالبًا من الفرقة الرابعة بشعبة اللغة الإنجليزية، تم اختيارهم وتوزيعهم عشوائيًا إلى مجموعتين: المجموعة التجريبية وبلغ عدد طلابها 25 طالبًا، والمجموعة الضابطة وبلغ عدد طلابها 24 طالبًا، ولقد أسفر التحليل الإحصائي للبيانات من خلال اختبار للعينات المستقلة عن وجود فروق ذات دلالة إحصائية بين متوسطي درجات مجموعتي البحث لصالح المجموعة التجريبية، مما يؤكد فاعلية نموذج مكارثي من خلال بيئة فصول جوجل في تنمية مهارات الكتابة الجدلية؛ حيث كان حجم الأثر كبير طبقًا لمعادلة كوهين ( $d = 1.47$ )، ولقد قدم البحث مجموعة من التوصيات والمقترحات لباحثي المستقبل.

**الكلمات المفتاحية:** نموذج مكارثي، بيئة فصول جوجل، الكتابة الجدلية.

## Introduction

The process of writing is infrequently stress-free even for professionals as it involves several steps to be followed so that the final text can communicate what the writer wants to convey to the reader. Over and above, writing in a foreign language is considered one of the most complex and sophisticated skills to be mastered. It is more multipart and challenging than writing in one's mother tongue as it imposes a great confrontation for most students in EFL academic context. To write in a foreign language, learners need to activate and coordinate several linguistic skills including, but not limited to, semantics, syntax, spelling and writing conventions (Zamel, 1985).

Pertinently, there are four main writing discourses, namely narrative, expository, descriptive, and argumentative; each of which requires specific techniques and is done for different purposes and for different audiences (Badger & White, 2000). As indicated above, writing in a foreign language for any purpose or at any discourse is very challenging; over and above, argumentative writing has been proven by researchers to be the most difficult discourse of writing (Neff-van Aertselaer & Dafouz-Milne, 2008) and one of the most sophisticated skills to teach (Zamel, 1985).

Argumentative essay writing is a dynamic literacy practice where the author establishes a dialogic relationship with an audience defending a point of view and looking to convince, get an adhesion or persuade. More than that, it requires reasoning and higher thinking skills such as predicting, analysing, and synthesizing. Such skills are not so easy for any FL student or even for writing in the student's first language. As for foreign language students, argumentative writing discourse is crucial to articulate their own ideas in academically appropriate patterns and approaches. It helps them acquire knowledge, promotes scientific thinking skills, and enhances comprehension. Furthermore, argumentative writing can lead to an increase in intrinsic motivation and enhance problem-solving skills in the academic settings (Chinn, 2006; De La Paz, 2005; Sampson & Gleim, 2009).

Learners at the university level often face difficulties in the use of complex and appropriate elements in producing argumentative writing (Kaur, 2015). Most EFL learners have partial understandings of argument; for instance, a for-and-against structure inserted between introduction and conclusion. Consequently, learners need to develop analytic and evaluative skills in order to write effective argumentative



essays, and learners need to be aware of the appropriate schematic structure, style and register for effective presentation of their position (Schwarz, et al., 2003; Wu, 2006; Zohar & Nemet, 2002).

Nippold and Ward-Lonergan (2010, p. 238) noted that “argumentative writing is a challenging communication task that needs sophisticated cognitive and linguistic abilities”. According to Toulmin, Rieke and Janik (1984), argumentative writing is a set of interrelated claims and supporting statements that enforce the arguer’s position. It involves the process of stating a claim, providing data to support that claim, acknowledging the possible counter-arguments and offering rebuttals (Toulmin, 1958). Based on these definitions, many models of argument structures have been developed by researchers and educators (e.g. Toulmin, 1958, 1984 (the Toulmin model of argumentation); Mitchell & Riddle, 2000 (the triangle model); Scriven, 1976 (the scriven model of argumentation); Walton, 1998 (the dialectical method of evaluating argument).

Toulmin’s (1958) model of argument structure is the most prominent framework for teaching and analysing argumentative text and essay writing. From Toulmin’s point of view, every argument is composed of six interconnected parts: claim, data, warrant, backing, rebuttal, and qualifiers respectively. *Claim* is an expression of the position that is advanced in the argument. The elements *datum*, *warrant* and *backing* fall within the term *grounds*. *Datum* is the information that is expressed to support the acceptance of the claim. *Warrant* (often implicit) is a rule of inference that justifies the transition from the datum to the claim and reveals the relevance of the data for the claim. *Backing* is information such as reasonable evidence, statistics or expert ideas that provide a rationale for a warrant. *Qualifiers* and their interrelated *rebuttals* are presented to qualify the relationship between the claim and warrant.

Argumentative writing places heavy load on the brain as it requires an integration of multiple cognitive functions simultaneously: hand-eye coordination, language, memory, creativity, insight, logic, spatial intelligence, abstract thought, and a lot of brain activity to accomplish. Brain scans show that many areas of the brain work in tandem during the act of writing, which creates strong neural connections for developing other skills (Dean, 2018). Similarly, individuals work differently even before they set pen to paper which may be attributed to the individual differences, the strategies adopted, the degree of skill mastery and the learning styles and addressing all

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the different types of learners within an argumentative writing class requiring a teaching model that can remediate and strategize the difficulties encountered by the students in an argumentative writing class (Erhard, et al., 2014; Zimmer, 2014).

With this in mind, argumentative writing requires orchestrating the teaching practices, adjusting the rhythm of the teaching, and avoiding the outdated traditional ones. Consequently, the teacher could address the learners higher thinking skills in an effective manner making use of their abilities, focusing on their learning styles and resolving the difficulties encountered (Berge, et al., 2016; Hasani, 2016).

