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## Concept Mapping as a Data Collection and Analysis Tool in Historical Research

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## Concept Mapping as a Data Collection and Analysis Tool in Historical Research

### Abstract

Nurse researchers explored the history of Mary Breckenridge's Frontier Nursing Service (FNS) during the years 1925 to 1965, to elicit how her experience could inform present day concerns regarding universal access to healthcare. A historical biographical approach informed by critical theory was selected as the methodology. As historical research tends to generate large volumes of data, concept mapping was selected to collect, reduce, organize and interpret data. Additionally, concept mapping can assist researchers to agree on meaning as seen in interrelationships of the data. The final aggregate concept map is a graphic, visual representation of the outcome of this historical research process. The researchers in this study found concept mapping to be an ideal tool for reducing and managing data, visualizing interconnectedness of the data and viewing significant concepts in relation to the whole. The results of this study found the FNS to be a powerful exemplar of a successful healthcare delivery system that had a major impact on the health of the residents in one of poorest regions in the country. Mary Breckenridge was able to mobilize public support and creatively generate resources, to initiate and maintain a community-based healthcare program.

### Keywords

Concept Mapping, Mind Mapping, Historical Research, Qualitative Research, Mary Breckenridge, Frontier Nursing Service

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## Concept Mapping as a Data Collection and Analysis Tool in Historical Research

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The historical approach to research includes biographic, social and intellectual perspectives and is applicable to all fields of study. Historical research calls for “the use of scientific principles to study the interrelationship of social, economic, political, and psychological factors that influence ideas, events, institutions, and people” (Lewenson, 2003, p. 208). The reason for choosing a historical design is that understanding of past events will hopefully enhance our awareness and offer insights and strategies in dealing with current trends and issues. In this study, the researchers were interested in exploring how factors, which impacted the progress of Frontier Nursing Service (FNS) in Kentucky, could inform present day concerns regarding access to healthcare in the United States . The intent of the study was to provide a deeper understanding of trends that influence access to healthcare using a historical approach. Two traditions of historical research are those of the positivist school of thought, which seeks causal relations among variables, and the idealist school, which has interpretive aims.

All three authors read the books, studied the historical documents, artifacts and related articles utilized in this paper. In addition, author three traveled to Hyden, KY to investigate firsthand the home of Mary Breckinridge and the FNS. Additional author contributions are detailed throughout the paper. A biographical approach informed by critical theory was

chosen by the researchers to view the events in a sociocultural context. The advantage of this approach is that it opens a window on the prevailing values, beliefs and culture during which the time period in which the individual lived. By investigating the life of Mary Breckinridge, we hope to shed light on the role of the FNS in the national struggle over access to health care. These events are also viewed from within the theoretical framework of critical theory; it is impossible to tell this story without reference to the many issues of gender, class, and race, as well as the economic and political factors that dominated this period of time.

Historical research tends to generate a large volume of data, therefore a data collection tool based on concept mapping was selected to collect, reduce, organize and interpret data. Two of the authors had experience with concept mapping as a method to organize and cluster data, note complex relationships and view significant concepts in relation to the whole. The author group decided this tool would be an ideal method to reduce the volume of historical data, cluster the data into themes and identify the interconnectedness of events.

### **Concept Mapping**

Concept mapping is a graphical tool that has been used by many disciplines to organize and represent knowledge and enhance meaningful learning. A concept map allows visual representation of regularly perceived concepts in a situation and the relationships among those concepts. The concept mapping process was developed in the 1970's by Joseph Novak of Cornell University as method to increase meaningful learning of students in science courses. (Novak & Gowin, 1984). Novak defined concepts as "perceived regularities in events or objects, or records of events or objects, designated by a label" (Novak, 1998, p.21). Typically, circles or boxes that are designated with labels represent the concepts. The relationship between identified concepts is articulated by linking statements consisting of words or phrases between two concepts which are written on a line. Other educators have utilized arrows, solid lines and dotted lines to designate the nature or directionality of a relationship between concepts. (Baugh & Mellott, 1998). Some encourage the use of signs, symbols and color to stimulate creativity. Novak used the term "semantic unit" to describe the propositional relationship between two or more concepts that are connected by linking words or phrases. (Novak, 1990).

