Unravelling the Literature Review: Helping Graduate Students in Education Re-conceptualize the Research Process

Elizabeth A. Lee and Corinne Laverty

511 Union St., McArthur Hall, Queen's University, Kingston
Ontario, Canada, K7M 5R7.
{elizabeth.lee,lavertyc}@queensu.ca

Abstract. A mixed methods study examined how visualization and dialogue extended and deepened students' understanding of the research process, especially the purpose of the literature review. Five graduate students in a Faculty of Education independently produced a visual map of their thesis topic before engaging in a collaborative dialogue with a librarian-faculty team. Transcripts were coded, identifying the types of prompts that elicited changes to the map. Initial maps were compared to maps resulting from dialogue. Changes to the collaborative map were categorized using stages of the research process. 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. Student comments were categorized for instances of sequential knowledge-building stages. Collaborative dialogue and visual mapping broadened students' understanding of information literacy and highlighted the literature review as a 'genre'.

Keywords: Information literacy, graduate students, literature review, research process, librarian-faculty collaboration, visual mapping, dialogue.

1 Introduction

Graduate students in many disciplines struggle with research study design, developing a research question, and the scope of the literature review [1]. This paper describes a study using visualization and collaborative dialogue among a librarian, faculty supervisor, and student to extend graduate students' thinking about the research journey, including the literature review. Bailey [2] identified librarians as an underutilized support for students and supervisors in the thesis process and proposed a three-way partnership. Librarians can help students shape the research journey, especially during the literature review process where students may have little guidance [3-6]. The challenge for librarians is helping students understand that a literature review involves "… constructing meaning rather than a process of accumulating" [7]. Students are still developing the information literacy skills that encompass finding, evaluating, and synthesizing sources, which is the core of the

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literature review process [8]. Information literacy education at the graduate level seeks to help students shift their perspective on information literacy. Bruce [4] described this as a shift from a 'topical' to a 'psychological' perspective where information is evaluated and selected based on its relationship to the research questions. This study examined how a collaborative dialogue between a graduate student and a librarian-faculty team extends student thinking while the student constructs a visual map of his or her thesis topic.

2 Literature Review

The literature review is central to the work of academics. It acts to situate new research within an existing body of scholarly writing and serves as a foundation for new research [9]. This involves the critical evaluation and synthesis of ideas from the historical and current literature to develop a new understanding of the topic. The analysis of the research methods used in the cited studies is an important part of being able to critique research and determine whether it contributes to the field. Boote and Beile remark that "… a good literature review is the basis of both theoretical and methodological sophistication, thereby improving the quality and usefulness of subsequent research" [10, p. 4].

Many graduate students encounter difficulty in writing a literature review but there is limited research addressing this challenge [11-13]. They may have little guidance in understanding the goal of a review and the processes needed to reach it [3-6]. Students receive varying amounts of support from their supervisors. Traditionally it is provided in the form of feedback to written drafts of proposals.

Hsiao and Yu [1] argue that the difficulties in writing a literature review are the consequence of not considering it a genre. A literature review is a specific genre within academic writing that involves sophisticated search strategies and the interplay of these with critical reading and complex writing processes. Genre analysis of a text uncovers the rhetorical structures allowing the writer to understand the relationships between form and function in the specific genre of text [5]. As a genre, the literature review has distinct features; understanding it as a genre helps to explain why particular features are required within this structure. However, guides on writing the literature review do not cast it as a unique genre with a specific rhetorical structure; rather it is more frequently described as a process of collecting, collating, and citing information [14-15]. Writing a literature review requires sophisticated information literacy skills and knowledge, beyond the strategic search capabilities. We hypothesize that without an understanding of the literature review as a distinct genre, students conceive of it as a summary of work, or a "knowledge-telling" task as described by Bereiter and Scardamalia [16].

Bereiter and Scardamalia [16] argue that an individual can conceptualize an intellectual task in two different ways. In one, the task is understood as one of knowledge-telling in which the individual provides whatever information she has on a topic whereas in knowledge-building the intellectual task is understood as one involving the selection and synthesis of this information for a purpose. They argued that knowledge-telling is not a conscious strategy and suggest that this type of knowledge is inert as it is not being applied to solve problems [17]. More recently,

Bereiter [18] has recast knowledge-building as knowledge transforming. Successfully writing a literature review requires engaging in knowledge-building. Olson [19] states that writing plays a particular role in knowledge-building as it is the external permanent record of thought 'on paper' that affords the reconsideration of ideas across time and place. Graduate students, as novice researchers, frequently approach writing a literature review without a clear understanding of the purpose and complexity of the task, of the 'genre'.

