The Effectiveness of Using Scientific Station Strategy in improving EFL Writing skills among secondary school students

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المستخلص

يهدف هذا البحث إلى تنمية مهارات الكتابة باللغة الإنجليزية لدى طلاب المرحلة الثانوية وذلك باستخدام استراتيجية المحطات العلمية ، حيث قام الباحث باجراء دراسة استطلاعية بمدرسة الحداد الثانوية اشتملت على اجراء اختبار للطلاب، حيث أظهرت النتائج وجود قصور لدى الطلاب في مهارة الكتابة مما دفع الباحث الى اجراء هذا البحث ، حيث تم اختيار عينة البحث والتي اشتملت على ٦٠ من الطلاب الصف الأول الثانوي وتم تقسيمهم على مجموعتين (مجموعة تجريبية – مجموعة ضابطة) كل مجموعة تتضمن ٣٠ طالبا ، وتم عمل اختبار قبلي وبعدي للمجموعتين وذلك بعد تطبيق استراتيجية المحطات العلمية على المجموعة التجريبية بينما تم تدريس المجموعة الضابطة بالطرق التقليدية ، حيث أظهرت التجربة تفوق لدى المجموعة التجريبية بعد إجراء التجربة وعمل المعالجة الاحصائية وذلك في نتائج الاختبار البعدي . استخدم الباحث أدوات للبحث وهي قائمة مهارات الكتابة الفرعية التي يفترض أن يجيدها الطلاب وأيضا اختبار تم تطبيقه قبل وبعد التجربة على المجموعتين (التجريبية والضابطة) وأيضا دليل المعلم ، وقد استخدم الباحث العديد من النشطة المصاحبة لاستراتيجية المحطات العلمية اثناء التجربة ، مما اضاف الى التجربة العديد من الآثار الايجابية التي انعكست على الطلاب والباحث وساهمت في نجاح التجربة .

الكلمات المفتاحية: اللغة الانجليزية لغير الناطقين بها– المحطات العلمية – مهارة الكتابة

Abstract

The current study aimed at improving English writing skills through using scientific station strategy. Sixty students enrolled in the first level of secondary school, ELHADADA secondary school, Giza governorate were the participants of this research. The experimental group was taught by using scientific station strategy where the control group received regular instruction. An EFL writing skills pre-posttest was prepared and administered. The data obtained were statistically analyzed. Findings revealed that using the scientific station strategy was effective in developing EFL writing skills. It is recommended that scientific station strategy is to be used for achieving better EFL writing skills.

Key words: Scientific Station Strategy, EFL Writing skills, and Secondary students

1.1. Introduction

Learning English language is an important aspect in academic field. It allows student to discover, in wide range, many researches in different kinds of knowledge (Kellogg, 2007). " English language plays a key role in cooperation between nation. It's not only important in labor market but it also contributes in enhancing bilateral ties among companies and organization in the time of globalization" (Clement & Murugavel 2018, p.2). For many educational experts, EFL learners should be aware of the four skills of English language in or `1der to acquire language in right manner.

The writing skill could be the most effective one among the four skills because of many reasons: the first reason is that writing rein forces the grammatical structure, idiom and vocabulary that the teacher has been working within the class. The second reason is that writing gives the chance to students to express themselves without any fear. (Alodwan & Ibnian, 2014).

After the designing of scientific station strategy in cooperation with his colleagues, Jones started carry out the new strategy by using new activities which helped him in presenting new kind of teaching methods. the new strategy was designed to divide students into groups ; every groups represents station. Every group responsible of the station whether they teach specific topic. After teaching the topic of one station others station will move to second station where new topic will be thought. All stations which engaged in the teaching process should be provided with tools and material in order to achieve their tasks in right manner (Jones, 2007)

Rogayan (2019) stated that scientific station gives chance to students to use different materials which enhance the motivation of students and encourages them to engage in teaching and learning process. It's also gives students confidence and make them able to face and solve any problems they could face in the futures ; theses will help teacher in working in good environment which facilitate the educational process whether in terms of teaching or learning.

1.2 Context of the Problem:

The problem of the current research is derived from the following resources:

First, as fat as the researcher of current study knows, due to his work, most first level of secondary students writing is poor, most of them couldn't write correctly. Their performance reflected weakness in their writing skills.

Second, the review of some related studies, which tackled EFL Learner's level of writing skills, revealed that there is a weakness in their writing skills.

Zaki (2017) referred that huge numbers of students in Egypt have problem in writing skills because the lack of training in writing and the grammatical rules.

However, The lack of acquiring writing skills backed to many aspect. Badr (2020) stated that many students have problems in writing skills because they couldn't understanding English idioms and the terminology of specific English branches, agricultural, media, medical document …..etc..

Mohamed , K,. (2019) stated that students suffer from weakness in their EFL creative writing skills. There is a lack of the ability to express their thoughts and ideas freely and confidently. The environment at schools also is not appropriate to encourage students to feel comfortable, relaxed, innovative, or able to produce creative ideas.

Samy (2018) referred that there is a lack in writing skills among secondary school students. The lack backed to teacher who couldn't teach students how to express their thoughts or ideas in order to show their point of views.

Pilot study: To document the problem, the researcher conducted a pilot study which was applied on 30 students from EL Hadad secondary school, level one, the grades of the students showed a huge decline in writing skills. The researcher used an exam in writing skills which tested the Following sub skills of writing:

1- Punctuation marks.
2- Grammar.
3- Cause and effect simple paragraph.
4- Emails.

