Writing a Literature Review for Engineers

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These workshops count towards the Graduate College Research Certificate Program. You may want to apply for this program.
How to write a literature review

- Levels of writing a literature review
  - Level 1: Basic assessment
  - Level 2: Compare: collate and contrast
  - Level 3: Integrate / Synthesis

- How to organize your material before writing

- Writing a Level 1 literature review

- Writing a Level 2 literature review

- Level 3: An integrative literature review

Contents
Level I: Basic Assessment

- Tabulate
- Select
- Find the patterns
- Categorize (subheads)
- Describe

This is also known as a bibliographic annotation. This level is author-centric.

Levels of Writing a Literature Review
Level I: Basic Assessment

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- Describe
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  • Graphically describes the types of literature reviews  
  • States 10 rules in writing a good literature review. |
| Taylor-Powell, E. and | Analyzing Qualitative Data                                            | • Qualitative Analysis or Content Analysis -- another name for Literature Review?  
  • Includes papers, video, photos, other forms of data.  
  • Five steps: know your data, understand what you want to analyze, organize your data, find the pattern among data sets, synthesize and interpret. |
| Watson, JT / 2002     | Analyzing the Past to Prepare for the Future: Writing a Literature    | • The need for a ‘plot’ or theme  
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  • Find the patterns and address the knowledge gaps  
  • Evaluate your own assessment to see if it is solid |
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  • Concept structuring and traditional step in writing a literature review  
  • What sets an integrative LR apart: critical thinking and advanced synthesis |

**Level I: Basic Assessment**
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- Tabulate
- **Select**
  - What do you want your paper to accomplish?
  - What is the focus of your study?
  - Find the literature that most closely pertains to your study and use those.
  - Work with your faculty advisor

In my literature review, I want to define the three levels of writing a literature review.

Level I: Basic Assessment
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Level I: Basic Assessment

- Tabulate
- Select
- Find the patterns
- Categorize (subheads)

**Describe**
- In your own words or
- *Quoted appropriately*

Taylor-Powell and Renner (2003) discussed a systematic approach to organize and describe qualitative information, in other words, information that is not in numerical format. This includes describing the literature regarding a specific topic, results of written answers in surveys, issues discussed in forums, and anecdotal material, and more. The material could be written, spoken, or in video, photos, or other forms of media.

These authors emphasize identifying the patterns and organizing the data in categories, an undertaking that the authors point out is “fairly labor intensive depending on the amount of data you have” (Taylor-Powell and Renner, 2003), and crucial to the total effort. Once the categories are established, they state the next step is to find the patterns existing among the categories. This is the starting point in finding a way to synthesize the material into a coherent literature review.

**Example of a Level 1 literature review (author-centric)**
Exercise:

- Get into teams of two

- Each using their own literature search material, create a table of three of the papers with Names of Authors, Title of Paper, and three to five key bullet points for each paper.

- Have the other person in your team review your table.

Level I: Basic Assessment
Level 1: Basic Assessment

- Not really considered a true literature review
- Also known as:
  - Author-centric literature review
  - Bibliographic Annotation
- We want to move you from Level 1 to Level 2, which is where graduate students should be.
- Faculty should be able to write a literature review at Level 3.
### Comparing the Annotated Bibliography to the Literature Review

Annotated bibliographies and literature reviews are both comprehensive collections of relevant sources, but that is where the similarity ends. Their purposes, structures, and components are very different.

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<th>Literature Review</th>
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<td><strong>Purpose</strong></td>
<td>Provides the reader with an ordered list of sources for additional reading. Usually also provides brief explanations of why each source is credible and relevant to the topic.</td>
<td>Provides an overview of a particular topic or problem by summarizing and explaining the most significant sources in the field.</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td>Sources are separated from each other and are arranged alphabetically, so they will be easy to locate.</td>
<td>Sources are integrated into paragraphs based on the progression of the topical overview, and they may be mentioned more than once.</td>
</tr>
<tr>
<td><strong>Components</strong></td>
<td>Each item in the list uses the formal citation style (usually APA, MLA, or Chicago) to cite a single source and includes a short paragraph with a summary explaining its credibility and relevancy.</td>
<td>Uses an introduction to explain the topic, synthesizes sources progressively as the topic is explained through the body, and then concludes by summarizing the overall background presented.</td>
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http://www.una.edu/writingcenter/docs/Writing-Resources/Comparing%20the%20Annotated%20Bibliography%20to%20the%20Literature%20Review.pdf

