

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/327820654>

A Comparative Study of Active Learning with and Without Using Mind Mapping Approach

Conference Paper · November 2017

DOI: 10.1109/WEEF.2017.8467158

CITATION
1

READS
429

3 authors:



Satirenjit Kaur Johl
Universiti Teknologi PETRONAS
72 PUBLICATIONS 1,442 CITATIONS

[SEE PROFILE](#)



Aamir Iqbal Umrani
Sindh Madressatul Islam University
23 PUBLICATIONS 109 CITATIONS

[SEE PROFILE](#)



Russell Tatenda Munodawafa
Universiti Teknologi PETRONAS
8 PUBLICATIONS 113 CITATIONS

[SEE PROFILE](#)

A Comparative Study of Active Learning with and Without Using Mind Mapping Approach

¹Satirenjit Kaur Johl, ²Aamir Iqbal Umrani, ³Russell Tatenda Munodawafa

¹²³Department of Management & Humanities

Universiti Teknologi PETRONAS, Malaysia

¹satire@utp.edu.my, ²umrani.aamir@yahoo.com, ³tororus@gmail.com

Abstract— Active learning strategies such as mind mapping have been proven to be effective in helping retain memory. Given that mind mapping has seen notable success in assessment and exam preparation, this study investigated the effectiveness of mind mapping as an active learning tool for university students. In addition, this study also looked into areas of active learning that could possibly require further improvement. Data collected from 22 Strategic management students was analysed using quantitative and qualitative methods. Results from the one-sample t-test suggest that the mind map technique enhances students learning ability. Results from the qualitative phase revealed areas that students feel could assist them to better utilize the mind map technique. Future improvements for the use of mind map technique for students are also discussed.

Keywords— *mind map, active based learning, strategic management, university students, Malaysia*

I. INTRODUCTION

In these recent years, scholars and researchers have discussed the importance of employing active based learning strategies to maximise student-learning process in college or university classroom. Students learn better by becoming involved. Students that are actively involved in the learning task would learn more as compared to when they are passive recipients of instruction [1, 2]. Genuine learning always takes place when it is active where there is the use of mind and not just the memory. In the process of discovery, the student is the main agent and not the teacher [2, 3].

There is a wide range of teaching methods. However, there is a general agreement that it has to be learner centred and help students to understand elements of management [4, 5]. Engaging with students is considered as one of the most important approaches for achieving learning objectives [6]. One of the ways is through active based learning strategies, which involve a wide range of activities that share the common element of “involving students in doing things and thinking about the things they are doing [7]. It is used to engage students in thinking critically and creatively. Mind mapping is one of the useful tools for creative thinking, planning and collaborating with others. Mind mapping can facilitate the learning process by making it interesting and engaging. In one of the studies conducted by [8] it was found that mind mapping is a fun, interesting and motivating approach to learning.

However, most of the studies discussed by scholars in the application of mind mapping have been mostly in the teaching of languages as well as project presentations in classrooms. There is a need to conduct more research concerning the application of mind mapping concept in teaching [9-11] management subjects. Students learn by becoming involved. The active involvement of students in the learning task results in them learning more as compared to when they are passive recipients of instructions [1, 2]. Genuine learning consistently occurs when it is active as there is the utilisation of the mind, not just the memory. In the process of discovery, the students is the main agent and not the teacher [2, 3].

However, it has also been noted by scholars that there is a need to apply the mind mapping more in the pedagogy of subjects as most academicians do not consider it as an effective education tool as yet [9]. Furthermore, concerns about management education are being raised, especially the preparedness of graduates for managerial and professional positions. It has been noted with concern that the business school pedagogy has a bearing on the degree of critical thinking development of students, as well as having an impact on the ability of students to analyse complex problems, induce synthetic reasoning and engage in integrative thinking. Furthermore, a traditional approach of teacher led, passive learning, limit students' intellectual development [12].

The University where the research was conducted offers strategic management course as one of the elective subjects for IT and engineering students that are taking management as a minor in their undergraduate program. In teaching this subject, it was found that students tend to be passive and their attendance rate is rather poor. This has raised a concern about the students' ability to apply their skills and knowledge taught in the classroom into their jobs after graduating.

