Writing Reviews of Family Literature: Guiding Students Using Bloom's Taxonomy of Cognitive Objectives*

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A model for guiding students in writing reviews of family literature is presented. The conceptual base for the model is drawn from Bloom and associates' (1956) taxonomy of educational objectives. A survey of advisors addressing the skills of their graduate students in writing literature reviews is reported. The findings supported the hierarchical nature of the taxonomy and demonstrated similarities across scientific disciplines. The article highlights the value of the Bloom taxonomy for assisting academic mentors, enlightening graduate students, and advancing family science.

Research without literature reviews may be a fantasy to students struggling with writing a thesis, dissertation, or introduction to a paper. Despite the momentary blissful image, a science without literature reviews quickly would cease to be a science. Without the literature review, theories would remain hopelessly isolated from one another and bodies of empirical research would become mere laundry lists of findings.

As in other fields, literature reviews in family science serve two functions: (a) to guide new research and (b) to organize information and facts. These functions are identical to the functions of theory (Miller, 1989). Writers focus on one or both of these objectives in writing scientific literature reviews. The value of the literature review in a developing discipline, such as family studies, seems particularly critical because of the multiple paradigms that compete and contribute to one another in a relatively young science (Kuhn, 1970). The multiplicity of paradigms, variety of theoretical bases, and the variation in methodologies imply a critical need for the integration that literature reviews afford. Because of their value, literature reviews appear as book chapters, dissertation chapters, journal articles, and introductions to journal articles. In all of these forms, the literature review serves to advance the state of knowledge by conceptualizing previous work in ways that lead to original ideas and new discoveries.

In addition to the advancement of the field, the writing of a literature review also contributes to the personal growth as well as the pragmatic goals of the writer. Several authors have indicated that writing benefits the writer by clarifying thinking and offering opportunities for integration of ideas (Blanton, 1983; Boice & Jones, 1984; Nodine, 1982). From a pragmatic perspective, competence in the writing of literature reviews promotes the development of important questions and sound proposals, and sharpens the ability to conceptualize problems. The sharpening of conceptualization skills provides a basis for perpetual renewal of learning as well as enduring contributions to the field. The necessity of learning this skill early is emphasized by the finding that over 45% of manuscript criticisms focus on conceptual errors, interpretative problems, or writing style (Fiske & Fogg, 1990). Clarity and writing style were also found to be one of the four major factors that determined manuscript acceptance in journals (Marsh & Ball, 1989). Although the writing of literature reviews benefits family science, the family scholar, and the student in family studies, writers often experience difficulty in constructing literature reviews.

Obstacles to Writing Effective Literature Reviews

Sometimes difficulties stem from specific problems such as grandiose expectations, writer's block, maintaining momentum, initiating writing, distracting interruptions, competing commitments, hypercritical experiences, inadequate support, writing anxiety, rigid rules, and self-criticism (Boice & Jones, 1984; Mack & Skjei, 1979; Rose, 1980, 1984). A variety of techniques including psychotherapy, monitoring, contingencies, or contracts have been found to remedy these specific problems and enhance productivity (Boice, 1982, 1983; Boice & Johnson, 1984; Crabbs, Allan, & Crabbs, 1985; Mack & Skjei, 1979; Passman, 1976; Rennie & Brewer, 1987; Skinner, 1981).

Even after specific impediments are removed, however, completing a literature review in family science can be stymied by the sheer complexity of the task. Often students may fail to understand the purpose of an effective literature review. The *Publication Manual* (American Psychological Association, 1983) succinctly states the purpose of this complex task: to provide a conceptualization of the problem and "demonstrate the logical continuity between previous and present work" (p. 25). But the brevity of the statement obscures the complexity and may lead students to develop simplistic notions of the nature of a literature review. Tools that help advisors to clarify the components of a literature review would benefit both the family science student and the family science advisor.

The heuristic or pedagogic tools used to aid the family science mentor in promoting the quality of literature reviews have received little attention. Several articles have suggested particular approaches for fostering completion of the dissertation (Blanton, 1983; Cheshire, 1989) and research has been conducted testing the effectiveness of some approaches (Dillon, Kent, & Malott, 1980; Dillon & Malott, 1981; Garcia, Malott, & Brethower, 1988). Generally, these studies and expositions suggest that providing students with structure for monitoring their progress along with group support facilitates the completion of the thesis or dissertation. Although these expositions and studies have aimed at improving completion rates in literature reviews, little attention has been directed to improving the quality of literature reviews in family science.