Concept mapping has been implemented as a methodological tool in quantitative research (McGaghie, McCrimmon, Mitchell & Thompson, 2000) and; the technique is increasingly utilized in the social sciences as an interview tool (Cañas, Leake, & Wilson, 1999) and as a tool for data collection and analysis (Tattersall, Watts, & Vernon, 2007, Given, 2008 & Wheeldon, 2011). This technique can assist researchers in analyzing the interrelatedness of data for possible meanings. Jackson and Trochim (2002) found concept mapping useful in qualitative research to assist participants in identifying concepts and formulating meaning. The concept map provides a visual representation of the conceptualization of the interpreted data and be can be used to support findings in the narrative account of the study findings (Trochim, 1989). The researchers were unable to find any historical research studies that utilized concept mapping for data collection and analysis and believe this is an innovative and useful application of this versatile tool.

### **Concept Mapping for Data Collection**

The three researchers collected the data individually and catalogued it using the concept mapping process. Priority was given to materials written by Mary Breckinridge herself, followed by historical materials from the Frontier Nursing Service and School such

as quarterly bulletins over the decades, and professional midwifery literature, such as Varney's Midwifery. PubMed, CINAHL, the American College of Nurse-Midwives (ACNM) website, Google Scholar, and the Frontier Nursing Service website were also investigated, using such search terms as Mary Breckinridge, American nurse-midwifery, the Frontier Nursing Service, .midwifery history in the United States, and Kentucky public health history. Materials collected as data included Breckinridge's published autobiography, *Wide Neighborhoods* (1952), a recent published biography, *Mary Breckinridge: The Frontier Nursing Service and Rural Health in Appalachia* by a historiographer (Goan, 2008), a history of the FNS by Bartlett (2008), a documentary film *The Forgotten Frontier* (1930), about the FNS, both period and recent photographs, and materials gleaned from a variety of internet sources which were recorded and cataloged. Photographs from brochures provided by the FNS and located online at the FNS website were examined. The authenticity and genuineness of the photographs were confirmed prior to use by the FNS. All three researchers wrote personal memos throughout the data collection and analysis process to record their interpretations and insights about the conceptual meaning of the data. In order to maintain procedural rigor, the data was recorded accurately to include the collection method and time, compiled and reduced to a manageable entity by the author group during multiple group meetings. The authors worked together to compare and contrast the content of their maps and personal memos while bracketing for subjectivity. A consensus was arrived at and an aggregate map which represented the agreed upon concepts was developed. Trustworthiness was established using triangulation of the data through data collection from multiple sources, the use of three researchers and multiple perspectives discussed during the analysis and interpretation phase of the study. Researcher subjectivity was repeatedly discussed during group meetings to include how it might affect the trustworthiness of the study results. The importance of maintaining a continual awareness of personal biases and how this might affect the entire research process was discussed and enforced through conversation.. At times, the researchers found it difficult not to judge Mary Breckenridge from a contemporary perspective. Author three is a nurse-midwife; it was necessary for her to recognize her bias in favor of Breckinridge's accomplishments. Ethical issues were considered and discussed by the author group. Specifically, confidentiality of personal records and intellectual honesty were strictly maintained during data collection.

### **Data Cleaning and Preparation**

During group meetings, the researchers all reviewed their individual concept maps and discussed which data appeared to be omitted, mislabeled, or miscoded; they made corrections as these were discovered. They noted common themes and the patterns identified by each researcher, concepts which addressed the primary aim of the study. The development of an aggregate map facilitated preliminary analysis of the data as the researchers explored the key concepts, evaluated the relationships among the data and considered the meanings embedded in the framework. As the key concepts, sub- concepts, and supporting data were identified and clustered, a gestalt began to emerge. The researchers achieved a high degree of agreement on the chosen concepts, enhancing interrater reliability.

### **Concept Mapping for Data Analysis**

The analysis of the historical data involved both interpretation and synthesis and was guided by both the primary aim and the theoretical framework of critical theory. This is in keeping with Lewenson (2003), who points out that, "data analysis relies on the statement of the subject including the questions raised, purpose, and conceptual framework of the study"

(p. 218). Using Fitzpatrick's (2001) approach to historical data analysis, evidence was examined using techniques of internal and external criticism to verify authenticity and genuineness of the data. Fitzpatrick recommends creating a highly specific and detailed written outline; this is used throughout the study to facilitate researcher understanding of the interconnectedness of events, and enables identification of the relationship of specifics to the whole. The group chose a concept mapping process that served as an alternative to the outline described by Fitzpatrick.

Concept mapping facilitated the historical data analysis process recommended by Fitzpatrick, which emphasized looking for interconnectedness of events and the development of a gestalt. Daley (2004) notes that this technique facilitates understanding of the relationships among concepts, and also assists in data comparison between researchers. It is similar in many respects to a coding system, and can be used to both identify themes and come to a visual understanding of the relationships among them.

