Evaluating Case Mapping as a Learning Tool for Problem-Based Learning in Medical Education

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Introduction

The problem-based learning (PBL) curriculum is the core learning modality for medical students at the University of Hawaii John A. Burns School of Medicine. Students are first introduced to PBL in MD1 Health and Illness, where they are provided learning tools that complement PBL that solidify the concepts covered in this curriculum. Case mapping, one of the learning tools, is an active form of learning where students make decisions to construct a map that organizes information by grouping facts and concepts. This modality prevents linear focus by illustrating relationships between concepts through cross-links, utilizing higher order learning than rote memorization alone, and fosters self-directed learning. Case mapping has been found to be effective in promoting critical thinking that translates into clinical and diagnostic reasoning.

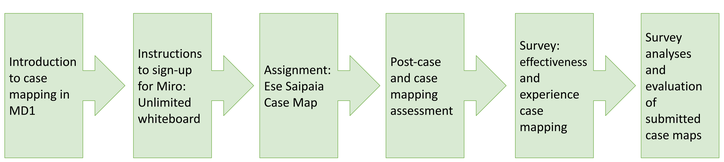
Thus, our aim was to introduce case mapping as a supplementary learning tool to evaluate its utility and efficacy for medical students in a PBL curriculum.

Methods

This study collected data from first year medical students (n=57) at the John A. Burns School of Medicine. Students received an instructional session on case mapping and its application to PBL. Following this, students were assigned to construct their own map on the pertinent concepts involving the differential for sore throat and Streptococcal pharyngitis. This assignment was followed by an anonymous, voluntary questionnaire inquiring about their opinions of the value and benefit of case mapping.

Survey:

Post-Test:

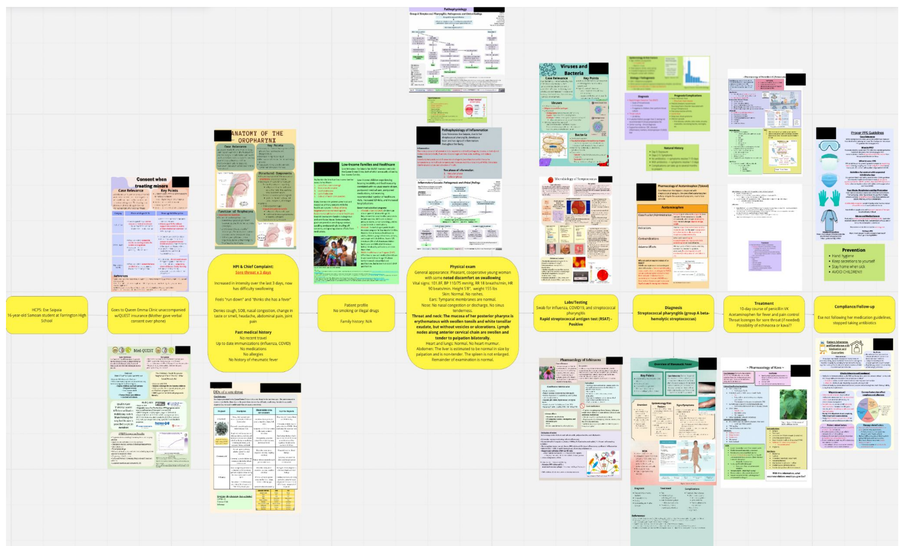


Results

	Strongly Agree + Agree	Neutral	Disagree + Strongly Disagree
Case-mapping helped with integration of concepts and learning issue (LI) topics	59.6	28.1	12.3
Retention of information relating to biological LIs	47.4	36.8	15.8
Retention of information relating to the clinical LIs	52.6	35.1	12.3
Retention of information relating to the populational LIs	29.8	42.1	28.1
Retention of information relating to the behavioral LIs	31.6	40.4	28.1
Promotion of active learning and facilitated discussion between my group members	70.2	17.5	12.3
Using an unlimited whiteboard program, such as Miro was helpful in constructing my group's case map	91.2	8.8	0.0
Will continue to use case mapping as a study tool	40.4	29.8	29.8
This PBL case mapping exercise should be continued as part of MD1	50.9	38.6	10.5

Data shown as percentages

Student Example



Discussion

In conclusion, case mapping is an effective learning tool that reinforced active learning that was beneficial in first year medical students introduced to a PBL curriculum. While students found case mapping to be an effective tool, responses demonstrated that more time was spent constructing case maps rather than focusing on content of the learning issues. However, with more exposure to the learning tool and unlimited whiteboard program, students could potentially overcome this learning curve associated with its initial use in medical education.

Future Directions:
While this study showed how case mapping can be used as a learning tool in the pre-clinical phase of medical education, there is potential to examine its utility in the clerkship phase as a method of organizing learning through patients.

References

1. Slieman, T. A., & Camarata, T. (2019). Case-Based Group Learning Using Concept Maps to Achieve Multiple Educational Objectives and Behavioral Outcomes. Journal of medical education and curricular development, 6, 2382120519872510. https://doi.org/10.1177/2382120519872510
2. Kasuya, R., Greene, G., Sakai, D., and Tam, L. University of Hawaii John A. Burns School of Medicine. Academic Medicine: September 2000 - Volume 75 - Issue 9 - p S90-S92
3. Fonseca, M., Oliveira, B., Carreiro-Martins, P., Neuparth, N., and Rendas, A. Revisiting the role of concept mapping in teaching and learning pathophysiology for medical students. Advances in Physiology Education. 2020 44:3, 475-481