Thus, the purpose of this research is to investigate on how active based learning using mind mapping could further improve the student competency in understanding and applying strategic management,

II. EFFECTS OF USING MIND MAP ON STUDENT PERFORMANCE

There is a growing global concern regarding the pedagogy of business education. The current pedagogy has been criticised as limiting students' intellectual development concerning integrative thinking, synthetic reasoning and the ability to analyse complex problems. Mind maps were used to explore these concerns. Mind maps are found to enhance student creativity and integrate diverse higher-order constructs and to develop metaphorical thinking. Therefore, mind maps are earmarked as a promising technique that can provide insights into how students integrate and apply knowledge. These insights can be beneficial in shaping the future of business school pedagogy and curricula [12].

Studies have highlighted that mind-maps based on the student's logical thought as opposed to having to utilise a mind-map crafted using the teacher's logic resulted in active learning for the students, student become engaged in learning, and it empowered the student through knowledge of their learning. As a result of the student personalising the map, the overall effect resulted in better performance in the subject area. When students create their mind-map, the teacher assumes the role of facilitator. This leaves the student to be free to add onto their knowledge and ideas which foster more creative and innovative thinking, which is crucial in management subjects [13].

While studies support mind-mapping application in the classroom, it was also noted that mind mapping might result in students partitioning knowledge into distinct silos. Therefore, the ability to share information as well as their knowledge bases becomes thin. Without the exchange of knowledge and information, it may be challenging for students to engage in holistic thinking and integrate concepts across business disciplines in a real world setting [12].

While mind mapping has received attention from its ability to increase academic performance, more studies are needed to assess its effectiveness in management education, particularly when group activities are involved, and knowledge sharing is encouraged. When working in a team scenario, sharing knowledge, information and critical thinking skills are needed. Therefore, more research on mind mapping in teaching is necessary to evaluate the efficacy of using this learning strategy with larger populations [14].

In addition, while research has been in agreement benefits of mind maps, it has been mostly in the scenario of exam preparations. There is a lack of research on the amount of preparatory work required by students to develop more comprehensive mind maps. Further research is needed to gain a better understanding of how students respond to mind mapping as an active learning strategy and how it fosters learning for other subjects like management [14].

In addition, when it comes to short term, research has also found that the mind map technique might not be superior to the routine learning strategy viz-a-viz short term information retrieval. Furthermore, there is a lack of

literature concerning the long-term use of mind mapping method in education. Therefore, there is a need to scrutinise this strategy further longitudinally, to determine its long term effects and the impact on the higher order skills such as creative thinking [15].

Critics also argue that despite the adoption of the notion that mind maps are an effective education tool, research in this area has not been exhaustive. There are not many supporters yet of mind mapping being the standard in educational use. Since the research is ongoing, there is a great need to monitor other tools that may be used towards helping in education. For instance, the collection of realistic and objective feedback and assessment of the process of instruction helps substantially to improving its quality. Hence there is a need to take other approaches in searching for a deeper reflection on how students understand problems and develop concepts provide background for running the learning process efficiently [15].

Creativity, which is the result of applying and combining existing knowledge in a new way, becomes ever more challenging with increasing task complexity. This is due to the concomitant increase in information density and interconnectedness. Mind mapping alone without some of the structure template could bring about a negative impact on problem-solving creativity, particularly when tasks are complex. This could be mitigated by mental models and their structural relationships such as templates, which could be provided for by the instructor. These could help the user to deal with increased complexity leading to the highest levels of fluency and originality in more complex tasks [16].

Lastly, many instructors and advisors readily agree that this topic is not one that is covered in their instruction, nor are seminar classes. Lecturers also argue that Syllabi classes are already stretched to their limits with necessary curricula; hence visualisation tool instruction simply will not fit, most often leaving the student to discover helpful techniques such as concept mapping on their own [16]. Critics also argue that despite the adoption of the notion that mind maps are an effective education tool, the analysis in this area has not been exhaustive, especially in the higher education context. There are not numerous supporters yet of mind mapping being the standard in higher education use. Hence there is a need to take other approaches in searching for a deeper reflection on how students understand problems and develop concepts provide background for running the learning process efficiently and recommendations for its future use in higher education [17].