The researchers decided that as key concepts related to the research purpose were identified, they would be written centrally on the tool. As related subconcepts, supporting, and other related data were identified, those would be clustered in proximity to the appropriate key concept in a dynamic fashion. This led to a complex weave of relationships that clustered around three main categories.

### **Interconnectedness of Events**

The concept mapping process promoted critical thinking and allowed the identification of relationships among data as the map was developed (Tattersall, Watts, & Vernon, 2007). The researchers noted correlations or relationships among the data and used directional arrows and lines to show the nature of the relationship. Directional arrows imply a direct relationship whereas a straight line indicates a correlation or a suspected relationship. The researchers explained in writing on these lines their thinking about the nature of the relationship. This process of developing propositional statements reflects analysis and synthesis where each relationship represents a "unit of meaning" (Trochim & Kane, 2005).

### **Interpretation and Synthesis**

Interpretation and synthesis of the data occurred simultaneously with data collection and organization. As the researchers noted key concepts, subconcepts, supporting, and related data, these were placed on the concept map. Concurrently, as patterns and themes among the data were interpreted according to Fitzpatrick's method, notations were made on the map in the form of propositional statements. The authors communicated their findings throughout the process, came to agreement on key concepts, and stated propositions that supported the study purpose. They agreed that the key concepts that impacted the progress and future of the FNS were social, financial and political factors. As other pertinent and related data were identified, they were placed on the map in relation to the appropriate key concepts. Synthesis occurred as the researchers identified correlations and relationships among the data, using the steps outlined by Fitzpatrick. The concept mapping process facilitated conceptualization, analytic clarity, and intellectual rigor. The maps became representations of the researchers' understandings, and interpretations of the data issued from it (see Appendix A). The personal memos of the researchers were reviewed during the development of the aggregate concept map and were helpful in understanding individual thinking about the nature of relationships.

## Findings

In 1928, Breckinridge built a 12-bed hospital in Hyden, KY, under the most difficult of circumstances; today its 80-bed successor bears her name. By the time of her death in 1965, the FNS had attended at least 15,000 births, the majority of them in homes without running water, central heat, electricity or plumbing, throughout an area of 700 square miles. They lost only 11 mothers (Goan, 2008). The FNS nurses provided safe, cost-effective personalized care, significantly reducing infant and maternal mortality. For example, hookworm infestation decreased from 35 per cent to 7 per cent in the years from 1930 to 1950, and by 1965 the majority of residents in the region had been immunized. Sanitation conditions of the region were greatly improved by efforts of the FNS, and road were installed. How was all this made possible?

## Financial Factors

Mary Breckinridge used her family connections to create a circuit of private fundraising events throughout the nation, but particularly in the northeast and the south. She traveled almost constantly across the nation, giving talks at civic organizations and raising funds, and was well known as a gifted and inspirational public speaker. Her social status gave her access to such notables as Henry Ford and his immediate family, the John Pierpont Morgan family, the Delano family, and other ‘captains of industry’. This was the foundation of her financial base for the FNS, in addition to her own personal inherited fortune from a prominent Southern political dynasty, which she devoted entirely to the organization. Family support was critical to the survival of the FNS on several occasions. This was evident in the long years of struggle to maintain the FNS throughout the Great Depression and the drought of the 1930s.

She was unsuccessful in acquiring governmental financial support for the FNS, for a variety of personal and political reasons, although she was not averse to summoning federal aid for families when famine threatened the entire population of the county. Likewise, she was unable to receive the kind of financial support she expected from corporate structures, such as coal companies and other entities that lay beyond the social circles she traveled within. She discovered, to her chagrin, that ‘new’ business models did not retain the old *noblesse oblige* standards of community involvement that she had expected to find. With two of the largest sources of funding unavailable to her, she increasingly turned to what had worked in the past; her family connections, and personal resources. She wrote two books, *Organdie and Mull* in 1948, and *Wide Neighborhoods* in 1952, as fundraising measures, which were also successful.

## Social Factors

Her views of class and race, while typical of many at the time in the American South, sharply restricted her ability to see other ways of accomplishing her aims. Time and again she turned to her own family and class because she knew how to operate within their confines; she seldom broadened her scope to include societal changes that made her uncomfortable. Her nonconformity and unorthodox ideas that served her well in so many ways did not apply to racial and cultural issues. Only after her death was the FNS able to admit African American students, for example. She remained a supporter of racial segregation throughout her life, having decided that it was the best way for the ‘colored race’ to advance itself. Her attitude towards African Americans was “I support brotherhood rather than equality”. She never had a person of color in her employ at the FNS, although she trained two Native

American nurses with the expectation that they would return to their reservations to work. Likewise, it has been noted that she hired few local residents to work for her service and did not encourage the women of Leslie County to consider higher education as a means of becoming FNS nurses themselves.