1.3 Statement of the problem

The problem of the current study shows the weakness secondary students' of EFL writing skills. This weakness backed to several reasons such as unsuitable educational environment or method and approaches used to enhance writing skills, insufficient time devoted to this aim, and inappropriate teaching and learning aids. That is why the current study attempted to investigate the effectiveness of using scientific station strategy in improving EFL writing skills among secondary school students.

1.4 Question of the Study

To accomplish the aim of the study, the researcher formulated the following questions:

Main question

- What is the effectiveness of scientific station strategy in enhancing writing skills for secondary school students?

    Out of this question, the following sub questions were stated:
    1- How far could scientific station strategy enhance EFL unity skills?
    2- How far could scientific station strategy enhance EFL coherence skills?
    3- How far could scientific strategy boost EFL mechanics of writing?
    4- How far could scientific strategy enhance EFL grammar and structure skills?

1.5 Aim of the study

The current study aims at developing secondary school writing skills through using scientific station strategy.

1.6 Significance of the study

This research might be significant to:

a) **Secondary school students**: Developing their writing skills in an attractive manner as the suggested using of scientific station strategy through exploration station, reading station, visual station and electronic station. The suggested using offers a new intervention and effective devices to develop student's language skills in general and writing skills in particular.

b) **Teachers of secondary schools**: as it directs their attention to using the scientific station strategy in developing secondary school students' writing skills.

c) **Curriculum planners**: as it draws their attention to the importance of the scientific station strategy in EFL teaching and learning.

d) **EFL researchers:** as it provides a theoretical foundation that researchers can build on in the field of scientific station strategy.

1.7 Hypotheses of the study

The following hypotheses were formulated as following:

1- There would be a statistically significant differences between the mean scores of the experimental group on writing skills pre-posttest in favor of the posttest.

2- There would be a statistically significant difference between the mean scores of the experimental group on improving coherence and unity.

3- There would be a statistically significant difference between the mean scores of the experimental group on enhancing mechanics of writing.

4- There would be a statistically significant difference between the mean scores of the experimental group on enhancing grammar and structure.

1.8 Variables of the study:

The independent variable of this study was represented in the scientific station strategy, while the dependent variable was represented in boosting and enhancing EFL writing skills.

1.9 Delimitations of the study:

The present study is delimited to:

1- Sixty students from El Haddad secondary school.

2- Unity, Coherence, Grammar and Mechanism as writing skills.

3- Second semester of 2021/2022 Academic year.

1.10 Definition of terms

4- **Writing skills**: Huy (2015) explained that "Writing is a complex meta cognitive activity that draws on an individual's knowledge, basic skill, strategies, and ability to coordinate multiple processes . Writing is defined by Komariyah (2015) as an intellectual activity

which reveals the ideas and thinking in arranged paragraphs or statement in order to be understood by the people. Yi,(2009) indicated that writing is the ability of communication which supported by discourse or sentence structure.

In the present study writing skills refers to the expression of the mental process which is considered as a means of communication which reveals the ideas and thinking in arranged paragraphs or statement in order to be understood by the people.

- **Scientific Station Strategy:** As a new strategy of teaching, scientific station strategy depends on dividing the classroom into some parts (Khaji, 2016). Other definition of scientific station was defined by Aqel (2010) who described it as a group of students, doing different activities organized and planned by the teacher inside the classroom.

- Heifa (2019) indicated that scientific station strategy is a new strategy based on some activities which determined by teacher in order to achieve learning aims by allowing students to rotate on tables to reach their learning aims. Scientific station strategy Al-Hafidh study (as cited in Ambo Saidi Al Balush, 2009) provided that scientific station is a group of tables organized inside classroom. Each table is considered an educational station in which the topic is being explaining by the group of the station by using specific activities and various materials .

Scientific station strategy is defined operationally in the current study as a strategy based on dividing the classroom in stations which present the activities adopted in teaching any specific lesson.

2. Review of Literature
2.1.1 Writing process

To produce good writing materials you have to follow some technique which led to achieve the goal and give the message. (Richard & Schmidt, 2010), revealed that writing process is the strategies, procedure and decision- making employed by writers as the write .

Writing is considered as a complex process of planning. It includes many procedures such as drafting, reviewing and revising and some approaches. For many experts in the field of education, the process of writing should be pass the as the followed pattern.

1- **The prewriting**: on this stage the writer should be collect his ideas and determine in what field of writing he will write and how to gather his data.

2- **Plan & outline**: on this stage the writer begins to put his plan and implement his outline, revealing the main and sub point of his subject.

3- **Write a First Draft**: on this stage, the writer have to finish the first draft of his subject, he should end his first edition of his written subject.

4- **Redraft & revise**: this is the second stage in which the writer begins his revision and correct any mistake in terms of grammatical, spilling or ideas.

5- **Edit & Proofread**: The final stage which the writer publishes his subject and to be ready to be read by the readers.

Fig. (1) Process of writing

(https://www.scribbr.com/academic-writing/writing-process/

It's obviously that the process of writing should pass the mentioned steps in order to produce writing in good manner. However, the process of writing includes some techniques which should be followed.

2.1.2 Writing Techniques

- **Topic statement:** it's the first sentence written in the passage, referring to the hall subject and what you are going to write. It should be clear and attract the readers.

- **Thesis statement:** this statement is main sentence in the hall. It shows the points which the writer will deal. It is usually written on the end of first paragraph.

- **Measure sentence**: It's the sentence which gives the readers new information about the subject.

- **Support sentence**: It usually comes after the measure sentence to give the evidence about the measure sentence and to support it by giving numbers, historical events or scientific facts.

