

# Using Iterative Quick Turnaround Cognitive Interviewing to Integrate Quality Into the 2022 U.S. Economic Census

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*Any opinions and conclusions expressed herein are those of the authors and do not reflect the views of the U.S. Census Bureau. The Census Bureau has reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance applied. (Approval ID: CBDRB-FY22-ESMD002-033)*

# Cognitive Interviewing

- Qualitative methodology used to test and improve survey questions by asking respondents open-ended probes
- Ensures that respondent's answers to survey questions meet the original intent
- Goals of these cognitive interviews:
  - Determine whether respondents can understand questions and report correctly
  - Identify what, if any, changes are necessary to the proposed wording
  - Provide recommendations to address cognitive issues identified during testing

# Overview of Cognitive Research for EC22

## By the Numbers:

- 230 cognitive interviews
- 19 topics
- 65 questions
- 3 rounds of interviewing
- 6 interviewers
- 4 months (August – November 2021)

# Outline of Presentation

- Methodology
- Components of high volume cognitive testing
  - Iterative design
  - Recruitment
  - Test instrument
  - Interviewing protocol
  - In-field support
  - Progress tracking
  - Analysis
- Examples
- Lessons learned

# Methodology

- Respondents recruited over email and self-scheduled themselves
  - Generally, contacted respondents from 2017 Economic Census
  - Some targeted recruitment for specific industries
  - Most participants were in accounting, finance, management, etc. roles
  - Respondents came from both single- and multi-unit businesses, large and small
- Approximately 30-minute interviews over phone or virtual meeting software
- Intro/consent form/background information
- Respondents viewed a select set of questions relevant to their industry and some cross-sector questions (assigned randomly) via online data collection tool
- Interviewers viewed identical questions but were provided space to ask probing questions and take notes on responses

# Iterative Design

- User comments and verbalizations noted during cognitive interview sessions
- Analyzed comments across all participants
- Met with stakeholders after each round
- Revised questions tested in iterative rounds of cognitive interviews, as appropriate
- Some topics/questions removed from consideration
- Remaining questions included as tested or revised based on findings

# Recruitment

- Very specific targets
  - Size
  - Location
  - Kinds of activities

## Solution:

Training to pull cases directly from the Business Register.

# Recruitment (cont)

- Self-scheduler – respondents pick the interview day and time

Please select the day and time combination from below when you are available for a 30 - 45 minute interview with the U.S. Census Bureau. A researcher will send you confirmation of your selected appointment time. All appointments are Eastern (Washington, DC) time zone.