Concordantly, 4MAT model (4 Mode Application Techniques), developed by Bernice McCarthy (1980), is a brain-based teaching model that incorporates the research on human brain processing preferences and learning styles to address diverse spectrum of learners. 4MAT model highlights learning in accordance with the way the brain is naturally designed to learn, and it has been gleaned from research in neurology and cognitive science to enhance teaching learning process. It was developed on the basis of constructivism, and it presents opportunities for students to understand the particulate nature of matter, such as modelling, visualization, theoretical knowledge, application, exhibiting individual creativity, the integration of these opportunities and knowledge transfer by interaction with activities (Aktas & Bilgin, 2015; Benchachinda, 2012).

McCarthy (1980) describes 4MAT as a model for delivering instruction in a way that engages, informs, and allows for practice and creative use of materials within each lesson. Students' journey through the learning process starts by asking four simple questions, namely why? (learners who seek a reason or motivation for learning), what? (learners who identify and seek knowledge), how? (learners who actively try out and apply knowledge allowing them to understand how they individually are going to use what they are learning) and what if? (learners who develop extensions of their learning to create new experiences) (McCarthy & McCarthy, 2003; Nowacki, 2011).

Consequently, if all four brain-based classifications are taught to all learners in a cycle that alternates from right to left mode information processing, and if in doing this, all styles are equally valued. This integration will allow learners to be comfortable some of the time and stretched and challenged at other times (McCarthy, 1990; McCarthy, & McCarthy, 2006).



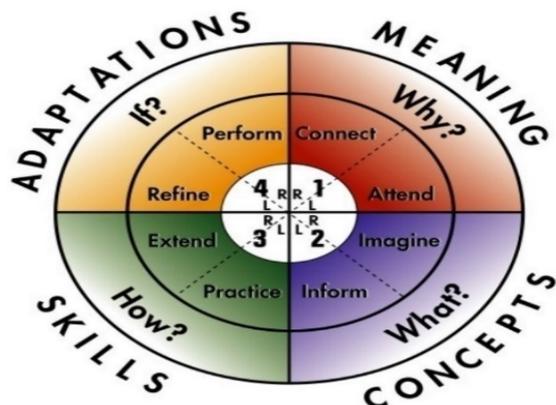
Originally, 4MAT model was developed on the basis of two major premises: 1) People have hemispheric processing preferences; and 2) people have major learning styles. McCarthy incorporated the research on human brain function and learning, into her theory. Research has proved that: a) both hemispheres of the human brain (right and left) process information and experience in different ways; b) both hemispheres are equally important for the whole brain functioning; and c) individuals rely more on one mode of processing than the other especially when they approach new learning (McCarthy, 1990). Research describes left mode as serial, analytic, rational, and verbal, while right mode as global, visual, and holistic. Left mode processing is systematic and problems are solved by looking at the parts and sequence is critical. Right mode processing seeks patterns and solves problems by looking at the whole picture (McCarthy, 2000). The reality is that people approach learning with their whole minds, with their intuition, their beliefs, and their subjectivity intact. Accordingly, both ways of the brain function while designing their teaching courses should be taken into account. Such inclusion of hemispheric specificity as a further determinant of individual differences in learning is a further extension of Kolb's model by McCarthy (St Germain, 2002).

Likewise, grounded on the work of David Kolb's Experiential Learning Theory, specifically his cycle of interaction between concrete experiential, reflective observation, abstract conceptualization, and active experimentation, 4MAT model was developed (McCarthy & McCarthy, 2006). McCarthy has slightly changed the articulation of Kolb's theory to incorporate other theories and to reflect more recent research. Each change was an extension of rather than departure from Kolb's original dictum that individuals expand their adaptive processes through exercising them (St Germain, 2002).

Operationally, 4MAT model (McCarthy, et al., 1987) serves as a conceptual framework for teaching. It provides a system of planning instruction that assumes engagement with a variety of diverse learning activities that results in higher levels of motivation and performance. 4MAT lesson planning comprises eight steps: 1) connect, 2) attend, 3) imagine, 4) inform, 5) practice, 6) extend, 7) refine, and 8) perform (McCarthy & McCarthy, 2006) (see figure:1).

Figure 1

4MAT (Four Mode Application Technique) model



The figure above (1) depicts that learning journey starts from the first and second steps of the first quarter (connect & attend), where students use their experiences. The aim of this stage is to make connections between the student's background and concepts (reflective observation). The fundamental question at this stage is "why?" tackling the imaginative learners. The third and fourth steps of the second quarter are imagine & inform where individuals learn what a concept is. Students analyse their experiences and shape concepts (concept formulation). The fundamental question at this stage is "what?" tackling the analytic learners. The fifth and sixth steps of the third quarter are practice and extend where students implement the concepts and learning is individualized (active experimentation). The fundamental question at this stage is "how?" tackling the common sense learners. The seventh and eighth steps of the fourth quarter are refine and perform where practice and experience are integrated (concrete experience). The fundamental question of this stage is "what if?" tackling the dynamic learners. In other words, 4MAT model was developed to modify the events of instruction so that they, specifically, address the brain-based classifications and the different styles of learning. This is increasingly assisting the careers of students as well as the teacher (McCarthy, 1990, Nicoll-Senft & Seider, 2009; Tatar & Dikici, 2009).

At the same time, catering to the brain prepossessing preferences as well as well as learning styles can be best achieved via utilizing different representations of content through technology (Eady &



Lockyer, 2013). On the other hand, “the brain is transforming itself because of its interactions with our technological world” (Sousa 2015, p. 1). Prensky (2008) asserts that technology is essential to the digital natives or the net-generation existence depicting young people as now being constantly “surrounded” and “immersed” by these new technologies in ways that older generations were not. Furthermore, technology which is most often right on the fingertips, keeps everything and everyone updated while the rest is getting outdated (Bhat, et al., 2018).

