Effectiveness of mind-mapping as a digital brainstorming technique in enhancing attitudes of Saudi EFL learners to writing skills

Fahd Hamad Alqasham [a 1] iD , Arif Ahmed Mohammed Hassan Al-Ahdal [b] iD

[a, b] Department of English Language, College of Arts and Sciences, Methnab, Qassim University, Saudi Arabia

Abstract

Writing is an essential means of contact between individuals and the community. This is an integral part of the connection. Developing a constructive outlook about writing by English as a Foreign Language (EFL) Saudi students would better train them to become internationally competitive. This research aims to enhance students' writing efficiency and mindset by utilizing mind mapping as an interactive brainstorming tool. The study employed a pre-test-post-test experimental research design. The respondents were 40 male English students at Qassim University, Saudi Arabia, with below-average writing performance. The intervention used a freely available digital mind mapping software over three weeks, focusing wholly on writing proficiency. Results revealed that the use of mind mapping improved the writing interest of the students. The remarkable benefits are accruing from mind mapping as a digital brainstorming technique in enhancing attitudes of Saudi EFL learners to writing skills. The study suggests recommendations on improving the writing proficiency of Saudi EFL learners.

Keywords: brain storming; digital mind mapping; learners' attitudes; Saudi EFL learners; skill enhancement; writing performance

1. Introduction

Writing is considered to be one of the essential skills students should have because, through this skill, they can express themselves i.e., who they are as an individual, and they may be able to preserve their ideas and memories. In society, the ability to write is vital because it is the primary basis upon which forms of communication, history, and art rest. In school settings, students learn different rules of grammar that they can use in a formal setting, thus preparing them to be professional for their future. It is also the basis to judge one's work, learning, and intellect, especially at the tertiary level of education. With the ability to write, an individual will be benefitted from the rest of his life. Writing is a kind of integrative skill, as well as a meaningful, constructive, and complex process (Maharani et al, 2018). Students consider it as a demanding job, and they show a pessimistic outlook towards it due to its increased efforts and it is considered as a frightening job, and do not have the vision that they are the authors of their own writing (Regehr, Glancy & Pitts, 2013). If students do not know how to write

---

[1] Corresponding author
 E-mail address: f.alqasham@qu.edu.sa

and gain from written language skills, they would most likely learn less and lose their appreciation toward it.

The Saudi Ministry of Education (MoE) has paid a primary focus on teaching and learning the English language, to aid the kingdom in foreign relations, economy, and to introduce the Saudi's cultural and heritage to the globe (Alqasham, 2018a; Alqasham, 2018b). Indeed, nowadays English is an international language is occupying a dominant role in the industry, commerce, education, human sciences, and almost all professions. The ability to use the English language in different situations is an essential learner's ability that needs to be achieved to reach global competence. English language proficiency allows an individual to have an understanding of people's diversity worldwide. The educational systems worldwide are intervening to prepare learners for global communicative competence (Al-Ahdal & Alqasham, 2020). Language education requires teachers to become conversant on using effective language teaching strategies to address the needs of the world's economy, emphasizing the English language as the language of the world, particularly with the advent of education 4.0.

In many educational contexts, problems arise with the use of teaching strategies producing deaf-and-dumb English learners (Chen et al., 2019; Hu, 2005; Wang et al., 2017; Doiz & Lasagabaster, 2021; Kaivanpanahet al, 2021; Vattøy, 2020; Waite, et al, 2020), and showing that the learners cannot use English language in a real-life situation. It was confirmed that Saudi EFL learners do not have the language capacity to speak and write English (Alqasham, 2018a; Koçak, 2020). To address such emerging concerns, the Saudi Ministry of Education initiated interventions to standardized English language instruction for all levels of schools. The emphasis was on English language writing, speaking, reading, and listening. The response hopes to increase the English language performance of Saudi EFL learners.

1.1. The relevance of the study

Writing is deemed one of the most valuable skills students can learn because it will convey who they are as individuals and retain their thoughts and memories. The capacity to write in culture is very significant as it is the primary pillar on which correspondence, literature, and art have started. Students study various grammar rules in school settings that they will follow systematically to train them for their future. It is also the framework for assessing one's job, learning, and intelligence, particularly in tertiary education. An individual would profit from the opportunity to write for the rest of his life. The outcome of the analysis would be as follows: Firstly, when its usefulness to the Saudi background is established, mind maps will be strongly recommended as a visual brainstorming tool in the teaching and learning process. Additionally, as part of the faculty learning plan, the University will offer seminars and instruction on using the writing technique and the different approaches, such as mind mapping. Thirdly, students may seek to recreate relational structures in class because it will encourage improved written performance. In the end, a pilot study will be conducted through the different topics by using large sample dimensions, as well as definitive empirical research to the extent of influence of mind mapping not only in writing but also in other skills. Mind mapping will draw students ' attention, so that they can use their creative side to think. Mind maps allow us to use words and use images, lists, graphs, etc. at the stage of learning. It's simple, enjoyable, and exciting to create and organize your ideas, to motivate students to compose and build up their skills in writing. As a result, the writing quality of students is optimally improved. The research explores how effective mind mapping is to encourage and empower teachers to consider alternative methods or techniques tailored to their teaching consciously. It also lets them grow their creativity to facilitate the experience of schooling and learning. This research will enable teachers to develop their ability to conduct the learning task

more effectively. The influence will also offer a clear explanation of how best to promote, control, and track students' writing habits.

2. Literature Review

Pieces of evidence show that one of the main issues influencing students' learning success is their approach to, and fear of, writing (Al-Ahdal, 2020a; Al-Ahdal & Alqasham, 2020; Abdel Latif, 2019; Limpo, 2018; Mahfoodh, 2017). Learners suffer from poor linguistic skills, anxiety about writing, lack of effort, first language dependency, and inadequate structures (Fareed et al., 2016). Students' training at university needs to be prepared in their future jobs for the different writing assignments that they might be expected to do. Teaching writing is one of the most challenging tasks for teachers in the 21st century. Moreover, the process of learning writing is crucial to express their feelings, knowledge, and emotions, especially for English learners as foreign language (ESL) speakers. Writing is critical to students because it is a skill that they must be equipped in order to communicate with the world. Aside from teaching the students the correct information and setting, a good example, writing is also their primary weapon in molding their character to be their best version of themselves. Without their skill in writing, they would not be valid and efficient educators to their students and the other people of the community. Therefore, the development of writing skills is an important consideration that the student, teachers, and scholars themselves need to tackle.