III. RESEARCH OBJECTIVES AND QUESTIONS

The purpose of this study is to investigate how active based learning using mind map could further improve the student competency in understanding and applying strategic management. Therefore, the aim of this research is to achieve the following objectives:

1. To investigate whether mind map has improved the learner's understanding in strategic management by using pre and post-test.
2. To explore the effectiveness of mind map in further improving learners' understanding of strategic management.

The research questions for this study are as follows:

1. Does the mind map improve learners' understanding in strategic management by using pre and post-test?
2. How effective is mind map in improving learner's understanding of strategic management?

IV. RESULTS AND DISCUSSION

This section focuses on the data analyses using quantitative and qualitative approach. As mentioned, this paper has adopted a sequential mixed method approach to answering the research questions. This study conducted an exploratory study on 22 students using with and without mind map approach. Quantitative analyses are presented in the first part of this section and later followed by qualitative discussion.

A. Phase 1 *Quantitative*

In phase 1, the study was conducted in two stages. In this phase, students were given two tests: pre and post-test. In stage 1, a pre-test was conducted before the mind-map presentation of a given topic using traditional lecture approach. The test consists of 20 questions, and 22 students participated in the test. The pre-test allows the researcher to identify students' knowledge level of the given subject. In stage 2, students were divided into groups and were given the task to present the same strategic management topic using mind mapping approach. A test was conducted after the mind mapping presentation to assess the same set of students on their understanding level of the subject. The post-test allows the researcher to examine the increase or decrease in the students' understanding level. Students' test scores are illustrated in Figure 1. The test indicated that 14 students out of 22 had observed an increase in their test scores after the mind-map presentation. However, six students had a decrease in their scores, whereas, two students maintained the scores. The result seems to suggest that the mind-map presentation has enhanced majority of the students' knowledge level, and they seem to learn better using mind-map approach.

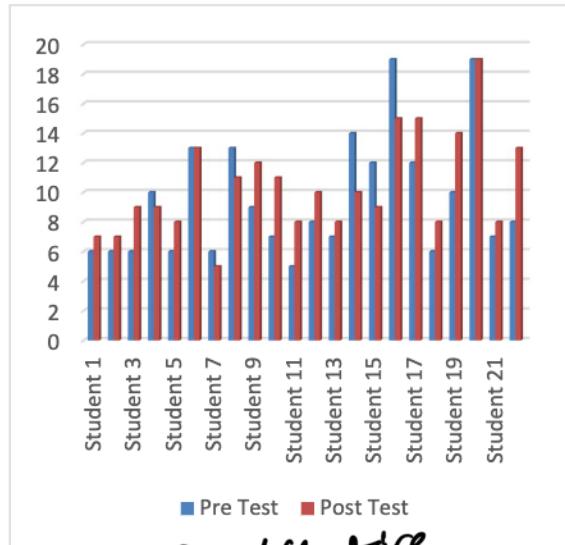
Table.1 Descriptive Statistics

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Pre-test	22	9.5000	4.11443	.87720
Post-test	22	10.4091	3.33323	.71065

The data was further analysed with one-sample t-test. The test helped to identify the students' understanding of

strategic management subject. Table.1. presents the descriptive statistics, and the mean statistics in the table shows an increase in the test score of the students in post-test. Moreover, the difference was significant with $p > .05$, and t value shows difference between pre and post-test, it shows an increase value in post-test (Table.2).

Figure.1: Students scores in pre and post test



B. Phase 2 *Qualitative*

In Phase 2 in depth interviews were conducted using qualitative approach. Using purposive sampling technique, seven open-ended questions were asked to obtain feedback from 11 students' on their experience using the mind-map approach in the classroom presentation. This method would allow the researcher to obtain greater insights of using mind mapping which Phase 1 was unable to provide. In this section, students were labelled as 'STD1', where STD refers to the student, and one relates to the student number.

Table.2 : Difference between pre and post test

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Pre-Test	6.270	21	.000	5.50000	3.6758	7.3242
Post-Test	9.019	21	.000	6.40909	4.9312	7.8870

The results revealed that majority of the students had a clear understanding of mind-map. From their responses, it seems to indicate that students were aware of what mind-map is and did not find any difficulty to understand the concept of it. The following quotes illustrate some of their responses;

STD1:- “mind mapping is generally a map, where we put all point in a map, which helps in revision and exam preparation. Mind-map generally helps people to know the topic in a nutshell”.