Most critically, the educational systems are adapting to technology to speak the same language of the audience at a rapid pace and the landscape of the educational area has witnessed a continuous transformation in the past years due to new technologies. Because of that, the integration and adoption of online education mode, with its subsequent possibilities in education causes controversy in the world of education actors. Higher educational institutions from all over the world are competing in all kinds of learning experience with the main aim of finding the best practices for their students and enriching learning through a new generation of pedagogical methods (Georgiev, et al., 2004; Herrick, 2009).

Google Classroom (classroom.google.com) is one of the innovative tools and e-learning environments developed by Google incorporation. It is a friendly user interface that suit different types of learners and corresponds to the brain structure as it provides a compatible environment for displaying and executing the learning process (Nikolaou & Koutsouba, 2012).

Google Classroom was introduced as a feature of Google Suite for Education and it allows any personal Google user to create and join classes (Putri & Ramadhani, 2017). It saves time and paper and makes it easy to create classes, distribute assignments, communicate, and stay organized in very effective manner. Teachers can post class resources, assignments, announcements in the due dates. Connecting to Google Classroom enables using Google Drive to automatically create and manage folders for each class. Teachers can view a student’s work and students can receive feedback of their submitted work (Shah, et al., 2016). Via Google Classroom, the instructor can more quickly identify which students may be struggling with their assignments via the tracking mechanisms associated with assigned tasks. Grading processes can be simplified because of the grading features associated with student submissions (Latif, 2016).

Google Classroom has elevated to become a pedagogical/cognitive tool to help in changing the focus of the classroom from one that is teacher-centred and controlled to one that is learner-centered and open to inquiry, dialogue, and creative thinking on the part of learners as active participants (Shaharane, et al., 2016). Additionally, Google Classroom as a virtual class allows participants to communicate with one another, view presentations and videos, interact with other participants and engage with resources in work groups. The classroom is today available in 42 languages and it also works well on mobile devices and most popular screen reader (Chicoreanu & Cosma, 2017; Putri & Ramadhani, 2017).

Individuals can sign up to use Google Classroom as a teacher or a student, and Google Classroom then connects to Google's other products. Instructors get a folder on Google Drive that holds assignment and exercise templates as well as a folder that holds copies of student materials, and students get a folder that stores their copies of documents submitted as assignments. Perhaps the most useful delivery method provided by this tool is that instructors can make a copy for each student, which automatically adds a copy of the assignment to the student's Google Drive. It also eliminates problems with the "forgotten" homework, and for teachers, it also eliminates the concern of many mails or manually correcting tasks in the workbook (Izenstark & Leahy, 2015).

### **Research Purpose**

The present research aimed to explore the effectiveness of 4MAT model via Google Classroom in enhancing the argumentative writing skills among the EFL majors at the Faculty of Education, Al-Azhar University. Through the analysis of a diagnostic test completed by (19) Fourth-year EFL majors at the Faculty of Education, Al-Azhar University, it was revealed that the most of candidates poorly developed their essays; did not write the introduction correctly; did not write the thesis statement correctly; did not write the claims correctly; did not provide evidence to support the argumentative issue; did not provide the counter-arguments; did not provide coherent piece of writing; did not adhere to the writing conventions (grammar, spelling and punctuation); and did not write the conclusion properly.

Thereupon, the research sought to answer the following key research question:



1. What is the effectiveness of 4MAT model via Google in developing argumentative writing among EFL majors at the Faculty of Education, Al-Azhar University?

### Research Hypotheses:

1. There is no statistically significant difference between the mean scores attained by the experimental group in pre/post argumentative writing test.
2. There is no statistically significant difference between the mean scores attained by the experimental group and the control one in the post argumentative writing test.

### Methods and Procedures

#### Design and Treatment Material

The current research adopted the experimental method (the pre/posttest non-equivalent group design). This design was selected because it potentially controls most of the threats directed to the internal validity of the research (Campbell & Stanley, 1963; Trochim, 2005). Specifically, this design potentially controls single group threats such as history, maturation, selection, testing, mortality, and regression. It also potentially controls most of the multiple group threats represented in selection-history, selection maturation, selection-instrumentation, selection-mortality, and selection-regression. As such, the experimental group studied the target content via 4MAT model in Google Classroom, and the control one received the usual content via the usual model of teaching (see table: 1).

Table 1

*The experimental design adopted by the present research.*

$GR^1$	$O^1$	$X^1$	$O^1$
$GR^2$		$X^2$	

The treatment material of the present research was epitomized in a training outline developed in the light of Kemp model due to its flexibility; as well as it is non-linear in its design and does not have specific starting or end points (Morrison, Ross, & Kemp, 2004). The outline is consisted of five units devoted to teaching argumentative writing in the light of 4MAT model via Google Classroom. The outline topics were as follows: overview of argumentative writing, conventions of argumentative writing, diverse types of argumentative essay, grammatical aspects for argumentative writing, scoring

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argumentative writing. The content validity of the program was assured via submitting it to three experts in the field of curriculum and instruction (EFL) who provided some constructive feedback ranging from linguistic to in-class activities. Such constructive feedback was thoroughly taken into consideration.

### **Research Participants**

The current research participants were 49 fourth year EFL majors at the Faculty of Education for Boys (Cairo), Al-Azhar University during the academic year (2019/2020). They were randomly selected and assigned into two groups, namely an experimental group (25 students) and a control one (24 students) using the SPSS tool “random distribution”. Consequently, as randomization ensures equivalence in the cognitive output, the groups were assumed to be homogeneous to an adequate degree for ensuring the thoroughness of the results.