Lagarrigue et al. (2017) confirm that if teachers were aware of writing, this would help teach correct techniques and develop 'students' writing skills in the educational environment. Therefore, writing is a useful critical ability that can be used to learn other productive and responsive skills (Shao & Purpur, 2016). Teaching writing is a complicated process for most teachers and often a demanding and challenging job for students to undertake (Saddler et al., 2017). The writing ability of the students is still weak. The learners made some mistakes in grammar, spelling, and punctuation. They were having difficulty "seeking" their thoughts (Graham, et al., 2019). Teachers should innovate their teaching methods, approaches and events which are in line with the students ' interest. The use of a creative and interactive prewriting technique such as mind mapping was described as an approach to improving the students' writing attitude and performance. Brainstorming is a prewriting approach to writing that is based on a method. This helps the students to discuss and generate ideas before production is written. Mind mapping is defined as a teaching technique in which the student places superordinate concepts on paper and then links subordinate concepts as required. Mind mapping is a way of creating knowledge in a human mind and getting information out of it. This technique is an innovative and effective way of mapping your ideas (Fu et al., 2019; Karim et al., 2019; Panggabean et al., 2019; Strobl et al., 2019). The literature on the effectiveness of mind mapping found that this technique helps enhance the writing skills and raise the motivation of EFL students (Burner, 2014; Hager, et al., 2016; Lin, 2019; Wette, 2017; Ercan & Naciye, 2019). Mind mapping is considered useful for teachers, as it has been shown to boost the writing ability of students (Dorota, 2020; Guerrero, 2020; Lin et al, 2020; López-Bernabé et al, 2020; Polat & Aydın, 2020; Prat-Acín et al, 2021).

3. Theoretical Framework

3.1. Communicative Language Teaching (CLT)

Communicative Language Teaching is another significant variable of the study derived from the language theory of communication (Richards & Rodgers, 2001). The primary purpose of this language learning theory is to develop communicative competence (Hymes, 1972). CLT is a task-based language teaching of grammar where lessons are taught in a stimulating and meaningful way. The

learners can explore the correct use and usage of the language in an actual setting. Through CLT, the students are given a formal explanation of the rules and structures of grammar and the methods allowed for language interaction in meaningful situations. In CLT, integration among listening, speaking, reading, and writing skills can be taught as a communication process via grammar teaching. Two or three macro-skills can be integrated into grammar lessons (Candlin et al., 2016). The main attributes of CLT is form and process; form refers to a specific grammar point or structure of the target language like verbs, nouns, or adjectives, while process refers to language in different situations like narrating past events, inviting a friend to a party, apologizing for a mistake done, suggesting solutions to a particular problem, expressing likes and dislikes, and many others.

For language teachers, teaching students to learn the grammatical form to perform effectively and appropriately in various communication situations is necessary. CLT is described to have a learner-centred characteristic (AlHassan & Wood, 2015; Larsen-Freeman, 2015). CLT is a language teaching approach that aims to facilitate language learning through engagement and interaction with authentic performance (Fulcher, 2000; Rahimi & Zhang, 2015). The students perform tasks to provide them real language learning exposure. For the CLT classroom, student learning performance is both for the teacher and students. Instead of establishing a dominant personality in the learning process, teachers are the facilitators of the communicative process, creating an atmosphere of democratic, secured, and non-defensive climate.

Mind mapping can be used to generate, visualize, organize, note, resolve problems, determine, review and clarify your university subject to begin evaluation tasks. A mind map is used primarily for 'brainstorming' a subject and is a perfect learning technique. In the final decades of the last millennium, Tony Buzan, an educational consultant, popularised the idea of mind mapping though in other ways, the technique had been around in education for long. This was also an outcome of the creative techniques used by Leonardo Da Vinci and Einstein, who used images to form associations in mind. Buzan broadcasted a series on the BBC about using the faculties of the mind to learn and memorize information creatively. 'Buzan's scheme of mind mapping rejects linear note-making as being boring and difficult to use, adding to 'learners' stress around exam time when they most needed their notes. Messy, extensively doodled, and image-based notes, however, were the hallmark of high achievers. Useful mind maps use colors, associations, imagery, and keywords to create helpful notes. Today, with education becoming more and more technologically oriented, there are computer-based tools to help learners make mind maps. The most popular of these are iMind Map, Spider Scribe, XMind, Freeming, Coggle, Text2MindMap, and many more. Most of these tools are free, but XMind is the freely available tool that is popular in the student community over the world. At first glance, mind mapping looks quite like brainstorming, and they do share certain features, but there are some fundamental differences between them. To discuss the similarities, both techniques have to do with the generation of ideas, and actually, that is where their similarities end. While brainstorming takes organization and arranging of ideas as a next step, and is a short-term exercise, mind mapping begins and ends with direct visualization of concepts and mapping of the relationship of parts to the whole. Mind mapping, thus, helps form next images in mind and does not defer the process of arrangement and the sorting of ideas to a later time.

3.2. *Process Approach to Writing Theory*

There are several cognitive processes and strategies in writing (Kellogg, 2008). It is a complex undertaking. Therefore, written thinking abilities can be divided into three components: planning, textualization, and interpretation (Flower & Hayes, 2008). The writers recognize them as methods; however, we label them to compose work. The strategy process involves setting and implementing goals (top-level ideas). Therefore, thoughts and principles at the lower stage must be clustered together

such that the authors can organize the document. Furthermore, inexistent or early planning is due to improperly arranged documents. The activity of textualization consists of creating language sequences arranged in the following phrases and paragraphs to achieve the desired objectives. The difficulties are apparent in classrooms as students can not follow the principles of growth and coherence, avoid duplication, or preserve logical consistency. The analysis cycle includes a text analysis and a systematic micro- and macro-modification step. Typically, students only take account of mistakes in spelling and punctuation, not to mention the following. While the cycle eventually starts, both processes are cyclical and overlap. When a writer stops, reviews, and then writes back, the schedule and plans are adjusted.

