The Impact of the Electronic Mind Maps on Developing EFL Students' Writing Skill and their Attitudes Towards Writing

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Abstract

The purpose of this study was to find out how the electronic mind maps affected the writing skill and attitudes towards writing among freshmen students at innovation University. The approach of quasi-experimentation was used. Two groups during the first term of the 2023–2024 academic year made up the study's sample. Each group contains thirty-five students, and the two groups were divided into an experimental and a control group. While the control group received traditional instruction, the experimental group used the selected books and the Electronic Mind Mapping approach. A writing test was implemented, as well as the writing attitudinal questionnaire. The results of the statistical analysis indicated a significant difference in favor of the experimental group between the mean scores of the two groups at the significance level of ($\alpha = 0.05$). Furthermore, the results demonstrated the significant impact of using electronic mind maps in writing. The suggestion to teach EFL teachers how to create electronic mind maps for their lessons stands out the most. Examining how electronic maps affect writing abilities while showcasing the teaching strategies was fundamental. It is recommended for teachers to use electronic mind maps in developing other skills of English.

Keywords: Electronic mind maps; the writing skill; Attitude.

Introduction:

Writing is an essential classroom activity which is included as a component of foreign language syllabi as it reinforces grammatical structures and vocabulary and helps students to express their ideas freely without the pressure of face-to face communication. Writing Stages are illustrated as follows; Pre – writing, drafting, revising, proofreading, and publishing. Process writing, according to Beare (2009), focuses on giving students—especially beginning writers—a lot of leeway to make mistakes in their work. There is no one manner that two people write the same way. All writers appear to adhere to a few logical procedures when creating a paper, nevertheless. Writing Stages: English's status as an international language has a wide range of effects. Anyone who is proficient in a language has it as a part of their identity, and proficiency indicates the extent to which we "possess" a language (Acar, 2005, Nunn, 2005).

Drafting is the process of assembling ideas and thoughts, much as prewriting is the act of putting concepts on paper. In this phase, one should focus on developing his topic with sufficient details for his audience and goal, as well as logically organizing his facts. One shouldn't worry about creating or fixing any mistakes at this point. After putting thoughts on paper, it's time to work with them and polish the writing to better convey the concepts. This stage involves the following steps: adding, deleting, and replacing words with other words. The goal of editing and proofreading is to ensure that one's writing adheres to accepted written English conventions. Checking spelling, punctuation, grammar, document, format, and usage should be done at this step. Writing is a kind of communication; if something is written down, it must have been meant for someone to read, even if that someone is merely the writer (Hogan,2003).

We can infer the relationship between how to develop the writing skill and the suitable strategy for achieving this goal by stating that writing for ourselves, or private writing, boosts our confidence when it comes to writing for others, or public writing, as we strive to cultivate a good attitude toward writing. According to Nordquist (2009), the important thing right now isn't whether we believe we are good writers or not, but rather how willing we are to put in the effort to improve. The mind map technique was developed by Buzan (2006) to help students better organize and categorize thoughts and tasks as well as read, solve problems, and make decisions.

Buzan was inspired to create the mind map because he was aware of how educational systems primarily emphasize using the left side of the brain. The application of reasoning, language, math, sequencing, and specifics of any subject is controlled by the left side of the brain. Additionally, the right side—which is in charge of employing imagery, imagination, and emotions—was completely neglected (Murley, 2007). This is a feature of mind maps; they use both sides of the brain. The fundamental components used to make these maps

are words, images, and colors. One kind of graphic organizer is the mind map. It also functions effectively as a tactic to help struggling pupils reach higher accomplishment levels (Holzman, 2004).

Traditionally, mind maps are created by hand, but when specialized software became available, electronic mind maps began to surface (Dara, 2010). The process of creating an electronic mind map has accelerated and grown more appealing. A comparison of electronic and hand-drawn mind maps was the subject of several studies, and the results consistently showed that electronic mind maps are more effective and visually appealing due to the inclusion of appealing images, colors, and drawings that capture the attention of the learner (Dara, 2010; Nong, 2009).

Therefore, according to the beneficial implementation of using the electronic mind map in many aspects related to TEFL, It was suggested to enhance the writing skill and their attitudes towards writing.

Statement of the problem:

On the basis of the observations and the written test results of freshmen at Innovation University, Egypt, it could be inferred that they lacked the necessary sub- skills of the five stages of the writing process: prewriting, drafting, editing, revising and publishing. In order to overcome these gaps, the researcher suggested using an educational model based on the IMP to develop the writing skill and the students' attitudes towards writing.