The war years (1939-1945) brought other challenges, mainly due to the loss of her British staff to the war effort. This created the necessity and the financial burden of establishing a midwifery school for the FNS at Hyden. She did participate in the US Nurse Cadet training program, but not for long, due to issues related to educational requirements. She had no 'by the book' curriculum and instead sent students out on home visits with her remaining staff to learn about whatever came up in the course of the day.

## Political Factors

She was the product of a particular time and place that greatly feared and mistrusted the role of the federal government. She notes in *Wide Neighborhoods* (1952) that when she was a child, her father refused to purchase property in Washington DC, based on his own youthful memories of having family property confiscated during the Civil War, despite the fact that he was a member of Congress at the time. She chose not to receive federal support for the FNS, in part because she was impatient with the application procedures, but also because she feared the federal regulatory processes involved, and loss of personal control of the organization that might ensue. When President Truman attempted to introduce national health insurance, she opposed the measure on the grounds that control of the public health services she envisioned should be local or statewide, not federal. Private insurance and pharmaceutical companies, the American Medical Association, and the American Hospital Association also united to fight Truman's bill, labeling it socialist, un-American and a threat to free enterprise. This was probably the greatest single factor in keeping the FNS from spreading nationwide in the postwar era.

It is clear that Mary Breckenridge was a maverick who at the same time did not brook opposition; she valued her own judgments and independence, and was reluctant to share power with anyone for any reason. This personal characteristic, combined with her political and social views, made her both an iconoclast and a supporter of the status quo. She firmly believed that social endeavors were most successful when 'people of the highest quality' chose to work for the greater good, with minimal interference (or accountability to others). This limited her ability to realize her grand vision of a network of interconnected local nursing centers that attended to the needs of the rural (and eventually, urban) poor.

Some of her decisions may have interfered with progress in Leslie County. She opposed the building of a bridge that would have provided better access to Hyden and was hesitant to replace her horses with automobiles for the FNS staff. It has been speculated by some authors that she fought modernization of the area, wanting to maintain a certain degree of remoteness and isolation because this was a crucial selling point in her fundraising activities. Her inherent romanticism may have played a role in this as well. She opposed social welfare programs in general, stating that was "best left to the private sector", and also opposed a local miners' union's attempts to acquire healthcare benefits as a condition of employment.

Yet Breckenridge envisioned the expansion of her healthcare model, which was inspired by the National Health System of Great Britain, to healthcare in the United States. The federal government's involvement in maternal and child health grew over the years of her service, although there was continual opposition from groups who feared any system that resembled socialized medicine. She witnessed the introduction of Medicaid, Medicare, the

Veteran's Health Administration, and the Indian Health Service, before her death at age 89 in 1965.

### Discussion and Conclusions

This historical research paper explored the history of the FNS from 1925 to 1965 and sought to elicit those factors which impacted the progress of the organization during that time and illuminated how a historical model could inform present day concerns regarding universal access to healthcare. An important assumption of the researchers was that knowledge about the past helps to foster understanding of the present and future. A biographical approach informed by critical theory helped the researchers view the events in a sociocultural context. The historical analytic approach as described by Fitzgerald (2001) was utilized to verify genuineness and authenticity of data, visualize the relationships of specific data to the whole and to see the interconnectedness of events.

The researchers found concept mapping to be a useful tool for data collection and analysis. They used to tool to individually collect data, share and discuss findings and then agree on meaning as seen in interrelationships in the data. The final aggregate map is a graphic, visual representation of the outcome of the historical research process. Important limitations of historical research include problems with data, which may be incomplete, inaccurate or obsolete. Many of the original authors may have passed away and cannot verify authenticity or veracity of their writings. The interpretation of the data may be affected by the researchers' own biases. Obtaining this information can be very helpful, however, in understanding current issues and trends and assist in decision-making.