4. Statement of the problem

Based on the literature review discussed above, studies relating to the effectiveness of the digital mind mapping technique in the writing performance of Saudi EFL students have not yet been further explored. There is some local research literature about using different writing strategies, but most of such investigations are limited to the basic education level. There is a shortage of research relating to the effectiveness of mind mapping as a writing strategy. Having identified this research gap, this study tested the effectiveness of mind mapping as one of the strategies in teaching writing among Saudi students. The study's findings will be very helpful to the teachers and the students, particularly in terms of assessing their writing skills and, therefore, improving their strategies and techniques. In this study, the Kingdom of Saudi Arabia constitutes the context of the investigation. The Kingdom recognized the significant role of the English language in the contemporary world of unprecedented change and global competition. The Kingdom had already initiated reforms in English language education programs to address the language learning needs of learners. They were positioning English language competence among learners in the Kingdom requires teachers to have a practical sense of sociocultural-sensitive pedagogy using effective language teaching methods considering that the Kingdom already implemented a policy articulating English as a medium of instruction, particularly in EFL writing. As to the research gap, there are no open studies explaining the use of mind maps to teach Saudi EFL students English. Mind mapping methods were developed in the late 1970s, but only now are mental maps used widely for teaching and learning applied as information and connectivity technology are adopted.

5. Research Questions

This study will examine the effectiveness of mind mapping as a digital brainstorming tool in improving students ' writing attitudes and performance. More importantly, it aimed to: (1) identify the pre-attitude and pre-test scores of the students in writing; (2) identify the post-attitude and post-test score in writing by using mind mapping as a digital brainstorming technique; (3) ascertain the attitudinal and linguistic effects of the mind mapping before and after the intervention.

6. Methodology

6.1. Research Design

The research employed an experimental design including a pre- and post-tests groups in order to evaluate the effectiveness of the automated brainstorming process to improve students' writing performance and behavior. The sample received a pre-test prior to the experiment through a 5-point Likert scale questionnaire. Post-testing was also performed by the end of the treatment to measure the outcome of the study using the same questionnaire. In addition, the current study utilized XMind tool

throughout the experiment, which is an easy to use tool for the students to help them in creating mind maps. The first week was devoted to training the participants in its use and the following two weeks for three digital mind mapping activities and obtaining of 'participants' feedback on attitudes to using mind mapping in improving their writing. Later, these feedbacks were compared with those obtained before the intervention to assess both the degree and direction of change in attitudes of the participants to the use of digital mind mapping and writing.

6.2.   Participants

There were 40 participants that participated in the current experiment. The participants were first-year male EFL undergraduate students at Qassim University in Saudi Arabia, with an average age of 19 years. All participants had a lower intermediate level of general English proficiency and a mean writing score of band four on the standardized IELTS writing Task 1as rated by the entry-level university exam of English. This translates to the following: i. Minimal response to the task; ii. Poor formatting; iii. Not able to take a clear position; iv. Ideas presented are difficult to identify; v. ideas are not well presented as they tend to be repetitive; vi. Pictures are not well supported with details or additional information. The participants came from two streams of learning but shared the researcher as their EFL teacher. The sample was chosen purposefully because the researcher took into consideration the value of good results and written actions that lead to their potential success. As already stated, the study used empirical methods, including tracking behaviors and student writing. The attitude assessment comprised 12 items with a 5-point Likert scale used for response to the instrument, with one end of the spectrum being disagreed, and the other agreeing. Three mind mapping tasks were allotted to the group over three weeks.

7. Data Gathering Procedure

The experimental procedures lasted three weeks on a two-hourly basis every Monday and Wednesday. The researcher felt that mind mapping needed a longer duration of time and consistent learner involvement. Three writing topics were chosen for the three mind mapping sessions. All the topics were interconnected to test the digital tool's efficacy in enabling learners to connect current and previous forms of knowledge. The items chosen were: (1) The EFL scenario in Saudi Arabia, (2) Ideas on the social benefits of learning English, and (3) Discussion on the economic activities one is free to undertake if proficient in English. Figure 1 below presents the initial screenshot of the XMind activity page:
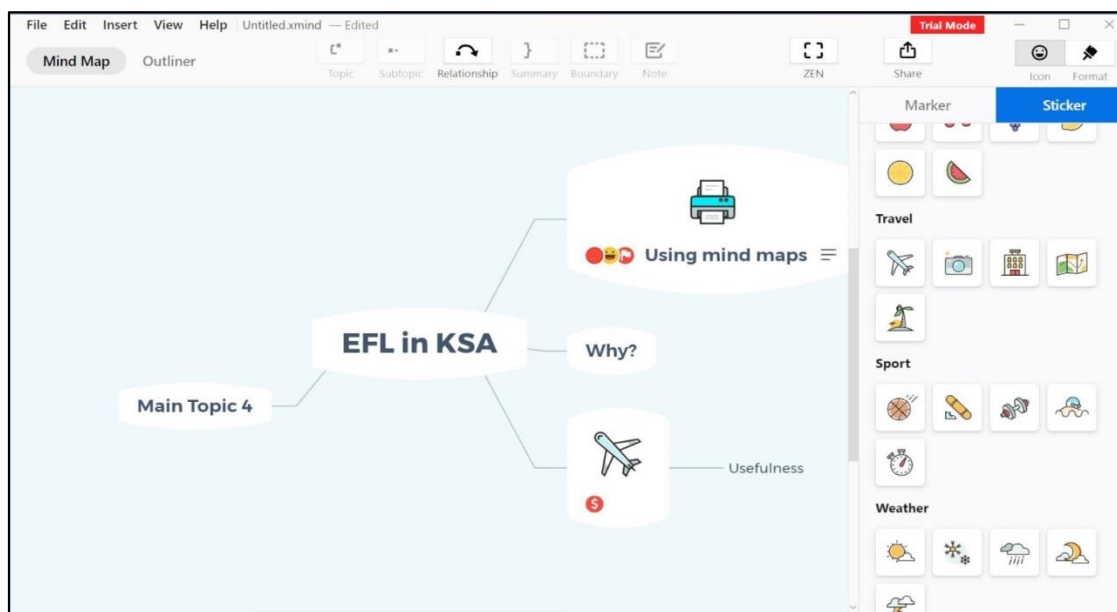
Figure 1. The initial screenshot of the XMind activity page

The participants were encouraged to use as many visual tools as possible and introduce new words related to the topics. They were also encouraged to use relevant native language words to which they could not find English substitutes. These 'other 'language' words were to be highlighted with the visual tools. It may be mentioned here that the activities were carried out on the classroom whiteboard, which also has network connectivity. In any case, the free software was downloaded onto the system, and any participant had the liberty to come up to the podium and add his idea using the console. This was highly appreciated by the participants (as revealed in the questionnaire feedback) as it ensured mobility for the kinesic learner and cut out the monotony of the lecture method, while also giving the participants a sense of contribution to the lesson. After the initial week, in the subsequent weeks, the participants were encouraged to refer to the previous mind map and connect to prior knowledge. In this step, the XMind was very useful as learners find it both cumbersome and annoying to allude to the previously handwritten notes. Still, with the graphic mind map, they were excited to go back to the earlier lessons and extract valuable ideas.