Accordingly, the problem under investigation in this study could be formulated into the following major question:

How could freshmen students' writing skill and their attitudes towards writing be developed by using the electronic mind maps?

This main question could be subdivided into the following questions:

1. What is the writing sub- skills required for the freshmen students to commend?
2. What's the level of students' mastery of these sub-skills?
3. What are the students' attitudes towards writing?
4. What is the effect of IMP on developing the students′ writing skill and their attitudes towards writing?

Significance of the study:

This study derives its significance from the following:

1. Using the electronic mind map technique as an independent variable and studying its impact on developing the writing skill. This technique may

contribute to encouraging English teachers to employ modern techniques in order to solve the problem of students' low performance in writing.

2. It is hoped that the electronic mind map, as a modern educational technique, may help students understand texts in English and thus increase their academic achievement and their ability in writing.
3. Teachers of English as they would be provided with a model to use the IMP to enhance the writing skill.

Aims of the Study:

This study aimed at:

1. Identifying the sub-skills of writing which are suitable for the freshmen students.
2. Determining and developing those students' attitudes toward the writing skill.
3. Determining the efficacy of the IMP to develop the students′ writing skill and their attitudes toward it.

Procedures of the study:

This study was conducted according to the following order:

Surveying the relevant literature and previous studies to determine the features of the variables of the study.

1. Designing the Writing Checklist to identify the writing sub- skills which are suitable for the students and following the conditions of validation.
2. Designing the Writing Attitudinal Questionnaire and following the conditions of validation.
3. Drawing a random sample of the first- year university students, and dividing them into two groups :an experimental group and one control.
4. Designing the educational model based upon the IMP to develop the identified sub –skills of writing .
5. Designing the Writing Test and following the conditions of validation.
6. Administering the designed strategy to the experimental group.
7. Administering the Writing Test after treatment to all the groups to check their mastery of the sub skills.
8. Administering the Writing Attitudinal Questionnaire after treatment to all the groups to check the effect of the strategy on developing the students' attitudes toward writing.

9. mparing the pre and post results of the Writing Test and the Attitudinal Questionnaire.

Definition of terms:

Electronic Mind Maps:

According to (Buzan, Ibid.2006), it's a computer software that the university students in the experimental group use to analyze and organize concepts so they can comprehend writings written in the English language utilizing gradient curves, images, and colors. Students could incorporate colors and graphics to fit the main and supporting concepts by using this strategy. Tony Buzan developed a unique tool called (IMindMap) that was used to construct these mental maps. On Buzan's official website, the researcher discovered this brain mapping tool.

Process Writing:

1. According to Beare (2009), process writing is an approach that integrates writing skills from the early stages of English language learning, emphasizing the importance of allowing students, particularly young learners, to write with ample room for mistakes.
2. Process writing involves a recursive and purposeful approach of creating multiple drafts to communicate content to an audience. This process includes several stages such as pre-writing, drafting, sharing and responding to writing, revising, editing, and publishing. It encourages collaboration among learners throughout various stages and activities.

It can be defined as generating, editing and publishing ideas to foster the value of revision and the vital relationship between students, professors and peers. (McClosky, 1990; Hedge, 1991; Oluwadiya, 1992: 13).

The researcher uses the previously stated definition of writing for the purposes of the current study.

Attitude:

1. According to Baer (1999), the tendency of a responder to communicate both verbal and nonverbal responses to the activity under study is known as their attitudes.
2. Attitudes that shape our behavior are psychological states that we accumulate through time as a consequence of our experiences. An attitude is not so much the act or response as it is a taught condition of readiness. Some synonyms for attitudes include "predisposition and tendency."(Mcleod, 1991).

The researcher would favor the second definition because it aligns with the relationship between "attitudes" and "the writing skill," thus providing clarity to the purpose of the study.

Literature Review:

The Writing Process:

Authors can explore ideas and notions and give them a tangible, visible form through the intricate process of writing. Writing encourages thinking and learning because it makes ideas available for reflection and makes communication easier. Thoughts can be examined, revised, added to, rearranged, and altered when they are written down. Students are more inclined to write for the purpose of stimulating thought and learning if they see writing as a process. Understanding that writing is an iterative process and that every writer approaches the process differently relieves students of the pressure to "get it right the first time" and makes them more open to trying out new ideas, investigating concepts, and going through the revision and editing procedures.

