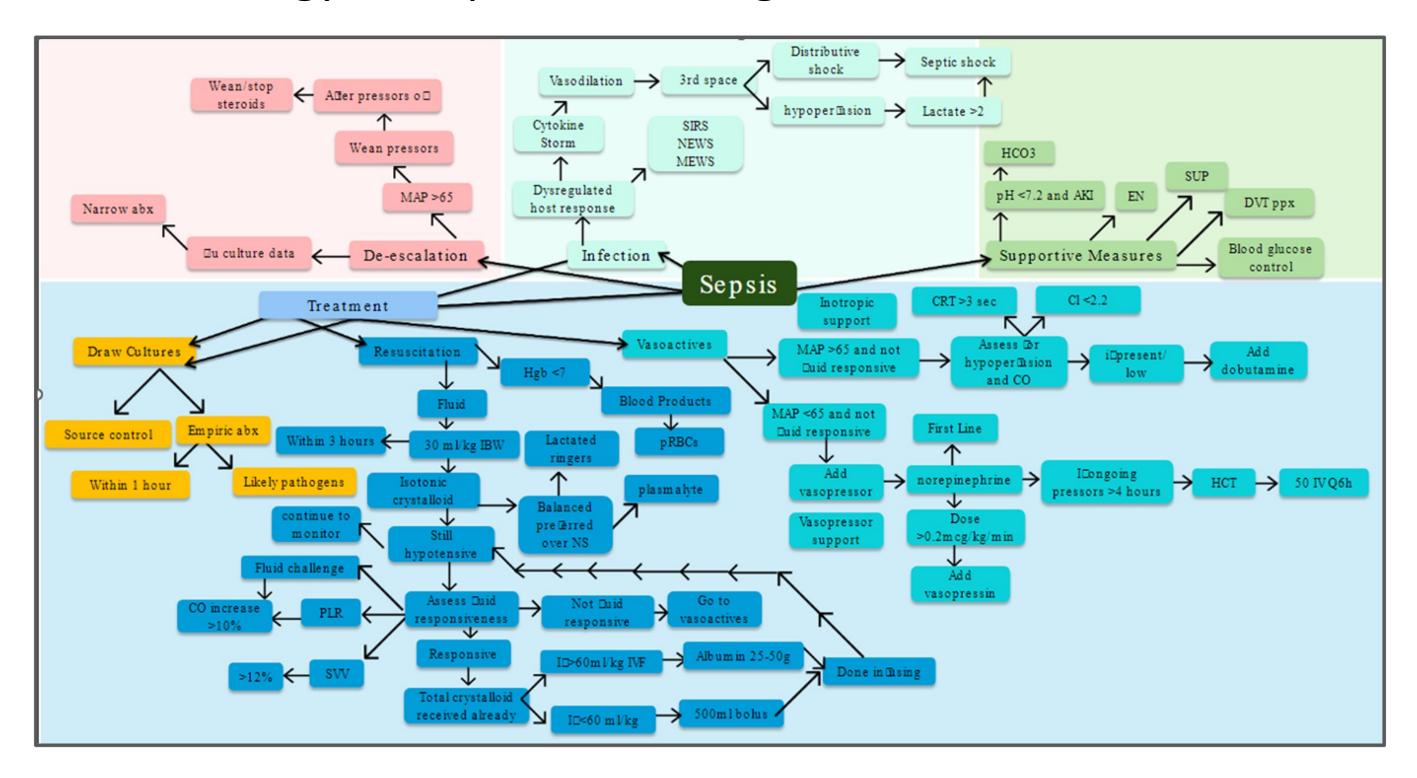


Students' Experience of a Concept-Mapping Technology for Understanding Sepsis Management