**Level I: Basic Assessment**
Level 2: Compare: Collate or Contrast

- Tabulate
- Select
  - What do you want your paper to accomplish?
  - What is the focus of your study?
  - Find the literature that most closely pertains to your study and use those.
  - Work with your faculty advisor
- Find the patterns
- Categorize
- **Compare: Collate or Contrast**
Level 2: Compare: Contrast or Collate

- This is what the literature calls ‘synthesis’ at the most basic level.

- You are trying to find the authors that are in agreement with each other on a conclusion (collate) or disagree (contrast) on a specific concept.

- This what Webster and Watson (2002) were talking about when they distinguished a literature review that is ‘author-centric’ versus ‘concept-centric’.

http://aisel.aisnet.org/cgi/viewcontent.cgi?article=2625&context=misq&sei-redir=1&referer=https%3A%2F%2Fscholar.google.com%2Fscholar%3Fhl%3Den%26q%3DAnalyzing%2Bthe%2Bpast%2Bprepare%2Bfuture%26btnG%3D%26as_sdt%3D1%252C29%26as_sdtp%3D#search=%22Analyzing%20past%20prepare%20future%22

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**Level 2: Compare: Collate or Contrast**
In the LVV, several water management models have been developed using system dynamics modeling approach. Stave (2003) developed a model to facilitate the stakeholder’s participation in water resources management; Venkatesan et al. (2011a, 2011b) developed models for salinity load estimation and water reuse, respectively; Shrestha et al. (2011, 2012) developed models to estimate the carbon footprint associated with water supply and water management options, respectively; and Qaiser et al. (2011) used SD to evaluate the impact of water conservation on the fate of outdoor water use. Dawadi and Ahmad (2012) developed a model to evaluate how future climate change will impact streamflow in the Colorado River Basin.


**Level 2: Compare: Collate and Contrast**
Level 3: Integrate / Synthesis

- To be able to write at this level, you need to master Level 1 and Level 2.
- You also need to gain sufficient experience and breadth of knowledge in your field of expertise.
- Level 3 has a narrative quality.
- If you have compared and contrasted at Level 2, at Level 3 you want to discuss why there were contrasting results in the first place.
- At this level, you might be offering your opinion on the quality and accuracy of other researchers’ work.
In the past, to meet the increasing demand, water managers have focused primarily on measures designed to increase supply. This approach, which primarily involves engineering solutions to water issues, is termed the ‘Hard’ path (Gleick, 1998) or supply-side management. Supply-side management has provided massive infrastructures to meet increasing water demands, even during extreme shortages (Gleick, 1998). Risks of flood and drought have been moderated with the construction of massive dams and reservoirs (Gleick, 2003). However, huge infrastructures also have resulted in very expensive and irreversible social, ecological, and environmental costs (Vedwan et al., 2008; Wang et al., 2011). Thus, a shift has been occurring toward managing the demand, an approach that is often termed as the ‘Soft’ path, or demand-side management.

The ‘Soft’ path seeks to make the available water supply more sustainable and productive instead of trying to find other new sources (Gleick, 2003); this approach also investigates areas where potential water savings can be made. A shift toward demand-side management practices is very important in the light of increasing population and changing climatic conditions.
Observations from Dr. Ladkany:

Literature citations are embedded in all the sections of a paper except for the abstract and the conclusion, which are your ideas exclusively.

Recommendation:

As you conduct your literature search for any of your projects, see if you can identify if the literature review in each paper was written at Level 1, Level 2, or Level 3.

Level 3: Integrate / Synthesis
Questions?