

## Mind Mapping as a Learning Strategy on the Students' Performance in Biology

Patricia Jayne D. Nacilla

Arlene C. Dolotallas, Ph.D

College of Education and Social Sciences  
Mindanao State University at Naawan  
Naawan Misamis Oriental  
Philippines

### Abstract

*Mind Mapping is a creative and logical means of note-taking and note-making that literally maps out the ideas in the brain. This study sought to find out the significant difference on the pretest scores in Biology of the students when grouped to Mind Mapping as a learning strategy and Lecture Method, find out the significant difference on the posttest scores in Biology of the students when exposed to Mind Mapping as a learning strategy and Lecture Method, and find out the pretest and posttest scores in Biology of the students when exposed to Mind Mapping as a learning strategy and Lecture Method. The study used the true experimental design, the pretest-posttest control group design. This study utilized the percentage, independent t-test and paired t-test to analyze the result. Paired t-test result revealed that there was a significant difference on the students' pretest and posttest scores in Biology when exposed to Mind Mapping as a learning strategy and Lecture Method. This study concluded that Mind Mapping as a learning strategy can improve the students' performance in Biology.*

**Keywords:** Mind Mapping strategy, performance, experimental group, control group, lecture method

### 1. Introduction

Science has brought to education many valuable new instruments of learning and teaching of which considerable emphasis is being placed on the importance of the visual approach to teaching (Akejo, et.al, 2011). Biology as a Science has been providing many important innovations for our lives by studies in its basic disciplines; genetics, biotechnology, molecular Biology, microbiology and biochemistry. With their famous studies such as cloning, gene transfer, prevention of microbial diseases and proteomics, these areas became popular and then entered into our daily life with discussions on some issues such as ethical issues and side effects of genetic engineering products. With pros and cons, learning Biology for daily life became a need in today's world. Biology learning includes understanding biological organization from molecules to ecosystem. To understand systems and their organs is one of the most important steps of learning the organization of life (Koksals&Cimen, 2008). Mind Mapping is a highly effective way of getting information in and out of the brain. Mind Mapping is a creative and logical means of note-taking and note-making that literally maps out the ideas (Kurniawati, 2011). According to Writing Centre Learning Guide (2014), mind mapping is an effective means to take notes and brainstorm essay topics. A mind map involves writing down a central theme and thinking of new and related ideas which radiate out from the center. Mind Mapping is developed as an effective method for generating ideas by association. It is used to brainstorm a topic and a great strategy for the learning of the students. Mind mapping strategy as a Self-Regulated Learning Strategy (SRL), helped to improve student's performance in Basic Science Technology and should be employed in the classroom as a better approach to teach Basic Science and Technology (BST) as its potency is very clear in this study at improving learners' critical thinking and creative skills (Adodo ,2013).

### II. Methodology

The participants of the study were the forty (40) grade 8 students of Cabalantian National High School, Cabalantian, Manticao, Misamis Oriental, Philippines. The study used the true experimental research design, the randomized pretest-posttest control group design. Two (2) groups were involved in the study wherein the twenty (20) students were exposed to Mind Mapping strategy and the twenty (20) for the Lecture Method respectively. The performance of the students was measured through pretest and posttest. The pretest and posttest questionnaires were composed of thirty (30) items multiple choices.

### III. Results and Discussion

Table 1 shows the independent t-test result showing the difference on the pretest scores of the two groups. It reveals a significant difference on the pretest scores in Biology of the students when grouped to Mind Mapping as a learning strategy and Lecture Method as shown in their mean difference of -1.90 with t-value of -1.90 and p-value of 0.03 which is less than the p-value of 0.05 that leads to the rejection of the null hypothesis. Students listed several reasons for having difficulties in learning Biology. Among these, the nature of the topic, teachers' style of teaching Biology, students' learning and studying habits, students' negative feelings and attitudes towards the topic and lack of resources predominated (Cimer, 2011). Some students' diminishing interest in learning Science was due to the curriculum content being overloaded and not generally related to working life, the lack of discussion of topics of interest, the absence of creative expression opportunities, the alienation of science from society and the prevalence of isolated science subjects (Osborne & Collins, 2001). This idea leads to the poor performance of the learners.

