Writing the Literature Review Section: Teaching Undergraduate Psychology Students Scientific Writing

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Abstract: Many undergraduate psychology students write the literature review section of a scientific paper as a list of summaries without direction or coherence. This paper proposes to teach students to write the literature review section as an argument instead of following the traditional hourglass metaphor approach.

One of the required courses in the psychology undergraduate curriculum is the research methods course. This course teaches students the process of conducting an experiment and includes the writing of a scientific report. This requirement reflects the emphasis of scientific method and reasoning in the field of psychology. In order for psychology undergraduates to understand the subject, students need to know how to conduct research and report their findings. A research methods course teaches students to write an empirical paper, starting with a literature review section according to the format laid out by the publication manual issued by the American Psychological Association (APA). The purpose of the literature review section is to provide the reasoning for the study by reviewing past findings. It also provides the rationale for the experiment and establishes the importance of the experiment. One of the most commonly encountered problems when teaching students to write the literature review is that students often adopt a sequential summary style of writing. In other words, the literature review section often begins with a short introduction section, a series of research studies and their summaries, and a final concluding paragraph that includes the hypotheses. Students often fail to connect the list of study summaries together and state how these studies relate to the main purpose of the paper. The literature review section thus reads much as a list or an annotated bibliography without a coherent argument for the importance of the experiment. This paper seeks to identify the problem for this form of writing behavior and proposes a pedagogical direction that would help students write a more coherent literature review section in their research papers.

Argumentative Versus Expository Text Structure

An empirical paper within the field of psychology is generally divided into three major sections, including (a) the literature review and references, (b) method and results, and (c) discussion and limitations. Students are taught to follow an "hourglass" structure when writing a scientific paper, where the literature review section would start broadly and end with a narrow and specific hypothesis (Bem, 2004; Schulte, 2003). The end of the literature review section would thus be toward the middle of the hourglass where the hourglass is the narrowest. Although the hourglass visual illustration is useful, it does not necessarily help students operationalize the individual steps in constructing the literature review section and convey the purpose of the literature review. Most students, before taking the research methods course, have not practiced writing empirical research papers and do not know how to approach the task (McCarthy, 1987). It is thus the instructor's job to define and teach the structure of a literature review section at the beginning of the semester. The literature review section of an empirical paper should argue for the importance and relevance of the studies conducted (Hart, 1998). The literature review section should therefore have an argumentative structure instead of any other

type of text structure.

Several types of text structures exist. The general classification of text structure is governed by schematic organizations called the superstructures (van Dijk, 1980; van Dijk & Kintsch, 1983). Superstructures refer to sets of conventionalized sections of a text and are useful in supporting reading comprehension (Kintsch & van Dijk, 1983; van Dijk, 1980). For example, a narrative superstructure has the basic conventionalized sections of setting, beginning, goal, attempt, outcome, and ending (Mandler & Johnson, 1977; Thorndyke, 1977; Rumelhart, 1975; Stein & Glenn, 1979). There are four main types of text structures based on these top-level superstructures. The four main types of text structures include narrative, argumentative, procedural, and expository (Mandler & Johnson, 1977; Meyer & Ray, 2011; Toulmin, 2003; van Dijk, 1980). The mistake that many students commit while writing the literature review section is that they would attempt to write the literature review using a narrative or expository superstructure. Sometimes students are even misguided by instructors to attempt to adopt such an incorrect text structure. For example, instructors might ask students to "tell a story" in the literature review. By saying this, the instructor intends for students to write a literature review with a main point and supporting facts and not necessarily generate a piece of writing that includes characters, conflicts, and resolutions. Of course, most students can distinguish the difference between a fictional paper and a research paper, and the mistake of adopting a narrative structure is rare. What is more prevalent is the usage of an expository text structure for the literature review section.