In this article, a taxonomy developed within educational psychology is applied to the difficult task of cultivating the quality of literature reviews in family science. The taxonomy was developed by Bloom, Englehart, Hill, Furst, and Krathwohl (1956) as a means of facilitating communication and improving the exchange of

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ideas. According to Bloom, terms such as thinking, problem solving, creating, and understanding may carry different meanings. Consequently, the taxonomy was developed to rectify ambiguity by sharpening and clarifying communication about educational processes.

Previous research on the use of the taxonomy in schools indicates that the level of the taxonomy that the teacher uses influences the level of response among students (Willson, 1973). The taxonomy also enables the mentor to identify the cognitive level and style of the writer. By identifying this level, the advisor can intervene with strategies that promote the improvement in quality. Application of Bloom's taxonomy to the literature review also helps the writer to understand the process.

In the following section, five levels of Bloom's taxonomy are defined and applied to the literature review process. These levels include knowledge, comprehension, application, analysis, and synthesis. For each of these levels, the authors provide examples of the levels from their personal experiences in advising graduate students. To protect the confidentiality of these students, the nature of their research was altered.

Taxonomy Categories Applied to Writing Literature Reviews

Knowledge

The first level of Bloom's taxonomy, knowledge, emphasizes the writer's ability to identify, recognize, and remember. The multiple choice format for testing is perhaps the prototypic measure of the knowledge objective. In writing literature reviews, the knowledge level includes tasks such as defining the domain of research, identifying the core literature, and sampling the relevant studies. These tasks are critical to success of the review. Prolific writers in marital and family therapy, for example, spend nearly one third of their time toward publication in the literature search and reading phase (Thomas & McKenzie, 1986).

To assess knowledge, the writers submit a reference list. The reference list acts as a proxy measure of their knowledge of the literature they are covering. Several common problems can be observed at this knowledge level. First, the writer's proposed knowledge base may be inadequate, covering too few of the potential sources. This inadequacy has been identified as a critical threat to the validity of a review (Cooper, 1982; Jackson, 1980). Second, some writers may include an inordinate number of references that are esoteric. The process of using abstracts or titles only in a literature search tends to promote this. One writer studying stepfamilies, for example, had numerous references to esoteric sources. These references preempted the inclusion of more prominent references on family structure and family processes. By eliminating some of these references, more prominent ones were emphasized. A third problem is the inclusion of old references. One writer, studying self-esteem in children, had employed references predominantly from the 1960s and 1970s. The writer's search procedure began with a comprehensive book published in 1979. Consequently, his citations were largely dated. After revising his references to a more contemporary period, he changed the focus of the study.

Although writers may show deficiencies at the knowledge level, it is rare for a graduate student to remain fixated at this level. Research on Bloom's taxonomy and Perry's (1970, 1981) theory of intellectual development has indicated an association between a focus at the knowledge level and a primitive tendency to rely on dualistic and absolutist views of education (Ryan, 1984).

Comprehension

Knowledge in Bloom's taxonomy is a necessary prerequisite for the second level of comprehension. The prototypic measure of the comprehension level is the essay test. Essay questions such as, "Summarize Bertalanffy's (1968) theory of systems" require the writer to understand the work, grasp the essential ideas, and recapitulate the important features. Of course, essay tests can also be used at the knowledge level such as, "List the stages in Duvall's (1957) family life cycle."

The writer operating at the level of comprehension on the literature review task, not only knows the relevant theories and studies, but is also capable of summarizing them. Writers who remain at this level of comprehension tend to write literature reviews that resemble annotated bibliographies. An easily identified signal in such literature reviews is the presence of one reference per paragraph. Often such annotated bibliographies include the citation in the first sentence of the paragraph and then proceed to summarize the study or theory in the succeeding sentences of the paragraph. Part of the inclination to write annotated bibliographies may stem from the strategy used by some writers of taking notes on large index cards. Although this strategy facilitates understanding of each individual reference, the sectioning by source also can inhibit integration.

Among some advisors the demonstration of the comprehension level may be sufficient to meet minimum standards for a literature review. The authors' impression, however, from discussions with colleagues from diverse disciplines suggests that most faculty expect more than an annotated bibliography. This is not to minimize the importance of understanding the literature through an annotated bibliography. In fact, some writers of literature reviews show remarkable skill in understanding and restating theory and research. Literature reviews in this vein can also be organized in interesting ways, grouping studies and theories in relevant categories and sequencing them effectively. In addition, good transitions between paragraphs can sometimes obscure the fact that the literature review is merely an annotated bibliography. One writer understood this distinction between annotated bibliography and an integrative literature review and requested the review of her annotated bibliography on attributions in marital relationships before proceeding on to the integrative review level. Writers sometimes have found that writing an annotated bibliography is helpful, but it has not generally been required.

