CARL LRI Paper: Connecting Librarians and Faculty to Enhance Student Research Through Visual Mapping and Dialogue

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Abstract: Five graduate students in education were videotaped while drawing a visual representation of and verbally describing their thesis topic. Dialogue among the faculty supervisor, librarian, and student followed and the map was further developed. Comparison between individual and collaborative maps revealed how faculty-librarian prompts extended and enriched students' conceptualization of the research process and its underlying themes.

Résumé:

This study investigated the following research question: How does collaborative dialogue between a graduate student and a librarian-faculty team extend student thinking while the student constructs a visual map of his or her thesis topic? It arose from a librarian's visual mapping of graduate student thesis topics in education to unravel key research themes during reference conversations between librarian and students. A free form of visualization was used, one without a hierarchical structure and formal naming conventions. The drawing enabled the deconstruction of complex ideas and a shared understanding of underlying research frameworks. It also uncovered areas where further literature searching would provide needed research context and background. Students invariably requested the map to further direct their investigation. The mapping strategy was derived from the work of Joseph Novak who studied how concept maps can represent ideas in multiple ways, illustrating the conceptual links that underpin complex topics and serving as "a scaffold to help organize knowledge and structure it" (Novak and Cañas , 2008, 7).

In seeking a sustainable model for this reference consultation within a graduate program in education, the librarian sought partnership with a professor who confirmed that her students often struggled with formulating research questions, searching the literature, and developing coherent thesis proposals. Students usually develop a research focus through discussion with faculty who supervise their theses (Catalano, 2013, 243). A collaborative librarian-faculty approach situated the conference in its natural sequence in the first term of the program. It also brought subject and information literacy expertise together to support graduates beginning their research.

Graduate students in education have degrees from a multitude of disciplines. Without a theoretical foundation in the field of education, their approaches to educational research often begin as ill-structured problems. Anne Fields (2006, 405) describes such problems as having "… indefinite starting points, multiple and arguable solutions, and unclear maps for finding one's way through information." Fields remarks that research requires strengths in two domains: subject knowledge and information literacy knowledge (Fields, 2006, 411). Subject domain expertise includes a knowledge base that is highly structured and well organized and information literacy domain knowledge involves the ability to distinguish patterns of

information needs. A shared feature of expertise in both domains is the ability to categorize problems and identify relationships between concepts and sub-concepts. Novice researchers are at a disadvantage on both fronts because they are only developing their understanding of the area of research while having to search for literature on it at the same time. A study of graduate students' search behavior indicates that their strategies are both random and organized (George et al, 2006, 12). They are random during the initial stages of research when they are isolating a topic focus, looking for background information, and determining an overall search strategy. It is at this point, when students are trying to find context in both their subject and information literacy domains, that the team approach can bring added value.

1. **Study Methodology and Analysis**

Five graduate students in education participated in the study. The second author was their thesis supervisor. Each student was individually audio and videotaped while independently constructing a map of their research topic while thinking aloud to explain their ideas. A collaborative dialogue followed where each student was prompted to explain and expand their map. The audio component of each session was transcribed and changes to the map as seen on the video were annotated on the transcript. Dialogue prompts that led to each change were identified, defined and coded. Prompts that triggered a change on the map relating to a specific aspect of the research journey were identified. Initial student maps were compared to maps resulting from dialogue with the researchers. After the mapping experience, students were asked for feedback on the process.

2. **Study Findings**

Prompts that triggered changes to the map were defined as either clarifying or knowledge prompts. Clarifying prompts occurred when researchers asked questions to unravel the verbal description or visual representation given by the student. Knowledge prompts occurred when researchers offered information to extend student thinking or analysis.Clarifying prompts accounted for 37 percent and knowledge prompts for 63 percent of the total prompts from the researchers leading to a change on the map. These prompts are similar to questions raised during a traditional reference interview; however, they extend the discussion beyond sources and location of information to include research design and methods. The collaborative maps showed a significant increase in the number of topics, sub-topics, and links connecting ideas revealing a deeper understanding of the research problem and its inter-relationships. On average, the number of topics increased by 61percent, the links increased by 69 percent, and sub-topics increased by 78 percent.The resulting changes on the collaborative map were broadly matched to stages of the research journey. Study design and methods accounted for 50 percent of changes, 36 percent related to the literature review and identification of information, and 14 percent pertained to research purpose and study questions.