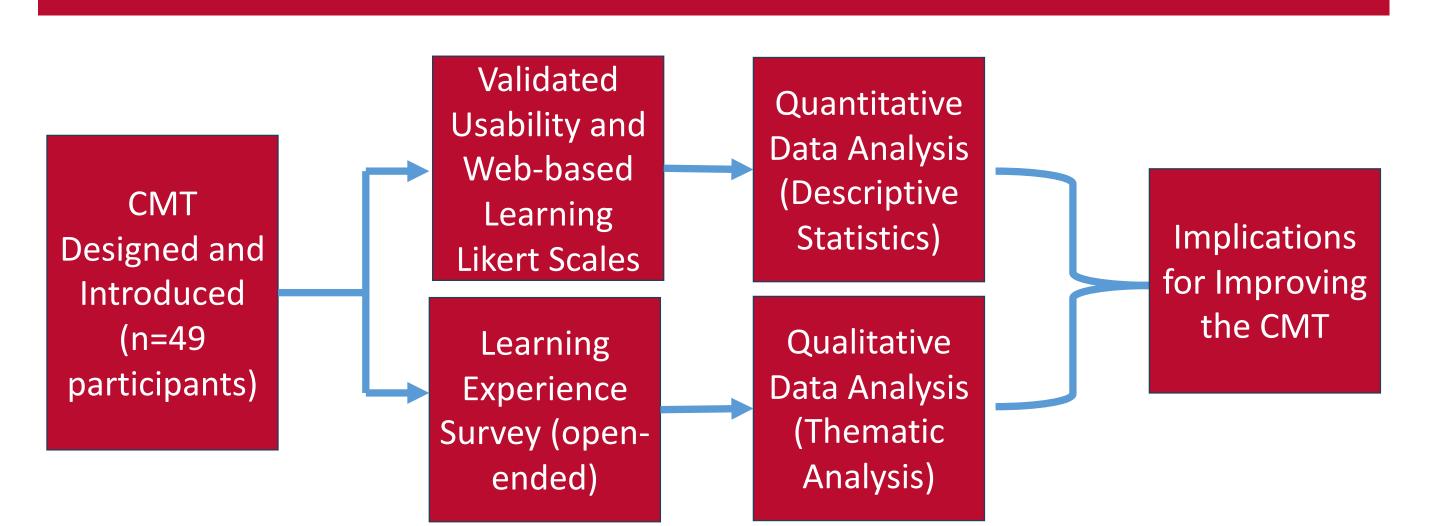
Russ H. Palmer, PhD, Trisha N. Branan, PharmD, Susan E. Smith, PharmD, W. Anthony Hawkins, PharmD University of Georgia College of Pharmacy, Athens Georgia, USA

Background and Objective

- In pharmacy education, innovations are needed that will support students in developing robust conceptual understanding of disease state management that provides a foundation for effective clinical problem solving.
- Recent research highlights the utility of constructing external representations, such as concept maps, for understanding complex concepts & associated problems.^{1,2}
- We developed a concept mapping technology (CMT) with an interactive design, allowing students to move various elements and use directional connectors to build relationships between the elements.
- The objective of this pilot study is to assess the usability, design, engagement, and overall learning experience of the technology to improve its design for future students.



Methods



System Usability Survey (SUS) Results*

Item Level and Aggregate SUS Scores				
Item	Mean	Min	Max	SD
1. I think that I would like to use the CMT frequently	3.39	1.00	5.00	1.31
2. I found the CMT unnecessarily complex	3.08	1.00	5.00	1.31
3. I thought the CMT was easy to use	3.27	1.00	5.00	1.16
4. I feel like I need the support of someone to be able to use the CMT	2.43	1.00	5.00	1.21
5. I found the various functions in the CMT were well integrated	3.49	2.00	5.00	0.86
6. I thought there was too much inconsistency in the CMT	2.65	1.00	5.00	1.02
7. I imagine that most people would learn how the CMT functions very quickly	3.53	2.00	5.00	1.01
8. I found the CMT very awkward to use	2.86	1.00	5.00	1.07
9. I felt very confident using the CMT	3.33	1.00	5.00	1.10
10. I needed to learn a lot of things about how the CMT worked before I could get going with it	2.92	1.00	5.00	1.08
SUS Aggregate Score	57.65	12.5	100	21.37
*Notes: SUS is a 5 pt likert scale. Ideally odd items trend upward while even items trend downward. Aggregate score is converted to a 100 point scale.				

Web-based Learning Tools Survey (WBLTS) Results*

WBLTS Subscale Scores				
Item	Mean	SD		
Learning Subscale	3.34	1.19		
Design Subscale	3.38	1.08		
Engagement Subscale	3.45	1.28		
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*Note: The WBLTS is a 5 pt likert scale designed to measure students' learning experience with instructional technology

Learning Experience Questionnaire Results

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Students' Experience of the CMT				
Theme	Definition	Example Quotes		
Benefit— The CMT Supports Cognitive Elaboration	Constructing connections between new information and existing knowledge.	"Single most useful tool we ever had in pharmacotherapy. Bullet points on a slide really don't illustrate processes well. I realized that there were more details that hadn't been made clear to me until I saw the concept map key"		
Benefit— The CMT Makes the Overall Structure of Sepsis Management More Coherent	Recognizing the relationships between individual parts and the greater whole.	"The benefit is being able to see the sepsis concept in full rather than parts of the sepsis concept."		
Limitation— The CMT May Result in Cognitive Overload	The cognitive demands of a task exceed the capacity of working memory.	"The limitation was a lack of starting point without referencing the key. There were a lot of words to work with and what felt like no starting point."		

Discussion/Implications

- Achieving meaningful (rather than rote) learning requires students to enrich the material they are studying and encode relationships among concepts within an organized knowledge structure.¹ The CMT in this study represents an initial attempt to design an application that supports improved conceptual understanding of sepsis management.
- This initial evaluation of the CMT has demonstrated a path towards supporting students with an appealing learning design that supports cognitive elaboration and helps make the overall structure of sepsis management more coherent.
- The evaluation also identified areas for improvement such as better usability (SUS score was below the benchmark of 68). Additional structure should be considered to help students manage initial overwhelm when first using the tool.