### **Research Instruments**

To accomplish the purpose of the research, the argumentative writing skills list which mainly aimed at delineating the most adequate argumentative writing skills necessary for the EFL majors was developed. The development of the skills list was inspired by a review of literature considering the principal model of argumentative writing developed by the British philosopher Steven Toulmin. The model depicts three essential components for effective argumentation, namely the claim, the data, and the warrant (Toulmin, 1958). Furthermore, the skills list development made use of the International English Language Testing System (IELTS) test specifications and skills. The IELTS necessary skills include the styles and register relevant to the target audience, developing a thesis statement, providing compelling evidence, achieving coherence and cohesion, utilizing a good amount of vocabulary, and maintaining accuracy of language (Cotton & Wilson, 2011; Makkar, 2017; Moghaddam, 2015). More than that, the researchers reviewed the relevant literature to delimit the most appropriate skills relevant to the research participants (e.g. Abu El-Magd, 2017; Elnaggar, 2018; Hassan, 2018).

The list of skills was submitted to a jury of EFL professors in order to assure its content validity. The members were requested to judge the items of this argumentative writing checklist and give their feedback. The jury’s feedback revealed that most of the argumentative skills were mostly relevant to the purpose of the argumentative



writing. More than that, all the jury's feedback was taken into consideration when designing the final form of the checklist which was consisted of 10 sub-skills under fine main dimensions.

### **The Argumentative Writing Test**

The argumentative writing test was utilized as a pre/posttest to assess the potential effectiveness of 4MAT model via Google Classroom in enhancing the research participants' argumentative writing skills. The test comprised mainly two tasks (two argumentative essays). In the light of the jury suggestions, each question of the test consisted of two alternatives and the student had to choose one of them to write about. The standard format of the test was that each examinee worked individually.

Furthermore, for determining the content validity of the argumentative writing test, it was submitted to a jury of specialists in the field of curriculum and instruction. The feedback of the jury recommended that each task of the test ought to be consisted of two alternatives and the student had to choose only one to write about for enabling him to select a topic of their interest and could express himself freely. Extra comments which were provided to sustain the participants generate ideas were recommended to be omitted as such comments, according to the jury feedback, limit the examinee creativity and they are not suitable for the fourth year EFL majors as they are advanced language learners. The word count of the pieces of writing ought not to be less than 200 words for allowing the participants to have reasonable chances to express their views and enable the researchers to form a clear overview of the students' skills mastery. Adjusting the scoring rubric to include more specified items related to the development of ideas to echo with the argumentative writing. All the suggested comments provided by the jury were taken into consideration.

For assuring the reliability of the argumentative writing test, the pilot test was administered to estimate the required time for answering and determine test reliability. In details, the students' performance in the pilot test was assessed and analysed by two specialized ratters. The percentages of agreement and disagreement concerning the students' performance were computed and statistically analysed using Holsti's formula, namely percent of agreement for calculating reliability (Holsti, 1969) as follows.

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$$PAo = 2A / (N1+N2) \quad PAo = 2 \times 1672 / 2500 = 0.668^1$$

The results of the analysis showed that the test reliability was 0.67, referring that the test was highly reliable and ready to be administered to the research participants.

Over and above, an analytic hybrid scoring rubric consisting of five components was developed by the researchers for scoring the students' argumentative essays, namely relevance of ideas, development of ideas, coherence and cohesion, lexical resource, and grammar accuracy. The students' performance, according to the descriptors provided, ranged from exemplary, distinguished, successful, basic to failing, and the total score of the test was 100 marks (see appendix: 1).

### Research Procedures

Initially, the homogeneity of the groups was statistically measured via using the homogeneity test (Levene statistic) before conducting the statistical analysis (see table: 2).

Table 2

*Homogeneity of the research groups.*

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Variable	Group	N	Mean	Std. Deviation	Levene statistic	Sig. (2tailed)
Argumentative Writing Skill	Experimental	25	55.48	8.52	0.02	0.57
	Control	24	54.97	9.46		

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Close inspection of the above table (2) shows that the homogeneity test factor was exactly 0.3, which is greater than 0.05 indicating that the groups were homogeneous in their argumentative writing skills.

The argumentative writing test was administered to the experimental group and the control one. The students' written product was assessed and analysed according to the developed scoring rubric. The pretest score was to be used as a baseline for comparing the participants' performance. The experimental group firstly received an orientation session for enabling them to best utilize the services

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<sup>1</sup> PAo represents percentage of agreement between two coders, A is the number of two coders' consensus decisions, and N1 and N2 are numbers of decisions coders have made, respectively.



provided by Google. Via their smart phones, the participants spend short time for mastering Google Classroom. By the same token, the content delivered for their peers in the first experimental group was uploaded to them on Google Classroom before the session assigned time. The students take their time exploring the content before starting the discussion and practice of the lesson. The experimental group had received the outline content as planned and the control group received the usual content via the usual model of teaching. The instructional process was managed by the researchers via the 4MAT model in Google Classroom accompanied by the handouts, which were prepared within the outline materials. The students' performance moved from the guided writing to the free one and feedback was provided for their written outputs.

Procedurally, the learners were cycled in terms of the four main quadrants of 4MAT starting from uncovering the meaning, then over-viewing the concept, acquiring the skill and finally adaptation. Thus, answering the learners' questions, namely why, what, how and when and if and addressing their learning styles and brain preferences. Procedurally, relationships were established between the content and the participants' life experiences in order to enable them develop links with the topic via discussing some ideas relevant to the topic. Then, the participants were given information to help them learn the content through visualization, visual comparison, and analogy. After that, students practiced the information demonstrated and turned them into reality in parallel with the information they had already acquired. The students were asked to freely practice for applying their theoretical knowledge with the help of the provided feedback and suggestions to fine-tune their written products. Finally, students assess their own products as well as that of their peers. Additionally, with the help of the given scoring rubric, the students amended, adjusted, enriched, and substantiated their written products before dissemination on Google Classroom.