8. Findings and Results

8.1. Pre-attitude and pre-test scores of the students in writing

The following Table 1 illustrates the results of the pre-and post-test questionnaires. It may be noted that the same questionnaire was used in both the surveys and the comparative outcomes are presented side by side in the table. The pre-test survey revealed that writing was perceived as a difficult task by the participants who certainly did not look forward to it. We understand that writing is a complex skill, and it becomes even more challenging for the foreign language learner if he/ she is required to undertake it at an individual level minus the peer support and collaboration. Numerous studies have anyhow, discussed the efficacy of collaboration in (Al-Ahdal, 2020b; Al-Ahdal & Al-Awaid, 2018; Alqasham, 2018; Magulod Jr, 2019) the EFL environment. In the traditional Saudi EFL class, collaboration or learner participation is not solicited though the reasons for these are sometimes beyond the control or capacity of the teachers. However, the researcher would like to make here that digital mind mapping comes with an entire basket of goodies for the foreign language learner. One, it ensures greater participation not just because fear and shame are ruled out, but also because even the

poor learner can do with contributing only a few words (which does not need a show of fluency). Learner participation is greater, or rather, such a class is totally learner run as learners are free to add to the mind map on the whiteboard, which also gives them a sense of involvement and control. In addition to this, mind mapping adds a specific energy to the class making it more lively and naturally participative as learners vie with one another for an opportunity to contribute. During the experiment, the researcher also noted that some learners frequently referred to previous knowledge to add to the digital map. In short, all that we, as teachers, dream of accomplishing in a foreign language class, freely flows in a digital mind mapping writing class.

Table 1. Participants' perceptions in the pre and post tests on writing class

No	Statement	Strongly disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree	
		Pre test	Post test	Pre test	Post test	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	The writing class is one that I really look forward to.	33	0	2	0	3	1	1	10	1	29
2	I prefer to do my writing assignments alone.	37	39	3	1	0	0	0	0	0	0
3	I am good at gathering ideas on a topic.	36	0	2	0	2	4	0	17	0	19
4	I enjoy preparing pen-paper notes for a writing task.	31	37	4	3	3	0	2	0	0	0
5	I can organize and arrange ideas under topical headings.	32	0	5	1	2	1	0	4	1	34
6	I think I can write better if I used a digital platform.	2	0	2	0	5	0	3	0	28	40
7	It is fun when I can participate in writing with my peers.	0	0	0	0	1	0	4	0	35	40
8	I understand what is mind mapping.	5	0	6	0	7	0	9	2	13	38
9	Undertaking technology connected writing can be fun.	1	0	0	0	3	1	24	0	12	39
10	I am allowed to contribute my ideas on the class board which makes me part of the class.	40	0	0	0	0	0	0	0	0	40
11	I know about the XMindtool.	37	0	0	0	1	0	1	0	1	40
12	I am confident about improving my writing skills.	37	0	2	0	0	1	1	3	0	36

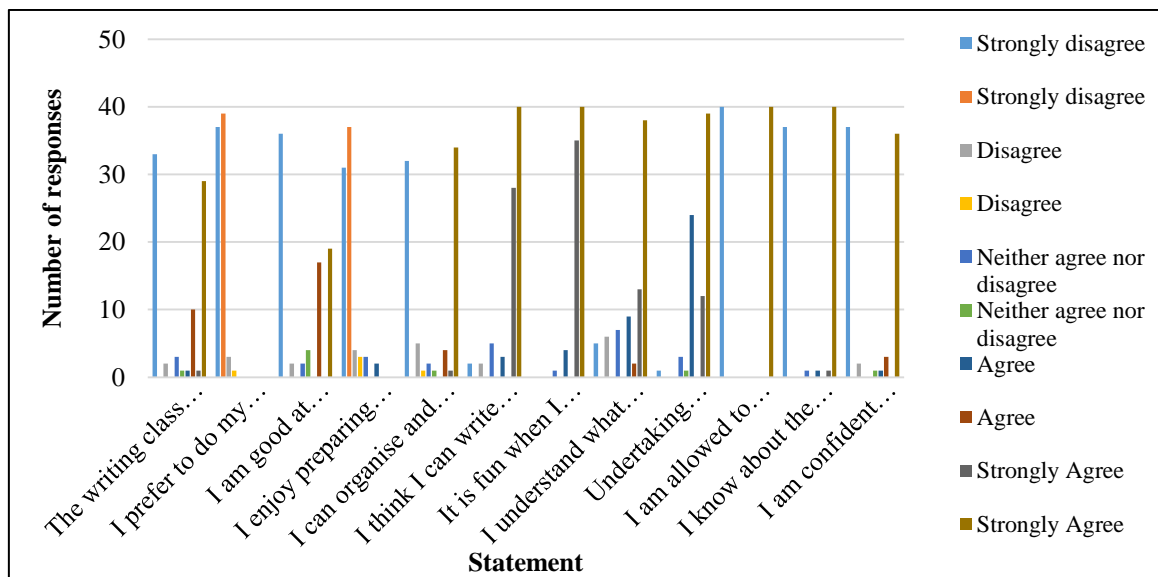The following figure 2 represents the responses to the two surveys.