For new writers, "writing" exercises or assignments that include duplicating or reproducing previously taught material are good ways to acquire spelling, punctuation, grammar, and other rules. as mentioned by Griffith in 2010. Writing is a tiresome task for many people, and creating mind maps on paper can seem like a significant step backward in this day of information and communication technology. Mind maps, however, can be created entirely on a computer.

One advantage of mind maps is their ability to accommodate item rearrangement. While you can "drag and drop" concepts to reorganize them on an electronic mind map, a paper mind map needs you to erase and redo the thinking.

The use of mind mapping has a number of disadvantages: Maps can only be "read" on machines using the same software, as many of the tools are copyrighted. Creating maps at home and reading them at work may become challenging as a result. Nonetheless, the benefits of mind mapping greatly exceed their drawbacks. They are a very helpful complement to the teaching and writing tools available because they allow you to rearrange concepts, copy and paste material from other programs, and print the mind map as a text outline.

The variations between infographics, mind maps, and concept maps:

The difference between mind maps and conceptual maps is that the former have a tree structure with multiple branches and groupings, while the latter have a radial structure.

A concept map links various concepts or ideas, whereas a mind map concentrates on a single thought. Mind maps are a useful tool for organizing facts and coming up with original ideas. However, infographics typically use computer programs and videos to illustrate complex information through drawings. (Davies, 2011).

Mind Map Structure Types:

Mind mapping is open and free rather than traditional and conservative. Here are four commonly used structures of mind maps.

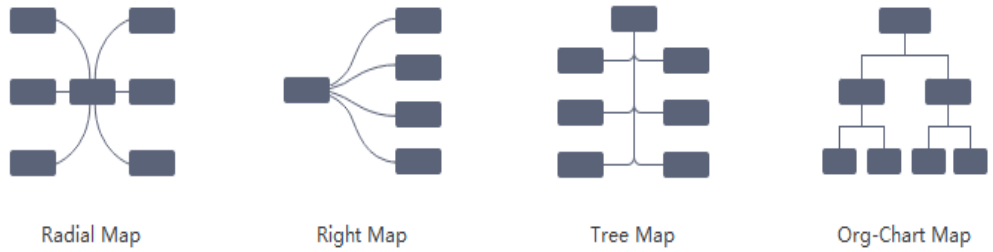

Figure1. ***Uses of Mind Map (Jones et al.,2012)***

The radiant structure of a mind map flows exactly the way human brain works, diverging a central idea to subordinate points. Mind maps are used for brainstorming, problem analyzing and solving, studying and memorization.

Advantages of Mind Maps:

Broad Flexibility

Because the human brain functions similarly to how a mind map develops, mind maps can be utilized for learning and organization tasks like studying for a test or taking notes.

Easy Editing

A mind map's structure can grow into an infinite number of branches and layers. With scattered lines and arrows, adding concepts and details at a later time is simple and convenient.

Strengthen Your Memory

The mapper is free to include any symbols and images he desires on his map.

Help People Concentrate

Rather than bits and pieces of information, we receive the whole picture.

Brief Details

A mind map is an excellent tool for compressing large amounts of knowledge because its topic texts are simply keywords and brief sentences.

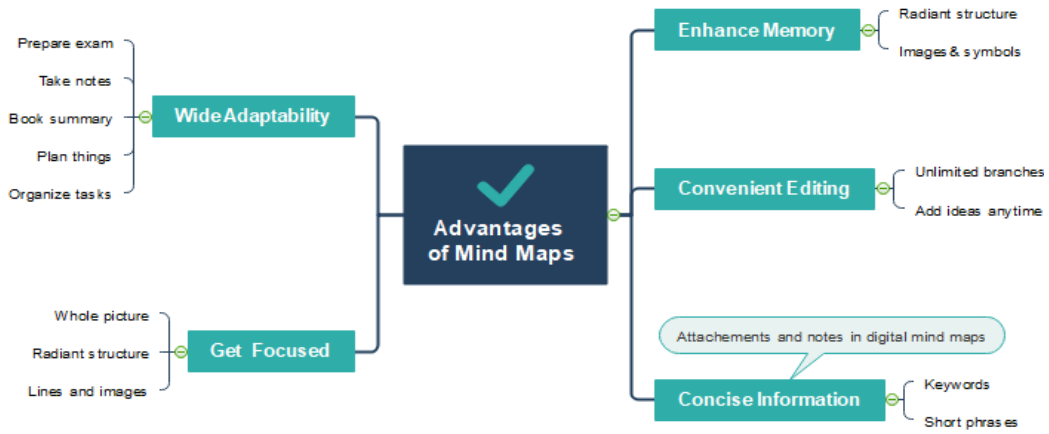

Figure2. ***Advantages of Mind Maps (Jones et al.,2012)***

Disadvantages of Mind Maps

Text Restrictions.

