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Mind maps as a new teaching strategy for medical students

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Learning strategies in traditional medical education are lectures, tutorials and practical techniques. A learning strategy is a thinking method that a student uses to acquire actively information as charts, and maps.[1] Diverse learning strategies in medical education, have been applied over the years. Case-studies are used to improve student's integration skills,[2] while problem-based learning are used to teach students to be self-directed learners.[3] Learning strategies in medical education are based on a theoretical learning theory which is the constructivist theory where, learners integrate new information within their current frameworks. The learner in the constructivist theory will assimilate the information into an individual Kevin framework so it will be reserved and lead to meaningful learning.[4]

Medical education strategies and underlying learning theories

Active learning methods, as problem-based learning, case-based teaching, didactic learning and web-based teaching are recognized strategies to stimulate student's critical thinking.[5] These strategies aid students to learn and eventually integrate information.[6] These learning strategies differ in efficiency and applicability, but they are in the same conceptual framework which is the constructivist theory of learning. This learning theory states that learning with understanding, happens when learners integrate new information with their current knowledge. Constructivism underlies mind mapping and concept mapping as learning strategies which are promising approaches in the setting of medical education.[6]

Students are expected to master large amounts of information. There are restricted learning strategies accessible to these students to memorize and recall essential information to succeed in their medical colleges. When medical students received very large amount of information, passive learning will result.[7] Passive learning is a learning strategy that focus on memorization without an effort to understand and connect information. Passive learners lack cognitive motivation through the learning process, and do not connect between information units. In contrast, active learning involves the learner in activities that encourage meaningful learning.[1] Mind maps and concept maps are active learning approaches that involve the learner in the learning process, and permit the learner to integrate information actively on a metacognitive level.[8]

Students remember facts rather than understanding and applying concepts. We must prepare students for self-directed learning through creating learning tools which will allow students to think and establish ideas. A learning approach is a thinking tool which enables the student to use and acquire information actively. Several learning approaches have been used as traditional note taking, mind maps, concept maps and flow charts.[9,10]

Mind mapping versus concept mapping

The concept of mapping strategy was established by Joseph Novak which has a hierarchical order that allows one to relate the linking of words or concepts together. It showed the relation between concepts in a top-down diagram which contain cross connections between concepts.[11] Although concept maps widely used in classrooms were efficient in student learning for numerous topics, they have disadvantages, that include:

a. They are not suitable for developing practical skills,

b. They present difficulties in presenting large number of items because of the arrows and boxes formatting;

c. They are a slow visualization technique; and

d. There is no template for a concept map, so it represent the student's own understanding of ideas, which may be incorrect.

Beside the concept map strategy, there is the mind map, which helps the student to visualize, interpret and understand information. A mind map is a diagram which represents words, concepts, ideas, or other items related to the topic. Although the mind map, as a learning strategy, has not been extensively used in medical education, the latest research recommends using mind mapping in learning as it increases medical students long-term memory. Moreover, mind mapping is a multi-sensory tool which uses visual orientation to assimilate information and, subsequently, help students to recall information in an organized manner.[6]

Mind maps as a teaching tool have been used to encourage critical thinking by inspiring students to assimilate information and understand relations between the clinical and basic sciences.[12] In the application of the mind map, addition of colors and pictures facilitate memory,[13] and enables the student to have linear - and visual -oriented learning styles. A mind map is a drawing that uses words, figures, ideas, or other items organized around a principal key word. Mind maps aid in the visualization of a concept in order to study, organize, and summarize information. It is an effective tool with taking of notes so that one can recall recently acquired memories. In mind maps the main topic is drawn in the center and key words diverge from it. Smaller branches project from these key words and more details about the subject are incorporated in an increasingly branched pattern.[14]

Advantages of mind mapping as a learning tool

The reasons for using mind maps in learning and teaching

include: it removes what is related to lengthy text; it allows learning through synthesis; it clarifies and better reorganizes ideas; it assists in revisions; it enhances visualization of the content learned prior to the student's final understanding of that information; cooperation through group study permits mutual enrichment; and finally, mind maps submitted to a group results in a higher quality experience because more individuals are involved and this produces more ideas and more critical thinking. In medical education, mind maps enables the student to better integrate information so that it is better organized. This results in the better recall of information.[15,16]

The majority of the medical students were hesitant to use the mind map technique and were unresponsive to learn from it.[14] On the other hand, in a previous study, the mind map method showed the advantage over traditional note-taking, in that students from a mind map group had a better pass rate than those using traditional note-taking. Students in mind map groups found it a beneficial way to summarize information. Mind map groups had significantly higher knowledge recall than traditional note-taking group.[17] Moreover, medical students found that mind map is a perfect way to memorize information (100%) and to summarize information (97.1%).[18] Additionally, Abdolahi et al.[19] reported the interesting finding that female students had higher scores as compared to male students when the map mind technique was utilized.[19]

How can medical students use mind mapping as a learning tool

Mind map may be very valuable for medical students, but first students need to know how to use it. This require training to make the mind map learning strategy effective to medical students. They should know how to structure and simplify ideas into leveled topics to be effective in recalling information. During formatting mind maps content, active studying will be achieved by students because they will generate a product which is not simply memorizing content; but rather it will stimulate learning and organize thinking.[15] Moreover, mind map induces non-linear associative thinking.[20]

Conclusion

Graduate physicians think critically and this involves: inductive reasoning, analysis, and reflection as the main goals of medical education.[21] The mind map as a learning strategy could help medical students to think critically and offer excellent patient care.[22,23] Previously, researchers faced the challenge of how to implement the mind map technique as a learning tool and to find ways to reliably apply a scoring system for the effective evaluation of its use by students: Further studies should be conducted to find out how to implement mind map as a teaching and learning tool with valid scoring system and to evaluate student's perception about it.

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Conflict of interest

Author declares that there is no conflict of interest.

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