- **Conclusion sentence**: It comes at the end of the passage to show to the reader which the writer final result and what the message he wants to deliver.
- **Editing and revising:** On this stage the writer begins to revise and edit his document to produce the final draft.
- **Writing final draft: It's** the final copy of the document in which the writer should be satisfied from his work, and produce it to the readers without any language mistakes.
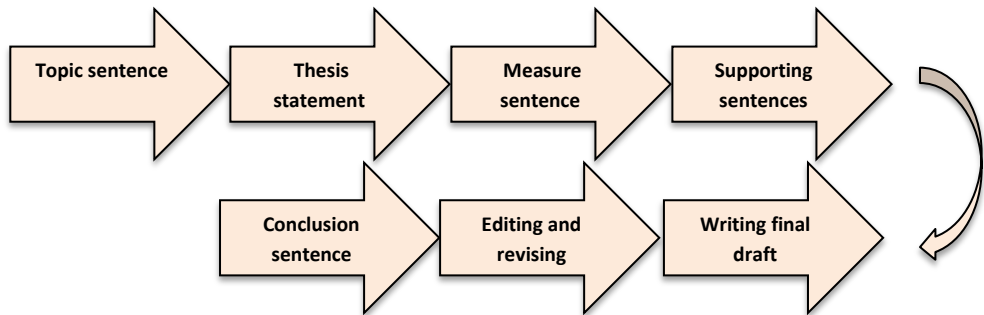

Fig (2) Writing technique

     The previous shape shows the techniques of process which should be adopted in order to produce a good written form. However there are many different types of English language writing which clearly showed in articles, essay and researches (hedge, 2001).

2.1.3 Types of English language writing

Bukhari(2016) stated that   many types of EFL Writing which were described as the following :

A – Descriptive writing.

     It's the easy type of writing because it belongs to fact and information about the real life.It shows details of the ordinary life for people, situation and thoughts. It also reflects the emotions and the ideas which make the readers feel of the situation or the story which is written.

B- Persuasive writings

     It's belongs to argumentative essay; this is obviously in using reasons and ideas which support the attitude of the writer. It attempts to persuade the reader to adopt a certain point of view. Therefore it required evidence and reasons which should be supported by fact and logical reasons

C- Critical writing.

Critical writing is using to accept or refuse a certain ideas of other writers. It's also required to reveal why you accept or refuse this idea by providing evidence and an acceptable argument; this of course should be illustrated in the conclusion of the writer.

D- Narrative writing

Narrative writing is considered an interesting type of writing because it doesn't required any analysis idea or any argument. It depends on the narrative which could be an exciting story which attracts children or uneducated people. Therefore, narrative writing has a huge numbers of readers.

E-Discursive writing

It's a kind of writing which use to present a balance between two different idea of decision.It aims to achieve balance by discussion every idea in separate paragraph and then a final paragraph should be written which reveals a balance between the two ideas.

F-Analytical Writing

Analytical writing describes a specific subject in terms of types, functions and components.It reveals all the side of the subjects by giving more details, numbers and reasons. On analytical writing, every point should be discussed in one paragraph, and in the final paragraph the writer should describe the hall subject as we mentioned before.

2.1.4 Writing skills Factors

Learning to write is a gradual development process. Cortes (2001) indicates that there are several factors that influence the process of developing learner's EFL/ESLI writing skills. These factors can be stated in the followin g points:

1. **Needs and objects:**

Explicit instruction is required to serve student's needs and objectives. Dhanya & Alamelu (2019) mentioned that explicit instruction should be directed to treat foreign language learners as intelligent human beings and unique individuals with their own views, experiences, interests, and agendas. These students are not blank states for teachers to inscribe their options, nor buckets to be filled with their teachers, wisdom. They need to be understood, placed in the suitable learning context, provided with appropriate instruction and evaluated fairly.

2. Motivation:

Low motivation level is considered a main source of blocking successful communicative writing. Students should be given opportunities to choose their writing topics in order to arise their motivation for writing.

3. Authenticity:

Another factor that affects second language writing development is using authentic messages and directing them to real audiences. When students write for real audiences, they give more emphasis i to the content and organization of their writing as much as they focus on linguistic form.

4. Background knowledge:

Foreign language writers need to increase their background knowledge of the target language's cultural-thought patterns, and linguistic features. In that sense, acquiring adequate amount of conceptual knowledge and grammatical competence improve foreign language writers performance.

5. The audience:

Famous writers always think about readers , and they write using conventional word order, they also always care about vocabulary and punctuation. If the writer can't select the propre vocabulary or grammar, this could confuse the reader. The role of teacher is not only read the writing of students. but it's very important to encourage students to think about their audience, primarily to their egocentric point of view in their composition. As writing is a means of constructing meaning, students should have the opportunity to share their writing with other students in order to improve their writing (Garaham, 2006).

6. The time:

Students need time to write. Student writers need time to explore topics and receive feedback so that they can discover the English words they need as they write and develop their writing skills.

7. The product:

Teachers did not see writing as a process, they evaluate the text as a final product/with writing marginal comments. So, students become confused because comments on a paper rarely are followed in subsequent drafts and thus, they rarely make the improvements desired by their teachers. Hence considering writing as a process not a product plays an important role in improving students' writing.

8. The grammar:

Writing for EFL writers requires knowledge of rhetoric, training, and practice. In order to teach to write, teachers should start as soon as students can write simple sentences and it should not have a relation with grammar program.

9. Error:

The last factor that affects writing skills is error, which has received a lot of attention in ESL EFL in general and in error analysis in particular. Teachers need to be more tolerant of the error of writers. If teachers do not correct the errors of the student writers, they will continue to make them.

2.2. Scientific station strategy

Scientific station strategy is considered the most important strategies which is used educational field. However, many experts in EFL begin to use it in the field in EFL studies. It could be very useful in enhancing the skills of English language specially in writing skills.Scientific stations was invented at the first time by Mr. Denise J,. Jones, 2007. As we mentioned it was used in the field of science in general but recently it began to use in different fields of knowledge.