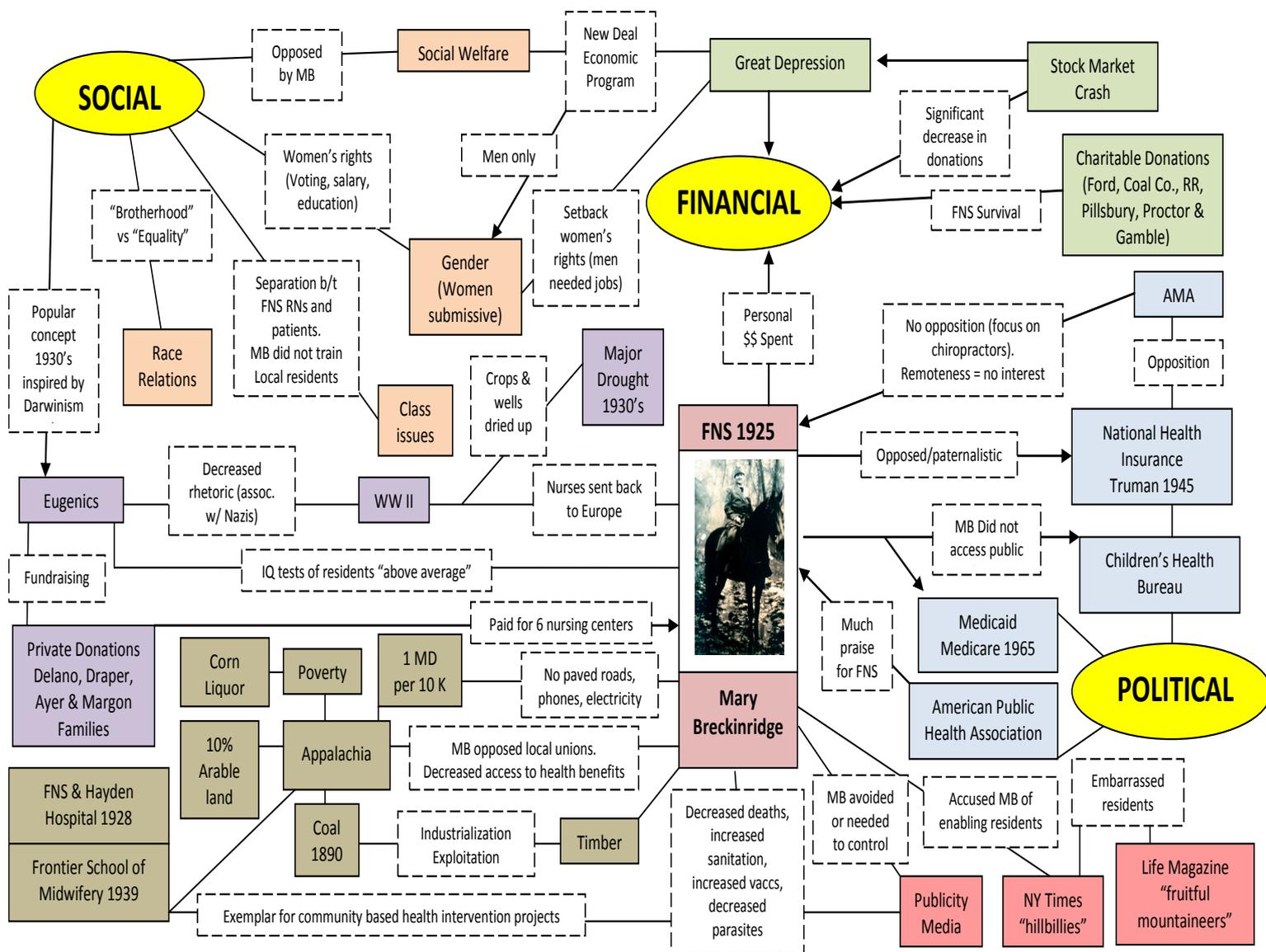
This research study did not discover any new information about Mary Breckinridge but examined her healthcare model that was decentralized, inexpensive and effective. This information is highly relevant today as we explore ways to make our present health care system more effective, affordable and accessible. This study examined the economic and political which played a heavy role in limiting what she was able to accomplish in her lifetime. It forced her to keep her focus on local issues and concerns. She made do with what resources she had, and the FNS survived. The FNS is a powerful exemplar of a successful healthcare delivery system that had a major impact on the health of the residents in one of poorest regions in the country. Mary Breckenridge may be seen as a role model who was able to mobilize public support and creatively generate resources, to initiate and maintain a community-based healthcare program.

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Appendix A



Author Note

Nancy Baugh PhD, ANP is an associate professor at the University of Southern Maine. She teaches baccalaureate and graduate level nursing students and has been involved in increasing the use of creative learning strategies throughout the curriculum. She has used concept mapping as a heuristic tool to promote critical thinking, improve problem-solving skills and foster understanding of the interrelationships among complex patient data. Her research interests include obesity prevention and management and she is currently developing an online healthy lifestyle management program for college students. Her contact information is as follows: Cell: (207) 939-2927; E-mail: [nbaugh@usm.maine.edu](mailto:nbaugh@usm.maine.edu).

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