After completing the implementation, the writing test was administered. Responses of the research groups were assessed and statistically analysed versus their scores in the pretest and the posttest to explore the effectiveness of 4MAT model via Google Classroom in enhancing the research participants' argumentative writing. The attained data were analysed via making use of paired and independent sample *t*-tests.

## Research Results

The research question was used as a guide to highlight the data analysis, the descriptive and inferential statistics, and explanations of the yielded results.

To answer the research question, the subsequent hypotheses were posed:

### Hypothesis One

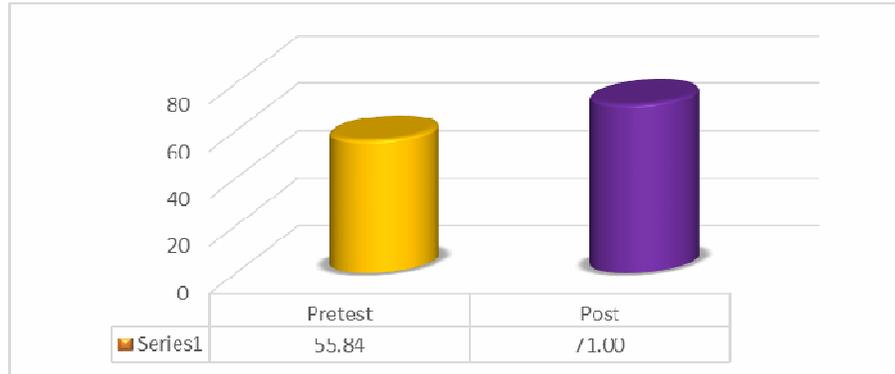
There is no statistically significant difference between the mean scores attained by the second experimental group (4MAT model in Google Classroom) in the argumentative writing test before and after the treatment.” Deciding on the appropriate statistical technique necessitated adopting a paired sample *t*-test due to the nature of the hypothesis, sample number, and target data. Consequently, after assuring the assumptions of the test a comparison between the pre/posttest mean scores of the second experimental group was conducted to demonstrate the difference in terms of the argumentative writing skills before and after the treatment. The shadowing table (4) unveils the results of the descriptive and inferential statistical analyses:

**Table 3**

***Paired sample t-test results (Ex pre/post argumentative writing test scores).***

Group	Treatment	N	Mean	Std. Deviation	<i>t</i> -Value	Sig. (2tailed)	Cohen's <i>d</i>
EX2	Pretest	25	55.84	8.52	6.08	0.001	1.21
	Posttest	25	71.00	6.81			

The above table illustrates that there was a statistically significant difference between the mean scores attained by the second experimental group learners before and after the treatment in the argumentative writing as assessed by the argumentative writing test. The results of *t*-test produced (6.08) which is significant (sig. = 0.00 2 tailed =  $P < 0.01$ ). Likewise, the consequent bar chart (4) below discloses the difference in the argumentative writing of the second experimental group before and after the treatment.

**Figure 2***The second experimental group (argumentative writing pre/post test).*

As shown in the figure (2) above, there is a significant difference between the mean scores of the second experimental group learners in the pre/post argumentative writing test. Accordingly, the second null hypothesis was rejected and the alternative one was accepted uttering “*there is a statistically significant difference at 0.01 between the mean scores attained by the experimental group (4MAT model in Google Classroom) in the argumentative writing test before and after the treatment in favour of the post-test*”.

More importantly, to authenticate the results attained, the effect size (a way of quantifying the size of the difference between two groups indicating the magnitude of the experimental effect) was calculated. The results of the effect size uncovered that the value of Cohen’s  $d$  was (1.21) which is a large effect size according to Cohen’s standards. Accordingly, in the light of the results drawn above, 4MAT model in Google Classroom has considerable effectiveness in developing argumentative writing among the EFL majors at the Faculty of Education, Al-Azhar University.

## Hypothesis Two

2) There is no statistically significant difference between the mean scores attained by the experimental group and the control one in the post argumentative writing test.

Deciding on the appropriate statistical technique necessitates adopting an independent sample  $t$ -test due to the nature of the hypothesis, sample number, and target data. Succinctly, after checking the test

assumptions a comparison was performed between the posttests of the experimental group mean score and that of the control one to reveal the difference in the development of the argumentative writing. Table (4) demonstrated the results of the statistical analysis:

**Table 4**

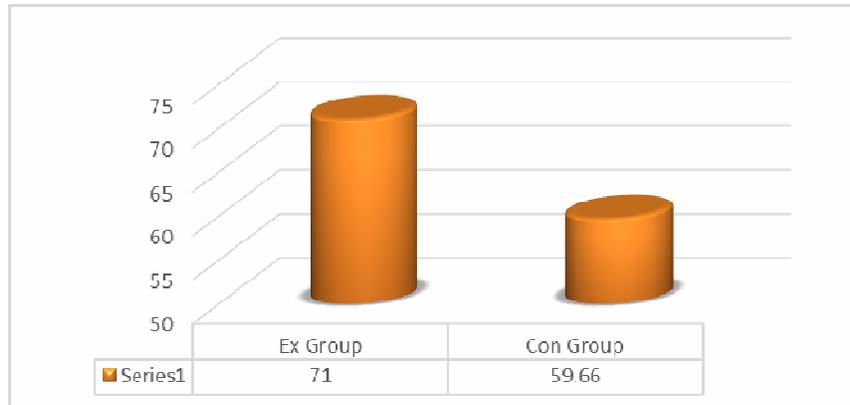
**Independent sample t-test results (Experimental and control groups post argumentative writing test )( $df=47$ ).**

Group	N	Mean	Std. Deviation	T-Value	Sig. (2tailed)
Experimental group	25	71.00	6.81	5.05	0.00
Control group	24	59.66	8.80		

The results displayed above underscored that there was a statistically significant difference at 0.00 level between the mean scores attained by the experimental group and the control one (posttest) in the argumentative writing test as measured by the argumentative writing test. Results of the *t*-test yielded (5.05) which is significant (sig. = 0.00 2 tailed =  $P > 0.05$ ). Other than that, the figure (3) below delineated the mean difference in the development of the experimental group and the control one in the posttest.