2.2.1 Definition of scientific station strategy

Castro (2019) indicated that   the stations strategies depends on dividing the students into three or four groups subsequently he/she sets up different stations around the classroom in order for students to rotate in all the stations.

(Aqel & Haboush, 2016) indicated that scientific station is a strategy based on dividing the students in groups every group represents a station. To explain the idea, every group has a station in which studying a specific subject related to the lesson.

Another definition of the scientific station was occurred by (Zaki, 2017)who indicated that scientific station is a strategy which allows to the students to transfer from place to other in order to acquire the knowledge which they need to by dividing the classroom into stations. (Alzahrani, 2018) revealed that scientific station strategy could be described as a strategy based on some activities by moving to some stations.by dividing students in groups and moving them to stations in order to get the knowledge they need . It gives the students the chance to be active in psychically and mentally as well. (Al-Abaji & Al Farkah, 2020) refers that

scientific station is a strategy which depends on dividing studying and moving them to many station in order to acquired skills of thinking and motivation. (Rawahi&Al Ghattami, 2020) referred that scientific station is a strategy which make students to moving to several station by groups in order to discover or acquired as specific knowledge . (Abdel-Hakam, 2018) revealed that Station strategies accelerates the process of learning a foreign language as it gets learners involved in the process of their own learning.

2.2.2 Types of Scientific Stations

1- **Exploratory station:** this station dealing with laboratory where the material and activities took placed, during this stage some short experiment could be conducted. The Exploratory station is not only dealing with scientific topic but it could also deal with other kinds of science like humanity science or languages sciences ; this occur by exploring new technics by using visual or electronics devices or even some websites which dealing with any kind of subject which is being thought.

2- **Reading station:** on this station, the knowledge presented through passage of reading . The reading passage could be written in article, magazine or books..etc. the students will read the passage which belongs to the topic. on this passage, the knowledge will be presented and the rest of students begin to obtain the information which they need. in case of shortage of knowledge, the station could present a new passage to read until the object of reading occur.

3- **Visual Station:** this station presents visual knowledge which could be video, pictures or drawing materials, through theses materials the students will obtain the information which they need or even begin think how to create their own ideas about the topic. if students still need to obtain more information, the station will be asked to provide more visual scenes in order to complete all the required knowledge.

4- **Audio / visual station:** . on this station, many technological devices are presented in order to explain the topic or subject which needed to show, the station present CD., videos, recording audio topics or documentary movies. the main aims of presenting all multimedia is to illustrate the topic and to allow to all students to be able to acquire the knowledge which they need and to be able to solve any problem they could face during the educational process

(Umbo Saeedi and Al Balushi, 2009, p. 286).

5- **Electronic station:** on this station, the students will present websites and computers programs which are dealing with the specific topic. the purpose is to explain the topic or lesson in new method which could attract students, making them like the topic and bringing this experience to their minds.

6- **Advisory station:** this station could be differ from previous station because it requires to bring an expert on the topic which will be thought in order to explain to students or to show them how deal with the problems which they face during the lesson . The expert role is to give the advice and the show how deal with the problems ; this occur by coordinating with the teacher where knowledge and information were presented .

7- **The Wax Museum station:** this station is considered the most likely station because the students will present a kind of act. The teacher will ask one of his students to choose one of celebraters or famous figure in any kind of filed they like, and the student will act like his character and begin to explain the topic to others students. the station of was museum could be use picture , movies or electronic devices through its work ; this will be very effectively in explaining the topic to other stations.

8- **The station (yes) and (no):** on this station, the teacher starts to form questions to the group who responsible about the station , and the group will begin to answer these question by using only (yes or no) answers. Others stations will slowly begin to obtain the information and knowledge which they need through this new techniques.

It's very important for teacher to allocate a specific time to all stations; this time depends on the topic which is being thought and the skills students and their ability to obtain knowledge. the teacher also has the right to add or do remove station or to make fundamental changes on the number of students participating in the station and to change the name of stations to invent a new techniques to any station in order to achieve best environment for students which allow them to obtain their knowledge (Zaki, 2013, p. 18).

2.2.3 The Advantages of Using the Scientific Stations Strategy

Aslan and Al-Naqah (2017) refers to many positive aspects in using scientific station strategy theses aspects were described as the following :

1- It allows to students and teacher as well to use all devices such as computers pictures, reading passage, actors activities and websites ; theses materials will achieve in enhancing the skill of students and teacher as well.

2- It helps students to depend themselves by implanting activities and teaching. It also gives them the self confidence which make them able to solve any problems they face. .

3- the students who participate on experiment will acquired new information and knowledge which could be not belong to the topic ; this could be named as general information acquired.

4- The pleasure that the learner feels with scientific stations enhance the self confidence and make them able to face any problems they could face.

5- scientific station enhance the cooperative learning which raise cooperation and creative work, exchanging ideas. (Aslan and Naqa, p. 17).

2.2.4 Methods of Applying the Scientific Stations Strategy

Ambo Saidi and Al-Balushi (2009) stated that the methods of applying the strategy of scientific stations as follows:-

1- **Moving to all stations:** the teacher begins to organize stations and time need to each station ; this is depending on the topic which is going to be thought, It is also depending on number of stations and the students, participating as well. All station should move to others and every stations has its role in teaching. after teaching, the station will back to and other station will begin to teach another topic sand so on. after finishing teaching, the teacher will prepare worksheet and begin to discuss what was thought.