## Thursday, July 1, 2020

Thursday, July 1 at 9:00 am, Eastern

Thursday, July 1 at 10:00 am, Eastern

Thursday, July 1 at 11:00 am, Eastern

Thursday, July 1 at 12:00 noon, Eastern

Thursday, July 1 at 1:00 pm, Eastern

Thursday, July 1 at 2:00 pm, Eastern

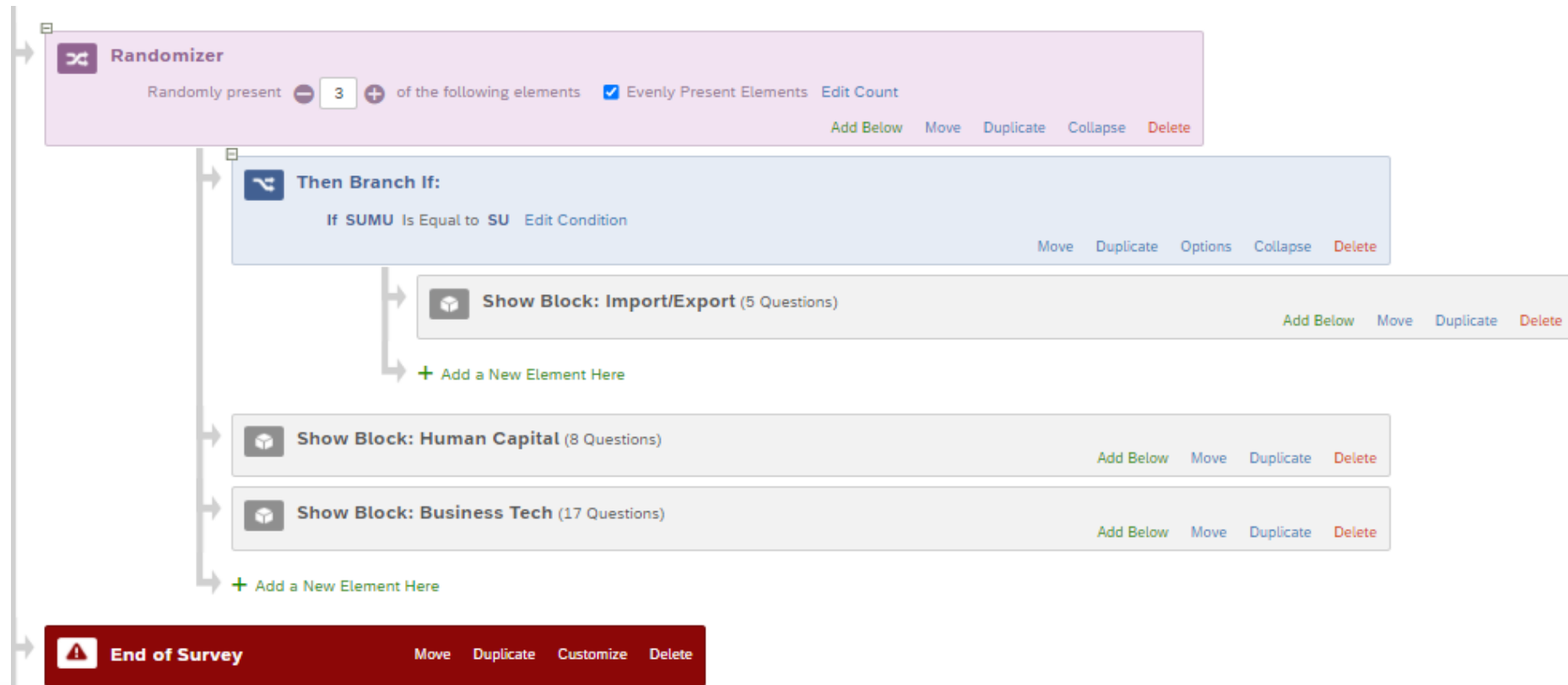
Thursday, July 1 at 3:00 pm, Eastern

Thursday, July 1 at 4:00 pm, Eastern

Thursday, July 1 at 5:00 pm, Eastern



# Test Instrument



# Interviewer Protocol

- Respondent Screen

United States  
**Census**  
Bureau

**Item 28 (Self Checkout)**  
Did this establishment offer a way for customers to self checkout, with no or minimal assistance, in 2020?

Yes

No

- Interviewer Screen

United States  
**Census**  
Bureau

**Item 28 (Self Checkout)**  
Did this establishment offer a way for customers to self checkout, with no or minimal assistance, in 2020?

Probes:

- In your own words, what do you think this question is asking?
- How did you come up with your answer? (Would you need to ask others for assistance in answering this question? How is this information kept in your records?)
- What does the term 'self checkout' mean to you? What does 'with no or minimal assistance' mean to you?
- How easy or difficult would you say this question is to answer? (Time estimate?)
- Do you have any suggestions to improve this question?

# In-field Support

- Protocol updates



# In-field Support (cont)

- Specialization:
  - Dedicated project lead
  - Multiple interviewers
  - Dedicated programmer and data analyst
- Dedicated chat – communication between interviewers and support staff
- Real-time troubleshooting – could answer issues in real- or near-real-time

# Progress Tracking

## EC22 Content Cognitive Testing Dashboard

This dashboard is almost real-time updating - there may be a slight lag between interview completion and population on the dashboard.  
If you have questions or concerns, please direct them to Melissa Cidade - melissa.cidade@census.gov

Overall Count ⓘ 105 Responses

▼ 1 ↓



Interviewer Productivity ⓘ 105 Responses

▼ 1 ↓

Interviewer - Interviewer Identification:

