

## CONCEPT MAPPING AND THE RESEARCH PROCESS: A LIBRARIAN'S PERSPECTIVE

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**Abstract:** For many graduate students the process involved in producing a capstone project, master's thesis, or PhD. dissertation is an intimidating mystery. Coursework does not adequately prepare them for the rigorous demands placed on their time and mental energy in the pursuit of an original research idea. Instructors often invite librarians into the classroom to discuss the resources available to complete the literature review portion of such projects, but that is not enough. Students also need a firm base from which to draw upon when working alone, locating relevant research materials. A large portion of that base should be developed during the research planning stage; at which time a hypothesis is developed, variables are defined, and a preliminary literature review conducted. At the University at Buffalo we have found that librarians can provide students with this base through hands-on instruction on the use of brainstorming and concept mapping. Words and terms created during such instruction can then be used to form search strategies and organize concepts. These strategies can be universally employed as students seek information via the Internet, library catalogues, and online journal databases. Such instruction has been used successfully at the University at Buffalo libraries for graduate students in the Informatics, Women's Studies, and Anthropology programs.

### 1 Introduction

The traditional research process consists of several components; including research planning, research implementation, and writing/revision. Many in higher education believe a majority of a student's time should be devoted to the planning stage. At this stage the hypothesis is developed, variables are defined, concepts are explored, and a hierarchy of tasks created. This is also the stage that a preliminary literature review is conducted to provide an overview of current and previous research on a student's topic. This literature review can then be used to redevelop the hypothesis and in turn the research project. Unfortunately, today's student is inundated with information due in large part to the Internet and online databases. Much of this information comes unfiltered, thus it must be organized, categorized, and either saved or discarded. Many students do not come into a university setting with the tools necessary to adequately filter such information. In many cases they rely on instinct and in rare cases the advice of professors or librarians. By focusing on concept mapping, in particular research planning, librarians equip students with the tools necessary to filter information based along traditional modes of research.

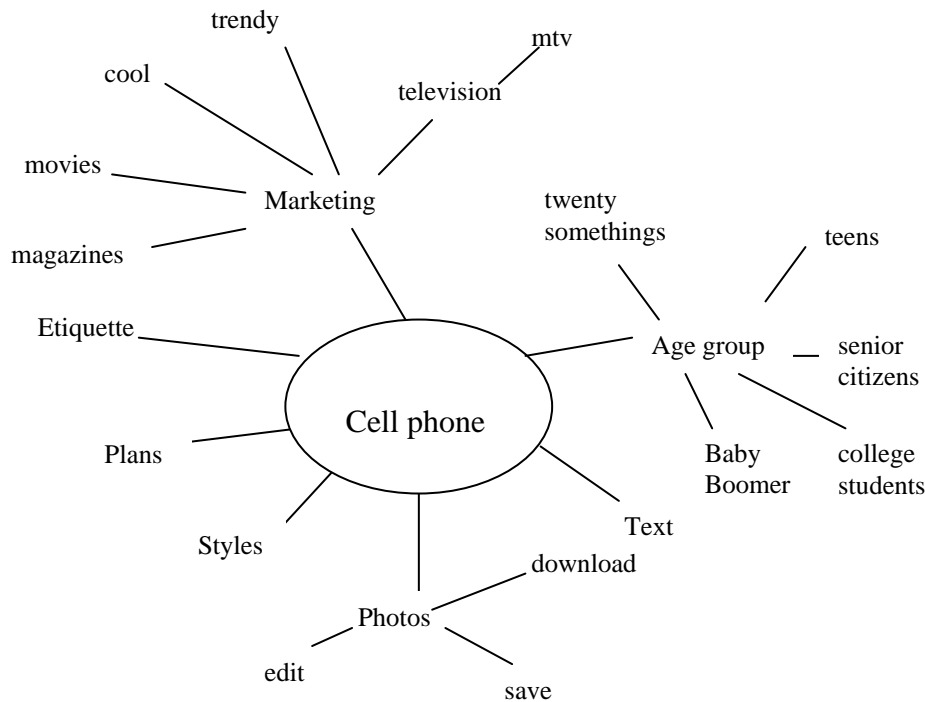
### 2 Library Instruction and Concept Mapping

At the University at Buffalo Arts and Sciences Libraries, I have employed concept mapping techniques in graduate level library instruction. The technique has been taught to students involved in developing an Informatics master's capstone project, a Women's Studies master's thesis, and an Anthropology PhD. dissertation. Students have reacted favorably to the instruction with many commenting on course evaluations that it was the most useful lecture of the semester.

#### 2.1 Brainstorming

The demonstration is usually done without technology simply a large chalkboard, pen, and paper. During one sixty-minute sessions students devote their energies to developing their research topic rather than finding articles, books, websites, reports, etc. The lecture is used to focus on the planning stage of their research project. The session starts with a fifteen minute, in-house video on how to develop a research topic. Once that stage is set students are given ten minutes to develop their own research topic if they have not already done so. What they create at this stage becomes the basis for the hands-on activities of the lecture.

