Effectiveness of Employing the e-mind Mapping Strategy in Scientific Courses: Adopting the Blended Learning Approach at Emirati Private Preparatory Schools

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Abstract

This article explored the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach. It explored that from the perspective of students. The researchers adopted the descriptive analytical and quantitative approaches. They used a survey that was developed by them based on several studies. Those studies were published in peer-reviewed journals. The forms of the survey were uploaded to the web through using the use of Google Form. The purposive sampling method was employed. For instance, the researchers sent the link of the survey to 400 students in five Emirati private preparatory schools. Two schools of those ones are located in Ajman, one school in Abu Dhabi, one school in Dubai and one school in Sharjah. However, 182 forms were filled. The response rate is 45.5%. The researchers used descriptive statistical methods. They found that the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach is high. This strategy promotes innovation within students and improves their learning skills. It enables students to carry out self-learning practices. It improves students' ability to do writing-related tasks. The researchers recommend holding courses for teachers for teaching them the way of creating e-mind maps through using various software.

Keywords: effectiveness, employing, the e-mind mapping strategy, scientific courses, Emirati private preparatory schools, the blended learning approach

1. Introduction

During the last couple of decades, many developments were provided in the field of computer. They affected modern societies (Al-Derbashi, 2017). They improved several aspects in life, including the educational aspects (Alderbashi and Khadragy, 2018). For instance, today, there are many computer-based learning and teaching strategies that are used in the scientific courses for teaching students in schools. For instance, teaching strategies include: the digital storytelling strategy (Alderbashi, 2021). Learning strategies include the e-mind mapping strategy (Salameh et al., 2020). E-mind maps refer to the mind maps that are designed through the use of a software. Such maps refer to a graphical technique that is used for visualizing connections between several ideas or pieces of information. Each idea or fact is written down and then linked through curved lines to its major or minor idea or fact. Such maps create a web of relationships (Al Shdaifat et al., 2019).

The e-mind mapping strategy has several benefits. For instance, it contributes to expanding students' knowledge on vocabulary. That is because it displays images that illustrate the meaning of words (Al Shdaifat et al., 2019). It contributes to raising the achievement of students. It contributes to raising the students' retention of concepts. That is because the images used in those maps facilitate the process of storing information in the long-term memory (Bawaneh, 2019).

In addition, this strategy contributes to developing the computer skills. That is because this electronic instructional

strategy offers students chances to understand the way of using computer programs to form shapes, videos, and images and attach audio files (Al-Montashiri, 2019). This strategy contributes to improving students' attitudes towards the course. That is because using computerized instructional strategy makes the learning process enjoyable instead of being boring (Sabrah, and Al-Jadery, 2019).

The e-mind mapping strategy contributes to developing the creative thinking skills of students. That is because the instructor may ask students to add their ideas to the map. That contributes to promoting creativity (Salameh et al., 2020). This strategy contributes to raising students' motivation to learn. That is because students shall feel motivated to learn when using images, shapes, attractive colours in such maps (Al-Sa'eedy, 2019). This strategy improves the thinking skills of students. That is because this strategy allows students to see items that are difficult to bring to class. That allows students to explore the world without travelling. Such exploration shall contribute to developing the thinking processes and skills of students (Al-Alam et al., 2020).

The e-mind mapping strategy improves the learning process. That is because carrying out the instructional process in a systematic manner with employing instructional strategies shall improve the learning process and raise the quality of education. This strategy raises students' engagement in the learning process. That's because the instructor can engage students in games that are based on such maps (Al-Helo, 2016). This strategy contributes to improving the planning skills of students (Mohammad, and Abed Al-Sayed, 2018).

This strategy enhances the writing skills of students. For instance, the instructor can ask the students to do writing tasks that are based on the e-mind maps that were designed by him/her (Sulaiman, 2018). This strategy enhances the visual thinking skills of students (Metwali, 2020). It improves the inferential thinking skills of students and expands students' knowledge. That's because such maps may be attached with webpages that include much information (Al-Ibrahim, 2016).