**Figure 3**

**Experimental group versus the control one (argumentative writing posttest).**



The figure (3) above disclosed that there is a significant difference between the mean scores of the experimental group and the control one. Accordingly, the second null hypothesis was rejected and



the alternative one was accepted demonstrated that “there is a statistically significant difference at 0.01 level between the mean scores attained by the experimental group and the control one in the post argumentative writing test in favour of the experimental group.

To authenticate the results attained, the size of effect was computed. With this in mind, the present research adopted Cohen’s *d* due to its appropriateness and accuracy of identifying the effect size of the paired sample *t*-test (how much variance in the argumentative writing was a result of the 4MAT model). The results of the effect size uncovered that the value of Cohen’s *d* was (1.47) which is a large effect size. Accordingly, in the light of the results drawn above, 4MAT model has considerable effectiveness in developing argumentative writing among the EFL majors at the Faculty of Education, Al-Azhar University.

More critically, to substantiate the results of the statistical analysis, indicating that there was a statistically significant difference between the mean scores attained by the experimental group and the control one in the post argumentative writing test, a comparison was held between the sub-argumentative writing skills targeted by the present research. In other words, an independent sample *t*-test was used to calculate the significance of the means difference among the sub-argumentative writing skills after the experimentation (posttest). Table (5) displayed the results of the statistical analysis:

**Table 5**

***Independent sample t-test results (Exp/control argumentative writing posttest) (df=47).***

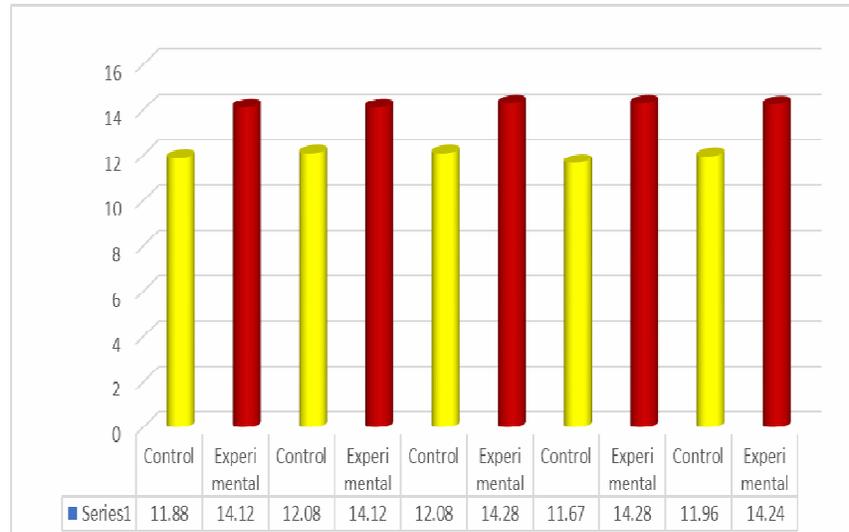
Writing skills	Groups	No.	Mean	Std. Deviation	T-value	Sig. (2tailed)	Cohen's d
Ideas relevancy	Control	24	11.88	1.65	4.97	0.00	1.44
	Experimental	25	14.12	1.66			
Ideas development	Control	24	12.08	1.95	4.12	0.00	1.20
	Experimental	25	14.12	1.55			
Coherence	Control	24	12.08	2.32	3.985	0.00	1.16
	Experimental	25	14.28	1.61			

Writing skills	Groups	No.	Mean	Std. Deviation	T-value	Sig. (2tailed)	Cohen's d
Lexical resource	Control	24	11.67	1.83	5.577	0.00	1.62
	Experimental	25	14.28	1.55			
Grammatical range and accuracy	Control	24	11.96	1.97	4.668	0.00	1.36
	Experimental	25	14.24	1.66			

The results shown above assured that there are statistically significant differences at 0.01 level between the mean scores attained by the experimental group and the control one in the argumentative writing skills. Results of the *t*-test respectively yielded (4.97, 4.12, 3.98, 5.57, 4.66) which were statistically significant at 0.01. Over and above, the figure (4) below delineated the mean difference in the argumentative writing skills of the experimental and control groups in the posttest.

**Figure 4**

*Experimental group versus the control one (sub-argumentative writing posttest).*



The figure (4) above reveals that there are significant differences between the mean scores of the experimental group and the control one in the sub-argumentative writing test. To authenticate the results attained, the size of effect was computed. The results of the effect size



revealed that the value of Cohen's  $d$  were (0.80, 0.73, 0.72, 1.02, 0.79) which are large effect sizes. Accordingly, in the light of the results drawn above, 4MAT model has a considerable effectiveness in developing argumentative writing among the EFL majors at the Faculty of Education, Al-Azhar University.

## Discussion of the Results

The aforementioned quantitative analysis concluded that 4MAT model in Google Classroom outperformed the usual one in teaching argumentative genre of writing. The following lines present a detailed discussion of the results attained supported with plausible interpretation and logical rationales for such results.