This study explored how to expose these relationships so that students can see the 'big picture' of the literature review. Writing a literature review is frequently described as a linear process but is in reality an interactive 'journey'. As new knowledge is acquired, the individual constructs a network of interconnected ideas – a mental model [20] and this in turn forms the infrastructure for the rhetoric of the literature review. The search and analysis process is an ongoing feedback loop that helps the writer clarify the research question and study design. We suggest that one method for exploring how to evoke knowledge-building during the literature review process with students is through using visual mapping accompanied by dialogue.

Various systems that visually represent information, such as graphic organizers, flow charts and concept maps, have demonstrated their benefit in supporting writing and learning. Concept maps represent ideas in multiple ways with images as well as words, illustrating the conceptual links that underpin complex topics and serving as "… a scaffold to help organize knowledge and structure it" [21]. Concept mapping also allows for the sharing of 'expert' knowledge and understanding among teachers and learners [22]. Maps can be thought of as a representation of the individual's mental model of the topic. We used a free form of visual mapping rather than a traditional concept map which has a hierarchical structure and requires formal naming of relationships. Our purpose was to focus on the visual representation of ideas while engaging in a naturalistic dialogue as it would take place during a librarian-faculty and student consultation.

Collaborative dialogue allows individuals to engage in reciprocal meaning-making through a focussed discussion of a topic that can result in the co-construction of knowledge. Wells [23] argued that dialogue is a form of collaborative knowledge-building in which the participants contribute differing pieces of information relevant to the topic under discussion. This dialogue allows for the co-construction of a common understanding that extends each participants' understanding; "learning is the 'internal' counterpart of participation in 'external' dialogue with others'' [23]. Wells argued that engaging in a discussion contributes to an individual's working out of meaning in the same manner that writing helps clarify the writer's understanding of a topic. Adesope and Nesbit [24] also found in a review of the literature that the co-construction of a concept map led to a cognitively productive interaction among group members. Our study proposed that collaborative dialogue and visual mapping provides a scaffold that encourages the revision of ideas.

3 Methodology for the Study on Dialogic Mapping

Graduate students typically take a research methods course early on in their program with a final assignment of writing a thesis proposal. The researchers, a librarian-faculty team in a Faculty of Education, theorized that the co-construction of a visual map would

enhance the initial conceptualization of the research topic and help focus the literature review.

Five graduate students in education (four females and one male) participated in a mixed methods study. The first author was the thesis supervisor for these students. All had completed their coursework in a Master's program but were at different stages in developing their thesis proposal at the time of data collection. Each graduate student was individually audio- and video-taped while constructing a map of their research topic. Students were initially asked to draw a visual map of their research topic independently, while thinking aloud to explain their ideas to us. Thinking aloud, in which individuals speak aloud the thoughts going through their mind while engaging in a task, allows access to their working memory, that is, what they are thinking about at that moment [25]. This technique been used extensively in research about problem solving through the analysis of verbal protocols [26]. We then began a dialogue in which we prompted each student to explain and expand the map through questioning and commenting on the map. These prompts led to a variety of additions and changes being made to the map in response to the dialogue. Sessions were videotaped to record the dynamic evolution of the map. We used an iterative process to develop and refine a coding scheme [27].

Analysis of the data had several stages. The audio was transcribed and changes to the map as seen on the video were annotated on the transcript. Through repeated reading of the transcripts, we developed coding categories that described the types of prompts that elicited a change to the map. Changes to the collaborative map were categorized using stages of the research process. Initial student maps were compared to maps resulting from dialogue with the researchers. After the mapping experience, students were asked to respond by email to a short survey on the value of the mapping exercise.

4 Findings

To provide context for the findings Figure 1 shows an initial independently constructed map and the map that resulted from the collaborative dialogue.

