

Concept Mapping in Nursing Education

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Abstract

Concept mapping is way of representing the organization of knowledge. It is a visual graphic, a web diagram for exploring knowledge and gathering and sharing information. Concept maps are two dimensional representations of cognitive structures showing the hierarchies and the interconnections of concepts involved in a discipline or sub discipline. It consists of nodes or cells that contain a concept or question and links. The links are denoted by the direction with an arrow or symbol. Labeled links explain the relationship between the nodes, whereas the arrow marks describes the direction of the relationship. Instructors and students reported satisfaction from use of concept maps in the educational process. Teaching with the aid of concept maps has been incorporated as an innovative and viable teaching method in nursing education.

Keywords: Concept; Mapping; Nursing Education.

Introduction

Although concept mapping was created in the early 1980s, research in nursing education first appeared in 1992. Mapping concepts and ideas is a way to visualize information, communicate, brainstorm ideas, problem-solve, collaborate with colleagues, and manage projects. You can turn ideas and thoughts into a visual diagram that will enhance learning and retention of material.

Historical overview

The technique of concept mapping was first used by Joseph D Novak and his team at Cornell University. The concept maps have their origin in the learning movement called constructivism. The *visual depiction of concepts and ideas* was reported as early as the 3rd century (Emilsson, 2015). Visual diagramming tools are categorized under

an umbrella term called *graphic organizers* and include concept mapping, mind mapping, spider or brainstorming web diagrams, plots, charts (e.g., organizational charts, Gantt charts), cause and effect diagrams, and others (Inspiration Software, 2017).

Evidence based practice

Taylor and Wros describe students' use of a software program to create a visual depiction of a nursing care plan. All and Haycke narrate nursing students unique usage of concept mapping in nursing theory. Mac Nell's article describes the benefits of concept mapping in course evaluation.

Steps in Preparing Concept Map

- *Select:* write down major terms, concepts, and keywords about a topic.
- *Rank:* identify the most general, intermediate and specific concepts and rank them as most abstract to most specific.
- *Cluster:* group the concepts by drawing circles
 - ✓ On top most general concepts.
 - ✓ In the middle intermediate concepts
 - ✓ On bottom specific concepts.
- *Arrange:* place concepts into a diagrammatic

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representation by drawing lines between related concepts.

- *Link and label*: use lines and prepositions to link and label the concepts.
- *Self assessment*: revise the concept map based on the appraisal.
- *Peer assessment*: get feedback from a peer group.
- *Finalize*: finalize concept map based on self and peer review and by critical analysis.

Tips used in preparation of concept maps

The following approaches are used to develop nodes and links

- Top down approach
- Working from general to specific
- Free association approach
- Brainstorming nodes to developing links and relationships.
- Different shapes for nodes to identify different types of information
- Different colored nodes to identify prior and new information
- Cloud node to identify a question.
- Question node to gather information.

Options for Developing Concept Maps

- Developed by faculty or student
- Open or closed structure
- Computer based concept maps

Types of Concept Maps

1. *Spider concept map*: the centre theme or unifying factor is placed in the centre of the map. The subthemes radiate outwardly to the centre.
2. *The hierarchy concept map*: the information is presented in a descending order of importance. Distinguishing factors determine the placement of the information.
3. *The flow chart concept map*: it is similar to flow chart with addition of inputs and outputs.
4. *Picture landscape concept map*: the information is presented in a landscape format.
5. *Multidimensional/3-D concept map*: these

describe the flow or state of information or recourses which are too complicated for a simple two dimensional map.

6. *Mandala concept*: Information is presented within a format of interlocking geometric shapes. A “telescoping” factor creates compelling visual effects which focus the attention and thought processes of the viewer.
7. *Problem solution map*: in this students will have a problem statement, definition, causes and effects leading to a possible solution. It can be more structured or less structured.
8. *Process development map*: there is a beginning and an end with multiple steps and alternatives. Students are asked to create a process for accomplishing a task.
9. *Persuasive argument*: students present a persuasive argument. This can be converted to the word processing document.
10. *Characteristics*: free form of thinking, ask students to think Characteristics of something. Can be used for descriptive type of work.
11. *Research topic*: it is more descriptive ask students to think how, where, why when research questions.
12. *Narrative story type*: it has setting characters, problem and solution. It is more traditional type.

Advantages of concept mapping for nursing students

- Demonstrate cognitive synthesis skills with minimum writing.
- Categorize various ideas.
- Clarify their thoughts
- Define new concept vocabulary
- Illustrate the relationship between ideas/ concepts.
- Aid in creativity by stimulation generation of new ideas.
- Enhance Meta cognitive learning abilities to learn and think about knowledge.
- Share knowledge and information generated.
- Design structures or processes such as written documents, constructions, websites, web search, multimedia presentation.
- Develop problem solving abilities.

Advantages of concept mapping for nursing faculty

- Gain an insight how students understand the existing knowledge.
- Broaden the faculty's understanding on how students develop the relationship between the facts
- Introduce the topic
- Help in formative assessment/evaluation.

Limitation of concept mapping

- If several concepts are included, it will be difficult for the begging students to understand and comprehend the whole meaning and interrelationship between the facts.
- As key words and phrases are used it may be more challenging to interpret the students' main intent.
- Special software is required to create, hence purchase price and training costs should be considered.
- Consumes more time in reading and responding
- Becoming a nightmare for those who do not like computer usage.
- Needs a clear grading rubric, otherwise it becomes subjective.
- Faculty needs to establish the validity and reliability of their assessment tools.

Conclusion

Over the past 25 years, nursing education scholars and researchers have investigated the use of concept maps in teaching and learning. This research has progressed through various stages and greatly expanded the understanding and use of concept maps in nursing. It is now time to move this research into areas that can further transform our educational practices.

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