There are numerous merits for the e-mind mapping strategy. Despite that, there isn't any study carried out about the use of this strategy in the scientific courses in the preparatory schools in UAE and students' attitudes towards such use. However, it's necessary to explore students' attitudes towards teaching and learning strategies (Abed and Al-Dirbashi, 2012). Thus, the present study explored the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach.

The blended learning approach refers to the use of face-to-face instructional method along with an electronic instructional method. Thus, it enjoys the advantages of face to face education and the advantages of online education. It allows learners to interact with their peers and the academic material. It positively affects the development of students' abilities in terms of knowledge analysis, and acquisition (Abubakar et al., 2019; Al-Derbashi, and Abed, 2017). During the first semester of the academic year 2020-2021, the blended learning approach was adopted by schools in UAE in order to deliver education. For instance, those school give some lessons online and other lessons face to face in order to prevent the COVID 19 from spreading among students.

1.1 Objective

This study explored the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach

1.2 Question

This study offer an answer for the question below

What is the extent of effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach?

1.3 Significance of the Study

This study offers significant results for the Ministry of Education in UAE. It offers a useful tool for researchers who are interested in conducting similar studies targeting other countries or courses.

1.4 Limits

The limits in this research are shown below:

-Spatial limits: This research targets Emirati private preparatory schools.

-Temporal limits: This data in this research was obtained during November, 2021

-Thematic limits: This research targets the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach.

-Human limits: The researchers chose a sample that consists from several Emirati private preparatory school students

1.5 Limitations

The results in this article can't be generalized because they are affected by the validity and reliability of the research instrument. They can't be generalized because they are affected by the sample size, objectivity and characteristics.

1.6 Definition of Terms

The main terms used in this study are defined below:

- The blended learning approach: (Theoretical definition): It refers to the use of face-to-face instructional method along with an electronic instructional method. Thus, it has the advantages of face to face education and the advantages of online education (Abubakar et al., 2019; Al-Derbashi, and Abed, 2017).

- The blended learning approach: (Operational definition): It refers to the use of face-to-face instructional method along with an electronic instructional method by the preparatory schools in UAE during the Coronavirus crisis.

- E-mind maps: (Theoretical definition): They refer to the mind maps that are designed through the use of a software. Such maps refer to a graphical technique that is used for visualizing connections between several ideas or pieces of information.   Each idea or fact is written down and then linked through curved lines to its major or minor idea or fact. Such maps create a web of relationships (Al Shdaifat et al., 2019)

- E-mind maps: (Operational definition): They refer to a graphical technique that is used for visualizing connections between several ideas or pieces of information. The instrument in this study explores the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach

- Preparatory schools: (Operational definition): This term refer to the schools that are located in the UAE and include 7th, 8th and 9th grades.

1.7 Theoretical Framework

Al-Helo (2016) adds that the e-mind mapping strategy improves the learning process. She adds that this strategy raises the degree to which the students are engaged in the leaning process. Al-Ibrahim (2016) adds that this strategy contributes to improving the inferential thinking skills of students. Through such skills, the learners can identify the implicit meaning that is not clearly mentioned. Such skills allow learners to read between lines. Ahmad et al. (2017) adds that this strategy contributes to improving the visual perceptual skills of learners. That's because such map involve visual elements (e.g. colours, arrows, images, videos and etc.)

Hani (2017) adds that this strategy contributes to improving the analytical thinking skills of students. She adds that this strategy contributes to improving students' academic achievement in science and raising their motivation to learn. She adds that this strategy is effective for teaching the students who suffer from attention deficit hyperactivity disorder. That's because the use of colours and figures that catch attention let those students learn effectively and concentrate more.

Mohammad, and Abed Al-Sayed (2018) adds that this strategy contributes to improving the planning skills of students. Sulaiman (2018) adds that this strategy contributes to improving the writing skills of students. That's because this strategy may be followed by writing tasks that allow students to develop their ability to write reports, letters, and etc. Al-Qat'an (2018) adds that this strategy contributes to raising the students' academic achievement. He adds that this strategy contributes to raising students' academic motivation. That's because students enjoy the learning strategies that require using the computer. Metwali (2020) adds that the e-mind mapping strategy improves the visual thinking skills of students due to employing several types of visual elements.