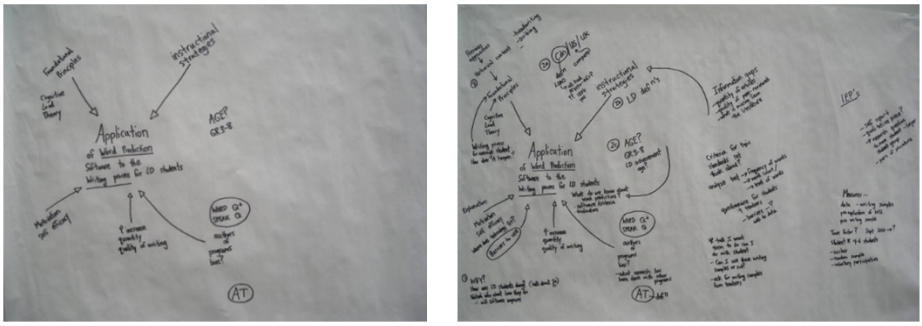

Fig. 1. Example of student A's initial and co-constructed visual map

Two types of prompts triggered changes to the map. 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. Table 1 provides examples of clarifying and knowledge prompts.

Table 1. Examples of clarifying and knowledge prompts

Examples of clarifying prompts	Examples of knowledge prompts
What are your research questions?	Is X also one of your research questions?
What is the context for this study?	Would knowing more about X help with the context of the study?
What is a suitable research method?	Did you think of gathering data on X?
What do you know about this research method?	Did you think of connecting X and Y?
What terms are used to identify X?	Did you think of including X in the literature review?
How does concept X relate to concept Y?	Did you think of gathering information or data on this aspect?
What is the relationship between X and Y?	You need to include X in the ethical review process.
How will you include this in the literature review?	Did you think of comparing information from other disciplines?
What other types of information do you need for the literature review?	
How will you order sections in the literature review?	

Table 2. Key topics, sub-topics, and links in the visual maps

	Individual map			Collaborative map		
Student	Key topics	Sub-topics	Links	New key topics	New sub-topics	New links
Student A	8	3	5	15	26	8
Student B	4	2	0	6	19	8
Student C	4	11	15	9	23	32
Student D	5	3	9	13	15	12
Student E	8	0	2	7	10	3

Clarifying prompts accounted for 37 percent and knowledge prompts for 63 percent of the total prompts from the researchers that led to a change on the map. It should be noted that not all changes to the maps were the result of a prompt. The collaborative maps demonstrated a sizable increase in the number of topics, sub-topics, and relationships that link key concepts that are the components of the literature review (Table 2). On average, the number of topics increased by 61 percent, 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 process. 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. There was no relationship between the number or scope of responses and the number of months that students were enrolled in the graduate program.

As discussed earlier, the research process can be characterized as a process of knowledge-building and is an essential component of a literature review. We carried out a qualitative analysis of the dialogue for instances of knowledge-building using three sequential stages. The following examples from 30-35 page transcripts of each session illustrate the different stages.

4.1 Stage One

This stage involved clarification of ideas around the research topic including definitions of words, principles, or concepts.

- Example 1: In response to a clarifying prompt, Student A added *Learning Disabilities-definition* to the map.
- Example 2: Student C in response to this clarifying prompt, *"But what about the term duration, that you used?"* replied "*Well there's two different kinds of it. There's time span maybe in terms of number of months…"* and added the term *length* to the map.
- Example 3: Student A while writing terms on the map said *"So cognitive goes in here. That's one of the ones I want to talk about below theory."*

4.2 Stage Two

This stage involved the connection of ideas including addition of topics, subtopics, and links demonstrating new relationships and organization of ideas.

- Example 1: In response to the prompt, *"What are you going to talk about in the literature review?* Student E connected the word *"engagement"* with the word *"resilience"* on the map, to show the connection that she will highlight. She also said, *"Why don't we look at it from a positive view and we can talk about resilience."*
- Example 2*:* Student B in response to the knowledge prompt from a researcher, *"a general lack of parenting skills"* added that phrase to the map and then generated more specific terms*: lack of role modelling … physical and sexual abuse … alcohol and drug* abuse underneath on the map.
- Example 3: Student D said, "*I'll probably do AT [assistive technology] for that and then early writers. And the reason … I'm going to put them in the middle"* writing the terms on the map *"but I think for the literature review there's going to be two sections, one that relates to the technology and the other that relates more to early writers, (*pointing to the terms) *and then some of them will interact because of how the assistive technology affects early writers or if there's been any research in that field."*

4.3 Stage Three

This stage involved the extension of ideas, when more information was needed to fill in gaps in the literature review, "aha" statements, and big-picture thinking.

