In AP Statistics, inferential reasoning is not only an ultimate learning goal as "informal" inferential reasoning where students draw conclusions about populations based on data before the procedures of formal inference are introduced (Zielffer, Isaak, & Garfield 2013). Lee (2017) offers five aspects of inferential reasoning: reasoning within a context, using computations and graphs in analysis, attending to variability, anticipating and appreciating uncertainty, and generalizing beyond the data.

While a growing body of textbook analysis studies in statistics exists, there is a lack of research on analyzing inferential statistics concepts in AP Statistics textbooks.

**Key Ideas in Inferential Reasoning**

**Problem Statement**

Utts (2013) argued that statistics textbooks also serve a purpose not common in other disciplines: “...Many instructors who teach AP Statistics were not trained in statistics, and may have little knowledge of the material or about how to make a good introductory course. For those instructors, the textbook is often their major source for teaching the material they are teaching (p. 4).

In AP Statistics, inferential reasoning is not only an ultimate learning goal, but its early introduction and implicit instruction is recommended by the GAISE report (Franklin et al., 2007). Recent research efforts have focused on an implicit learning goal as “informal” inferential reasoning where students draw conclusions about populations based on data before the procedures of formal inference are introduced (Zielffer, Isaak, & Garfield 2013). Lee (2017) offers five aspects of inferential reasoning: reasoning within a context, using computations and graphs in analysis, attending to variability, anticipating and appreciating uncertainty, and generalizing beyond the data.

While a growing body of textbook analysis studies in statistics exists, there is a lack of research on analyzing inferential statistics concepts in AP Statistics textbooks.

**Research Question**

How are the concepts in inferential statistics presented in textbooks used in a sample of Advanced Placement Statistics textbooks?

a) What is the nature of opportunities to learn concepts in inferential statistics in the textbooks?

b) What is the sequence and scope of inferential statistics concepts in the textbooks?

c) What are the similarities and differences among the textbooks as they pertain to (a) and (b)?

**Framework**

<table>
<thead>
<tr>
<th>Inferential Reasoning Key Aspects</th>
<th>Contextual Data</th>
<th>Computations &amp; Graphs</th>
<th>Attending to Variability</th>
<th>Uncertainty</th>
<th>Generalizing Beyond Data at Hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posing a Question</td>
<td>Rich context</td>
<td>Require both Statistical question. Not only computations</td>
<td>Compare groups</td>
<td>Competing models</td>
<td>Samples to population</td>
</tr>
<tr>
<td>Collecting Data</td>
<td>Multiple attributes, Categorical, numerical</td>
<td>Measurement, effect of sample size</td>
<td>From sample to sample</td>
<td>Random process. Stochastic models</td>
<td>Awareness of population, big picture</td>
</tr>
<tr>
<td>Analyzing Data</td>
<td>Investigation about group and associations</td>
<td>Multiple representations and different statistical measures</td>
<td>Repeated sampling, central tendency</td>
<td>Theoretical vs Empirical modeling</td>
<td>Patterns and trends</td>
</tr>
<tr>
<td>Interpreting Data</td>
<td>Skeptic</td>
<td>Data visualization tools</td>
<td>Sampling error</td>
<td>Hypothesis</td>
<td>Generalize</td>
</tr>
</tbody>
</table>

**Qualitative Analysis: Example Coding of a Problem**

**Methodology**

**Coding structure: A Textbook chapter**

- Components of textbook
  - Expositions
  - Activities
  - Examples
  - Technology tools
  - Problems

For Problems, Activities & Examples, code for:

- Investigative cycle phases
- Pose—Collect—Analyze—Interpret
- Inferential Reasoning key aspects
  - Context—Computations & Graphs—Variability—Uncertainty—Generalize Beyond Data

**Select References**


