Navigating the Research Labyrinth: Preparing Winning Research Projects Using Concept Mapping

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Patricia O’Malley PhD, RN, CNS
Premier Health
Dayton, Ohio

Concept Map

- Diagram of relationships
- Leads to, causes, drives
- Organizes ideas- images- words
- Structures knowledge
Why Use Concept Maps for Research?

- The initial conceptualization of a research project is the most difficult element in developing a successful research project.
- How well the project is initially conceptualized is the basis for right choices for design & analysis.
- Conceptualization refers to the articulation of thoughts, ideas, or hunches and the representation in objective form.
- In the planning process, concept maps help the researcher conceptualize:
  - major goals & objectives, needs, resources, & capabilities
  - programs or treatments
  - samples & settings
  - measures & desired outcomes
  - strengths & weaknesses

Origin

- Developed by Joseph Novak & research team beginning in the 1990's at Cornell University
- Work based on theories of David Ausubel (1968), which stressed the importance of prior knowledge in being able to learn about new concepts.
- Novak concluded that learning that matters requires integration of new knowledge and propositions into existing cognitive structures.
- A concept map was defined as a graphical representation where nodes (points or vertices) represented concepts, and links (arcs or lines) represented the relationships between concepts.
- The concepts, and sometimes links, are labeled.
- The links between the concepts can be one-way, two-way, or non-directional.
- The concepts and links may be categorized.
- The concept map may show temporal or causal relationships between concepts.
- Concept maps are powerful tools for learning.
- Use has expanded beyond the classroom.

Concept Map

- Graphical tool to organize & represent knowledge.
- Includes concepts placed in circles or boxes.
- A concept is an event or object or reality described by a label.
- Relationships between concepts are indicated by connecting lines.
- Words placed on a line are linking words to describe the relationship between the two concepts.
- The label is most often a word(s), although symbols can be used.
- Propositions are statements about the event or object either naturally occurring or constructed.
- Propositions contain two or more concepts connected using linking words or phrases to form a meaningful statement.
- Sometimes these are called semantic units, or units of meaning.
Concept Mapping for Planning, Evaluation & Research  
Rosas & Kane, 2012

- Integrated mixed method approach to plan, evaluate & research
- Concept mapping generates valid & reliable results
- Purpose varies considerably - confirms the broad use of mapping outside education

Concept Mapping  
Village & Greig et al. 2012

- Provides rich information
- Appropriate for qualitative or quantitative designs

There is no domain of knowledge or skills for which concept maps cannot be used  
Novak 1990
Concept Mapping
Rosas & Kane 2012

Why does concept mapping work?
Ausubel 1968

Concept Maps
- Drives focused thought & understanding
- Visualizes ideas
- Complements the physiology of brain work
- Helps construct knowledge

The primary benefit accrues in construction
Novak, 1990
Concept Maps Stimulate Metacognition

Harrison & Gibbons 2013

Critical Thinking
Problem Solving
Knowledge

Key to successful research projects

The First Discussion

- Evidence check
- Width & depth
- Organization
- Clinical unit
- School
The First Map

Goals
Map
Project

How Concept Maps Drive Successful Research

- interpret
- organize
- compare
- plan

Concept Map

Successful Map Construction

Facilitator

Shared language

Openness

Success

Yeo CM 2014
Data Collection for Concept Mapping

- Internet
- Survey
- Interview
- Interaction

Map Construction

- Define the problem
- Define the context
- Write the questions- all of them!
- Identify the key concepts- usually 15 to 25 concepts will suffice
- Place the key concepts in the “parking lot”
- Concept maps are never finished. After a preliminary map is constructed, it is always necessary to revise this map & add concepts
- Good maps usually result from three to many revisions
- After a preliminary map is constructed, start cross linking
- Begin focus, limiting and choose

- Novak & Canas 2008
Concept Map Progression

- Meeting 1
  - Deepen the links
  - Integrate parking lot elements

- Meeting 2
  - Connect
  - Integrate
  - Limit
  - Focus

- Meeting 3
  - Concept mapping
  - Trochim WM, 1989

  • Concept mapping focuses group to stay on task/track
  • Relatively "quick" results reduces ambiguity
  • Interpretable related to use of participant's language
  • Provides an image which simultaneously reveals ideas & interrelationships
  • Can help to improve group communication, cohesiveness, morale
  • Provides a structure for a successful research project
Creating the project

Resources

Web Resources
Great brainstorming web site
http://www.bubbl.us
Concept mapping software
http://conceptmap.com (for Windows, OS X, Mac, Linux)
Concept map building site
http://simplemapper.org/
Penn State Library Resources
http://www.library.psu.edu/psul/lls/students/research_resources/conceptmap.html
The birth of concept mapping
Texas Collaborative for Teaching Excellence concept mapping
http://tice.austincc.edu/adnfac/collaborative/onsite_conceptmap.htm
Contact Information
Patricia O’Malley PhD, RN, CNS
937-208-4518    work
paomalley@premierhealth.com    email