- Example 1: Student A wrote, *"What research has been done with other programs?"*
- Example 2: Student B, while viewing the map with the terms *incarceration* and *intergenerational trauma* made an extension by saying, *"Looking at this … these are the negative aspects you get from the residential schools"* that situated the terms as consequences of a historical institution. Later in the dialogue Student B, had an insight into how the individual components of the map could come together to form a model: *"But when you look at all this, I like the idea of it being a model …"*
- Example 3: Student E, in response to a knowledge prompt about research design, *"In order to be a study what you have to do is you have to have questions that are answerable"* wrote *"Answerable?"* and *"What will I ask them to do to give me the answer?"* on the map. She also added, *"Test ideas?"* underneath *"what engagement means"* and then made a box around the question and drew an arrow from it to the term *"Authentic/relevant"* and then highlighted *"software Photovoice"*. This was an 'aha' moment for this student in understanding the research process.

Students were also surveyed for their impressions of the mapping experience. Some examples of comments were: "The visualization helped me to group major concepts, and finally create an outline of how the research should feed into my literature review." Another student wrote, "It also helped in generating new search criteria to find literature I had previously had trouble finding." Answering the following question about the dialogue, "If you found it helpful, what aspect of the dialogue was helpful?" participants stated it was the questioning that was most beneficial. One participant wrote, "The part of the dialogue that helped me the most was the persistent questioning about issues against which I had dug my heels in. . . I think it'll be important for me to be able to justify the choices I have made and to help me anticipate questions in the future." Another student wrote: "Thinking through the possible research questions out loud. Answering the questions posed to me from both of you was helpful in forcing me to be concise, something I struggle with often in my thought processes. De-mystified the [literature review] process and made it seem attainable rather than a mammoth task!" Dialogue and visual mapping helped students unravel relationships among concepts, giving context and meaning to the literature review.

5 Discussion

The literature review is frequently described in terms of information gathering with emphasis on topicality, comprehensiveness, breadth, exclusion, relevance, currency, availability, and authority [4]. While these aspects of information literacy are important, they neither address the core purpose of the literature review, the synthesis of information, nor do they situate the literature review as a specific genre. The 'genre' of the literature review involves an analytical argument developed through knowledge-building around the research question. By engaging in collaborative knowledge-building using a visual map, students began to understand what the

literature review encompassed as a genre. The map made the discussion concrete by capturing the ephemeral dialogue. The act of gathering information for a literature review can be viewed as a discrete information retrieval process or as a knowledge-building process. We argue that the ultimate goal of information literacy is to enable individuals to build knowledge to arrive at deeper understandings.

We believe that collaborative conversations around a research topic supported by visual mapping could provide graduate students with direction and the opportunity to take a more conceptual approach to developing their research topic and literature review.