Students are then introduced to the concept of brainstorming using the simple example of "zoo" (space, social organization, animals, types of animals, etc.) Students, together with the librarian, then brainstorm for five minutes on the topic demonstrated in the video.



**Figure 1.** Brainstorming results from Informatics course, ICO566, on the subject of cell phones.

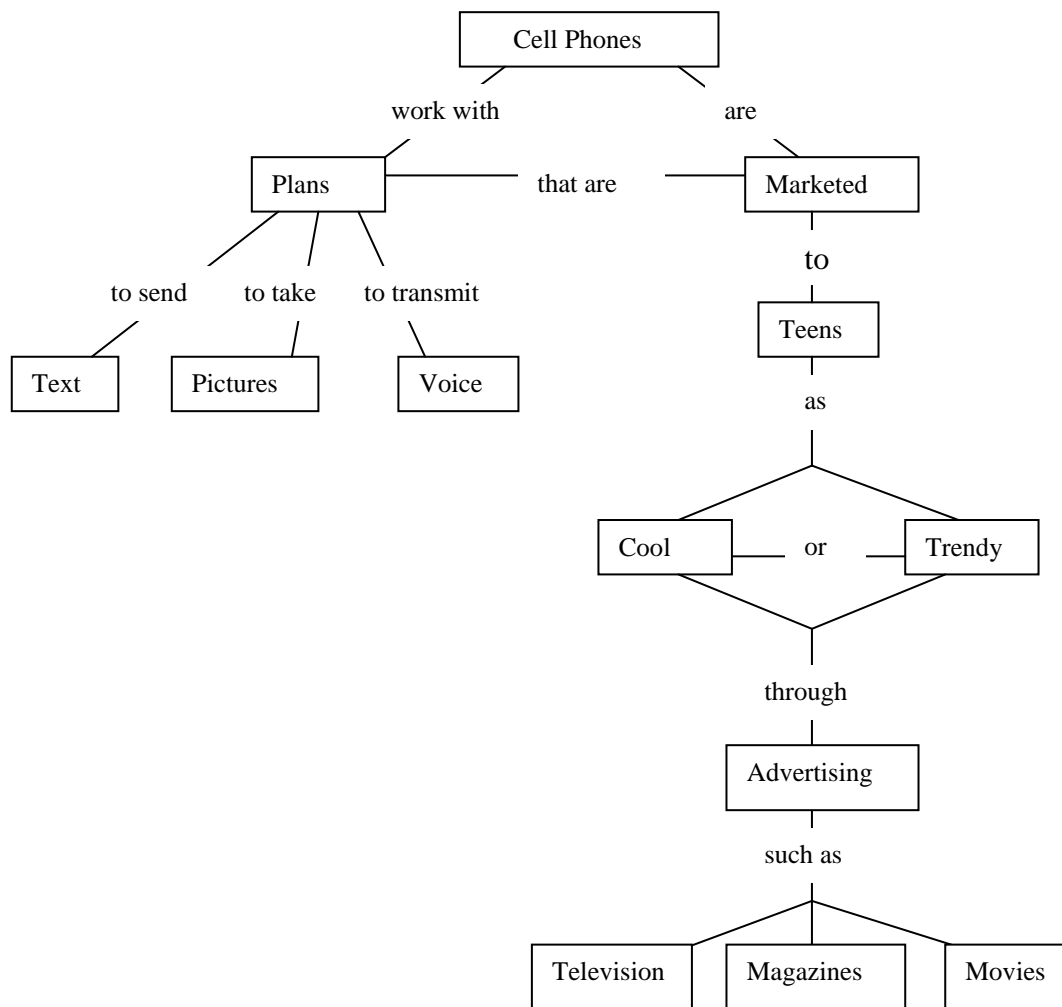
As a team they actively engage in identifying components of the topic, variables of the hypothesis, known information, and information necessary to complete the research project. The brainstorming results are then discussed in terms of relationships, concepts, variables, and potential revisions. Students are then given five to ten minutes to brainstorm their own research topic.

At this stage students are asked to look closely at the results and ask themselves a few questions. Is this topic too broad or too narrow? If so is there a relationship that has emerged that I can/should explore? Is there a concept that I can focus on? What variables do I know nothing about? What areas or variables might necessitate original research on my part? What areas or variables will need to be defined? If applicable, have your addressed who, what, where, when, how, and why of your topic? What inevitably emerges is an area of research that is either unique to the student's original hypothesis or more focused.

## 2.2 Concept Mapping

Once this stage is complete students examination their research project differently. A set of concepts and their variables emerge that a student, once without direction, can explore. Those who believed their research topic had been fully developed discover concepts and their variables never previously considered. Students are then shown how to hierarchically arrange the concepts and their variables into concept maps complete with linking phrases.