2- **Roaming on half of the stations:** It backs to activities for example, if the activities need more than 10 minutes time, so the teacher could reduce it to half of the number, and instead of moving on (4) stations. It could only movie to two stations. this also depends on the similarity of stations which the teacher could gather similar stations in one.

3- **Partial learning:** this could be carry out if the teacher hasn't enough time or a difficulty in moving all stations in one time. There for, every group could nominate one person to move to stions which teaching. After finishing the person will come back to his station and begin to explain and teach what he has learned to his colleagues. (Ambo Saidi and Al-Balushi, 292, 2009).

2.2.5 The aims of the scientific stations strategy:

The aims of the scientific stations strategy are**:**

1- **Overcoming the problem of the lack of tools:** When tools and materials are limited, scientific station could help because the materials will be divided into separate tables.It also could be very helpful because the tools using in the strategy have many pattern. for example, it could be technological devices, pictures, websites or reading passages. therefor, the teacher or students will be able to use different kinds of tools.

2- **Overcoming the negative of practical presentations**. In the method of practical presentations, the teacher usually performs the lesson in front of the whole class, and the only activity which students do is watching the lesson However, scientific station allow to students to participate in teaching process by making them use the materials and engaging them in cooperative work ; this will enhance the spirit of cooperations and exchanging ideas which surly produce a good session and results as well.

3- **Bringing fun, change and movement in the classroom.** By moving from station to another and exchanging the ideas among students, this will bring fun and happiness to classroom and to all participants which will reflect on the their understanding the topic.

4- **The diversity of practical and theoretical experiences,** the learners, by using scientific station gives huge experience in many fields such as reading, technology, electronic and explaining, because students move all stations definitely they will acquired all the mentioned skills. (Al-Anbaki, 2014, p. 87).

2.2.6 Intellectual Trends of the Scientific Stations Strategy

1- **Constructive direction:** The constructive direction emphasizes that students are the focus of the learning process and they should discover, read, explore by themselves, they should also be able to

solve any problems they face and to be able work to gather through cooperative learning which is allowed by scientific station strategy. the students will be the key element of learning process where they designed their activities and begin to nominate a leader person in every station. they also will be able to exchange their points of view and ideas this differently will helpe them in achieve the knowledge they need.

2- **Exploratory direction:** Al-Kubaisi (2008) asserts that learning by exploration gives the students the ability to discover their ideas and find solutions to problems themselves, this will raise the ability of students in terms of creative and patient. exploratory directions which occur by scientific station make the students able to express themselves in many filed of life not just in academic issue.
Mustafa (2011) believes that students in the process of discovery will reais the mental ability of students by sharing ideas and make activities by themselves.

3- **Investigative direction**: Al-Haila (2001) mentioned that Bruner saw that the survey is one of the best methods to affect the process of learning and teaching, as it is based on understanding and understanding, as it is considered one of the most influential teaching methods in developing thinking and processes among students (Al-Bawi and Al- Shammari, 2020, p. 35).

Upon the researcher view, the scientific stations of give students all kind of knowledge they need. It enhances the mental ability of students by changing the traditional way of teaching in classroom. it encourage them to think, create, changing ideas and give them the confidence which make them able to make decision and solve any problems they face.

3. Method
3.1. Participants of the study

A group of 60 for the first-year secondary school students randomly selected from EL HADADA secondary school for girls and boys in 2022 in second semester. Each group was 30 students. The experimental group received training by scientific station strategy while the control group was taught regularly.

3.2. Instruments and Material of the study

The Present Study Adopted the Following:
1- An EFL Writing skills checklist.
2- An EFL Writing pre- posttest.
3- Teacher's Guide of scientific station strategy.

These instruments and material are presented in detail as follows:

3.2.1An EFL Writing skills checklist

The checklist consists of the main sub skills of writing skills in which were taught in secondary school level one. The checklist was designed in the light of writing skills revealed by the analysis of the English writing topic used in secondary schools in teacher's book.

A) Description of the EFL writing skills checklist

The check list consists of four following writing main skills: (Unity – Coherence – grammar – mechanism) every skill has many sub skills. **Coherence** has 7 sub skills, Unity has 4 sub skills, mechanism has 4 sub skills and grammar has 2 sub skills (see appendix 1).

B) Administration of the EFL Writing skills checklist.

To prepare the EFL writing Checklist, the researcher followed these steps:
1- Reviewing the related literature and previous studies of EFL Writing skills.
2- Designing the instrument taking into consideration its relevance to student abilities.
3- The researcher submitted the checklist to 4 TEFL jury members.
4- The jury members validated the instrument and provided some comments that were considered by the researcher.

C) Validity of the EFL Writing Skills checklist

A panel of 4 juries' members was requested to validate and determine the writing skills relevant to the secondary school students. They provided some comments which were carried out. Some of the comments and remarks raised by the jury members were as follows:
1- Summarize the EFL Sub skills.
2- Delete some similar skills.
3- Add some other skills.

3.2.2 An EFL Writing skills pre- posttest

In order to evaluate the participants' EFL writing skills before and after using scientific station strategy, the researcher designed a pre-posttest

writing skills test. The test was designed for the sample of the study represented by the first level of secondary school and is trying to assess the following objectives:

1) To set a clear topic sentence that expresses the main idea.
2) To support main idea with adequate details.
3) To end paragraphs with a relevant concluding sentence.
4) To set a clear thesis statement that addresses main idea.
5) To order sentences in the most logical way.
6) To support ideas with some transitional words.
7) To arrange essay's paragraphs in the chronological order with smooth transitions.
8) To punctuate sentences correctly.
9) To capitalize sentences in a correct way.
10) To set a correct word spelling.
11) To use appropriate vocabulary, idioms, and expression.
12) To apply grammatical rules correctly.
13) To maintain tenses consistent in sentences.
14) To organize writing logically and clearly.
15) To elaborate event or sequence of event logically.
16) To provide ample details to describe actions, thoughts, and feelings.
17) To develop the storyline by including sensory details, conflict resolution, and other narrative elements.
18) To order events/series of events correctly.
19) To appeal t more than one of the five senses.
20) To make use of literary devices.
21) To use enrich and vivid descriptive words and details.
22) To include rich support details.
23) To address the best argument of opposition.
24) To support argument with good quotes, evidence, and examples.

