
Utilizing Small Group Cognitive Labs for Assessment Item Validation

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Cognitive Labs

What are they?

When are they used?



The Process

- Draft assessment questions
 - Have gone through initial design process
- Part of pilot testing
- Collecting evidence to see if questions elicit intended type of thinking



Why Group Cognitive Labs?

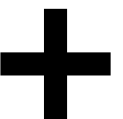
IRB requirements

Time and logistics considerations (educator must be present)

Cost considerations

Research on peer mentoring and focus groups in high school students

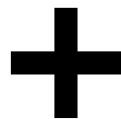
- Foster conversation and encourage discussion
- Student metacognitive skills and expression



How data informs assessment improvement



- Mismatch between expected and observed cognitive processes
- Areas of confusion
 - Vocabulary
 - Concepts



The approach



- Scripted
 - Introduction
 - Modeling by interviewer and practice
 - Read questions
- Open-ended probing questions
 - Focused on understanding approaches to thinking
- Emphasis on thought process, not correct answers
- Record transcripts
- Track data

COGNITIVE LAB INTERVIEW PROTOCOL



Rebecca J. Peterson, PhD
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Thank you for facilitating the cognitive labs for the Genetic Science Learning Center. The following information describes the cognitive interview procedure.

- The protocol is divided into three main sections: pre-interview tasks, interview protocol, and post-interview tasks.
- It is important that you follow the protocol as written.
 - Where there are scripted instructions or prompts, please read them verbatim.
- If you have any questions about any portion of the protocol, please don't hesitate to reach out.

PRE-INTERVIEW TASKS

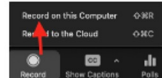
1. Review the protocol to make sure that you understand the procedures.
2. Familiarize yourself with:

- The interview script (see below)
- The assessments ([Cog Lab Form A](#) and [Cog Lab Form B](#))

- The Zoom meeting will be scheduled to start 10 minutes before the arrival of any meeting participants.
2. Open the Qualtrics assessment link for the test form you are using for the interview.
 - Day 1 interviews will use [Cog Lab Form A](#), and Day 2 interviews will use [Cog Lab Form B](#).
3. Make sure you can share the screen that has the Qualtrics assessment displayed.
4. Be prepared to start recording the audio of the meeting to your local computer once the teacher and students have joined.
 - No video recording is permitted.
 - The host may have their video on so that participants can see the host and the host's shared screen, but the host will not be able to see participants.
 - The meeting settings will be set to prevent participants from turning video on.
 - Participants will be automatically muted upon entering the meeting.

Starting The Meeting

1. At the time the meeting is scheduled to begin, verify with the teacher or other school personnel that the students are present with them and that they are ready to begin.
2. Tell the teacher to assign one student to be student 1, one to be student 2, and the remaining student to be student 3 and remind them not to share their names.
3. Notify participants that you will be audio recording this interview and begin the recording by clicking on the record button on the Zoom meeting controls and selecting "Record on this computer."
4. Verify that the recording has started before beginning the interview.



INTERVIEW PROTOCOL SCRIPT

*Italicized text should be read aloud to students. Non-italicized text provides directions for the interviewer and is not part of the script.**

Hi everyone! My name is [interviewer name] and I'll be leading our interview today. First, I'd like to introduce you to [teacher name]. [teacher name] and I have received student assent forms and parent consent forms for each of you. [teacher name], can you confirm we have permission to proceed?

Thank you. Now, when I call your assigned number, please say "here" so I know who is who for our interview today.