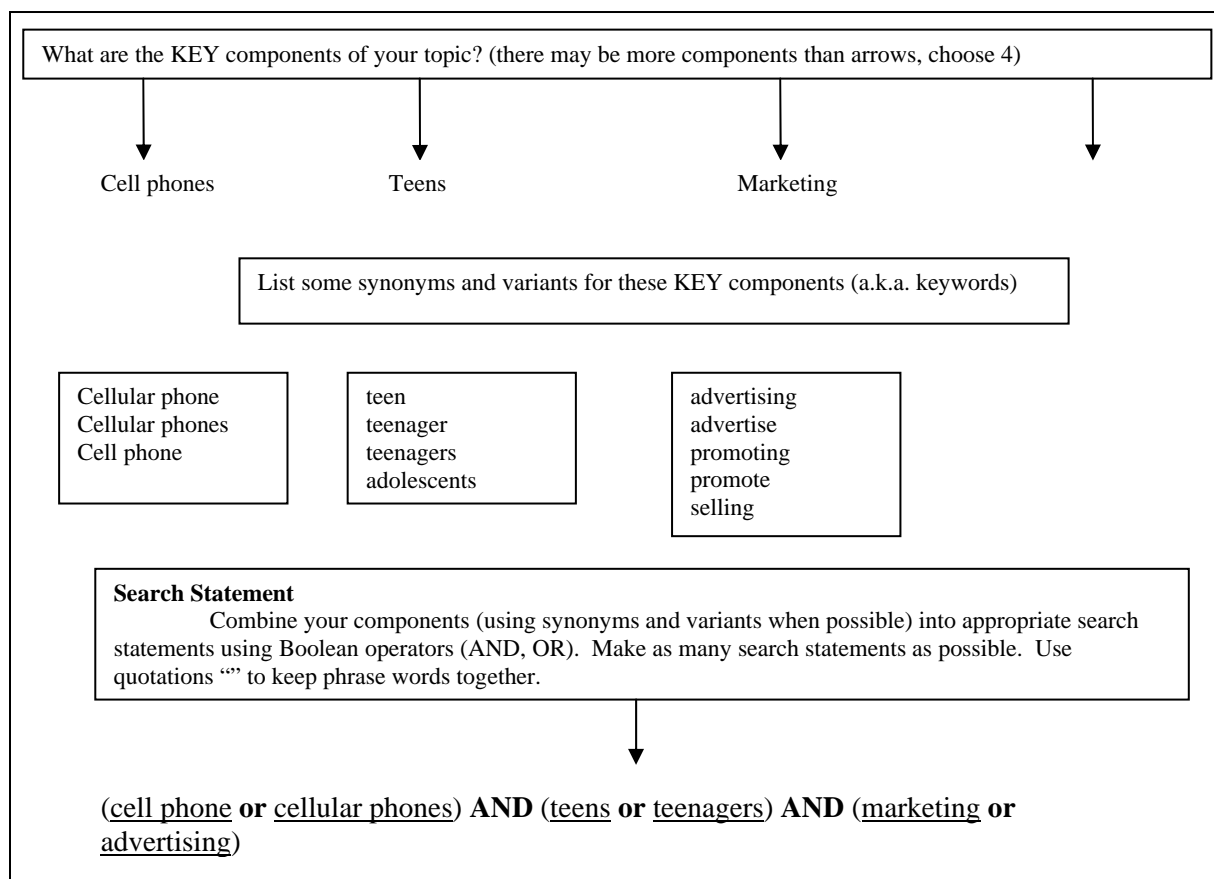
Students are given approximately five minutes to arrange their brainstorming work into a concept map, focusing on those areas they wish to explore for their research project. At this point students are encouraged to think of their project as constantly evolving. One concept and its variables may be explored through a preliminary literature review and judged unnecessary to the research project. Meanwhile, other concepts and their variables will need to be re-evaluated using brainstorming and concept mapping so that a fuller literature review can be conducted. What is important is that the students begin putting terms to paper in order to create search strategies for use in online databases, the Internet, or library catalogs.



**Figure 2.** Concept map of brainstorming lesson, ICO566.

### 2.3 *Creating Search Strategies*

Concept mapping and brainstorming are excellent tools for librarians to use in developing search terms and search strategies. Through the hands-on lecture students conceptualize their research question and as a result alternative words and phrases describing that question emerge. In addition, a concept map organizes words and terms into concrete search strategies. For example, zoos are social organizations. The search strategy, ‘zoos and social organizations’ can be used on the Internet, in library catalogues, and in journal citation databases. In the case of the University at Buffalo students were given five minutes to pull two main concepts and their variables from their maps and create at least two search strategies using parenthetical sentence structure and Boolean operators.



**Figure 3.** Sample entry from ICO566 worksheet on creating a search strategy.

At this point students have spent 45 minutes learning how to define and refine their research project and develop a search strategy to use during both the preliminary and final literature review. The remaining 15 minutes is spent going through a search of one online database using their search strategies. At that point problems with search terms or concept ordering becomes obvious and students who need assistance can work further with the librarian in during office hours.

### 3 Summary

Walking students through sixty minutes of instruction on how to find books or research articles on a topic that many have not thoroughly explored does not give them the skills to articulate a research need and filter irrelevant information. Concept mapping the research process has proven to be an effective tool that serves the student well when researching a topic on their own. A librarian would love to be with their students at all times, able to answer any question immediately. Unfortunately, that is impossible. However, concept mapping has allowed me to offer graduate students tools to rationally analyze their research needs and verge onto another path when other attempts have proven less than adequate.