Al-Shawawreh (2020) adds that this strategy contributes to enhancing the reading comprehension skills of students. That's because students can read a text and form a mind map that involves the most important ideas in the text. That allows students to understand and analyse the text in a better manner. It allows students to answer the questions on the text fast. The latter researcher adds that this strategy contributes to enhancing the attitudes of students towards reading. Khalifah (2021) adds that the e-mind mapping strategy improves the decision making skills of students. He adds that the e-mind mapping strategy improves the cognitive flexibility level of students. That's Mahmoud (2021) adds that this strategy improves the visual thinking skills of students. He adds that this strategy contributes to acquiring more syntactic concepts. Mohammad (2021) adds that this strategy makes learning an enjoyable process for students. She adds that this strategy contributes to expanding students' knowledge on geographical concepts.

1.8 Empirical Studies

The researchers reviewed the following empirical studies. Those studies are presented based on the year of publication from the oldest to the newest:

Ahmad (2014) explored the effect of using mind maps on raising the achievement of middle school students. She explored the effect of using those maps on the ability of those students to solve mathematical problems. She sampled 90 female students in Bour Saeed, Egypt. 45 students are in the experimental group and 45 students are in the control group. The researcher used achievement test and test for measuring students' ability to solve mathematical problems. She found that using those maps have a positive significant impact on students' achievement and ability to solve mathematical problems in middle school.

Mohaidat (2018) explored the impact of electronic mind maps on students' reading comprehension among the ninth grade students in Jordan. The sample consists from 60 ninth grade students in Jordan. The control group involves 30 students and the experimental group involves 30 students. Pre-test and post-test were used. It was found that using electronic mind maps has a significant positive impact on the reading comprehension among the ninth grade students in Jordan

Hasooneh (2018) explored the effectiveness of using the visual mind maps in e-learning environment in improving the academic achievement of the students enrolled in the Faculty of Education in Al-Aqsa University. He explored the effectiveness of using such maps in improving the visual thinking skills among those students. 68 female and male students were. A test for assessing the academic achievement was used. A survey for exploring the visual thinking skills of students was used. It was found that using the visual mind maps in e-learning environment contributes to improving the academic achievement of those students. In addition, using those maps improves students' visual thinking skills.

Al Shdaifat et al. (2019) explored the effect the e-mind mapping strategy on expanding the knowledge of basic school students on vocabulary in English language. They employed a quasi-experimental research design. 50 students were chosen from basic schools in Jordan and divided into control and experimental groups. Pre-test on vocabulary in English language was developed. Post-test on vocabulary in English language was developed.   The researchers found that this strategy contributes to expanding the knowledge of basic school students on vocabulary in English language.

Al-Sa'eedy (2019) explored the effectiveness of employing the e-mind mapping strategy in developing the middle school students' achievement and raising their motivation In Assir, Saudi Arabia. She used a pre-test and post-test for assessing achievement. She used a survey for assessing motivation. She employed a quasi-experimental research. She sampled 60 female middle school students from Assir. She divided them into control and experimental groups. She found that employing the e-mind mapping strategy improves students' achievement. She found that employing this strategy positively and significantly affects students' motivation

Bawaneh (2019) explored the extent of effectiveness of employing the mind mapping strategy in raising the achievement of students in 10th grade. He explored the extent of effectiveness of employing this strategy in raising the students' retention of concepts related to electronic energy.   111 students (including males and females) were sampled through the use of the random sampling method.   They were chosen from Bani Kenanah region in the Northern Province in Jordan. They were divided into control and experimental groups. After using the pre-test and post-test, it was found that the mind mapping strategy contributes to raising the achievement of students in 10th grade and retention of concepts related to electronic energy.