Initially, the main plausible interpretation of the superiority of 4MAT model is that the model monitors the diversity of learning styles by means of instructional plans developed taking into account the differences in such styles and the dominant brain hemispheres preferences of students. Consequently, every phase of the 4MAT model was designed in accordance with the real existing abilities, aptitudes and needs of the participants, who theoretically and practically achieved better performance in argumentative writing skills (Al-Saleem, 2019, Inel, 2018, Jackson, 2001).

Furthermore, 4MAT model provided a systematic model for organizing and delivering instruction as the learners were cycled in a natural learning cycle. Initially, the students' personal experiences of the target teaching concept were developed through a systematic theoretical teaching. Next, students were provided with guided practice and application; Finally, students were given opportunities to integrate and synthesize their new learning. The system reflects the learning process as finding a reason or motivation for learning followed by constructing knowledge and information shadowed by finding ways for applying knowledge and concluded with developing extensions for the learners to generate new experiences regarding the learned material (Aktas & Bilgin, 2015; Benchachinda, 2012; Tezcan & Güvenç, 2017).

Moreover, taking into consideration the nature of the argumentative genre of writing which needs much comprehension of the different specifications followed by awareness in application, the different teaching strategies based on the constructivist theory under 4MAT model teaching model, enabled and encouraged students to advance their argumentative writing skills. Notwithstanding, the

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dynamic nature of the 4MAT model allows the students to internalize the subject doing their own application and definitions (Nikolaou & Koutsouba, 2012; Nowacki, 2011; Tezcan & Güvenç, 2017).

Another reasonable interpretation of the results attained is that the adoption of 4MAT model in the classroom with its main premises, namely learning styles preferences and brain processing of information increased learners' motivation and willingness to write with an eye to develop their argumentative writing skills. It could be explained that giving the students the chance to apply the theoretical knowledge in a practical context following the normal cycle of learning was of great consequence and resulted in remarkable development in the participants' written products. Thus, apart from enabling active participation and interaction in lessons, 4MAT model provided students with practical opportunities for practicing and applying their learning outside the usual classroom (Aktas & Bilgin, 2015; Benchachinda, 2012; Tatar & Dikici, 2009).

Over and above, functioning the whole brain (left and right hemispheres) enabled fruitful learning experience for the most students. 4MAT accommodates each student's unique learning style, enables students to functionalize the dominant styles with the non-dominant ones and ensures progression through a natural learning cycle. Thereupon, the 4MAT cycle begins with students subjectively connecting to the outside world and processing it through their own personal filters (Bawaneh, Md Zain & Saleh, 2011; Jackson, 2001; Tatar & Dikici, 2009).

Added to that, teaching and learning via 4MAT model depending on the student's frame of mind changes the focus on the creation of a conducive learning environment and learning communities. Such environment gave the students opportunities to ask questions so they would improve, seek new knowledge, and make new discoveries, master new skills for dynamism and perfect old skills needed for life- long learning. Moreover, making the best use of mind maps, worksheets, experiments, preparing and disseminating pieces of writing which easily adapted to the steps of the 4MAT made the teaching learning process more fruitful and effective (Inel, 2018; Ruangtrakun & Chaiyasang, 2019).

More importantly, 4MAT model takes into consideration that each learner has different psychological, social, and physical development features in the teaching-learning process, the individualization of teaching is a significant feature of any successful



teaching learning endeavour, student-centred is superior to teachers centred. In other words, the 4MAT teaching model is a cycle of the teaching processes which begins and ends with the learner himself/herself. Accordingly, 4MAT qualifies students to thoroughly understand the target learning construct, such as modelling, visualization, theoretical knowledge, application, exhibiting individual creativity, the integration of these opportunities and knowledge transfer through interaction with activities (Nikolaou & Koutsouba, 2012; Ruangtrakun & Chaiyasang, 2019).

The aforementioned detailed discussion offers insights into justifications for the impression that not only does 4MAT model help design a balanced teaching and give all learners the opportunity to learn in their own preferable way, it also aids the instructor to organize the teaching process based on the individual differences. More critically, the four sequential steps of 4MAT require that the teacher changes roles from motivator, to information-giver, to coach, to evaluator (Inel, 2018; Nikolaou & Koutsouba, 2012; Tezcan & Güvenç, 2017).

4MAT facilitated learning, took individual differences into consideration, increased positive attitudes and motivation, made lessons more enjoyable, gave the opportunity to enhance what was learned, increased student self-confidence, and provided a base for life-long learning. Furthermore, 4MAT increased the learner motivation and engagement and provided students with greater opportunities for practice and application of their learning in real life settings. The literature includes a relevant number of studies which are echoed with the results of the current research signifying the effectiveness of 4MAT model in enhancing different abilities and skills (Aktas & Bilgin, 2015; Al-Saleem, 2019; Ruangtrakun & Chaiyasang, 2019; Tatar & Dikici, 2009).

On the other hand, another plausible interpretation of the advantage of Google Classroom as an innovative environment for 4MAT model is that it enables and scaffolds the construction of communal ways of practicing shared knowledge and producing well-developed product in a creative way. The utilization of such technology in the world of education has an influence on improving the delivery process, making such process more efficient and effective and providing knowledge, skills, new experiences for both teachers and students. Another item of interest, Google Classroom in harmony with 4MAT model operates all the classroom functions such as

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editing, giving feedback, reviewing, checking, and disseminating the written product (Crawford; 2015; Shah, et al., 2016; Zakaria, et al., 2020).