STD2:- “mind-map help me to summarize everything, when we learn any topic or subject, we put main points in mind-map to help to understand easily.”

STD3:- “mind-map for me is to take the main points and link with the sub-points ... I used a lot of mind map for exam preparation”.

Students were then asked whether they have used mind-map before this subject. Majority of the students expressed that they were familiarised with mind-map during their secondary school days. Most of the students had formal training of mind-map at school and university as well. However, few students did not receive any formal training. However, they self-learned from their schoolteachers teaching styles. Following quotes illustrates these points;

STD1:- “I did not have the formal training for mind-map, our teacher in school used mind-map to memorize the subject. ... I picked up from her practice, [...] some teachers in our school and university use mind-map, and sometimes we do at our own [...] I am using mind-map since school, it helps me to prepare for the class tests and exams”.

STD3:- “I am using mind-map since my school days [...] we had a proper training on mind-map in our high school [...], but I never used it for my presentations except for strategic management class”.

STD4:- “I was studying in a boarding school, I learned mind-map in my school [...] some of the university teachers used mind-map during their lectures [...] the mind-map helped in exam preparation, and I am doing mind-map since my school days”.

STD6:- “first time I used mind-map in my school, my teacher introduced mind-map in our class [...], I did not have any formal training for mind-map, I just picked up from class”.

The responses seem to indicate that students had an opportunity to learn mind-map in their school days, except for a few who only started using mind-map during their university days. Most of the students used mind-map for exam preparations, it is an easy technique to learn, understand and memorise any subject.

Furthermore, the students were asked about the benefits of using mind-map during the class presentation. Majority of the students expressed that mind-map has increased their understanding level and in memorising the key points of the subject matter. Most of the students stated that the strategic management subject consists of many chapters. By using mind-map, it has assisted them to identify the most important points and easily to revise different chapters more efficiently. Similarly, mind-map is a beneficial tool for exam preparation Thus; the following quotes illustrate these points:

STD8:- “Strategic Management has a lot of chapters and many points. Mind-map allows students to see the most important points more easily (using mind-map). [...] it is better to use mind map to understand the contents (of the subject).

STD5:- “Yes, it (mind-map) helped me to reach (understand) to the idea. [...] it is helpful for the exam (preparation), and it gives a clear picture and easy (to understand).

However, there were few problems, which hindered students in using mind-map effectively. Mind-map help students to summarise a whole chapter or a topic into a one-page graphical map for better understanding. Thus, it requires the users to connect proper nodes and represents the nodes with proper keywords. Some of the students felt that it was time-consuming to identify and name the main point that would best suit in a mind-map approach. Similarly, connecting all nodes in one map would be difficult for many users. They find it difficult to focus on the most important points, which could be used in mind-map. The group task needs all the members to participate in discussion session among all the team members, and everyone needs to focus on the task together. However, in some groups, there were issues of non-compliance with the task divided among group members. Thus, the following quotes illustrate these points:

STD2:- “Completing a mind-map was a difficult task, as we need to summarise it, make it short and choose the correct keywords.”

STD6:- “It was difficult to choose the main keywords to represent the subject, all words seem similar [...] teamwork is important to finalize the mind-map [...] one of our team members was quite, I need to push him (to complete the tasks).

Although, mind-map is a beneficial tool for many purposes, such as, to understand the subject content, easy to remember and efficient way for exam preparation. Thus, it is important to identify the effectiveness of existing mind-map technique and to determine how to improve mind-map practices. The importance and problems of using mind map were discussed in the earlier sections. Thus, it is necessary to identify for suggestions on how to improve the existing mind-map approach. Some of the students indicated that it is important to determine the most important points to include in the mind-map. It is critical for students to know how to use mind-map in their studies. In a group task, all team members must sit together to discuss and develop a holistic mind-map rather than to prepare individually in parts and only to combine it towards the end. Similarly, training would assist students to understand and use mind map more efficiently. Thus, the following quotes illustrate the mentioned points:

STD8:- “students need to differentiate between the main points (of the subject) [...] it is important for students to know how to use mind-map.

STD5:- "the group was doing their assignment (mind-map) separately (instead of doing it in a group) and combined different parts together to complete mind-map. [...] during presentation, the group mates were unaware of the part of their partners. So they need to work in a team.