An expository text structure in its basic form is a network of topics and their respective elaborations (Karamanis, 2004; Mann & Thompson, 1988; Meyer & Ray, 2011; Richgels, McGee, Lomax, & Sheard, 1987). The elaborations are explanations or extensions of the topic, but they do not justify the validity or necessity of the topic. For example, a piece of writing could be on the topic of psychology, and the elaborations could include the various sub-disciplines of psychology, including cognitive, developmental, social, and so on. The various sub-disciplines are related, and they are all included within the field of psychology, but the expository text structure does not need to relate individual sub-disciplines to the main topic or to other sub-disciplines. This particular type of expository text structure is called a "collection" because the relationship among minor sections and the relationship between a minor section and the main topic are often not explained (Meyer & Ray, 2011). They are simply grouped together based on their similarities. The reader only knows that the minor sections fall within the main topic, but the minor topics do not necessarily justify or provide evidence for the main topic. Many students adopt this expository collection text structure in their writing, which causes the literature review section to be a collection of study summaries without much connection. Readers could often tell that all the listed studies were on a similar topic, such as text comprehension or memory. It is often not evident how individual studies relate to the main question that was proposed for the study.

Why Students Should Write Using an Argumentative Text Structure

The purpose of the literature review section of a research paper is not simply answering the question of "what," but "why," A good literature review section for an empirical research paper has an objective and should provide the motivation and rationale for conducting a particular research study. In an argumentative text, a claim provides the assertion of the author and is justified by pieces of evidence (Chambliss, 1995; Chambliss & Garner, 1996; Toulmin, 2003). For the literature review section of a scientific paper, the objective or the hypothesis of

the paper is the main claim; the importance and necessity of the hypothesis are supported by past research findings, which serve as pieces of evidence to justify the claim. This argumentative structure should provide the basic layout for the literature review section of a scientific paper. Instead, students' literature review sections often exhibit an expository collection structure, with one study summary after another without any justification or connection to the main hypothesis. It is therefore important to convey to students at the beginning that they should not adopt an expository text structure because such a text structure does not necessitate the usage of past studies as evidence to justify the main claim of the research paper.

The main difference between the argumentative structure and the expository collection structure is that past studies are used as evidence to justify the purpose of the study in an argumentative structure, whereas the study summaries are listed sequentially in an expository collections structure only because they are sub-categories of a larger idea. In the literature review section of an empirical research paper, the purpose of the paper is the main claim of the argument. For example, a hypothetical study might look at how pitch variations could affect comprehension by highlighting keywords in an audio book. In order for the purpose of this study to be justified, the authors need to reference previous studies that show the usefulness of highlighting keywords in print format. In this example, the results from past studies would serve as evidence to explain the usefulness of this type of highlighting technique for audio texts. The authors also need to show that the proposed experiment has not been attempted before and that the study is providing novel information. The summaries of past findings in the literature review section should serve as an argument for the proposed study and not merely as a sequential collection of findings.

It is likely that students write the literature review section as a list of summaries because they adopt a bottom-up writing strategy (Kirkland & Saunders, 1991; Rumelhart, 1984). In other words, students find studies based on the abstracts, attempt to comprehend each one, and then provide a list of summaries for the findings of each study. Students probably do not have a pre-conceived text structure for their literature review sections and the similarity to an expository collection structure is simply an accident. It is also possible that students intentionally use an expository structure because that is the basic structure of most college textbooks with distinct topics and explanations under each topic. Most college students are probably more familiar with the expository structure found in textbooks than the argumentative structure found in empirical research articles. Regardless of the actual cause of the writing pattern, instructors should ask students to take a step further than simply identifying the findings of individual studies and attempt to explain how each study relates to and supports the main purpose of the paper. The process of using past findings as evidence for the proposed study should start even as students read the assigned research papers and not just while writing the literature review section.

Instructions on Writing

Instructions on how to read empirical papers should precede the writing process. First, students should be taught the argumentative text structure using Toulmin's (2003) argumentative model. This background knowledge would allow students to understand the function of the hypothesis as the main claim and the function of past research findings as supporting evidence. Second, students should understand the rationale behind the hypothesis. This would include an understanding of the variables involved in the study and the design of the experiment. Using the example of highlighting audio texts, students should understand that the experiment seeks to test pitch variation's effect on memory. In the hypothetical study, pitch variation is the independent

variable and memory is the dependent variable. The highlighted portion of the text would have a lower pitch relative to the rest of the text, and participants would be asked to recall parts of the text with lower pitch. Third, students would need to search and find relevant studies to support the rationale of the proposed hypothesis. For every study, students should be able to answer three questions: (a) What were the questions addressed by the particular study, (b) What did the researchers find in their experiments, and (c) How did the findings justify the relevance of the currently proposed hypothesis? The first two questions require students to understand a particular study and its findings. The third question requires students to establish the logical and argumentative connection between a past study and the proposed study. These three questions would allow students to establish the connection between past research findings and the proposed hypothesis in the form of a coherent argument.