To discourage an annotated bibliography approach to the literature review, writers are usually asked to construct outlines of the literature. It is stressed that the outline should reflect their conceptualization of the area, rather than merely stringing together the references. In the construction of the outline, the need for including the references is specified. The marker of the annotated bibliography in the outline is the frequent use of one reference for each point.

The authors hesitate to recommend a system for notetaking to writers because of the idiosyncratic ways that people tend to store and retrieve knowledge. Some writers, for example, prefer to work with references strewn about themselves. Others prefer to take single phrase notes with citation in parentheses and then to reorder the notes. Two things are stressed in the notetaking and writing process. First, not all references are of equal importance. Sometimes novices to a literature hesitate to take the step of determining which references are most important and deserve the closest scrutiny. In their zest to cover the literature completely, some writers may tend to divide their attention across the references equally. Instead, a handful of references are usually most critical for advancing the conceptual development of the literature review. The need to understand this handful of references completely is emphasized. A middle set of references need a moderate amount of attention. A final set of references must

eventually be discarded because of lack of relevance.

Writers are sometimes reluctant to discard irrelevant references based on the positive comments they have received in the past for their work that demonstrated such a "thorough" reference list. Most come to appreciate, however, that omitting irrelevant or outdated references strengthened rather than weakened their papers. If the writer has conducted a very thorough literature review, the overwhelming volume mitigates against this reluctance to omit irrelevant references.

Application

Knowledge and comprehension in Bloom's taxonomy are prerequisite skills for the third level of application. Writers who demonstrate application skills write in a way that is more advanced than the comprehension level. A case with a writer studying friendship in the elderly is illustrative. The outline for his literature review was not a mere string of studies. Instead, many of the points in his outline did not specifically cite a reference. The structure of the paper reflected an *application* of his ideas. Moreover, the writer was able to *apply* his knowledge and comprehension of the sources by inserting them in appropriate points within his outline. Despite the strengths, the paper failed to effectively analyze or integrate the literature.

The marker for operation at the application level is the imprecise use of references. For example, at this level a writer may cite a note mentioned in passing from an empirical study. The findings of the study may not have been sufficiently relevant, but instead of searching for a more substantial basis for citation, the writer relied on excerpts. This sloppy citation approach is sometimes evident in published work as well. Lack of attention to study details has been identified as a problem that can lead to invalid reviews (Cooper, 1982). The tendency to take excerpt notes and to rely on these notes solely when writing promotes the application level of performance. The worst case of the excerpt approach is the extraction of a phrase or sentence from the original that is contrary to the theme of the reference. For readers who may not be familiar with the literature, the identification of a piece of writing as application level may be difficult to detect. Only by careful examination of the literature can a reader discern whether the citations are the most appropriate or mere excerpts.

Analysis

Bloom's fourth level, analysis, is the first example of more abstract reasoning. This level presupposes the knowledge, comprehension, and applications skills evident at the previous levels. At this level, the writer takes the step of developing a critical analysis of the literature. The previous reliance on excerpt approach is abandoned in favor of a more critical approach to the literature. Writers at this level may still tend to develop their literature review only to support their point. They may critique previous studies that contradict their ideas on the basis of reliability or validity problems. The same standards may not be applied to the research and theory that support their position. These writers tend to be like persons in a debate. They stake their position and interpret all the data from that position. This is not to minimize the quality evident in some writings that illustrate this level. Some writers may exhibit superior skills in polemics and debate. The marker for this level, however, is hesitancy to employ the same stringent standards to points that support their premise as points that oppose the premise.

Writers at this level tend to spend more time planning and outlining their arguments than writers at lower levels. Research on the composing process indicates that such planning is characteristic of good writers who were found to spend more time in planning than poor writers (Humes, 1983). Writers at this level begin to appreciate the process of revision. The use of revision, multiple drafts, and soliciting opinions from colleagues have been found to be common characteristics of academic writers (Hartley & Knapper, 1984). In addition to revision, providing students with guidelines for analysis also appears to help students to think critically (Anisfeld, 1987).

The authors have struggled with facilitating writers' improvement beyond this point. Sometimes, however, personality characteristics can interfere. Rigid, compulsive approaches to epistemology can thwart the writers' movement beyond this level.