**Table 1. Independent t-test result showing the difference on the pretest scores of the two groups**

Variable	Mean score	Mean difference	t-value	p-value	Remarks
Pretest					
<b>Mind Mapping strategy</b>	12.45				
		-1.90	-1.90	0.03*	Significant
<b>Lecture Method</b>	14.35				

$p < 0.05^*$

Table 2 presents the independent t-test results showing the difference on the posttest scores of the two groups. It shows no significant difference on the posttest scores in Biology when exposed to Mind Mapping as a learning strategy and Lecture Method as shown in their mean difference of 1.30 with t-value of -1.04 and p-value of 0.15 which is greater than the p-value of 0.05 that leads to the non-rejection of the null hypothesis. There is a little difference in the posttest performance of the students. It is said that teachers utilize various instructional strategies to be effective in assisting students' learning. Cooperative learning, note-taking assistance, memory devices, graphic organizers, and other methodological reinforcements are instrumental to supplement instruction. Teachers continually search for methods to improve student learning. In searching, teachers consider the developmental level of students and design instruction. Treviño (2005) believes that a successful teacher is cognizant of pedagogical and content strategies to assist students' learning.

**Table 2. Independent t-test result showing the difference on the posttest scores of the two groups**

Variable	Mean score	Mean difference	t-value	p-value	Remarks
Posttest					
<b>Mind Mapping strategy</b>	17.80				
		1.30	1.04	0.15	Not Significant
<b>Lecture Method</b>	16.50				

$p < 0.05^*$

Table 3 shows the paired t-test result showing the difference on the pretest and posttest scores of the two groups. It displays a significant difference on the pretest and posttest scores in Biology when exposed to Mind Mapping as a learning strategy and Lecture Method as shown in their t-value of -4.9914714 and -2.43 and p-value of 4.05E-05 and 0.01 respectively. This reveals rejection of the null hypothesis. Mind Mappings contains visual frameworks like figures, diagrams, or charts utilized to display structural knowledge. It was found out that the Mind Mapping technique was more effective than Traditional method (Parikh, 2016). Majority of the students had positive perceptions of the use of Mind Mapping strategy in enhancing their writing skills (Yunus and Chien, 2016). It is a highly effective way of getting information in and out of the brain. Mind Mapping is a creative and logical means of note-taking and note-making that literally maps out the ideas (Kurniawati, 2011). It are an effective way to remember ideas from the notes. Moreover, Mind Mapping also helps to promote their creativity in writing. This means that there was improvement of students' performance in Biology when exposed to Mind Mapping as a learning strategy. Mind Mapping is an effective strategy in learning Biology

**Table 3. Paired t-test result showing the difference on the pretest and posttest scores of the two groups**

Group	Mean Score	Mean difference	t-value	p-value	Remarks
<b>Mind Mapping strategy</b>					
Pretest	12.45				
		-5.35	-4.9914714	4.05E-05*	Significant
Posttest	17.80				
<b>Lecture method</b>					
Pretest	14.35				
		- 2.35	-2.43	0.01*	Significant
Posttest	16.70				

$p < 0.05^*$

#### IV. Conclusion

Based on the findings of the study, it revealed a significant difference on the pretest and posttest scores of the students when exposed to Mind Mapping strategy and Lecture Method. This study concluded that Mind Mapping strategy can improve the performance in Biology of the students. Mind Mapping helps to promote creativity in writing.

#### V. Recommendations

Based on the findings and conclusion of the study, the researchers would like to recommend that Mind Mapping strategy can improve the performance in Biology of the students. Mind Mapping as a learning strategy that will enhance performance of the students when it is used appropriately. Selection of the students' group will be taken after obtaining the pretest result. Similar study should be conducted using Mind Mapping strategy in other schools to different grade levels and in other disciplines too.