Al-Montashiri (2019) explored the effect of using e-mind mapping strategy on developing the computer skills of middle school students. 46 middle school students were sampled. They were divided into control and experimental groups. Pre-test and post-test were developed for assessing students' computer skills. The researcher found that using e-mind mapping strategy contributes to developing the computer skills of middle school students.

Sabrah, and Al-Jadery (2019) explored the effectiveness of teaching biology through employing the e-mind mapping strategy in raising 10th grade students' achievement in this course in Jordan. They explored the effectiveness of teaching biology through employing the e-mind mapping strategy in improving 10th grade students' attitudes towards the course in Jordan. 31 students were sampled from Jordan. Pre-test and post-test were used in addition to using a survey. The researchers found that teaching biology through employing the e-mind mapping strategy contributes to raising 10th grade students' achievement in this course in Jordan. They found that teaching biology through employing the e-mind mapping strategy contributes to improving 10th grade students' attitudes towards the course in Jordan.

Salameh et al. (2020) explored the effectiveness of using the electronic mind mapping strategy in developing the creative thinking skills in science among the 9th grade female students who reside in Gaza. She used an experimental approach and sampled 70 female students from Khan Younis, Gaza. Pre-test on creative thinking skills was developed. Post-test on creative thinking skills was developed. It was found that the electronic mind mapping strategy has a significant positive impact on developing the creative thinking skills in science among the 9th grade female students who reside in Gaza.

Al-Alam et al. (2020) explored the effectiveness of using the mind mapping strategy in improving the imaginative thinking skills of the tenth grade students in the math course in Al-Korah district in Jordan. They used the experimental approach. They sampled 50 students. Those students were divided into control and experimental groups. Pre-test and post-test were developed for assessing students' imaginative thinking skills. It was found that this strategy improves students' imaginative thinking skills of the tenth grade students in the math course.

2. Methodology

2.1 Approach

The researchers adopted the descriptive analytical approach. They also adopted a quantitative approach. Those approaches were adopted for identifying the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach. According to Östlund et al. (2011), the quantitative approach is used in the studies in the fields of social sciences and healthcare. It allows researchers to identify the links existing between a specific theory and empirical findings. It allows researchers to develop a new theory and check the validity of theoretical assumptions (Östlund et al., 2011).

2.2 Population

The population involves all the students enrolled in Emirati private preparatory schools

2.3 Sample

The researchers used a survey that was developed by them based on several studies that were published in peer-reviewed journals. The forms of the survey were uploaded to the web through the use of Google Form. The purposive sampling method was employed. For instance, the researchers sent the link of the survey to 400 students in five Emirati private preparatory schools. Two schools of those ones are located in Ajman, one school in Abu Dhabi, one school in Dubai and one school in Sharjah. However, 182 forms were filled. The response rate is 45.5%. It should be noted that the teachers of scientific courses of the respondents were provided with training sessions about this strategy before collecting the required data.

Data about the sample is shown below

Table 1. Distribution of the Sampled Students in Accordance with Gender and Grade (frequencies and percentages)

Variable	Category	Frequency	Percentage (%)
Gender	Male	155	85.3
	Female	27	14.7
Grade	Grade 7	19	10.3
	Grade 8	17	9.2
	Grade 9	146	80.5

N= 182 students

2.4 Instrument

The researchers used a survey that was developed by them based on several studies published in peer-reviewed journals. Such studies are: : Salameh et al. (2020), Al-Montashiri (2019), Al Shdaifat et al. (2019), Al-Sa'eedy (2019), Ahmad (2014), Al-Alam et al. (2020), Sabrah, and Al-Jadery (2019), Hasooneh (2018), and Khalifah (2021). The five point likert scale was used. This survey is presented in the appendix of this study. The five point likert scale was used.

2.5 Validity

The researchers passed the initial version of the survey to three individuals who work as faculty members in a

university located in the UAE. Those individuals possess a PhD degree in the field of teaching methods. The researchers asked those faculty members to evaluate the survey in terms of relevancy, clarity, language and content. The three faculty members suggested that the survey is clear and free from language mistakes. They added that it's strongly related to the study's goals. They added that there isn't any need to delete any item. One faculty member recommended adding an item that was added by the researchers.