Synthesis

Whereas the salient skill at the analysis level is the use of deductive thinking based on a premise, the salient skill in the synthesis level incorporates induction as well as deduction. At the previous level, the writer had a premise and worked logically from that premise in encountering new information. At this level the writer may have premises that are challenged by new information. The new information may supplant the previous premises and lead to new premises. The logic of these revised premises is then followed to their conclusions. Contradictions in the literature are not merely stated as contradictions, but attempts are made to explain the nature of the contradictions. Disparate features are integrated into a consolidated perspective of the literature.

Informal consultations with colleagues from other fields of study and within other universities indicate that this fifth level of synthesis is the ideal in literature reviews. Although this ideal is rarely achieved in full, many writers have components of their literature review that are integrative and novel.

Evaluation

A sixth level, evaluation, has received criticism for its placement in the taxonomy (Klein, 1972; Kunen, Cohen, & Solman, 1981; Smith, 1968). In the authors' experience, it was found that this level fails to contribute to the communication about the process of literature review writing. Despite Bloom's attention to defining the level, the application to literature reviews has often led to misinterpretations and confusion about the literature review process. For these reasons, this sixth category was excluded from the study reported in this article.

There is ample support for the validity and usefulness of the taxonomy (Kropp, Stoker, & Bashaw, 1966; Kunen et al., 1981; Lipscomb, 1985; Lyon & Gettinger, 1985; Madaus, Woods, & Nuttall, 1973). Despite variation in interrater reliability across studies (Seddon, 1978), the taxonomy has stimulated a diversity of applications to educational test objectives (Clevenstine, 1987; Cox & Wildemann, 1970; Frazier & Caldwell, 1977). One factor analytic study of the taxonomy suggested that two factors underlie the six levels (Neumann & Mahler, 1985). This factor structure is not conclusive, however, as differential factor structures might be obtained based on variation in the particular items and differences across subject areas.

Although the taxonomic categories discussed so far provide a means for communicating about the literature review, they also raise several questions. Do these categories actually represent discrete skills and are these skills hierarchically arranged? Also, are these skills similar across other academic disciplines or restricted to family science or social science?

To answer these questions, a survey of faculty who had advised graduate students in the writing of literature reviews was conducted. We believed, first, that students improve from the first draft to the final draft in their use of the complex skills of application, analysis, and synthesis. Second, we predicted that the higher the skill in Bloom's taxonomy, the less likely the skill would be rated as an area of strength for most students.

Survey of Mentors of Literature Reviews

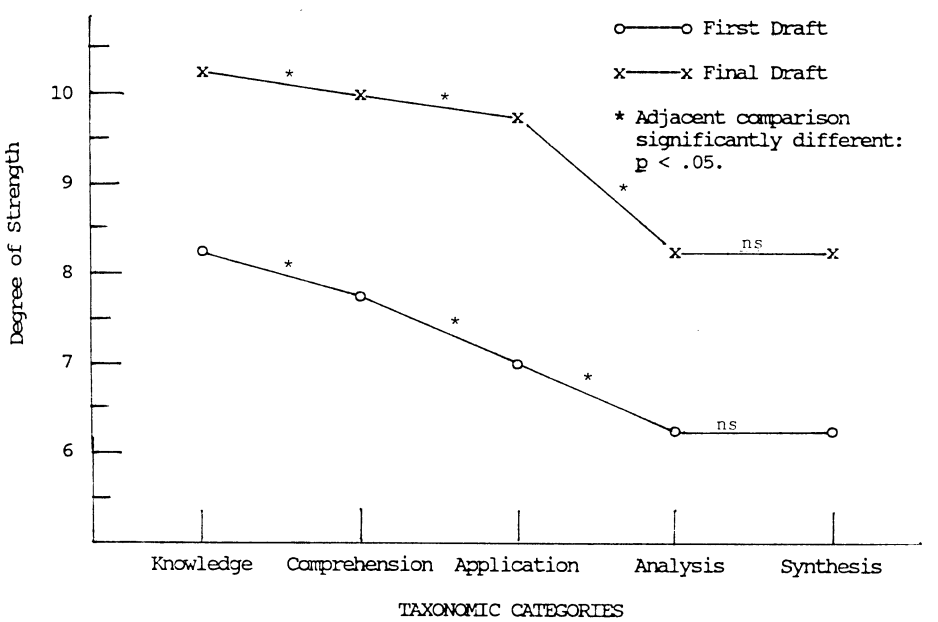
To examine these hypotheses a survey of 260 faculty at a large university who had served as a chair of a graduate thesis or dissertation committee was conducted. Because of their experience, only faculty at the ranks of associate and full professor were surveyed. The numbers of theses or dissertations supervised showed a positively skewed distribution with a median of 16 and a mean of 22. The average age of the respondents was 49 years (SD = 7.7). The respondents included 57% full professors and 43% associate professors. Those surveyed included 11% women and 89% men. Academic areas represented were: 29% social sciences, 46% natural sciences, 17% engineering sciences, 4% humanities, and 4% business.