#### References

- Adodo, S.O. 2013. Effect of Mind Mapping as a Self-Regulated Learning Strategy on Students' Achievement in Basic Science and Technology. *Mediterranean Journal of Social Sciences* MCSER-CEMAS-Sapienza University of Rome. Retrieved on September 18, 2016, from [http://webcache.googleusercontent.com/search?q=cache:a9Ye\\_QR4kn8J:ww.w.mcser.org/journal/index.php/mjss/article/download/295/311+&cd=20&hl=en&ct=clnk&gl=ph](http://webcache.googleusercontent.com/search?q=cache:a9Ye_QR4kn8J:ww.w.mcser.org/journal/index.php/mjss/article/download/295/311+&cd=20&hl=en&ct=clnk&gl=ph).
- Akejo, O.S., C.O. Rotimi and A.M. Kenni, 2011. Teaching with Concept Mapping Instructional Strategy in Nigeria Secondary Schools. *International Association for Teaching and Learning (IATEL)*. Retrieved on September 18, 2016, from <http://www.hrmar.com/admin/pics/172.pdf>.
- Cimer, A. 2011. What Makes Biology Learning Difficult and Effective: Students' Views. *Educational Research and Reviews* Vol. 7(3), pp. 61-71, 19 January, 2012. Retrieved on September 10, 2016, from [http://www.academicjournals.org/article/article1379665422\\_Cimer.pdf](http://www.academicjournals.org/article/article1379665422_Cimer.pdf).
- Koksal, M.S. and O. Cimen, 2008. Perceptions of Prospective Biology Teachers on Importance and Difficulty of Organs as a School Subject. *World Applied Sciences Journal* 5 (4): 397-405, 2008 ISSN 1818-4952. Retrieved on September 10, 2016, from [http://idosi.org/wasj/wasj5\(4\)/2.pdf](http://idosi.org/wasj/wasj5(4)/2.pdf).
- Kurniawati, I. 2011. Improving Students' Vocabulary Mastery Through Mind-mapping Strategy. A Classroom Action Research at the Second Year of SMP Negeri 2 Polanharjo, Klaten in the Academic Year of 2010/2011. Retrieved on September 18, 2016, from <http://perpus.iain sala tiga.ac.id/docfiles/fulltext/21775332118f3742.pdf>.
- Osborne J. & S. Collins, 2001. Pupils' views of the role and value of the science curriculum. *Int. J. Sci. Educ.*, 23(5):441-467.
- Parikh, N.D. 2016. Effectiveness of Teaching through Mind Mapping Technique. *The International Journal of Indian Psychology* ISSN 2348-5396 (e) | ISSN: 2349-3429 (p) Volume 3, Issue 3, No.3, DIP: 18.01.054/20160303 ISBN: 978-1-365-03419-0 <http://www.ijip.in> | April - June, 2016. Retrieved on September 18, 2016, from <http://oaji.net/articles/2016/1170-1461519892.pdf>.
- Treviño, C. 2005. Mind Mapping and Outlining: Comparing Two Types of Graphic Organizers for Learning Seventh-grade Life Science. A Dissertation in Curriculum and Instruction. Texas Tech University. Retrieved on September 18, 2016, from [https://ttu-ir.tdl.org/ttu-ir/bitstream/handle/2346/1058/Cynthia\\_Trevino\\_diss.pdf%3Bsequence=1](https://ttu-ir.tdl.org/ttu-ir/bitstream/handle/2346/1058/Cynthia_Trevino_diss.pdf%3Bsequence=1).

- Writing Centre Learning Guide. 2014. Mind Mapping. The University of Adelaide. [writingcentre@adelaide.edu.au](mailto:writingcentre@adelaide.edu.au). Retrieved on September 18, 2016. [https://www.adelaide.edu.au/writingcentre/learning\\_guides/learningGuide\\_mindMapping.pdf](https://www.adelaide.edu.au/writingcentre/learning_guides/learningGuide_mindMapping.pdf).
- Yunus, M.M. and C.H. Chien. 2016. The Use of Mind Mapping Strategy in Malaysian University English Test (MUET) Writing. *Creative Education*, 2016, 7, 619-626. <http://www.scirp.org/journal/ce>. Retrieved on September 18, 2016. from [http://file.scirp.org/pdf/CE\\_2016041516242328.pdf](http://file.scirp.org/pdf/CE_2016041516242328.pdf).