2.6 Reliability

The Cronbach alpha value is 0.814.   Thus, the survey used in this article is deemed as being highly reliable. That's because the latter value is greater than 0.70 as it's added in the reference of Salehi & Farhang (2019)

2.7 Analysis Criteria

For classifying the means, the researchers used the criteria that are shown below

Table 2. The Criteria Used for the Classification of Means

Range	Level	Attitude
2.33 or less	Low	Negative
2.34-3.66	Moderate	Neutral
3.67 or more	High	Positive

The five point Likert scale consists from 5 categories for rating answers. Those categories include several categories, which are: strongly agree, agree, neutral, disagree and strongly disagree. Those categories stand for the following scores respectively: 5, 4, 3, 2 and 1.

2.8 Data Collection Methods

The researchers used primary and secondary data collection methods. The primary data collection method is represented in the questionnaire that was designed for meeting the study's goal. The secondary data collection methods include: books, and articles that are published in English language and books, and articles that are published in Arabic language. Through using those types of data collection methods, the researchers were able to meet the intended goal

3. Results and Discussion

Means and standard deviations were calculated to answer the study's question. The study's question is shown below:

What is the extent of effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach?

The researchers found that the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach is high. That is because the overall mean is 4.08. The latter result may be attributed to the fact that students prefer the learning strategies that are based on using computer. In addition, the researchers found that employing this strategy in scientific courses contributes to raising students' academic achievement, because the mean of statement 1 is 4.75. The latter result is in agreement with the one found by Hasooneh (2018). It may be attributed to the fact that the use of a learning strategy improves the learning outcomes and makes information more organized.

The researchers found that employing this strategy in scientific courses contributes to providing students with more scientific concepts, because the mean of statement 2 is 4.39. The latter result is in agreement with the one found by Al Shdaifat et al. (2019). It may be attributed to the fact that the concepts in those maps may be attached to images and videos illustrating their meaning. The researchers found that employing this strategy in scientific courses contributes to motivating students to learn and acquire more information, because the mean of statement 3 is 4.70. The latter result is in agreement with the one found by Al-Sa'eedy (2019). It may be attributed to the fact that students feel more motivated to learn when employing multimedia and colours that attract their attention and increase their concentration.

Table 3. Means and Standard Deviations for Identifying the Extent of Effectiveness of Employing the e-mind Mapping Strategy in Scientific Courses in Emirati Private Preparatory Schools in the Light of Adopting the Blended Learning Approach

No.	Item	Mean	Std.	Level	Attitude
	Employing the e-mind mapping strategy in scientific courses in the light of adopting the blended learning approach				
1.	Raises my academic achievement in these courses	4.75	0.63	High	Positive
2.	Provides me with more scientific concepts	4.39	0.47	High	Positive
3.	Motivates me to learn and acquire more information	4.70	0.51	High	Positive
4.	Improves my problem solving skills	2.22	0.33	Low	Negative
5.	Organizes scientific information	4.21	0.84	High	Positive
6.	Facilitates the retrieval of scientific information	4.67	0.69	High	Positive
7.	Develops my computer skills	4.49	0.81	High	Positive
8.	Develops my creative thinking skills	4.63	0.27	High	Positive
9.	Improves my attitudes towards scientific courses	2.15	0.17	Low	Negative
10.	Improves my visual thinking skills	4.42	0.39	High	Positive
11.	Improves my imaginary thinking skills	4.82	0.57	High	Positive
12.	Improves my attitudes towards the teachers of scientific courses	1.98	0.92	Low	Negative
13.	Makes learning in scientific courses enjoyable	4.77	0.36	High	Positive
14.	Facilitates the process of storing scientific information in the long-term memory	4.33	0.58	High	Positive
15.	Promotes innovation within me	4.80	0.22	High	Positive
16.	Improves my learning skills	4.68	0.77	High	Positive
17.	Enables me to carry out self-learning practices	4.75	0.93	High	Positive
18.	Improves my ability to do writing-related tasks	4.84	0.84	High	Positive
19.	Improves my decision making skills	2.10	0.75	low	Negative
	Overall	4.08	0.58	High	Positive

* This survey was developed by the researchers based on the following studies: Salameh et al. (2020), Al-Montashiri (2019), Al Shdaifat et al. (2019), Al-Sa'eedy (2019), Ahmad (2014), Al-Alam et al. (2020), Sabrah, and Al-Jadery (2019), Hasooneh (2018), and Khalifah (2021).

