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A Review of Using Think-Aloud Interviews and Cognitive Labs in Educational Research

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Abstract

In this book, Leighton (2017) describes two methods of qualitative interviewing that provide researchers an opportunity "to present *observable* indicators (evidence) of phenomena that are technically *unobservable*" (p. 14). Leighton (2017) describes the procedures for conducting and analyzing think-aloud interviews, which are used to understand problem solving processes; and cognitive laboratories, which provide insight into comprehension and understanding. Through the use of examples of verbal reports, Leighton (2017) provides readers with step-by-step processes which prepare researchers to be well equipped for collecting and analyzing interview data.

Keywords

Qualitative Interviewing, Cognitive Labs, Think-Aloud Interviews

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In this book, Leighton (2017) describes two methods of qualitative interviewing that provide researchers an opportunity "to present observable indicators (evidence) of phenomena that are technically unobservable" (p. 14). Leighton (2017) describes the procedures for conducting and analyzing think-aloud interviews, which are used to understand problem solving processes; and cognitive laboratories, which provide insight into comprehension and understanding. Through the use of examples of verbal reports, Leighton (2017) provides readers with step-by-step processes which prepare researchers to be well equipped for collecting and analyzing interview data. Keywords: Qualitative Interviewing, Cognitive Labs, Think-Aloud Interviews

In her book, *Using Think-Aloud Interviews and Cognitive Labs in Educational Research*, Jacqueline Leighton describes two methods of qualitative interviewing with such clarity that anyone who reads it, regardless of his or her research experience, will be able to conduct each type of method with confidence. Cognitive laboratories and think aloud interviews allow researchers "to present *observable* indicators (evidence) of phenomena that are technically *unobservable*" (p. 14). These two interview methods allow investigators gain an understanding of how participants engage in problem solving processes or comprehension strategies.

Overall, Leighton organizes her book with a method of spiraling. She takes time to review and bring us back to information discussed previous chapters before extending our knowledge in the current chapter. She acknowledges what we should recall from previous chapters and what we should revisit if we do not remember: "In this chapter it is assumed that readers understand. . . . If not, the reader is referred to chapters 2 and 3 before proceeding further in this chapter" (p. 98).

Leighton (2017) begins the book establishing a foundation of understanding the history of cognitive labs and think aloud interviews in a literature review format. She then describes the process of conducting each method of interviewing individually, followed by chapters devoted to analyzing the verbal reports collected from each interview method. Leighton (2017) stocks each chapter with tables and figures that aid in understanding main components of what she is discussing. She begins each chapter with a review of what was previously discussed and ends each chapter with a summary of the main points, which also acts as a transition for what is to come. As a doctoral student who is unfamiliar with think-aloud interviews and cognitive labs, I appreciated the foundation of the methods and the many citations provided for my continued learning. I found the figures that Leighton includes to be very helpful as they improved my understanding of the value for the two interview methods.

Think aloud interviews are designed for understanding participants' problem solving processes. Leighton (2017) explains:

> If the situation is not difficult, or the process of resolving it is so clearly straightforward as to make the problem solving trivial because the solution is

simply recalled from LTM (long term memory), then the situation is not considered as presenting a real problem. (p. 22)

For this reason, she provides Simon's (1974) six criteria for a well-structured problem, which is key when interviewing to measure a participant's problem-solving processes. These criteria are followed by sample problem solving tasks and explanations for engaging participants in think-aloud interviews. The examples she provides not only help me understand exactly how think-aloud interviews are conducted, but also provided a scaffold for how I should conduct these interviews.

Later in the book, Leighton (2017) explains the analysis of think-aloud interviews. She uses examples of categorical syllogisms, which "are used in tests of deductive logic" (p. 100), to engage readers with the procedures of analyzing think-aloud interview data. What I find most helpful is that Leighton (2017) provides a categorical syllogism and the verbal report associated with the syllogism. Then, she refers to a specific coding frame, attribute hierarchy of information processing of categorical syllogisms (Leighton, Gierl, & Hunka, 2004), which is determined before the coding process begins, and walks me through the steps of coding and analyzing the reports collected from think-aloud interviews. This amount of support is much needed for someone who is new to this process.

Think-aloud interviews are best used when the reporter is focusing on problem-solving processes, and cognitive labs are used when the researcher is focusing on comprehension and understanding. Engaging in this process is different from the process of think-aloud interviews because the investigator is able to probe the participant for clarification or elaboration, while think aloud interviews are designed to only gain insight into a participant's thoughts, leaving the researcher to be as unobtrusive as possible. Another difference between think-aloud interviews and cognitive labs stems from the coding process. "Coding, rating, and scoring of verbal reports from think-aloud interviews was described as contingent on an a priori cognitive model of information processing" (p. 151) while coding reports from cognitive labs may take a more confirmatory approach, where reports are coded "without a cognitive model guiding the processes, and [developed] … based on the verbal report data" (p. 152).

Because of the focus on comprehension and understanding, cognitive labs are commonly used to validate assessment items. "The goal with cognitive laboratory interviews is to gather evidence to ensure that target audiences comprehend task materials – survey scenarios, items/questions, and options – as they were designed" (Leighton, 2017, pp. 66-67). When using cognitive labs to validate assessments, special attention should be given to sample size and participant selection. "When cognitive laboratory interviews are conducted to explore the clarity of questionnaire items, … adequate representation is still important to verify the instrument works well for the diversity of audience intended" (p. 150). Leighton (2017) addresses some of the concerns for bias when selecting participants and engaging in cognitive labs.

Prior to reading this book, I would not have considered the selection of participants or poorly timed probing when thinking of bias. Leighton (2017) ensures her readers are aware of these downfalls and can conduct cognitive labs considering these items.

As mentioned earlier, verbal reports collected from cognitive laboratory interviews may be coded with a model developed from the verbal reports themselves. Leighton (2017) includes Chi's (1997) seven steps for analyzing verbal reports (p. 152) by developing themes from codes that are derived while reading the reports. She references sample interview questions and a corresponding coding scheme as she explains how to engage with each of the seven steps.

If using cognitive labs to design educational tests and/or survey items, Leighton (2017) also includes Willis' (2015) five analysis models (p. 164).

One of the greatest things I think Leighton does in chapter five is mention qualitative data analysis software programs that may be used to aid in the process of organizing the verbal reports for coding (pp. 167-168). She not only mentions how they can be a helpful tool to assist the analysis process, but she also shares some websites where I might find some helpful resources.

What I enjoy most about this book is the amount of support Leighton (2017) provides. The sample verbal reports accompanied with step-by-step procedures are tremendously helpful for anyone who is interested in engaging in think-aloud interviews or cognitive labs. Sample scripts and probes are other scaffolds that I appreciate being included in this book because they provide a starting point for these interview procedures. Overall, I walk away having a clear understanding of think-aloud interviews and cognitive labs and know that I have a supportive text to reference as an aid throughout the process.

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