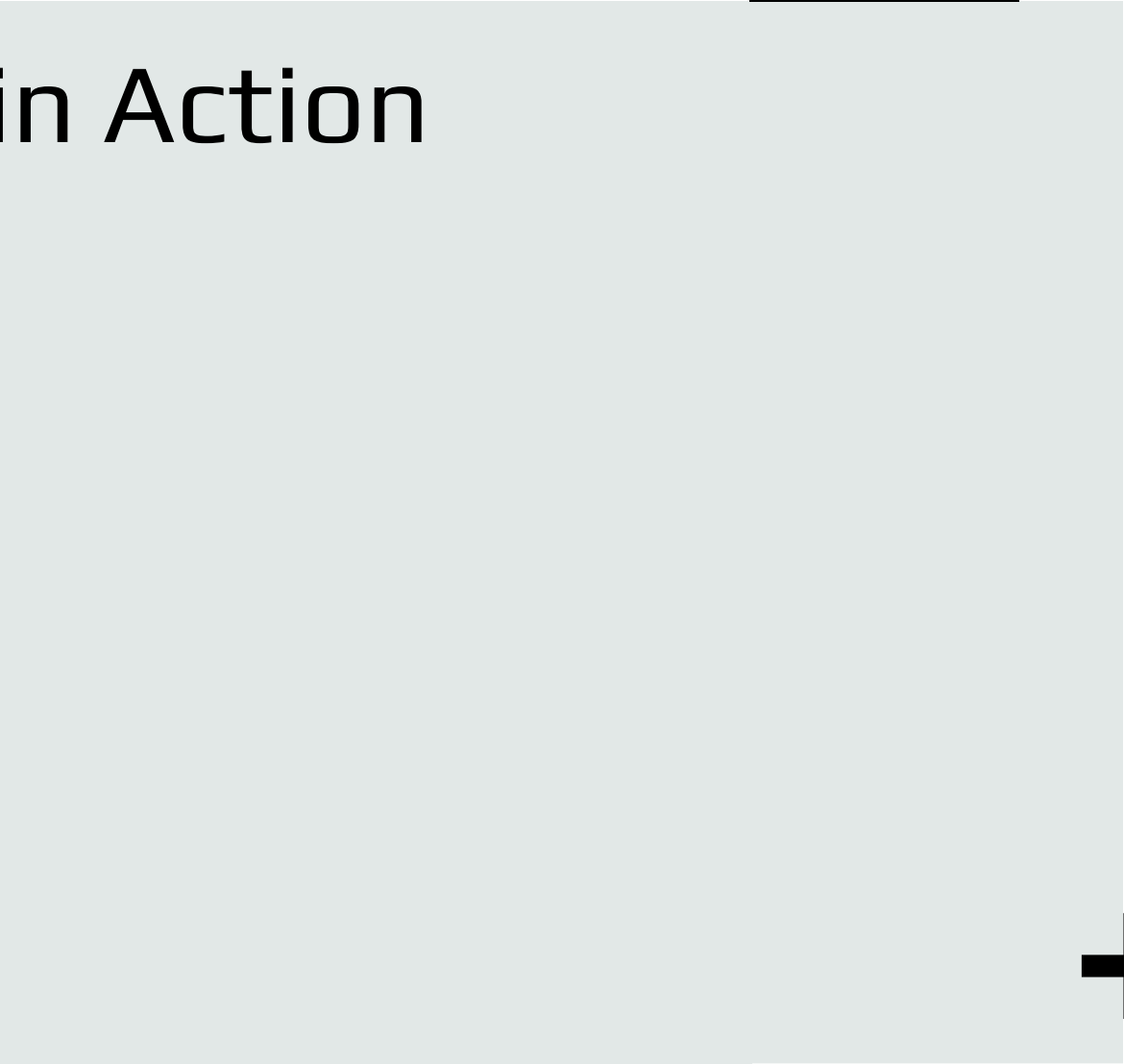
During our interview today to keep your

During our interview today, I will ask you to share [question] on my screen.

Tools of the Trade

A	B	C	D
Student Number	Student ID (assigned by teacher for the study)		
1			
2			
3			
	DOK 1 ex. classify, associate, describe, follow steps, identify, list, match, name, order, recall, recognize, sort, state, etc.	DOK 2 ex. apply, compare/contrast, connect, describe unfamiliar ideas or constructs, develop models, explain familiar ideas, infer, interpret, organize, predict, summarize, draw conclusions	DOK 3 ex. analyze, critique, design solutions, develop hypotheses, evaluate against criteria, construct explanations, identify patterns, interpret data in context, investigate, justify, make decisions, reason, relate, synthesize, draw conclusions based on evidence, apply knowledge in new or unfamiliar situations
Question 1			
Question 2			
Question 3			
Question 4			
Question 5			
Question 6			

Group Cognitive Labs in Action



Best Practices

- A priori
 - study the material ahead of time
 - practice the script (with another person or out loud)
- Tone during the conversation
 - keep it friendly (they are helping us, not the reverse)
 - keep it light (remind them this is not for a grade so they are not stressed)



Best Practices

- Strategies for eliciting meaningful conversation
 - use known principles of eliciting student conversation (e.g., provide time to think; “say more;” “so are you saying that;” “explain why”)*
 - employ strategies specific to groups (e.g., if a student is stuck remind them they can pass to another student; allow time for student-student discussion; “do you agree with student 1 and why”; “who wants to add to what student 1 said”)
 - employ different strategies for “talkers” and “non-talkers” (e.g., “boy, I really love the way you’re thinking, let’s see what student 2 says and then I’ll circle back to you for the next item” and “you had a great answer to item 11 so I’m curious what you in particular think of this item”)

* From *Goals for Productive Discussion and Nine Talk Moves*

References and Resources



<https://tinyurl.com/SciEd24CogLab>

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Questions?

Thank you for your time and attention