

Effectiveness of mind maps as a learning tool for medical students

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Background

The Mind Map is an expression of Radiant Thinking, the associative thought processes that proceed from or connect to a central point, and is therefore a natural function of the human mind. It is a powerful graphic technique that can be applied to improve learning and clearer thinking (Buzan & Buzan, 1993). Mind maps can be used as self-learning methods that facilitate understanding of difficult concepts.

Objective

The curriculum of the Faculty of Medicine, University of Colombo, Sri Lanka emphasises the need for self-directed learning and deep learning. Our objective was to evaluate the effectiveness of using mind maps as a self-learning method for the new entrants to the Faculty.

Method

Seventy-four new entry medical students were randomly selected and assigned to

two equal groups based on their high school performance. (Mind map vs. self-selected study technique). A text on iron deficiency anaemia was selected as self-study material. The mind map group was given a 30-minute lesson in the technique. Both groups were exposed to the study text for a 45-minute period and were requested to answer four structured essay questions based on the study text.

Results

There was no significant difference between the marks of two groups. The average mark of the entire group was 34.4%. Majority (97.1%, N=34) from the mind map group felt that it is useful to summarize information and 87.9% want to study further about mind mapping.

Discussion

Mind map technique is not superior in newly trained for short-term learning; however majority perceived it as a useful learning tool.

Background

A mind map is a diagrammatic representation of words, ideas, tasks or other items associated with a study topic. These maps are useful tools that can be utilized to represent the structure of knowledge in a form that is psychologically compatible with the way human beings construct meaning (All & Havens, 1997).

In a mind map the main study topic is drawn at the centre with keywords branching out in a 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. By undergoing this process, information initially contained within passages of text becomes hierarchically organized, with the most general information being presented in the centre of the mind map and material of increasing detail being presented at the extremes (Farrand *et al.*, 2002). It is used to generate, visualize, structure and classify ideas, and as an aid in study, organization, problem solving, and decision making. The elements are arranged intuitively according to the

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importance of the concepts and they are organized into groups, branches, or areas. The uniform graphic formulation of the semantic structure of information on the method of gathering knowledge, may aid recall of existing memories.

Mind maps can be used as self-learning methods, which enhance the focus on salient rather than irrelevant aspects. It also facilitates the achievement of a conceptual understanding of the fundamental principals of a huge amount of information and enables to assemble and integrate many concepts together. Mind maps promote active learning. Analysis of the data indicates that, as a strategy to improve memory for written information, the mind map technique has the potential for an important improvement in efficacy (Farrand *et al.*, 2002).

Medical schools have been changing their educational programs and teaching strategies, at national and international levels, to ensure that students have active responsibility for their learning process and are prepared for life-long, self-directed learning (West *et al.*, 2002). The effort toward developing active learning was based on the concern, expressed by experienced medical educators, that students memorized facts ("rote learning") instead of understanding and applying concepts ("meaningful learning") (Rendas *et al.*, 2006). Unless there is understanding, students may only commit unassimilated data to short-term memory and no meaningful learning will occur (All & Havens, 1997).

The curriculum of the Faculty of Medicine, University of Colombo, Sri Lanka emphasises the need for self-directed learning and deep learning. Therefore the study was performed not only to evaluate the effectiveness of mind maps as a self learning method, but also with the objective of introducing this technique to the new entrants to the faculty.

Objective

Educational materials have recently emerged which aim to improve memory for medical information by representing facts in the form of "mind maps". Our aim was to evaluate the effectiveness of using mind maps as a self-learning method.

Methodology

A total of seventy four students from the new entrants to the Faculty of Medicine, Colombo were randomly selected to participate in the study. They were assigned to two equal groups designated the mind map group and the self-selected study technique group according to the rank obtained at the university entrance examination. There were only four dropouts from any of the sessions.

A text on "iron deficiency anaemia" was selected from a recommended text book as self study material. The topic of the text was carefully chosen to minimize the possibility of participants' existing knowledge in the selected study material from interfering with the results. The investigators developed four structured essay questions from the study text and all questions were of a similar length and required the recall of a specific piece of information presented in the text. Each question reflected a similar level of difficulty.

Initially the participants in the mind map group were given a 30-minute lesson on the mind map technique to train them on the application of the method. The lesson used material totally unrelated to the study text to demonstrate the best ways to produce and memorize mind maps. During the training the participants were given the opportunity to ask questions regarding the technique.

Following this training both groups were exposed to the selected study text on iron-deficiency anaemia for a 45-minute period.

Participants in the mind map group were advised to divide the time between reading the study text and producing a mind map and studying it. Participants in the self-selected study technique group were advised to divide their time between reading the text and applying their existing study methods. None of the participants in the self-selected study technique group used mind maps as their preferred method of study. Following the study session all participants were again given 30 minutes to answer the questions. The perception regarding the technique was obtained from the mind map group using a self-administered questionnaire.

In the study, a method was developed to score the Mind Maps prepared by students taking into account the map's structure as well as its content. The answers were marked using this pre-prepared marking scheme. Data was analysed using the Statistical Package for the Social Sciences version 15.

Results

The average mark obtained by the entire group was 34.4%. The average mark obtained by the mind map group was 31.3%. It was 37.6% in the self selected study technique group. There was no statistically significant difference between the two groups.

However all the participants (100%, N= 34) in the mind map group have realized that it is a useful way of memorising information. Almost all (97.1%, N= 34) from that group perceived the technique as a useful method of summarising information and wanted to follow the technique for their future studies. A majority (87.9%, N= 34) wanted to learn more about mind maps.

Discussion

The students of the mind map group as well as the self selected study technique group were able to achieve a satisfactory performance level after being exposed to a totally unfamiliar topic. A majority in the mind map group had grasped the concept of developing mind maps after the initial training session. A majority designed the mind maps incorporating many of the key features of mind maps. The information embedded in the mind maps varied from one student to the other reflecting individual educational needs. Considering the fact that they have been exposed to the technique for the first time, it is supportive towards promoting the use of mind maps as an effective self-learning tool.

However the mind map technique did not show any superiority over other conventional study techniques as a short term learning method in a newly trained population. But the majority of the mind map group perceived it as a useful way of summarising information. They also perceived it to be helpful in memorising information in an organized manner compared to their previous self study techniques. Students expressed their interest to learn more about the mind mapping technique and follow it in their future academic activities.

The mind map technique may not be effective in improving retention of information in the short-term. Further studies should be undertaken to evaluate its effectiveness in retaining information in the long-term. Students' perception of the mind map technique as an effective learning tool is a positive factor in deciding the use of mind maps as a learning method.

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