The number of texts you can enter in a mind map is restricted by the use of keywords and brief phrases as theme texts.

Time-consuming.

Drawing a delicate mind map with well-chosen images and textual accompaniment could need a considerable amount of time.

Limitations on Rules.

You cannot create mind maps in an unrestricted, freestyle manner if you decide to use mind mapping software. Software follows certain conventions; for example, established themes, fonts, and layouts.

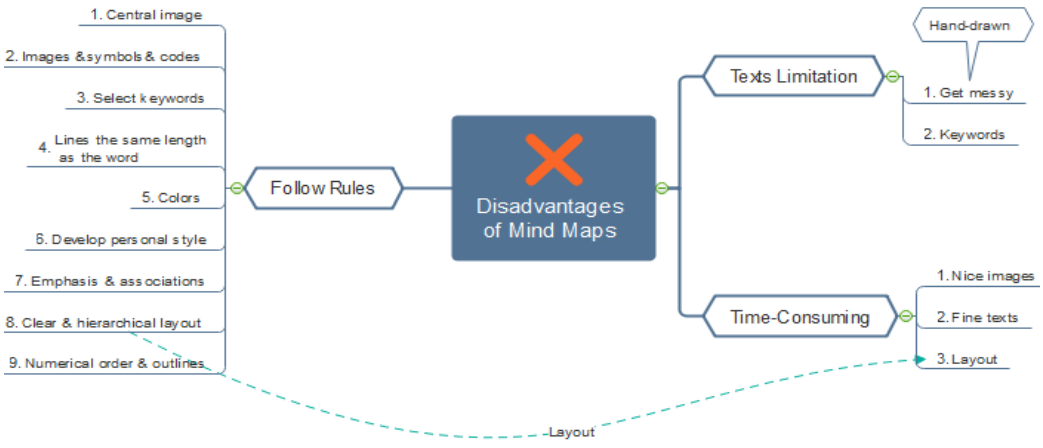

Figure 3. ***Advantages of Mind Maps (Jones et al.,2012)***

Zhang (2018) examined the relationship between the quality of argumentative writing produced by Chinese EFL learners and the explicit instruction of mind mapping in the pre-writing stage. Thirty-nine first-year English majors from two convenient classrooms were randomly assigned to the experimental group and the control group. The results showed that in terms of writing organization and content, the experimental group did better than the control group. It was shown that participants' opinions on writing in English had changed and that they thought mind mapping was a useful tool for structuring their work.

Haji (2017) investigated how language employed in the works of Iranian EFL students was impacted by the mind mapping technique. From an English Language Institute in Ardakan, Yazd, Iran, sixty female pre-intermediate students were chosen.

In contrast to the standard teaching approach outlined in the teacher's guide, Aljaser, M. (2017) sought to determine the impact of employing electronic mind maps on the academic achievement of female primary students in the fifth grade in the English language curriculum.

Writing has two primary concerns: correctness and fluency, which make it the most difficult component of language acquisition for both teachers and students, according to Lochana and Sultana (2002). Longshaw (2002) simultaneously examined how providing low-level students with the right level of challenge and engagement is essential to assisting them in developing their reading and writing skills. Regarding the topic of writers' attitudes and convictions regarding their work, White and Bruning Lee (2008) agreed. Lee clarified the relationship between a writer's observations and performance on a writing test relevant to their area.

Another element that Graham, Harris, and Mason (2004) identified as impacting the writing process was the self-regulated shifts in children's motivation, knowledge, and strategic conduct. The efficacy of an instructional paradigm called Self-Regulated Strategy Development (SRSD) was investigated in Harris and Mason's study.

Storch (2005) concentrated on the premise that student performance in written activities and their perceptions and reflections about writing are related. The purpose of the project was to look at collaborative writing. The study prompted learners to consider their experiences with group writing. This research has to do with the research of (Alzahrani,2016) as there is an exploration of perceptions and preferences of teachers and learners regarding corrective feedback.