Students were also surveyed for their impressions of the mapping exercise. They all found the exercise useful, especially the collaborative dialogue, think-alouds, and visual documentation:

- The visualization helped me to group major concepts, and finally create an outline of how the research should feed into my literature review.
- It also helped in generating new search criteria to find literature I had previously had trouble finding.

3. **Discussion and Implications for Reference Practice**

This study provides evidence that collaborative dialogue between graduate students and a librarian-faculty team helped to extend student thinking. Knowledge prompts, where the researchers provided new information, triggered the most changes to the map. This supports the idea that the faculty-librarian team brought both subject and information literacy domain expertise to the conversation and this contributed to the students' generation of new ideas. The co-constructed maps included more key topics, sub-topics, and inter-connections between ideas than the student's initial map reflecting a deepening and an elaboration of the conceptualization of the research topic.

Students remarked that the visualization helped them group, articulate, and develop new ideas. We surmise that the visual record allows students to find the "big picture context" by reducing the cognitive load inherent in verbal conversations. One student captures this when she notes that the exercise helped her see how "the ideas fit together" and "tie the question/method/data analysis together".

Study findings have implications for reference and instructional services.

1. Visualization assists shared understanding and development of research ideas and the research process. Seeing relationships on paper reveals connections, gaps, and themes.
2. Dialogue where students are equal partners in the conversation provides a constructivist approach to learning allowing for the free flow of questions and ideas.
3. Students may need to target the research design as much as finding information sources because it is a new area for them. Discussion about methods helped to sculpt the research questions and narrow the sources for the literature review. Librarians can prompt for study population, the type of data to be collected, and how to identify literature that uses similar research methods. Research methods databases and handbooks that describe qualitative and quantitative techniques should be included in the conversation.
4. Librarians should explore the subject domain of the topic as much as the information resources through questioning and clarification. Both areas are critical for finding context during the research process.
5. Visual maps provide a record of the scope of a research topic. They also offer evidence of the impact of reference service.
6. Mapping can be used during instructional sessions as a means of capturing the evolving understanding of the topic and research strategies. This approach has been adopted in our introductory research methods course for graduate education students.
7. Specific prompts can trigger the elaboration and generation of new ideas.
   Examples of clarifying prompts include:
   - What is missing from the literature?
   - How will you bring these ideas together in the literature review?
   - What type of analysis will you use with your data?
   - What definition will you use for these concepts?

   Examples of knowledge prompts include:
   - Would knowing more about X help with the context of the study?
   - Did you think of gathering data on …

- Did you think of connecting …
- Did you think of including X in the literature review?

A librarian's knowledge base in a general subject domain, such as social sciences, can provide a foundation for using knowledge and clarifying prompts. Prompts are broad questions that encourage students to elaborate on and connect ideas represented in their visual map. The map is itself a scaffold for learning that enables the librarian to ask meaningful questions in knowledge domains where they are not experts. The map also exposes gaps in student understanding and types of research literature that could support their learning.

From a faculty perspective, this study has encouraged librarian-faculty collaboration and enhanced awareness of the role that reference service plays in supporting graduate students. Through our group discussion, the faculty member learned more about the range and scope of education research tools and the difficulties that graduate students experience in finding and using them. Another recommendation for faculty is to use concept maps during meetings with graduate students and encourage them to work with a reference librarian on an ongoing basis.

Dialogue plus visualization allows students to further unpack the research process so they are aware of the decisions and choices they are making during the research process. This reduces the compelling desire to find information before the purpose for the information is fully understood. "Slow research" makes for a clearer focus and a more equitable exchange between librarians, faculty, and students. Engaging in collaborative consultation is a powerful opportunity for students to articulate and co-construct their ideas providing context in both subject and information literacy domains.

References

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