Furthermore, receiving the instructional process via Google Classroom made the students more involved in the teaching learning process which became more dependent on technology. Moreover, Google Classroom tweak with 4MAT model enables the learners to interact with one another and form collaborative activities. The students have the opportunity to give feedback to their classmates by taking part directly to the flow of discussions in Google Classroom. Thus, if a student needs help because of encountering a difficulty of understanding an assignment or want to learn more about a particular topic, he can get feedback directly from his virtual classmates or teacher (Crawford; 2015; Iftakhar, 2016; Shah, et al., 2016).

More importantly, the paperless learning experience can be easily achieved via 4MAT model in Google Classroom anywhere as long as internet connection is established from any devices, computer, tablet or mobile. Communication would be initiated between teachers and students; such personalized learning was highly valued by students. Google Classroom integrates Google Drive, Google Docs and Slides and Gmail together to help classroom run. Google Classroom automatically creates drive folders for each assignment and for each student. Students can easily see what is due on their assignments page. Teachers can upload files, videos, links, announcements, and assignments for students to retrieve and view (Janzen, 2014; Subandoro & Sulindra, 2019).

A significant interpretation is that Google Classroom helps to save the instructor and the students' time, keep the classes organized and improves communication with students considering the students' different preferences in the learning situation. Google Classroom allows teachers to spend more time with their students and less time on the paperwork. Google Classroom is mainly designed to save the students' and teachers' time. More critically, the integration and automatization of the use of other Google applications, the process of administering document distribution, grading, formative assessment, and feedback is simplified and streamlined. Moreover, no time is wasted distributing physical documents and that students can complete their tasks online on time, making it easier for them to meet the deadline (Crawford; 2015; Khalil, 2018; Sawant, 2020; Zakaria, et al., 2020).



On the same line, the instructor in a glance can observe who has or has not completed the assignment or his classwork and provide direct, real-time feedback to individual students. Google Classroom design purposefully simplifies the instructional interface and options used for delivering and tracking assignments; communication with the entire course or individuals is also simplified through announcements, email, and push notifications (Madhavi, et al., 2018; Sawant, 2020; Shah, et al., 2016).

### 5.3 Conclusions

Based on the aforementioned experimentation, data analysis and the results yielded, the following conclusions were drawn.

- 4MAT model is based on prominent learning theories and principles served as foundation such as constructivism, brain-based learning theory and learning styles. Additionally, through experiences with alternative modes, learners were stimulated to develop a meaningful learning repertoire. As such, the learners are supported to develop their learning and produce fruitful learning outcomes.
- The model does not ask the learners to fit themselves in a particular learning method, yet it displays a variety of teaching learning strategies and methods. The new information and experiences are delivered by teachers and assimilated by learners in light of their unique learning styles.
- Filling the gap between knowledge and application, 4MAT enables the students to comprehend the abstract concept, which is one of the problematic areas for all learners in general and EFL learners in particular. Another item of interest, it provides equal chances for learners to put such abstract knowledge in action, which is a missing component in teaching practical skills.
- 4MAT model is a lens through which the teaching learning process can be viewed as a series of questions about the fragmentation of our approach to content. As well as, it gives a wealth of instructional methods or cyclical context for learning stages and an appreciation for the diversity of learners.
- The steps taken by the MAT model were in harmony not only with the use of web tools, especially Google Classroom, but also with providing a wider range of activities outside the sessions. The application of 4MAT model in distance

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instructional material suggests a balanced method of delivering new information in a total of learners with different characteristics and learning styles.

#### **5.4 Limitations of Google Classroom**

Despite of the penchants expressed by the EFL learners participated in the current research, Google Classroom has some drawbacks. 1) poor internet services, 2) written language is the mode of interaction, 3) sharing learning material is too difficult, 4) no automated updates, 5) editing problems. it is concluded that Google Classroom was utilized as an independent instructional environment, and it was used as the main means of communication. Although the countless superb features which were valued by the research participants and made the learning process more interactive and enjoyable, it did not outperform the usual classroom due to the above-mentioned limitations. Subsequently, Google Classroom, from the viewpoints of the researchers, ought to be used a teaching learning management tool for assigning tasks, uploading materials, providing fruitful feedback, exchanging homework, replying to the students' questions, grading the students, tracking the students' progress with another cloud meeting platform such as Google Meet (a feature which was not added when conducting the research), Zoom, Microsoft Teams, Cisco Webex Meetings in order to best use the virtual learning environment to achieve the target objectives of the teaching learning process.

#### **5.5 Recommendation**

In the light of the results attained, the shadowing recommendations seem pertinent.

- The teaching learning process ought to be conducted guided by the learners' learning styles and whole brain activation for promoting the teaching learning outcomes and adjust the learning environment to suit the learners' preferences.
- 4MAT model ought to be adopting for delivering the content as it enables the teacher to sequence the teaching learning content logically in a way that balances knowledge and skills.
- Adopting online learning is not an option nowadays due to many factors: of which the nature and interests of Gen Z and Covid 19 pandemic are the most prominent ones.



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- Google Classroom ought to be paid the due attention by the stakeholders in the education field and it should be adopted as the main channel of communication for assigning, turning in, correcting, and returning tasks to students.
  - Argumentative writing is an effective and advanced genre of writing which ought to be practiced and mastered by EFL learners at the faculties of education because of its consequences on the learners' mental abilities and thinking skills and strategies.

### **5.6 Suggestions for Further Research**

In the light of the results attained, the present research demonstrated the untrodden hot topics which need further investigations in future research:

- 4MAT teaching model effectiveness in developing the EFL majors' different writing genres at the faculties of education in Egypt, namely narrative, descriptive, and expository ought to be explored in future research.
- Google Classroom is a fertile area in research for investigation as a modern technological learning environment which has emerged recently, especially due to Covid 19 pandemic.
- Argumentative writing is one of the untrodden genres of writing due to its sophistication and further investigations are needed for enabling the students to use critical and logical thinking in their writing.

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