Figure 2. Comparative responses of the pre and post test survey

The entry-level pre-test had concluded that the learners, in general, were terrible with keeping the writing relevant as they sometimes went on a tangent, totally missing out on the central theme of the essay, putting in incoherent and irrelevant information instead. It may be noted that during the pre-test, as shown in Table 1 & Figure 2, the learners were at liberty to jot down notes before undertaking the real task. The researcher also being a certified IELTS trainer has seen that test aspirant while away the few minutes they get for this exercise as they are so nervous about taking the exam that they overlook the importance of making notes and straightaway dive into the actual writing task. Informal inquiries often revealed that most of the learners are not trained in the mission of note-making as a prewriting exercise, and if insisted upon, they end up writing whole sentences with irrelevant information instead of bullet or other point form notes. This causes them to lose the precious opportunity to think organize and arrange their ideas for the writing task. Many of these stumbling blocks are easily tided over when learners are trained with digital mind maps as they get to use a variety of tools, such as notes, travel, sports, weather, and an entire gamut of pictures to capture an idea succinctly. As a post-test assessment of improvement in writing skills, if any, an IELTS Task 1 writing test was administered to the participants on the last day of the experiment. It may be pointed out here that at the time of entry to the university system, the group's mean score placed them in band seven, which translates to the following: i. understanding of the task; ii. Clear overview of the main trends; iii. The tone of the essay consistent and suitable to the purpose of the job; iv. Ability to present the key points; v. clarity of presentation. In short, the intervention and training with digital mind mapping greatly benefitted the 'participants' writing skills.

8.2. Post-attitude and post-test score in writing by using mind mapping as a digital brainstorming technique

Table 2. Test of Difference Before and After the Intervention

	Mean Score	SD	t-value	df	p-value
Pre-test	11.63	1.93	-2.16	29	0.039*
Post-test	13.456	1.96			

*= Significant at 0.01 level　　　**=Significant at 0.05 level　　　ns= not significant

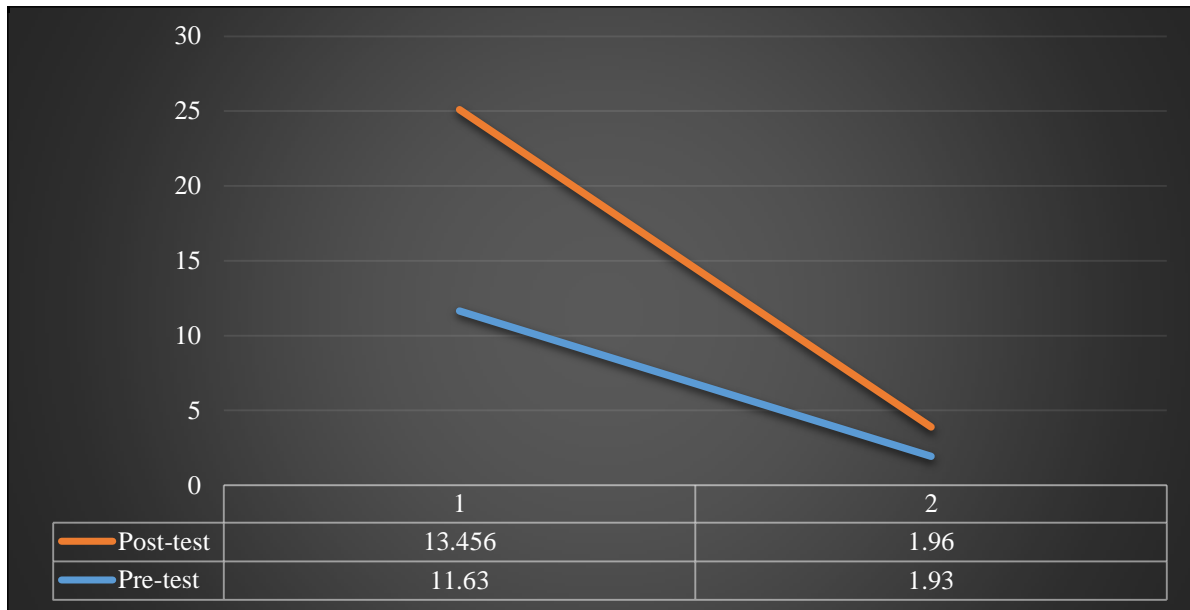|	1	2
Post-test	13.456	1.96
Pre-test	11.63	1.93

Figure 3. Test of Difference Before and After the Intervention

The study reveals that the use of concept mapping as interactive brainstorming significantly improved respondents' writes results as shown with the t-test results. Table 2 and Figure 3 present that the pre-test score of the students is 11.63 while their post-test score is 13.45. The computed p value of 0.039, presented in Table 2, which is lower than the alpha level of 0.05 revealed that there is a significant difference on the performance of the students before and after the intervention. This shows that mind mapping is effective. Mind mapping allows students the chance to reinforce their concepts before studying, so they can transfer meaning or write summaries efficiently. This enabled the students to write more detailed and well-organized essays. An additional plausible explanation of the output of the mind mapping is essential in the training process itself. The outcome of this research collaborates with the effects of mind mapping on the writing of short story-learning skills stated that mind mapping technique is successful in improving students' writing short stories. Similarly, previous studies emphasized the benefits of mind mapping in students' writing skills and made them more reliable in writing and expressing their ideas. Their fear was also reduced by a favourable and favourable writing learning environment (Abd Karim et al., 2020; Hussain, 2017; Maaravi et al., 2020; Bratitsis & Prappas, 2018).

8.3. Attitudinal and linguistic effects of the mind mapping before and after the intervention

To identify common movements and patterns, the narratives and thoughts were coded and synthesized. As part of the mind mapping approach, three clustered themes were identified: coordination and cooperation, student interest in a partnership, and creativity and critical thought. *Collaboration* emerged as a driving factor in students' engagement and participation in the process of making movie posters. According to one student, "during the planning process of the elements to be mixed, we met as a group and discussed the topics that will be presented in the movie poster." We were forced to cooperate as a result." Additionally, as a group member, one student said, "we collaborated on how to package the poster." The methodology of instruction included practices that encouraged our society to participate in positive social interaction. This enabled us to pool our ideas and suggestions and create a high-quality product. Since mind mapping is a constructivist method of study, it therefore follows the concept of social constructivism. Students' relationships with their

communities culminated in a variety of meanings that were resolved by relational mediation, resulting in group harmony and shared understanding. '*Larners' Interests*' Another construct defined as motivational in the study is students' curiosity. "Yes, participating in the challenge was very interesting and inspiring," a student said. We were invited to design our own movie posters, and it was as if we were already film stars and actresses." Additionally, one student confirmed, "It's interesting because we were genuinely dedicated to hands-on activities and our determination to achieve the task remained high because we were all so eager to see our output."