3.2.2.1 Description of the EFL writing skills pre-posttest

The EFL Writing skill test consisted of four types of questions which deal with the EFL writing skills of secondary school students' level one table (3) show a specification of the tests questions.

Table (3) specification of the EFL Writing test question

Questions	Description
Writing an essay	The Students are given a specific subject in order to write an essay discussing the subject. The question aims to figure out the ability of students in unity and mechanism.
Writing email	Students are asked to write an email about one of events which popular to be written. the purpose of the question is to figure what how far students have the skill of coherence and mechanism
Choose the correct answer	The students are asked to choose the right answer in order to measure how far they could know the grammatical rules and new vocabularies as well.
Correct the mistake	The students are asked to correct the mistakes in some sentences in order to figure out how far they have the ability to solve and editing any text.

3.2.2.2. Preparing the EFL Writing tests

In order to form a EFL writing test the researcher adopted the following steps:

1- The researcher analyzed the content of the English textbook.
2- The researcher submitted the instrument to 4 TEFL Jury members.
3- The jury members validated the instrument and provided some comments that were considered by the researcher who modified and refined the EFL writing tests accordingly.
4- Based On The EFL Writing checklist and the language elements revealed through analysis of the textbooks, The EFL writing tests were developed.
5- One EFL writing test was a pre-test and the other was the post-test.
6- The pre-test was used to measure level one secondary school students before the experimentation and to make sure that students in both groups were at the same level before starting the experiment.
7- The post – test was used to investigate the effect of scientific station in enhancing writing skills.

3.2.2.3 Validity of the EFL Writing tests

The validity of the test was measured by two methods: validity, content validity and comparison of extreme groups. Face validity means the validity at face value. This aspect of validity refers to whether the test looks reasonable. As a check on face validity, test items were judged by the panel of TEFL Jury to obtain suggestions for modification. The content validity

indicates the knowledge and skills covered by the test items should be representative to the larger domain of the knowledge and skills.

3.2.2.4. Timing the test

The time of the test was calculated during the pilot administration of the test. The researcher calculated the time according to the following equation:

$$\text{Test time} = \frac{\text{The sum of each students' time (3600)}}{\text{Students' number (30)}} = 120$$

The time of the test was (125) minutes. Five minutes for the direction of the test.

3.2.3. The Teacher's Guide

3.2.3.1 The Aim of the Teacher's Guide

The teacher's guide was constructed to help secondary school teachers to improve their students' writing skills (unity- coherence- grammar- mechanism). Students' worksheet and materials were printed and given to the applicants of the study. The content was arranged and collected from several resources (the students' book, books from school library, journals, magazines, and websites).

3.2.3.2 Steps Of Implementing Scientific Station Strategy

1) The teacher presents an introduction to the topic and what students are required to do.
2) Prewriting stage:- the stage of prewriting consists of four station as the following .
   - Exploration Station: The Station Of Exploration Presented To A Video Talking About The Topic Of The Session.
   - Reading station: on this station the teacher presents a picture and reading passage about the topic.
   - Visual station: this station shows videos about the topic.
   - Electronic stations : on this station, students will reveal two websites (the teacher choose them according to the topic).
3) Writing stage: the stage of writing is considered the key station in which the students carry out what they had learned.
   - All students move to exploration station to watch videos related to the topic, After watching the videos, they start to write according to what they had learned.

- All students move to reading station in order to read a passage in which they be able to find out how it was written, and begin to write the topic which will copy with the passage.
- All students move to visual station to see more videos which explain how to write the topic which they had learned.
- All students move to electronic station to review the websites which discovered by the electronic station in order to write their topic.

4) post writing stage

   Post writing stage includes two following stations :

- station of editing : the main duty of this station is to find out any mistakes or problems during the mechanics of implementing the station and solve it. station of revision :on this station, the teacher will summarize all what students had learned and solve any problems or misunderstanding.

5) the stage of evaluation: on this station, the teacher starts to evaluate the performance of his students and how far they acquired the new strategy. He will prepare a work sheet, writing the marks for every station, giving little prize for the station which achieved the best performance.

3.2.3.3. Evaluation

The researcher used formative as well as summative evaluation. The former took the form of tasks given to students during teaching. The latter was represented in the post testing.

3.2-3-4 Homogeneity of both groups

to investigate the equivalent of the two groups (the experimental group and the control group) at the pre-test; Independent samples t-test was used to identify the significance of difference between the mean scores of the experimental group and the control group. Table (1) shows the t-values.

Table (1): The T-Value to Signify the Difference between the Mean Scores of the Two Groups

Skills	Group	N	Mean	Std. Deviation	t-value	d.f	sig
Unity	Experimental	30	2.13	0.97	0.125	58	No Significant
	Control	30	2.10	1.09			
Coherence	Experimental	30	1.37	0.85	0.391	58	No Significant
	Control	30	1.27	1.11			
Grammar	Experimental	30	2.43	1.01	0.567	58	No Significant
	Control	30	2.27	1.26			
Mechanism	Experimental	30	1.33	1.15	0.105	58	No Significant
	Control	30	1.37	1.30			
Overall Writing	Experimental	30	7.27	2.78	0.432	58	No Significant
	Control	30	7.00	1.93			

Table (1) refers that the calculated values of "t" were no significant which meant that there isn't difference between the mean scores of the two groups. Table (1) shows that the values of calculated "t" are not significant. Thus; the two groups are equivalent pre the implementation of the research experiment.