The questionnaire consisted of background information and a measure developed for this research which asked mentors to rate their average advisee on 15 skills involved in a literature review. The measure included three items for each of the five levels of the Bloom taxonomy. Participants were asked to rate both the first draft and the final draft written by their average advisee with each of these 15 items. The rating was in a forced-choice format: *significant weakness* (1), *minor weakness* (2), *minor strength* (3), and *significant strength* (4). Each of the three-item scales had a possible range of 3 to 12. The five scales of the first draft and five scales of the second draft all showed good internal consistency. Despite only three items per scale, the internal consistencies ranged from .73 to .86 for the 10 scales.

The results from the survey indicated two important findings that were consistent across disparate disciplines. First, as evident in Figure 1, there was a significant perceived improvement from the first draft to the final draft in every one of the five taxonomic categories (dependent *t* tests, $p < .001$). Thus, not only did the complex skills change from the first to the final draft, but the skills of knowledge and and comprehension also changed from the first to the final draft. A halo response bias may be one explanation for the change. It is also plausible that the alteration in knowledge and comprehension is consistent with the notion that the process of writing and revision not only changes the organization and integration of ideas, but also fosters expanded knowledge and comprehension.

Second, on both the first and final draft, lower scores were obtained for each successive level on the Bloom hierarchy as shown in Figure 1. More specifically, knowledge was perceived as more of a strength than comprehension, comprehension was seen as more of a strength than application, and application was viewed as more of a strength than analysis, $p < .05$. The analysis and synthesis levels, however, received comparable ratings of strengths/weakness. Moreover, this lack of differential rating between analysis and synthesis held across academic disciplines on both the first and final drafts. This is consistent with research that has suggested a Y theory of Bloom's taxonomy (Madaus et al., 1973). The Y theory suggests that after the level of application, the analysis and synthesis represent separate but not hierarchical skills. The implication for literature review writing is that analysis and synthesis may be mutually beneficial processes rather than hierarchically ordered skills.

Figure 1. *Degree of Strength for Average Advisee across Five Levels of Cognitive Skills*



Summary Implications

In summary, the Bloom taxonomy provides a useful device for clarifying communication about the literature review process. Facilitating communication between mentor and apprentice may reduce the high attrition rate which has been identified within Ph.D. programs (Lunneborg & Lunneborg, 1973). Because early attention to the writing phase has been associated with quicker completion of the Ph.D. (Welsh, 1981), the focus on literature review writing early in the students' program may enhance timely degree completion. Completing the dissertation can also be facilitated by various books (Allen, 1973; Moore, 1985; Sternberg, 1981; Weedman, 1975). This article supplements the array of sources available to the family scientist that focus on writing or publication. Readers are referred to several sources for writing skills (Elbow, 1981; Follett, 1966; Strunk & White, 1959; Zinsser, 1980) and publication tips (Berardo, 1981; Dorn, 1984; Dougherty, 1982; Walton, 1979). For writers pursuing academic careers, communication about the literature review process provides them with a conceptual framework for their developing ideas about the process of literature review writing and theory development in science.

The taxonomy provides a valuable vehicle for improving literature reviews and achieving the two goals, mentioned earlier: (a) guiding new research and (b) organizing information and facts. The full achievement of these goals is unlikely, however, unless the writer utilizes the advanced skills of critical analysis, integration, and evaluation. Without these advanced skills, the attempt at a literature review is more likely to result in a collection of critiques of different articles or an amalgam of unconnected innovations. Focusing on the overall goal, whether to guide new research or summarize information in the field, helps the writer to avoid the pitfalls of the unintegrated review and sharpens thinking. By keeping the focus on the overall goal, writers are led to make the creative leap that leads to the extraction of a unique research question or a novel summary of a field. Attention to combining these skills to improve literature reviews can lead to better research questions and more integrated theories about families.

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