

ASSESSING KNOWLEDGE CONSTRUCTION IN MEDICAL RESIDENTS THROUGH SERIAL CONCEPT MAPPING

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Abstract. Medical residents (post graduate trainees) in the US are assessed once annually through an in training multiple-choice exam. However, there is no assessment of their knowledge development and thinking processes on a formative basis. A challenge for supervising faculty is the inability to evaluate residents' development and progression of thinking over time. Concept maps have been shown to provide assessment of learning and performance (Daley & Torre, 2010) while serial concept maps reveal students' growing understanding of a single concept (All & Huycke, 2007). Therefore, our study aimed to assess medical residents' knowledge growth and meaning making process using serial concept maps.

A small-scale pilot study was conducted with 56 residents at a graduate medical education program in the US. Residents were required to create three serial concept maps throughout the academic year on a clinical topic of their choice. A 30-minute orientation session was conducted to introduce relational concept maps (Novak & Cañas, 2008) and CmapTools. Residents worked on their serial maps approximately every 3 months for 1 hour during a scheduled time in the curriculum. After each mapping session, residents' maps were stored electronically by researchers.

The first maps included few concepts with a limited number of propositions and almost no hierarchy and progressive differentiation. Some concepts had no propositions or propositions between concepts were not labeled. It was evident that participants were trying to synthesize content, master the concept mapping process, and CmapTools.

The second maps included a higher number of concepts, linked by more meaningful propositions. An initial level of progressive differentiation and hierarchy began to emerge. The third maps began to show greater knowledge integration and interrelatedness of concepts by an increased propositional network including several levels of hierarchy with crosslinks.

The findings show that the concept maps were good indicators of how participants were making meaning and constructing knowledge from the information they were receiving. The expansion in the maps revealed a deeper understanding of the topic, and a process of continuous knowledge assimilation and restructuring. Furthermore, the concept maps provided instructors with an opportunity to assess residents' knowledge structures and understanding and it enabled them to follow the participants' learning longitudinally. The concept maps also highlighted areas for concern that could then be addressed with the resident.

Serial concept mapping is a feasible instructional tool in a residency curriculum. This approach can be used for remediation, to detect inaccuracies, gaps, misunderstanding allowing for feedback to be provided at different times throughout the program.

Keywords: serial concept mapping, medical education, medical residents, graduate medical education, knowledge construction

References

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