STD4:- "it is important to introduce the mind-map at first place (before the presentation) [...] most of the student does not have a clear idea of mind-map, that is why they were confused in preparing, presenting and explaining their mind-map.

V. CONCLUSION

Mind-map is a unique learning approach, which assist students in simplifying the content and improving the understanding of the subject matter. The t-test shows the difference between students' level of understanding before and after using mind map technique. The mind map technique is helpful for future use in the classroom to enhance students learning ability. Moreover, the qualitative phase revealed that, the students found this approach is helpful for exam preparation, as mind-map would place all the relevant key points in one simplified pictorial map. It creates a link between the subject matter and presents it in a way that would assist students to memorise the content of the subject matter. However, a formal training session is required to understand and utilise the mind-map approach more effectively. Majority of the students faced problems during the development of their mind-map. They found that a formal training would certainly assist them to develop the mind-map more efficiently.

ACKNOWLEDGEMENT:

This paper has been supported by Center of Excellence in Teaching & Learning at Universiti Teknologi PETRONAS under the SOTL research grant.

REFERENCES

- [1] K. P. Cross, "Teaching for learning," AAHE Bulletin, vol. 39, p. n8, 1987.
- [2] E. Esmi, P. Sussner, H. Bustince, and J. Fernández, "Theta-fuzzy associative memories (Theta-FAMs)," IEEE Transactions on Fuzzy Systems, vol. 23, pp. 313-326, 2015.
- [3] D. R. Sadler, "Specifying and promulgating achievement standards," Oxford Review of Education, vol. 13, pp. 191-209, 1987.
- [4] A. Gibb, "In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge," International Journal of Management Reviews, vol. 4, pp. 233-269, 2002.
- [5] B. Jones and N. Iredale, "Enterprise education as pedagogy," Education+ training, vol. 52, pp. 7-19, 2010.
- [6] H. B. Coates, "Engaging students for success: Australasian student engagement report," 2009.
- [7] C. C. Bonwell and J. A. Eison, Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports: ERIC, 1991.
- [8] K. Goodnough and R. Woods, "Student and Teacher Perceptions of Mind Mapping: A Middle School Case Study," 2002.
- [9] A. Buran and A. Fil'yukov, "Mind Mapping Technique in Language Learning," Procedia-Social and Behavioral Sciences, vol. 206, pp. 215-218, 2015.
- [10] T. Bystrova and V. Larionova, "Use of Virtual Mind Mapping to Effectively Organise the Project Activities of Students at the University," Procedia-Social and Behavioral Sciences, vol. 214, pp. 465-472, 2015.
- [11] B. T. Cheng, I. Ioannou, and G. Serafeim, "CORPORATE SOCIAL RESPONSIBILITY AND ACCESS TO FINANCE," Strategic Management Journal, vol. 35, pp. 1-23, Jan 2014.
- [12] M. J. Somers, K. Passerini, A. Parhankangas, and J. Casal, "Using mind maps to study how business school students and faculty organize and apply general business knowledge," The International Journal of Management Education, vol. 12, pp. 1-13, 2014.
- [13] C. S. Fun and N. Maskat, "Teacher-centered mind mapping vs student-centered mind mapping in the teaching of accounting at pre-U Level-An action research," Procedia-Social and Behavioral Sciences, vol. 7, pp. 240-246, 2010.
- [14] A. Rosciano, "The effectiveness of mind mapping as an active learning strategy among associate degree nursing students," Teaching and Learning in Nursing, vol. 10, pp. 93-99, 2015.
- [15] M. Kalyanasundaram, S. B. Abraham, D. Ramachandran, V. Jayaseelan, J. Bazroy, Z. Singh, et al., "Effectiveness of mind mapping technique in information retrieval among medical college students in Puducherry-A pilot study," Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine, vol. 42, p. 19, 2017.
- [16] C. P. Malycha and G. W. Maier, "The Random-Map Technique: Enhancing Mind-Mapping with a Conceptual Combination Technique to Foster Creative Potential," Creativity Research Journal, vol. 29, pp. 114-124, 2017.
- [17] I. M. Kinchin, "Concept mapping as a learning tool in higher education: A critical analysis of recent reviews," The Journal of Continuing Higher Education, vol. 62, pp. 39-49, 2014.