9. Conclusions

The pre-test survey revealed that EFL students find it challenging to generate ideas related to topical sentences, which are the basis of paragraph design in a writing sample. Further, they could not arrange ideas under each sub-topic, as the details were usually challenging to remember and classify. However, when the XMind software was used, learners reported the efficacy of the branches, note-taking, graphics, and coloring options as quite useful in making connections between ideas generated during the exercise and the previous knowledge. The writing score of the group showed a remarkable rise from band four on the standardized IELTS writing task 1 to band six and learner feedback confirmed greater engagement and motivation in the writing class, which was significantly deficient in the pre-experiment phase. They also reported improved confidence in generating, organizing, and utilizing ideas with digital mind mapping. In other words, 'learners' attitudes improved significantly to writing with the use of a digital tool.

10. Recommendations

Writing is considered one of the most challenging tasks by the learners of EFL and the teachers because it involves several processes, one of which is thinking in the language. Digital mind mapping enables the learners to remember aloud, helping them visualize information, storing it in their mind for recall later. It is a successful note-taking method, which may very well be used for subjects other than languages. Though the scope and length of this study were limited in terms of the number of participants and duration of the intervention, benefits accrued from that place are many. Therefore, digital mind mapping may be more actively integrated into the EFL curriculum precisely because it is a tool meant to introduce new knowledge, which is also the central point of learning a foreign language. Devices other than XMind may also be tried out to zero in on one that worked the best for the Saudi learner base. Finally, learners may be encouraged to undertake digital mind mapping as an individual exercise to reap the full benefits in self or home learning, such as in the present times when education has wholly shifted to 'learners' homes with the outbreak of the COVID 19 pandemic.

11. Implications

This study will have the following benefits. The mind mapping will be commonly promoted for its usefulness in the Saudi context. The University will provide seminars and instruction on how to use the writing technique in the instructor training curriculum with various methods, including mind mapping. The students will seek to build relationship frameworks to write so that they can produce improved results in studying. Finally, studies with other subjects will be performed using broader sample ranges and a comprehensive quantitative survey to assess the impact of visual, not just in literature but also in different fields of expertise. First, because the significance of pre-test and post-test success results has been determined, mind mapping is highly recommended as a teaching and learning method for digital brainstorming. Secondly, as part of the academic learning plan, the University will undertake seminars and research on the usage of the written approach as well as on

different methods like mind mapping. Thirdly, students will try to rethink relational frameworks for learning, because that will facilitate improved written outcomes. Finally, a pilot test of all the relevant topics will be carried out utilizing broader surveys and real observational analysis to determine in any form, not just in writing but also in other abilities, the impact of mental mapping. Despite efforts to successfully implement a variety of second-language teaching techniques, teachers and students still face many problems in their language classrooms. In the area of education, we must allow changes. Otherwise, students and teachers may not be able to overcome more challenges in the future. Strong, innovative and adaptable learning techniques are needed. Mind mapping can be used to solve the problems described above. They recommend that teachers and students can use visual maps in the instruction and instruction of English as the amount of knowledge is that every second and our brain can not only interpret a small part of it linearly. The research shows that language mapping technology plays a vital role for students, while an instructor is a facilitator and leader who helps students. Digital Mind maps were helpful in writing and problem solving, brainstorming concepts, new language learning, observations, reading skills development and presentation planning. Taking into account the results of personal teaching experiences and the results of the survey, it can be concluded that mind mapping techniques can be implemented successfully in a language classroom to develop and provide the available tools for students, educators and researchers. Mind mapping helps students to plan and organize their ideas for writing tasks in writing conditions". It also described monitoring of the concept of e-learning in the mind maps of students at universities. Educators are focused on using concept generation techniques in various cultural environments; the use of e-learning technologies in school studies, and the evaluation of scientific understanding through concept maps.

12. Limitations of the Study

This study restricts its attention to the written results and attitude of the participants through a single post-test method that is the least intrusive methodology, suggesting that a query be raised whether the written views of the participants are correlated with the specific profile of potential research. However, it also focuses on the efficacy of the prewriting cycle, which is just one of the stages in the writing phase, and on the utility of specific writing strategies relating to composition, editing, reading, interpretation, and presentation systematic approach to writing.

References

Al-Ahdal, A. A. M. H., & Al-Awaid, S. A. A. (2018). English as the lingua franca of development: finding common correlates in Saudi Arabia. *Malaysian Journal of Languages and Linguistics (MJLL), 7*(1), 1-7. https://doi.org/10.24200/mjll.vol7iss1pp1-7

Al-Ahdal, A. A. M. H. (2020a). Overcoming pronunciation hurdles in EFL settings: An evaluation of podcasts as a learning tool at Qassim University Saudi Arabia. *Asian EFL Journal Research Articles, 27*.

Al-Ahdal, A. A. M. H., (2020b). Using computer software as a tool of error analysis: Giving EFL teachers and learners a much-needed impetus. *International Journal of Innovation, Creativity and Change, 12*(2), 418-437

Al-Ahdal, A. A. M. H., & Alqasham, F. H. (2020). EFL writing tasks and the application of the concept of situatedness: Evaluating the theoretical and practical aspects of the Saudi EFL context. *TESOL International Journal, 15*(4), 167-190.

Abd Karim, R., Tahir, M. H. M., Adnan, A. H. M., Idris, N., Ismail, I., & Abu, A. G. (2020, May). Bubbl. us: A digital mind-mapping tool to promote a mobile-based technology approach in writing courses. In *Emerging Perspectives and Trends in Innovative Technology for Quality Education 4.0: Proceedings of the 1st International Conference on Innovation in Education and Pedagogy (ICIEP 2019), October 5, 2019, Jakarta, Indonesia* (p. 231). Routledge.

Abdel Latif, M. M. (2019). Helping L2 students overcome negative writing affect. *Writing & Pedagogy*, *11*(1), 151-163. https://dx.doi.org/10.1558/wap.38569

AlHassan, L., & Wood, D. (2015). The effectiveness of focused instruction of formulaic sequences in augmenting L2 learners' academic writing skills: A quantitative research study. *Journal of English for Academic Purposes*, *17*, 51-62. https://doi.org/10.1016/j.jeap.2015.02.001

Al-Jarf, R. (2011). Teaching spelling skills with a mind-mapping software. *Asian EFL Journal, 53,* 4-16.