On the whole, students preferred written over oral tests and rated the former more favorably along a variety of dimensions. Written tests were perceived to be

more pleasant, valuable and more reflective of students ' comprehension of the English text than oral tests.

Hypotheses of the Study:

The following are the study hypotheses that have been developed in light of the prior discussion:

1. There is a statistically significant difference between the mean scores of the experimental group and the control group in their post application of the writing test in favor of the experimental group.
2. There is a statistically significant difference between the mean scores of the experimental group and the control group in their performance of the post application of the writing attitudinal questionnaire in favor of the experimental group.
3. There is an effect of the IMP educational model on developing the students **'** writing skill and their attitudes towards writing. Black's equation was used to verify the effect of the program.

The Use of Electronic Mind Maps:

The course book for the subject was used to select the texts (linguistic texts). After researching mental maps and learning how to develop them, evaluating the lesson plans, and determining each one's objectives, the concepts were organized and defined, and an electronic mental map was made for each text. A few universities English academics were shown these maps to confirm the accuracy and fullness of the information on them, and their comments improved the maps. These mind maps were made with the IMindMap software.

Methods:

Research Design:

The EFL writing skills checklist:

The researcher created an EFL writing skills checklist with the goal of identifying EFL writing skills that first-year students can use.

- The layout.
- The sources used to create the checklist.

Several EFL writing skills checklists, including those by Heinonen (2001), Storch (2005), Harris, Graham & Mason (2004), Ali (2008), Hughes (2002), Cumming and Riazi (2000), and other relevant authors, have been examined in order to determine the EFL writing abilities necessary for university students.

The checklist's goal was to identify the EFL writing abilities and sub-abilities needed for the study sample.

Description of the Checklist.

The checklist included (26) skills under the five stages of the writing process: Prewriting, Drafting, Revising, Proofreading and Editing. The Skills were in three – point – Likert Format.

Relative Weight of each EFL writing sub – skill in the Checklist: According to the jury's responses, the relative weight of each EFL Writing sub – skill was assigned as indicated in table (1):

Table 1. ***The Relative Weight of Each EFL Writing Sub – Skill***

Writing Skills		Percentage of each skill	Relative weight
Stage 1 Pre – writing	Generating ideas with patterns.	90.90%	3.49
	Discussing.	81.81%	3.14
	Brainstorming.	100%	3.85
	Outlining.	72.72%	2.79
	Mapping.	90.90%	3.49
	Listing.	72.72%	2.79
	Free writing.	81.81%	3.15
	Watching films on TV.	18.18%	0.699
	Listening to music.	27.27%	1.048
	Role playing.	18.18%	0.699
	Responding to literature.	9.09%	0.349
Stage 2 Drafting	Concentrating on organizing the information logically.	100%	3.846
	Writing more than two paragraphs.	72.72%	2.796
	Indentation of paragraphs.	90.90%	3.496
	Dividing the written paper into introduction, body and conclusion.	72.72%	2.796
Stage 3 Revising	Adding Words to help make the point clearer.	100%	3.846
	Removing words that are repeated.	90.90%	3.496
	Moving around words and sentences to keep one's ideas clear.	72.72%	2.796
	Substituting words with more exact ones or phrases.	18.18%	0.699

Writing Skills		Percentage of each skill	Relative weight
Stage 4 Proofreading	Checking spelling.	100%	3.846
	Checking punctuation.	90.90%	3.496
	Checking grammar.	90.90%	3.496
	Document format and usage.	9.09%	0.349
	Capitalization	100%	3.846
Stage 5 Publishing	Publish the essays in the school journals.	90.90%	3.496
	Present the final version to the teacher.	90.90%	3.496

From Table (1), it is obvious that the relative weight of all these writing kills is high, except some skills that have low percentage and relative weight and have been excluded.

the purpose of the Writing Test, which was created by the researcher, was to determine whether or not EFL writing skills were improved as a result of teaching the syllabus using mind maps. It was administered as a pre- and post-test.

The Sources for Developing the Test:

The Design:

The pertinent literature and a few writing assessments were examined in English. These assessments aided in the final writing test preparation. (Olive, Favart & Beauvais, 2009; Lee, 2002; Reed, 1992; Luk, 2008; Nussbaum, 2008; Amelsvoort, Andriessen & Kanselaar, 2008) are the tests in question. The test was divided into two main sections: Objective questions were presented to the experimental and control groups both before and after the trial. The latter covered an extensive variety of subjects for writing tasks.There were two methods employed to assess the reliability of the writing test: Test-Retest and Inter-rater Procedure Continuity testing-retesting process. The Pearson Formula was used to determine the correlation coefficient (r) between the test's first and second application results. The statistical significance of the reliability coefficient of 0.801 was seen at the 0.01 level.