The researchers found that employing this strategy in scientific courses doesn't contribute to improving students' problem solving skills because the mean of statement 4 is 4.81. The latter result is not in agreement with the one found by Ahmad (2014). It may be attributed to the fact that developing such skills requires posing a problem and asking students to work to find solutions for it rather than presenting e-mind maps. The researchers found that employing this strategy in scientific courses contributes to organizing scientific information, because the mean of statement 5 is 4.21. The latter result may be attributed to the fact that using arrows and geometric shapes in such maps contribute to presenting data in a manner that is more organized than presenting it in the form of a paragraph or sentences.

The researchers found that employing this strategy in scientific courses contributes to facilitating the retrieval of scientific information because the mean of statement 6 is 4.67. The latter result may be attributed to the fact that students can using the keyboard in order to search for a specific word in the map in case the map include numerous items. The researchers found that employing this strategy in scientific courses contributes to developing students' computer skills, because the mean of statement 7 is 4.49. The latter result is in agreement with the one reached by Al-Montashiri (2019). It may be attributed to the fact that using this strategy requires learning the way of adding a geometric shape, and arrows to the map, and the way of changing the colours of the map and the way. It's because students have to learn the way of deleting something in the map and the way of attaching something to the map.

The researchers found that employing this strategy in scientific courses contributes to developing students' creative thinking skills because the mean of statement 8 is 4.63. The latter result is in agreement with the one reached by Salameh et al. (2020). It may be attributed to the fact that the instructor may ask students to show creativity and add new items to the map. The researchers found that employing this strategy in scientific courses doesn't contribute to improving the students' attitudes towards scientific courses because the mean of statement 9 is 2.15. The latter result

is attributed to the fact that students' attitudes towards scientific courses are influenced by the instructors' personalities, way of dealing with students and extent of respecting students. It is inconsistent with the one reached by Sabrah, and Al-Jadery (2019)

The researchers found that employing this strategy in scientific courses contributes to improving students' visual thinking skills because the mean of statement 10 is 4.42. The researchers found that employing this strategy in scientific courses contributes to improving students' imaginary thinking skills because the mean of statement 11 is 4.82. The latter result is in agreement with the one reached by Al-Alam et al. (2020). It may be attributed to the fact that the attachment of images and videos with those maps contribute to developing students' ability to imagine things and come up with ideas.

The researchers found that employing this strategy in scientific courses doesn't contribute to improving students' attitudes towards the teachers of scientific courses because the mean of statement 12 is 1.98. The latter result is attributed to the fact that the students' attitudes towards the teachers are affected by the teachers' personalities, instructional methods and extent of respecting students and interacting with them.

The researchers found that employing this strategy in scientific courses contributes to making learning in scientific courses enjoyable because the mean of statement 13 is 4.77. The researchers found that employing this strategy in scientific courses contributes to facilitating the process of storing scientific information in the long-term memory because the mean of statement 14 is 433. That's attributed to the fact that the information acquired visually lasts in memory more than the ones acquired through audio means only.

The researchers found that employing this strategy in scientific courses contributes to promoting innovation within me because the mean of statement 15 is 4.80. That is because such maps may be attached to videos that let students see experiences and experiments that are difficult to be seen inside classroom.The researchers found that employing this strategy in scientific courses contributes to improving students' learning skills because the mean of statement 16 is 4.68. The researchers found that employing this strategy in scientific courses contributes to enabling students to carry out self-learning practices because the mean of statement 17 is 4.75.