Alqasham, F. H. A. (2018a). *Virtual social network-mediated English language learning in a Saudi tertiary EFL context: innovation and agency.* (Doctoral thesis, Massey University, Palmerston North, New Zealand) Retrieved from https://mro.massey.ac.nz/handle/10179/13406

Alqasham, F. (2018b). Exploring Saudi EFL learners' agency toward the use of WhatsApp for English learning at Qassim University. *International Journal of Linguistics, 10*(6), 10-43. https://doi.org/10.5296/ijl.v10i6.13857

Bratitsis, T., & Prappas, I. (2018). Creative writing enhancement through digital storytelling tools in primary education. *Andreas Moutsios-Rentzos*, *21*(23/09), 252-263.

Burner, T. (2014). The potential formative benefits of portfolio assessment in second and foreign language writing contexts: A review of the literature. *Studies in Educational Evaluation*, *43*, 139-149. https://doi.org/10.1016/j.stueduc.2014.03.002

Candlin, C. N., Crichton, J., & Firkins, A. S. (2016). Crucial sites and research orientations: Exploring the communication of risk. In *Communicating Risk* (pp. 1-14). Palgrave Macmillan, London. https://doi.org/10.1057/9781137478788_1

Chen, F., Tsai, S. C., & Tsou, W. (2019). The application of translanguaging in an English for specific purposes writing course. *English Teaching & Learning*, *43*(1), 65-83. https://doi.org/10.1007/s42321-018-0018-0

Doiz, A., & Lasagabaster, D. (2021). An analysis of the use of cognitive discourse functions in English-medium history teaching at university. *English for Specific Purposes*, *62*, 58-69.

Dorota, Z. (2020). Mapping teachers' personal epistemologies–Phenomenographical approach. *Thinking Skills and Creativity*, *38*. https://doi.org/10.1016/j.tsc.2020.100722.

Ercan, H., & Naciye, K. U. N. T. (2019). Is it really difficult to produce correct th (/ð/and/θ/) sounds in English for EFL Learners? A case study in Northern Cyprus. *Journal of Language and Linguistic Studies, 15*(3), 926-936.

Fareed, M., Ashraf, A., & Bilal, M. (2016). ESL learners' writing skills: Problems, factors and suggestions. *Journal of Education and Social Sciences*, *4*(2), 81-92.

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. *College composition and communication*, *32*(4), 365-387. https://doi.org/10.2307/356600

Fu, Q. K., Lin, C. J., Hwang, G. J., & Zhang, L. (2019). Impacts of a mind mapping-based contextual gaming approach on EFL students' writing performance, learning perceptions and generative uses

in an English course. *Computers & Education*, *137*, 59-77. https://doi.org/10.1016/j.compedu.2019.04.005

Fulcher, G. (2000). The 'communicative' legacy in language testing. *System*, *28*(4), 483-497. https://doi.org/10.1016/S0346-251X(00)00033-6

Graham, S., Harris, K. R., & Beard, K. (2019). Teaching writing to young African American male students using evidence-based practices. *Reading & Writing Quarterly*, *35*(1), 19-29. https://doi.org/10.1080/10573569.2018.1535775

Guerrero, J. M. (2020). Mind mapping in artificial intelligence for data democracy. In *Data Democracy* (pp. 45-82). Academic Press. https://doi.org/10.1016/B978-0-12-818366-3.00004-6

Hager, K. D., Kolar, C., & Janke, K. K. (2016). Concept mapping, reflective writing, and patchwork text assessment in a first-year pharmaceutical care course. *Currents in Pharmacy Teaching and Learning*, *8*(4), 492-500. https://doi.org/10.1016/j.cptl.2016.03.006

Hu, G. (2005). Using peer review with Chinese ESL student writers. *Language teaching research*, *9*(3), 321-342. https://doi.org/10.1191%2F1362168805lr169oa

Hussain, S. S. (2017). Teaching writing to second language learners: Bench-marking strategies for classroom. *Arab World English Journal (AWEJ), 8,* 208-227. https://dx.doi.org/10.2139/ssrn.3005597

Hymes, D. (1972). On communicative competence. *sociolinguistics*, *269293*, 269-293

Kaivanpanah, S., Alavi, S. M., Bruce, I., & Hejazi, S. Y. (2021). EAP in the expanding circle: Exploring the knowledge base, practices, and challenges of Iranian EAP practitioners. *Journal of English for Academic Purposes*, *50*. https://doi.org/10.1016/j.jeap.2021.100971.

Karim, R. A., Abu, A. G., & Khaja, F. N. M. (2016, November). Brainstorming approach and mind mapping in writing activity. In *Proceedings of English Education International Conference, I*(2), 423-429. http://www.eeic.unsyiah.ac.id/proceedings/index.php/eeic/article/view/83

Kellogg, R. T. (2008). Training writing skills: A cognitive developmental perspective. *Journal of writing research*, *1*(1), 1-26.

Koçak, A. (2020). Turkish tertiary level EFL learners' recognition of relative clauses. *Journal of Language and Linguistic Studies, 16*(4), 1637-1655.

Lagarrigue, A., Longcamp, M., Anton, J. L., Nazarian, B., Prévot, L., Velay, J. L., & Frenck-Mestre, C. (2017). Activation of writing-specific brain regions when reading Chinese as a second language. Effects of training modality and transfer to new characters. *Neuropsychologia*, *97*, 83-97. https://doi.org/10.1016/j.neuropsychologia.2017.01.026

Larsen-Freeman, D. (2015). Saying what we mean: Making a case for' language acquisition' to become' language development'. *Language Teaching*, *48*(4), 491. DOI:10.1017/S0261444814000019

Limpo, T. (2018). Development of a short measure of writing apprehension: validity evidence and association with writing frequency, process, and performance. *Learning and Instruction*, *58*, 115-125. https://doi.org/10.1016/j.learninstruc.2018.06.001

Lin, C. J. (2019). An online peer assessment approach to supporting mind-mapping flipped learning activities for college English writing courses. *Journal of Computers in Education*, *6*(3), 385-415. https://doi.org/10.1007/s40692-019-00144-6

Lin, L., Shadiev, R., Hwang, W. Y., & Shen, S. (2020). From knowledge and skills to digital works: An application of design thinking in the information technology course. *Thinking Skills and Creativity*, *36.* https://doi.org/10.1016/j.tsc.2020.100646 .