4. Results and Discussion

This section shows the collected data from administrating the EFL writing test to the two groups before and after the experimentation and the statistical treatment of the data.

- **Hypothesis One**

There is a statistically significant difference between the experimental and the control groups' mean score of Writing skills posttest (unity) in favor of the experimental group

To verify this hypothesis, data were treated statistically. Means, standard deviation, minimum and maximum scores were computed and table (2) reveals this.

Table (2) Descriptive Statistics of the Control and the Experimental Groups in Unity.

Test	Group	N	Mean	Std. Deviation	Minimum	Maximum	Mean difference	totalscore
Unity	Experimental	30	4.13	0.78	2	5	2.07	5
	Control	30	2.07	0.69	1	3		

Table (2) shows that the value of unity mean score of the experimental group was (4.13) which is higher than that of the control group which was (2.07). As table (1) shows the experimental group's scores were higher than those of the control group in the post-administration of unity test It also indicated a higher homogeneity (=Std. Deviation /Mean) of the experimental group's grades than the grades of the control group due to the application of the scientific station strategy

To show the significance of the differences, t-value was calculated for the difference between the mean scores of the two groups. This is illustrated in table (3)

Table (3)t-Value and effect size of both groups

Test	Group	Mean	Std. Deviation	t-value	d.f	Sig	η^2	d	Effect size
Unity	Experimental	4.13	0.78	10.890	58	Significant at (0.01)	0.67	2.86	Large
	Control	2.07	0.69						

Table (3) shows that the calculated value of "t" (= **10.890**) which is higher than the tabulated value of "t" with 58 degrees of freedom and significant level "0.01".This refers that the difference between the mean scores of the two groups reached the level of statistical significance.

- **Hypothesis two:**

"There is a statistically significant difference between the experimental and the control groups' mean scores of Writing skills posttest (coherence) in favor of the experimental group.

To verify this hypothesis, data were treated statistically. Means, standard deviation, minimum and maximum scores were computed and table (4) reveals this.

Table (4) Descriptive Statistics of the Control and the Experimental Groups in coherence.

Test	Group	N	Mean	Std. Deviation	Minimum	Maximum	Mean difference	totalscore
coherence	Experimental	30	3.80	1.03	1	5	1.97	5
	Control	30	1.83	0.59	1	3		

Table (4) shows that the value of coherence mean score of the experimental group was (3.8) which is higher than that of the control group which was (1.83). As table (3) shows the experimental group's scores were higher than those of the control group in the post-administration of coherence test It also indicated a higher homogeneity (=Std.Deviation /Mean) of the experimental group's grades than the grades of the control group due to the application of the scientific station strategy

To show the significance of the differences, t-value was calculated for the difference between the mean scores of the two groups. This is illustrated in table (5)

Table (5) t-Value and effect size of both groups

Test	Group	Mean	Std. Deviation	t-value	d.f	Sig	η^2	d	Effect size
Coherence	Experimental	3.80	1.03	9.063	58	Significant at (0.01)	0.59	2.38	Large
	Control	1.83	0.59						

table (4) showed that the calculated value of "t" (=**9.063**) which is higher than the tabulated value of "t" with 58 degrees of freedom and significant level "0.01".This refers that the difference between the mean scores of the two groups reached to the level of statistical significance.

- **Hypothesis three:**

"There is a statistically significant difference between the experimental and the control groups' mean scores of Writing skills posttest (Grammar) in favor of the experimental group"

To verify this hypothesis, data were treated statistically. Means, standard deviation, minimum and maximum scores were computed and table (6) reveals this.

Table (6) Descriptive Statistics of the Control and the Experimental Groups in Grammar.

Test	Group	N	Mean	Std. Deviation	Minimum	Maximum	Mean difference	totalscore
Grammar	Experimental	30	3.77	0.82	2	5	1.27	5
	Control	30	2.50	1.07	1	4		

Table (6) shows that the value of Grammar mean score of the experimental group was (3.77) which is higher than that of the control group which was (2.5). As table (5) shows the experimental group's scores were higher than those of the control group in the post-administration of Grammar test also indicated a higher homogeneity (=Std.Deviation /Mean) of the experimental group's grades than the grades of the control group due to the application of the scientific station strategy.

To show the significance of the differences, t-value was calculated for the difference between the mean scores of the two groups. This is illustrated in table (7):

Table (7) t-Value and effect size of both groups

Test	Group	Mean	Std. Deviation	t-value	d.f	Sig	η^2	d	Effect size
Grammar	Experimental	3.77	0.82	5.138	58	Significant at (0.01)	0.31	1.35	Large
	Control	2.50	1.07						

It is clear from table (7) that the calculated value of "t" (=**5.138**) which is higher than the tabulated value of "t" with 58 degrees of freedom and significant level "0.01".This reflects that the difference between the mean scores of the two groups reached the level of statistical significance.

- **Hypothesis four:**

"There is a statistically significant difference between the experimental and the control groups' mean scores of Writing skills posttest (Mechanism) in favor of the experimental group"

To verify this hypothesis, data were treated statistically. Means, standard deviation, minimum and maximum scores were computed and table (8) reveals this.

Table (8) Descriptive Statistics of the Control and the Experimental Groups in Mechanism.