The researchers found that employing this strategy in scientific courses contributes to improving students' ability to do writing-related tasks because the mean of statement 18 is 4.84. The researchers found that employing this strategy in scientific courses doesn't contribute to improving students' decision making skills because the mean of statement 19 is 2.10. The latter result is in agreement with the one reached by Khalifah (2021). It may be attributed to the fact that the improving such skills requires engaging students in special courses that target this skill. Such courses must be given by specialists in the field of psychology.

4. Conclusion

The researchers found that the effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach is high. They found that this strategy makes learning in scientific courses enjoyable and facilitates the process of storing scientific information in the long-term memory. This strategy promotes innovation within students and improves their learning skills. It enables students to carry out self-learning practices. It improves students' ability to do writing-related tasks.

However, the researchers found that employing this strategy in scientific courses doesn't contribute to improving students' attitudes towards the teachers of scientific courses. The latter result is attributed to the fact that the students' attitudes towards the teachers are affected by the teachers' personalities, instructional methods and extent of respecting students and interacting with them. The researchers found that employing this strategy in scientific courses doesn't contribute to improving the decision making skills of students. The latter result may be attributed to the fact that the improving such skills requires engaging students in special courses that target this skill. Such courses must be given by specialists in the field of psychology.

Recommendations

In the light of the study's results, the researchers recommend holding courses for teachers for promoting knowledge about the way of employing the e-mind mapping strategy in scientific courses. They recommend holding courses for teachers for teaching them the way of creating e-mind maps through using various software. They recommend holding courses for teachers for promoting knowledge about the significance of engaging students in the learning processes when adopting distance and blended learning approaches

Suggestions for Future Research

The researchers recommend conducting a study about the effectiveness of the blended learning approach in the schools in UAE. They recommend conducting a similar study exploring the impact of gender and grade on students' attitudes towards the e-mind mapping strategy. They recommend conducting a study exploring university students' attitudes towards this strategy in the scientific faculties.

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Appendix:

The Questionnaire

Hello, I am Dr. Khalid. I am working on a study with Dr. Moustafa. This study is titled (Effectiveness of employing the e-mind mapping strategy in scientific courses in Emirati private preparatory schools in the light of adopting the blended learning approach). In order to carry out this study and meet its goals, I need to collect data through using this questionnaire. So, please cooperate with me and answer the items below.

Before reading the questionnaire, please note that the term e-mind maps refer to the mind maps that are designed through the use of a software. Such maps refer to a graphical technique that is used for visualizing connections between several ideas or pieces of information. Each idea or fact is written down and then linked through curved lines to its major or minor idea or fact. Such maps create a web of relationships (Al Shdaifat et al., 2019(Note 1))

Please, answer the items below

Part one:

a)-I am a

Male

Female

b)-I am in

Grade 7

Grade 8

Grade 9

Part two

Have you ever been taught in a scientific course through using the e-mind mapping strategy?

Yes

No

Part three:

Please, answer the table below

No.	Item	Strongly agree 5	Agree 4	Neutral 3	Disagree 2	Strongly disagree 1
	Employing the e-mind mapping strategy in scientific courses in the light of adopting the blended learning approach					
1.	Raises my academic achievement in these courses					
2.	Provides me with more scientific concepts					
3.	Motivates me to learn and acquire more information					
4.	Improves my problem solving skills					
5.	Organizes scientific information					
6.	Facilitates the retrieval of scientific information					
7.	Develops my computer skills					
8.	Develops my creative thinking skills					
9.	Improves my attitudes towards scientific courses					
10.	Improves my visual thinking skills					
11.	Improves my imaginary thinking skills					
12.	Improves my attitudes towards the teachers of scientific courses					
13.	Makes learning in scientific courses enjoyable					
14.	Facilitates the process of storing scientific information in the long-term memory					
15.	Promotes innovation within me					
16.	Improves my learning skills					
17.	Enables me to carry out self-learning practices					
18.	Improves my ability to do writing-related tasks					
19.	Improves my decision making skills					

Thank you for dedicating time and effort to fill in the questionnaire ☺

Note

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