Once students understand the argumentative structure of the literature review section and can articulate the connection between past studies and the proposed hypothesis, instructors could guide students through the writing process by providing scaffolding questions. The first paragraph of the paper should answer two questions: (a) What is the topic that you are interested in, and (b) What is the purpose of this study? For example, the introduction of the literature review section of an empirical paper could describe audio text comprehension. The introduction would need to define audio text comprehension, describe the usefulness of highlighting techniques in printed texts, and state the lack of parallel highlighting techniques in audio texts. Subsequent paragraphs would provide evidence for the usefulness of printed-text highlighting techniques as evidence for the usefulness of highlighting parts of an audio text. Questions that require students to describe the problem, findings, and relevance of past studies could be used to scaffold this part of the writing process. Studies that show memory improvement as a result of highlighting keywords in textbooks would be considered relevant. Students should be able to explain not just what the findings were, but how the findings provide the motivation for the current study. For example, students could describe that highlighting keywords in printed texts promote comprehension and memory; therefore, similar highlighting techniques should also promote comprehension in audio texts but no previous studies have attempted to investigate this. In this example, the evidence of highlighting techniques in printed text provides the motivation for investigating highlighting techniques in audio texts. It also provides evidence that highlighting techniques could improve memory and therefore the newly proposed study concerning audio text is not without basis. The literature review section should culminate with the hypothesis, where the proposed study is the logical next step based the findings from past studies.

After students have produced their first drafts, students should be allowed to go through a peer review process. Peer evaluation is useful in writing because it benefits both the reviewer and reviewee (Lundstrom & Baker, 2009). Each student should receive an evaluation rubric that guides the reviewer through the process. The rubric would include basic formatting criteria for citations and APA-style formatting. The rubric would also include evaluations for content, specifically for the quality of the argument established by the paper. The section on content evaluation could be in the form of questions. The first question in this section of the rubric should ask the reviewer if he or she could find the main claim (hypothesis) of the study. The rubric should also gauge if the main claim was easily comprehensible, made sense, and did not miss any of the important information. Other questions in the content evaluation section of the rubric should ask the reviewer to identify the pieces of evidence that were used to support the

main claim. Reviewers should be able to identify several pieces of evidence, each supported by one or multiple studies. It should be clear to the reviewer how each piece of evidence justified or supported the main claim. For example, a student's paper could talk about how words highlighted by underlining caused longer eye fixation duration. This piece of evidence does not support the main claim unless the author makes the connection that longer eye fixation is an indication of increased attention and cognitive processing. Increased attention and cognitive processing should lead to better memory and therefore highlighting words by underlining should improve memory. The key evaluation point is if the justification of the main claim is clearly conveyed by the supporting evidence.

Conclusion

This paper has identified a writing problem that is common among undergraduate psychology students. Psychology students often structure the literature review section of their paper as a list of summaries without direction or coherence. The proposed solution is to teach students to follow an argumentative writing structure instead. A limitation to the proposed pedagogical change is that although argumentative writing structure is generally suitable for scientific papers, it is not always the best text structure. Experienced authors of empirical research papers have adopted different styles of writing depending on the content and the target audience. For example, certain literature review papers that simply provide an overview of a field of study would have an expository collection structure instead of an argumentative structure. An expository collection structure is suitable in this case because there might be diverse opinions within a field and the different opinions do not necessary point to a coherent main claim. The majority of empirical papers, however, should adopt an argumentative style of writing because they are not simply a collection of past studies (Bem, 2004). Because the purpose of an undergraduate research method class is to provide hands-on research and reporting experience for students, instructors should teach students to write the literature review section of an empirical paper in an argumentative style. The key pedagogical steps should include (a) an explanation of the difference between argumentative and expository texts, (b) scaffolding questions that require students to use individual research findings as evidence for the main argument, and (c) some type of peer-review process that evaluates the coherence of the argument. By focusing on the argumentative structure in the writing instructions, students should be able to construct literature review sections that are more coherent and argue for the relevance of their proposed studies.

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