

# Application of 'Mind Mapping' as a Teaching-Learning & Assessment Tool in Health Professions Education

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## ABSTRACT :

**Background :** A 'Mind map' is a diagram used to represent words, ideas, tasks, or other items linked to and arranged around a central key word or idea. These tools are simply a way to visualize a concept. It's an aid to studying, organizing, summarizing information, and writing. The research on the use of Mind mapping as a teaching-learning-assessment strategy has been done in health professions education including medical education in general as well as in specific subjects. Mind mapping is an aid in medical education and a potentially valid tool that can be used by students and teachers for multiple purposes. It particularly helps medical students to learn and organize information faster. They can communicate their ideas quickly and precisely in a diagrammatic form. For teachers too, it allows to monitor and assess the students understanding more efficiently.

**Key words :** Mind map, medical education, learning

## INTRODUCTION :

'Mind mapping' is one of the visual mapping techniques that is used for displaying complex information visually. It is the graphical organization and presentation of information. The idea of displaying complex information visually is pretty old. For example, 'Flow charts' were developed in 1972[1] pie charts and other visual formats go back much earlier[2]. More recently, visual displays have been used to simplify complex philosophical issues[3]. Formal ways of 'mapping' complex information as opposed to the earth's surface, countries, cities and other destinations began at least 30 years ago, and arguably even earlier. More recently, the use of information and computer technology has enabled information mapping to be achieved with far greater ease.

## ORIGIN<sup>[4,5]</sup> :

Modern mind mapping has been around since the mid-1970s, having been developed in its current form by Tony Buzan. It works by taking information from several sources and displaying this information as key words in a bright, colourful manner. Mind maps have been described as an effective study technique when applied to written material.

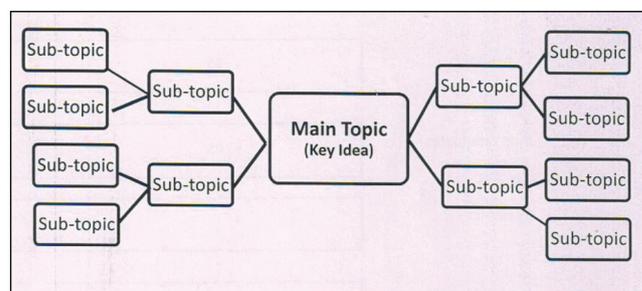
A 'Mind map' is a diagram used to represent words, ideas, tasks, or other items (in different colors, pictures) linked to and arranged around a central key word or idea. These tools are simply a way to visualize a concept. It's an aid to studying, organizing, summarizing information, and writing. It is an extremely effective method of taking notes and it also aids recall of existing memories.

## FRAMEWORK OF MIND MAP:

In a mind map the main study topic is drawn at the center with key words branching at divergent pattern. These key words correspond to subtopics and then smaller branches project from the subtopics with further details regarding the subject being included in a progressively branching pattern. These sub-branches of key words or pictures can be linked together resulting in the integration of different parts of the mind map

By undergoing this process, information initially contained within passages of text becomes hierarchically organized, with the most general information being presented in the center of the mind map and material of increasing detail being presented at the extremes.

**Figure 1 - Basic structure of 'Mind map'**



## TECHNIQUE:

The medium for drawing the mind map is usually colored pens or pencils. Students can begin by drawing an image in the center of the paper that reflects the central theme, or topic, of the mind map which is to be created.

By placing this central image in the center of the paper it allows the student 360 degrees of freedom to develop their mind map. Next, the student draws main branches with key words extending from this central image. The branches represent different categories which the student perceives as being relevant to the content of the key concept of the mind map. From these main branches, sub-branches are created. One key tenet of the mind map is that each of the branches and sub-branches should contain pictures to aid in recalling the information. These sub-branches of key words or pictures can be linked together resulting in the integration of different parts of the mind map.

#### **APPLICATION OF 'MIND MAPPING' IN VARIOUS DISCIPLINES/FIELDS :**

The research on the use of Mind mapping as a teaching-learning-assessment strategy has been done in health professions education including medical education in general as well as in specific subjects. Anthony V. D'Antoni et al(2006)[6] made use of Mind Map as learning technique in Chiropractic Education and concluded that use of the mind map promoted course material integration and learning in physical therapy education and further work is needed to explore its usefulness in chiropractic education. Application of Mind Map as a new teaching-learning method for Medical Immunology[7] revealed that, it enhances the visibility and logic correlation among knowledge points. It gives a good solution to the problems existing in medical immunology learning and also helps student's divergent thinking and their innovation ability. Even for gross Anatomy [8], Mind Mapping is a better learning tool and helps to score better in written examination when compared to standard note taking. Genevieve Zipp and Catherine Maher (2013)[9], stated that though the Mind Mapping is not used in many physical therapist education programs primarily due to faculty's lack of awareness, but the faculty would be interested in exploring its utility if they understood mind mapping tenets and relevance as a teaching and learning strategy.