The Questionnaire:

There were thirty-three items in the Writing Attitudinal Questionnaire (WAQ). Every item has a Likert scale with five points: 1. Never 2- Seldom,

3-Occasional, 4-Frequently, 5-Always. The questionnaire's items fell into the following four categories:

- Cognitive variables
- Written Expression.
- Thinking in English while writing.
- Mechanics of writing.

Validation:

For assigning the face validity of the attitudinal questionnaire, it was submitted to a jury (n=11) of professors of curriculum of teaching methodology and professors of educational psychology who suggested omitting 18 items and rewording of some words, and hence reducing the questionnaire items from 51 to 33 items. The suggested changes were made. (SPSS) was used to estimate the validity and reliability of the questionnaire.

Table 2. ***Table of Item Agreement Percentages for the Dimensions of the Writing Attitudinal Questionnaire***

Item number	Number of agreement	Percentage of agreement	Item number	Number of agreement	Percentage of agreement
1	7	53.84%	26	11	84.61%
2	8	69.23%	27	12	92.30%
3	11	84.61%	28	8	61.53%
4	12	92.30%	29	11	84.61%
5	11	84.61%	30	11	84.61%
6	6	46.15%	31	11	84.61%
7	11	84.61%	32	12	92.30%
8	11	84.61%	33	13	100%
9	6	46.15%	34	12	92.30%
10	11	84.61%	35	11	84.61%
11	12	92.30%	36	11	84.61%
12	11	84.61%	37	7	53.84%
13	12	92.30%	38	6	46.15%
14	5	38.46%	39	4	30.76%

Item number	Number of agreement	Percentage of agreement	Item number	Number of agreement	Percentage of agreement
15	12	92.30%	40	3	23.07%
16	11	84.61%	41	5	38.46%
17	11	84.61%	42	7	53.84%
18	11	84.61%	43	11	84.61%
19	12	92.30%	44	11	84.61%
20	11	84.61%	45	11	84.61%
21	13	100%	46	2	15.38%
22	13	100%	47	11	84.61%
23	5	38.46%	48	12	92.30%
24	11	84.61%	49	3	23.07%
25	2	15.38%	50	11	84.61%
			51	2	15.38%

Therefore, based on the previous table, items number (1, 2, 6, 9, 14, 15, 23, 25, 28, 37, 38, 39, 40, 41, 42, 46, 49, 51) were of the lowest percentage and they were to be excluded from the questionnaire.

Reliability of the Questionnaire:

The reliability of the questionnaire was sought through the use of the split – half technique. The researcher prepared a new form of the questionnaire on the design of a Likert – scale with five responses: (Never , rarely , sometimes , often and always).

The test was divided into two main sections: Objective questions were presented to the experimental and control groups both before and after the trial. The latter covered an extensive variety of subjects for writing tasks. "- The consistency of the writing assessment.

There were two methods employed to assess the reliability of the writing test: Test-Retest and Inter-rater Procedure Continuity testing - retesting process.

The Pearson Formula was used to determine the correlation coefficient (r) between the test's first and second application results. The statistical significance of the reliability coefficient of 0.801 was seen at the 0.01 level.

Study Design

Utilizing both control and experimental groups, this study is quasi-experimental in nature. In the academic year 2019–2020, the experiment was carried out. The groups received the pre-test before the investigation got underway. None of the treatments were administered to the control group. Using the conventional approach, they were taught the texts. IMindMap, an electronic mind mapping approach, was employed by the experimental group to study the same texts in parallel. After the test was given to the two groups once more as a post-test, the data was examined.

Results:

The study attempted to answer the following questions:

1. What's the level of students' mastery of the writing sub-skills?
2. What are the students' attitudes towards writing?

To answer this question, the mean scores and standard deviation of student's scores in the posttest and the (T) value were calculated as shown in table (3).

- **Hypothesis No. 1:**

There is a statistically significant difference between the mean scores of the experimental group and the control group in their post application of the writing test in favor of the experimental group. A paired samples t- test was used to verify this hypothesis (tables 3, 4).