References

1. Hsiao, C., Yu, H.: Knowledge Presentation in Thesis Writing-Examining Move Use in Reviewing Literature. English Teaching & Learning 36(3), 133–179 (2012)
2. Bailey, C.: Thesis Practicum and the Librarian's Role. Journal of Academic Librarianship 11(2), 79–81 (1985)
3. Bruce, C.: Research Students' Early Experiences of the Dissertation Literature Review. Studies in Higher Education 19, 119–217 (1994)
4. Bruce, C.: Interpreting the Scope of Their Literature Reviews: Significant Differences in Research Students' Concerns. New Library World 10(1163/1164), 158–165 (2001)
5. Swales, J.M., Lindemann, S.: Teaching the Literature Review to International Graduate Students. In: Johns, A.M. (ed.) Genre in the Classroom: Multiple Perspectives, pp. 105–119. Lawrence Erlbaum Associates, Mahwah (2002)
6. Green, R., Bowser, M.: Observations from the Field: Sharing a Literature Review Rubric. Journal of Library Administration 45(1/2), 185–202 (2006)
7. Green, R., MaCauley, P.: Doctoral Students' Engagement With Information: An American-Australian Perspective. Portal: Libraries and the Academy 7(3), 317–332 (2007)
8. Association of College and Research Libraries: Information Literacy Competency Standards for Higher Education. ACRL, Chicago, IL (2000)
9. Hart, C.: Doing a Literature Review. Sage, Thousand Oaks (2008)
10. Boote, D.N., Beile, P.: Scholars Before Researchers: On the Centrality of the Dissertation. Educational Researcher 34(6), 3–15 (2005)
11. Libutti, P., Kopala, M.: The Doctoral Student, the Dissertation, and the Library: A Review of the Literature. Social Science Reference Services 48, 5–25 (1995)
12. Williams, H.C.: User Education for Graduate Students: Never A Given, and Not Always Received. In: Jacobson, T.E., Williams, H.C. (eds.) Teaching the New Library to Today's Users, pp. 145–172. Neal-Schulman, New York (2000)
13. Zaporozhetz, L.: The Dissertation Literature Review: How Faculty Advisors Prepare Their Doctoral Candidates. ERIC, ED303131 (1987)
14. Weissberg, R., Buker, S.: Writing up Research: Experimental Research Report Writing for Students of English. Prentice Hall, Englewood Cliffs (1990)
15. Swales, J.M., Feak, C.B.: English in Today's Research World: A Writing Guide. University of Michigan Press, Ann Arbor (2000)
16. Bereiter, C., Scardamalia, M.: The Psychology of Written Composition. Erlbaum, Hillsdale (1987)

17. Bereiter, C., Scardamalia, M.: Cognitive Coping Strategies and the Problem of "Inert Knowledge". In: Chipman, S.F., Segal, J.W., Glaser, R. (eds.) Thinking and Learning Skills: Research and Open Questions, vol. 2, pp. 65–80. Lawrence Erlbaum, Hillsdale (1985)
18. Bereiter, C.: Artifacts, Canons, and the Progress of Pedagogy: A Response to Contributors. In: Smith, B. (ed.) Liberal Education in a Knowledge Society, pp. 111–138. Open Court, Chicago (2002)
19. Olson, D.R.: The World on Paper. Cambridge University Press, Cambridge (1994)
20. Johnson-Laird, P.N.: Mental Models in Cognitive Science. Cognitive Science 4, 71–115 (1980)
21. Novak, J.D., Cañas, A.J.: The Theory Underlying Concept Maps and How to Construct and Use Them. Technical Report IHMC CmapTools 2006-01. Florida Institute for Human and Machine Cognition, Pensacola, FL (2008), http://cmap.ihmc.us/Publications/ResearchPapers/TheoryUnderlyingConceptMaps.pdf
22. Hay, D., Kinchin, I., Lygo-Baker, S.: Making Learning Visible: The Role of Concept Mapping in Higher Education. Studies in Higher Education 33(3), 295–311 (2008)
23. Wells, G.: Dialogue about Knowledge Building. In: Smith, B. (ed.) Liberal Education in a Knowledge Society, pp. 111–138. Open Court, Chicago (2002)
24. Adesope, O.O., Nesbit, J.C.: A Systematic Review of Research on Collaborative Learning with Concept Maps. In: Torres, P.L., de CássiaVeiga, R. (eds.) Handbook of Research on Collaborative Learning Using Concept Mapping, pp. 238–251. Information Science Reference, Hershey (2010)
25. Afflerbach, P.: Verbal Reports and Protocol Analysis. In: Kamil, M.L., Mosenthal, P.B., Pearson, P.D., Barr, R. (eds.) Handbook of Reading Research, vol. 3, pp. 163–179. Lawrence Erlbaum, Mahwah (2000)
26. Basque, J., Pudelko, B.: Intersubjective Meaning – Mapping in Dyads using Object Typed Concept Mapping. In: Torres, P.L., de CássiaVeiga, R. (eds.) Marriott Handbook of Research on Collaborative Learning Using Concept Mapping, pp. 187–209. Information Science Reference, Hershey (2010)
27. Schoenfeld, A.H.: On Paradigms and Methods: What Do You Do When the Ones You Know Don't Do What You Want Them To? Issues in the Analysis of Data in the Form of Videotapes. Journal of the Learning Sciences 2(2), 189–190 (1992)