#### **OTHER ASSETS OF MIND MAPPING:**

##### a) Recall of information and critical thinking-

The Mind maps have also been examined for effectiveness to improve factual recall from written information. Farrand P et al (2002)[10] in a study found that recall of factual material improved for both the mind map and self-selected study technique groups of medical students, at immediate test compared with baseline. However, this improvement was only robust after a week for those in the mind map group. At 1 week, the factual knowledge in the mind map group was greater by 10%.

Similarly, Anthony V D'Antoni et al (2010)[11] tried to find out whether the mind map learning strategy facilitate information retrieval and critical thinking in medical students and revealed that although mind mapping was not found to increase short-term recall of domain-based information or critical thinking compared to 'Standard note taking', a brief introduction to mind mapping allowed novice Mind Mapping subjects to perform similarly to 'Standard note taking' subjects. This demonstrates that medical students using mind maps can successfully retrieve information in the short term, and does not put them at a disadvantage compared to 'Standard note taking' students. Thus there is scope for future studies to explore longitudinal effects of mind-map proficiency training on both short and long-term information retrieval and critical thinking.

##### b) Promotion of student engagement-

While many researches done on investigating the use of Mind maps as a teaching and learning tool to foster critical thinking and clinical reasoning in students, Genevieve Pinto Zipp (2011)[12] focused on the utility of Mind Maps to promote Student engagement. It was found that by requiring students to generate mind maps on pre-class reading material they are more prepared to engage in class activities. Similarly Wickramasinghe et al[13] studied the effectiveness of mind maps as learning tool for medical students and stated that majority from the mind map group perceived it as useful tool to summarize information and wanted to study further about mind mapping.

##### c) Mind mapping as a teaching tool -

Sarah Edwards, Nick Cooper (2010)[14] explored Mind mapping as a teaching resource. They insisted that, though the Mind mapping is a technique not often used or considered by many teachers but a busy clinical teacher can apply this technique in a practical, useable way. The investigator concluded that Mind mapping has many potential applications to clinical education, and can be adapted to many situations. It can be used as a teaching resource, as an aid to preparing and reviewing lectures, and the technique allows notes to be written and reviewed quickly, and most importantly enables information to be easily updated. Vilela VV et al(2013)[15] showed how students and teachers can use mind mapping in teaching and learning processes, contributing to better quality and performance in medical education. It is a technique that can be easily taught and learned and requires no equipment or high costs.

##### d) Mind mapping as an assessment tool-

The Mind maps are also used as an assessment tool, wherein maps as a gradable piece of student work, can

be assessed using a rubric. The rubric used should be appropriate to the required learning outcome for that topic and should not hinder flexibility. D'Antoni, Zipp and Olson (2009)[16], in their study, proposed a scoring system to assess mind maps and examined the inter-rater reliability of their scoring system. Generally, while using the Mind map as an assessment method, the content and structure of the Mind map would take precedent over appearance.

In addition, Mind mapping can be used in many situations including problem-based learning, small-group teaching, in a one-to-one context, as an examination tool and for personal revision.

### CHALLENGES OF USING MIND MAPPING TECHNIQUE:

Though the Mind maps can help us enjoy an enhanced creativity, a boost in memory retention and an enhanced problem solving ability, still these are not without any drawbacks or challenges. Individuals, who particularly think in a logical way, may find it difficult to trust their creativity or innovation, which is required for making any mind map. Another drawback is the time consuming nature of mapping exercise. For hand drawn maps, limited space/area available on the paper may sometime act as an obstacle for 360 degree expansion of the key topic. Once an individual has created and personalized his/her map, it might be difficult for others to understand all his/her ideas and concepts.[17]

### SOFTWARE FOR MIND MAP :

Now days, various software are available for preparing a mind map. These software are having good usability, friendly interface and excellent features. E.g. XMind, FreeMind, Mind manager, Mind Meister, MindMaple, etc

### CONCLUSION:

Thus the Mind mapping is an aid in medical education and a potentially valid tool that can be used by students and teachers for multiple purposes. It particularly helps medical students to learn and organize information faster. They can communicate their ideas quickly and precisely in a diagrammatic form. For teachers too, it allows to monitor and assess the students understanding more efficiently. Mind mapping has its own advantages and disadvantages. However, this doesn't indicate that these drawbacks can make this technique less useful.

Secondly, the combined use of learning methods could compensate for the limitations of different individual teaching-learning & assessment methods, enabling a richer learning experience for students. Hence, mind maps can be an attractive resource that can be added to the repertoire of active strategies in teaching and learning.

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