Test	Group	N	Mean	Std. Deviation	Minimum	Maximum	Mean difference	totalscore
Mechanism	Experimental	30	3.27	0.91	2	5	1.47	5
	Control	30	1.80	0.81	1	3		

Table (8) shows that the value of Mechanism mean score of the experimental group was (3.27) which is higher than that of the control group which was (1.8). As table (8) shows the experimental group's scores were higher than those of the control group in the post-administration of Mechanism test It also indicated a higher homogeneity (=Std. Deviation /Mean) of the experimental group's grades than the grades of the control group due to the application of the scientific station strategy.

To show the significance of the differences, t-value was calculated for the difference between the mean scores of the two groups. This is illustrated in table (9)

Table (9) t-Value and effect size of both groups

Test	Group	Mean	Std. Deviation	t-value	d.f	Sig	η^2	d	Effect size
Mechanism	Experimental	3.27	0.91	6.623	58	Significant at (0.01)	0.43	1.74	Large
	Control	1.80	0.81						

It is clear from table (9) that the calculated value of "t" (=**6.623**) which is higher than the tabulated value of "t" with 58 degrees of freedom and significant level "0.01".This refers that the difference between the mean scores of the two groups reached the level of statistical significance.

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- • **Hypothesis five:**

There is a statistically significant difference between the experimental and the control groups' mean scores of overall Writing skills posttest in favor of the experimental group

To verify this hypothesis, data were treated statistically. Means, standard deviation, minimum and maximum scores were computed and table (10) reveals this.

Table (10) Descriptive Statistics of the Control and the Experimental Groups in overall Writing.

Test	Group	N	Mean	Std. Deviation	Minimum	Maximum	Mean difference	Total score
Writing	Experimental	30	14.97	1.85	9	18	6.77	20
	Control	30	8.20	1.06	6	10		

Table (10) shows that the value of Writing mean score of the experimental group was (14.97) which is higher than that of the control group which was (8.20). As table (9) shows the experimental group's scores were higher than those of the control group in the post-administration of Writing test also indicated a higher homogeneity (=Std. Deviation /Mean) of the experimental group's grades than the grades of the control group due to the application of the scientific station strategy.

To show the significance of the differences, t-value was calculated for the difference between the mean scores of the two groups. This is illustrated in table (11)

Table (11) t-Value and effect size of both groups

Test	Group	Mean	Std. Deviation	t-value	d.f	Sig	η^2	d	Effect size
Writing	Experimental	14.97	1.85	17.387	58	Significant at (0.01)	0.84	4.57	Large
	Control	8.20	1.06						

It is so clear from table (11) that the calculated value of "t" (= **17.387**) which is higher than the tabulated value of "t" with 58 degrees of freedom and significant level "0.01".This reflects that the difference between the mean scores of the two groups reached the level of statistical significance.

Results and discussion

Data were calculated statistically. Statistical Package for the Social Sciences (SPSS,version25) was used to analyze the Students' scores on the pre and post-test. The results of the current study shows that Scientific stations strategy proved its ability to enhance writing skills through calculated results which estimated statistically .The results showed that scientific station strategy identified clear writing goals and objectives for the students ; this was occurred when all stations or groups have been given they role and task . it also divided students into smaller groups and assign each group to specific writing station ; this also encouraged to boost cooperative learning among students . scientific stations encouraged students to acquire new skills through made them deal with materials at each stations such as handouts , worksheets and exercises . during implementing experiment , the students were given clear instructions and guidance in every stations . through rotating to stations , students became more effectively to achieve their task and creating a funny environment which made the educational process more attractive . scientific station allow the teacher to monitor and observe the students progress , giving them feedback easily . the teacher also was able to evaluate students' writing progress and assess the effectiveness of the scientific station strategy . By using this approach , students are able to focus on specific writing skills , engage in independent learning , and receive personalized feedback , which leads to improved writing proficiency .

5.Conclusion

According to the previous results, many important points should be hinted out about using scientific station strategy to enhance EFL writing skills among secondary school level one.

1- Motivating students to scientific station strategy in order to reduce any problems could face students in terms of EFL writing skills .
2- scientific stations helped students to discover and organize their thoughts during writing.
3- Increasing students' awareness of writing as a process that includes pre-writing phases, editing, evaluation, revision.
4- Scientific stations helped the students promote flexible thinking and ideas organization through writing. As a result, their paragraph and letters became more organized.

5- Scientific stations trained students to evaluate the written sample to determine the correct forms .Accordingly, they became aware of the EFL mechanics and shifting correctly between tenses.
6- Dividing students into group made them more cooperating and feeling responsibility.
7- Moving through station helped students to acquired self-confidence and showing their ability to make a decisions.

6. Recommendations

In the light of findings, the following points are recommended :
1- The proposed treatment in the current study can be adopted for teaching EFL writing skills at other learning stages taking into considerations the learners age, needs and levels.
2- More attention should be paid to teaching EFL writing, besides testing it.
3- Immediate positive feedback thought the EFL writing process is recommended.
4- More EFL writing activities should be included in school textbooks.
5- Adopting scientific station that suit individual learners, needs, proficiency level, background knowledge and attitudes.
6- Training students to use different learning station In different stages of EFL writing process to raise their strategy awareness.
7- Training students to form organized paragraphs and letters by using learning stations.

7. Suggestions for further studies

The study offers the following suggestions for further researchers:
1- replicating the current study to make sure that scientific station has a positive effect on enhancing EFL Writing skills among secondary school students.
2- Using scientific stations to enhance secondary school students EFL writing skills.
3- Using scientific stations to enhance secondary school students EFL reading skills.
4- Using scientific stations to enhance secondary school students EFL listening skills.
5- Using scientific stations to enhance secondary school students EFL speaking skills.

6- Using scientific stations to reduce student teacher's EFL Writing Apprehension.

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