Table 3. ***T- test Results of the Post Application for the Writing Test Comparing the Control Group and the Experimental Group***

The group	N	Mean	Std. error mean	Std. deviation	Compared mean	T value	Sig. (2-tailed)
The Experimental group	35	125.72	1.428	8.45	46.92	19.08	0.01
The control group	35	78.800	1.828	10.82			

The obtained t- value is 19.08. It is significant at 0.01 level in favor of the post application of the experimental group. The mean scores of the experimental group are higher than those of the control one. Moreover, the deviation of the experimental group is lower than that of the control group. Therefore, the above table indicates that there is a statistically significant difference at 0.01 level between the attained mean scores of the control and experimental groups in favor of the experimental group's post application of the writing test.

Table 4. ***T- test Results Comparing the Pre and the Post Applications for the Experimental Group in the Writing Test***

The group	N	Mean	Std. error mean	Std. deviation	Compared mean	T value	Sig. (2-tailed)
The Experimental group (pretest)	35	70.88	8.777	1.4836	54.82	27.85	0.05
The Experimental group (posttest)	35	125.72	8.449	1.428			

From the previous table, it can be inferred that the obtained t value (27.85) is significant at 0.05 level. The mean scores of the pretest are lower than those of the post test, whereas the deviation of the scores of the pretest is much higher than that of the post test. This means that there is an improvement in the performance of the experimental group due to the implementation of the IMP and its activities.

- **Hypothesis No.2:**

There is a statistically significant difference between the mean scores of the experimental group and the control group in their performance of the post application of the writing attitudinal questionnaire in favor of the experimental group. A paired samples t- test was used to verify this hypothesis (tables 5, 6).

Table 5. ***T- test Results of the Post Application for the Attitudinal Questionnaire Comparing the Experimental Group and the Control Group***

The group	N	Mean	Std. error mean	Std. deviation	Compared mean	T value	Sig. (2-tailed)
The Experimental group	35	137.17	7.979	1.387	41.57	16.307	0.01
The control group	35	96.11	15.359	2.59			

The estimated t- value is 16.307. It is significant at 0.01 level in favor of the post application of the experimental group. The mean scores of the experimental group are higher than those of the control one. Moreover, the deviation of the experimental group is lower than that of the control group. Therefore the above table indicates that there is a statistically significant difference at 0.01 level between the attained mean scores of the control group and the experimental in

favor of the experimental group's post application of the attitudinal questionnaire.

Table 6. ***T- test Results Comparing the Pre and the Post Applications for the Experimental Group in the Attitudinal Questionnaire.***

The group	N	Mean	Std. error mean	Std. deviation	Compared mean	T value	Sig. (2-tailed)
The Experimental group (pretest)	35	60.00	16.00	2.70	77.18	18.94	0.05
The Experimental group (posttest)	35	137.18	7.979	1.387			

From the previous table, it can be inferred that the obtained t value (18.94) is significant at 0.05 level. The mean scores of the pretest are lower than those of the posttest, whereas the deviation of the scores of the pretest is much higher than that of the post test. This means that there is an improvement in the performance of the experimental group due to the implementation of the IMP and its activities.

- **Hypothesis No.3:**

There is an effect of the IMP educational model on developing the students ' writing skill and their attitudes towards writing. Black's equation was used to verify the effect of the program. The following table (7) shows the compared mean scores of the pre and post applications of the experimental group and the ratio of the Black's equation as well as the level of confidence of the difference between the two scores of the pre and post applications of the attitudinal questionnaire.

Table 7. ***Results of Black's Equation Comparing the Pre and Post Applications of the Experimental Group in the Attitudinal Questionnaire***

The group	Compared mean	Df	T	99% Confidence Interval of the Difference		Black's value	Effectiveness
				Lower	Upper		
The Experimental group (pre application)	77.17	34	18.93	88.28	66.05	1.2	effective
The Experimental group (post application)							

As indicated in the previous table, it is obvious that the value of Black's equation to the experimental group comparing their pre and post applications in the Attitudinal Questionnaire ranges from 1.2 to above. Based on that, it has been concluded that the effect of the IMP on writing has been determined.

The Black's equation values are significant at 99% confidence interval of the difference between the pre and post applications of the experimental group in the attitudinal questionnaire.

The following table (8) shows the value of Black's equation to prove the effect of the IMP on developing the students' writing skill by comparing the mean scores of the pre and post applications of the experimental group in the Writing Test.