López-Bernabé, E., Foudi, S., & Galarraga, I. (2020). Mind the map? Mapping the academic, citizen and professional stakeholder views on buildings and heating behaviour in Spain. *Energy Research & Social Science*, *69*, https://doi.org/10.1016/j.erss.2020.101587.

Maaravi, Y., Heller, B., Shoham, Y., Mohar, S., & Deutsch, B. (2020). Ideation in the digital age: literature review and integrative model for electronic brainstorming. *Review of Managerial Science*, 1-34. https://doi.org/10.1007/s11846-020-00400-5

Magulod Jr, G. C. (2019). Learning Styles, Study Habits and Academic Performance of Filipino University Students in Applied Science Courses: Implications for Instruction. *Journal of technology and science education*, *9*(2), 184-198. https://doi.org/10.3926/jotse.504

Maharani, S., Fauziati, E., & Supriyadi, S. (2018). An investigation of writing strategies used by the students on the perspective of language proficiency and gender. *International Journal of Multicultural and Multireligious Understanding*, *5*(5), 185-190. http://dx.doi.org/10.18415/ijmmu.v5i5.364

Mahfoodh, O. H. A. (2017). "I feel disappointed": EFL university students' emotional responses towards teacher written feedback. *Assessing Writing*, *31*, 53-72. https://doi.org/10.1016/j.asw.2016.07.001

Panggabean, W., Lubis, F., & Lubis, R. F. (2019). Mind mapping on students' writing descriptive text. *English Education: English Journal for Teaching and Learning*, *7*(02), 164-174. https://doi.org/10.24952/ee.v7i02.2233

Polat, Ö., & Aydın, E. (2020). The effect of mind mapping on young children's critical thinking skills. *Thinking Skills and Creativity*, *38*. https://doi.org/10.1016/j.tsc.2020.100743.

Prat-Acín, R., Galeano-Senabre, I., López-Ruiz, P., Ayuso-Sacido, A., & Espert-Tortajada, R. (2021). Intraoperative brain mapping of language, cognitive functions, and social cognition in awake surgery of low-grade gliomas located in the right non-dominant hemisphere. *Clinical Neurology and Neurosurgery*, *200*. https://doi.org/10.1016/j.clineuro.2020.106363 .

Rahimi, M., & Zhang, L. J. (2015). Exploring non-native English-speaking teachers' cognitions about corrective feedback in teaching English oral communication. *System, 55,* 111-122. https://doi.org/10.1016/j.system.2015.09.006

Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal of affective disorders*, *148*(1), 1-11. https://doi.org/10.1016/j.jad.2012.11.026

Saddler, B., Moran, S., Graham, S., & Harris, K. R. (2017). Preventing writing difficulties: The effects of planning strategy instruction on the writing performance of struggling writers. In *Students Who Are Exceptional and Writing Disabilities* (pp. 3-17). Routledge. https://doi.org/10.1207/s15327035ex1201_2

Shao, X., & Purpur, G. (2016). Effects of information literacy skills on student writing and course performance. *The Journal of Academic Librarianship*, *42*(6), 670-678. https://doi.org/10.1016/j.acalib.2016.08.006

Strobl, C., Ailhaud, E., Benetos, K., Devitt, A., Kruse, O., Proske, A., & Rapp, C. (2019). Digital support for academic writing: A review of technologies and pedagogies. *Computers & Education*, *131*, 33-48. https://doi.org/10.1016/j.compedu.2018.12.005

Vattøy, K. D. (2020). Teachers' beliefs about feedback practice as related to student self-regulation, self-efficacy, and language skills in teaching English as a foreign language. *Studies in Educational Evaluation*, *64*. https://doi.org/10.1016/j.stueduc.2019.100828

Waite, J., Curzon, P., Marsh, W., & Sentance, S. (2020). Difficulties with design: The challenges of teaching design in K-5 programming. *Computers & Education*, *150*, https://doi.org/10.1016/j.compedu.2020.103838 .

Wang, H., Smyth, R., & Cheng, Z. (2017). The economic returns to proficiency in English in Saudi Arabia. *Saudi Arabia Economic Review*, *43*, 91-104.

Wette, R. (2017). Using mind maps to reveal and develop genre knowledge in a graduate writing course. *Journal of second language writing*, *38*, 58-71. https://doi.org/10.1016/j.jslw.2017.09.005.

AUTHOR BIODATA

Fahd Alqasham is an Assistant Professor of Applied Linguistics and Head, Department of English Language, College of Arts and Sciences, Methnab, Qassim University, Saudi Arabia. Dr. Fahd's PhD Thesis, earned from Massey University, has been awarded the prize of best Ph.D. in Applied Linguistics in New Zealand for the year of 2018. His research has been extensively on language learner agency and innovation. He is an active writer, with a very handsome record of publications in Scopus and ISI indexed journals.

Arif Ahmed Al-Ahdal is a Full Professor of Applied Linguistics in the Department of English Language, College of Arts and Sciences, Methnab, Qassim University, Saudi Arabia. Though his vocation is teaching, Dr. Al-Ahdal is an established poet and writer. He has to his credit two bi-lingual poetry collections, To Yemen with Love and Joys and Sorrows, published in Yemen in 2010 and a reference book, Preparing EFL Teachers for Tomorrow: Opening New Vistas in Teacher Development with INSET, published in Germany in 2015. He is also credited with nearly 50 research papers published in internationally indexed journals. Apart from this contribution to research, he has examined many PhD theses and is presently writing two books on Literary Translation and Applied Linguistics. With a vast cross-cultural teaching experience and diverse exposure gained across three countries: Yemen, India and Saudi Arabia, he is now Editor-in-Chief of both, Journal of Translation and Language Studies and, Kuwait, and International Journal of Language and Literary Studies, Italy; Monograph Editor, Sage Open Journals, America; Distinguished and Honoured Advisor, Asian EFL and Asian ESP Journals, UK, and TESOL International Journal, Philippines; Board Member of ELT Journal, Canada; Arab World English Journal, Malaysia; International Journal of English and Literary Studies, Australia; Journal of ELT and Applied Linguistics, India, among others. He is also a freelance language trainer and an IELTS Examiner, certified by Cambridge University, UK.