Table 8. ***Results of Black's Equation Comparing the Pre and Post Applications of the Experimental Group in the Writing Test***

The group	Compared mean	df	T	99% confidence interval of the difference		Black's equation value	Effectiveness
				Lower	Upper		
The Experimental group (pre application) The Experimental group (post application)	54.82	34	27.85	58.83	50.83	1.20	effective

From the previous table, it can be inferred that the value of black's equation is 1.2 or above which is the best value to prove the effect of the IMP on developing the student's writing skill. The value of Black's equation in the previous table is significant at 95% confidence interval of the difference between the pre and posttest of writing.

Hence, the results of the two tables comparing the pre and post applications of the experimental group in the attitudinal questionnaire, as well as those comparing the pre and post administrations of the Writing Test and clarifying the value of the black's equation show that there is a great effect of the IMP on developing the students' writing skill as well as their attitudes towards writing.

Discussion:

The results of the study showed that the mean scores of the experimental group and the control group on the writing post-test differed statistically significantly, with the experimental group's mean scores being higher. The experimental group may have grown as writers as a result of using computerized

mind maps to read texts, evaluate them, and pinpoint important and supplementary ideas. Additionally, the important result of using abstract language in electronic mind maps created in a creative computerized environment is the successful blending of colors, forms, and images. The experimental group's substantial progress may also be explained by the fact that students often show positive attitudes toward innovative teaching techniques that prevent them from becoming bored in a typical classroom.

Remarkable attitudes toward studying English were established through the use of these maps. Further contributing to the development in students' understanding may be the use of electronic mind maps, which use colors and visuals to link the ideas in the texts and aid in concentration. The use of electronic mind maps by the students in the experimental group may be due to the fact that the computer has made it possible for them to work on them efficiently. This result is connected to the research findings from 2012 by Brett D., Chloe, Dee, Britta, and Chelsea, which demonstrated the potential benefits of mind mapping activities for enhancing motivation. Moreover, it is closely connected with the findings of (Beare,K.2009)

A well-conducted statistical analysis of the obtained results helped the researcher to better understand the obvious improvement in the experimental groups' performance. Comparing the performance of the experimental group to the performance of the control group in the post administration of both the writing test and the attitudinal questionnaire, it can be said that the practices done by the students of the experimental group have a notable effect on their desire to write essays narrating events or incidents happened in their real life. The graphic organizers of the narrative essay which the teacher explained on the board and had been written on worksheets to the students facilitated the form of the narrative essay. The students were notably excited when writing about topics which were not chosen by their teacher. They were so encouraged when brainstorming ideas, discussing details with their classmates and experiencing different situations.

Conclusion:

On discussing the obtained results, the researcher was quite aware that the improvement in the performance of a group of students involved in an experimental educational study could be related to the students' awareness as they are a part of a scientific experiment. Accordingly, the researcher would do everything he or she can to change these negative attitudes as might be expected to get better results for the study. A more realistic and even deeper thinking to deal with the results is to investigate the interrelationships underlying the variables and the practices carried out in the classroom while conducting the experiment and administering the research instruments. A well-conducted statistical analysis of the obtained results helped the researcher to better

understand and interpret the apparent improvement in the four experimental groups' performance.

The findings from this study indicate that IMP served as and symbolic transitional resources for freshmen learners entering a new educational sphere of experience. Furthermore, the IMP drew on their own lived experiences to offer students guidance on learning tools and strategies that could help them become more self-directed learners. Finally, students could compare IMP techniques to their own and conceivably helped them to orient themselves in the process of writing.

Limitations:

Freshmen students were the only participants in the study for the following reasons:

1. They are first taught to long composition writing.
2. The study was restricted to specific writing sub-skills that were appropriate for them at this specific age. These subskills were identified by creating a checklist of them, which the supervisors and EFL specialists then examined.

Recommendations:

In the light of the findings of the study, the following recommendations were presented:

1. Conducting workshops on how to apply the electronic mind mapping technique.
2. Conducting further studies that investigate the impact of electronic mind maps on other English language skills.

Suggestions for Further Research:

According to the findings of the present study, the following points would be suggested for further research:

1- The present study was confined to some sub skills of the writing skill which are suitable for the students' age and level of learning. However, other sub skills related to the levels of sophomores, juniors and seniors would be practically beneficial to be under the application of IMP.

2- It would also be effective to conduct a study determining the efficacy of a programme based on the IMP in developing English speaking skill of various levels of students.

3- It would also be valuable to examine the effect of IMP on developing students' English reading skill, as IMP enhances the brainstorming and critical thinking techniques involved in such an important skill.

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