Count

Aryn	26
Jessica	21
Kristin	38
Krysten	19
No Response	1

Interview Completion Rate ⓘ

↓

Count

126

# Progress Tracking (cont)

## Critical Item Response Tracking

	Sum	N
GENERAL MANUFACTURING, QUESTION 1	Sum	2.00
M1 PATH	Sum	9.00
R1 PATH, QUESTION 1	Sum	11.00
R1 PATH, QUESTION 2	Sum	0.00
R1 PATH, QUESTION 4	Sum	9.00
R1 PATH, QUESTION 5	Sum	2.00
R1 PATH, QUESTION 6	Sum	1.00
S1 PATH, QUESTION 1	Sum	4.00
S2 PATH, QUESTION 1	Sum	5.00
S3 PATH, QUESTION 1	Sum	10.00
S4 PATH, QUESTION 1	Sum	12.00
S4 PATH, QUESTION 2	Sum	NONE
S5 PATH, QUESTION 1	Sum	1.00
S6 PATH, QUESTION 1	Sum	NONE
S7 PATH, QUESTION 1	Sum	22.00
S7 PATH, QUESTION 2	Sum	16.00
GW PATH, QUESTION 1	Sum	10.00
GW PATH, QUESTION 3	Sum	1.00
GW PATH, QUESTION 6	Sum	10.00
W1 PATH, QUESTION 1	Sum	5.00
W1 PATH, QUESTION 3	Sum	NONE
W1 PATH, QUESTION 6	Sum	5.00
W3 PATH, QUESTION 1	Sum	11.00
IA PATH	Sum	7.00

Note: contains fictional data.

# Analysis



# Analysis (cont)

The screenshot displays the NVIVO software interface. On the left is a navigation sidebar with sections for 'Quick Access', 'IMPORT' (Data, Files, File Classifications, Externals), 'ORGANIZE' (Coding, Codes, 9-18 protocol, Sentiment, Relationships, Relationship Types), 'Cases', 'Notes', 'Sets', 'EXPLORE' (Queries, Visualizations, Reports), and a search bar. The main area shows a hierarchical tree of codes under the 'Codes' tab. The tree structure is as follows:

- Human Capital
  - HC1
    - Categories
      - Cat unclear (1 file, 3 references)
      - Number of categories (1 file, 3 references)
      - Other-specific (1 file, 6 references)
      - basic skills (1 file, 7 references)
    - Burden (0 files, 0 references)
      - Why asking (1 file, 5 references)
      - Does not have info (1 file, 16 references)
        - confused (1 file, 2 references)
        - Has the information (1 file, 23 references)
      - COVID (1 file, 4 references)
      - Definitions (1 file, 31 references)
    - HC2
      - Burden (0 files, 0 references)
        - satisficing or estimating (1 file, 9 references)
        - Does not have the data (1 file, 15 references)
          - Has the data (1 file, 28 references)
        - Why asking (1 file, 2 references)
        - COVID (1 file, 3 references)
        - Confusion (1 file, 10 references)
      - HC3
        - Burden (0 files, 0 references)
          - Has the data or willing t (1 file, 22 references)
          - Does not have the data (1 file, 36 references)
        - Why asking (1 file, 1 reference)

Below the tree is a table with the following columns: Name, Files, References, Created on, Created by, Modified on, and Modified by. The table lists all codes and their associated statistics.

Name	Files	References	Created on	Created by	Modified on	Modified by
Human Capital	0	0	8/18/2021 9:45 AM	MAC	8/18/2021 9:45 AM	MAC
HC1	0	0	8/18/2021 9:45 AM	MAC	8/18/2021 9:45 AM	MAC
Categories	0	0	8/18/2021 9:59 AM	MAC	8/18/2021 9:59 AM	MAC
Cat unclear	1	3	8/18/2021 9:59 AM	MAC	8/18/2021 10:03 AM	MAC
Number of categories	1	3	8/18/2021 9:55 AM	MAC	8/18/2021 10:07 AM	MAC
Other-specific	1	6	8/18/2021 9:46 AM	MAC	8/18/2021 10:09 AM	MAC
basic skills	1	7	8/18/2021 9:48 AM	MAC	8/18/2021 10:11 AM	MAC
Burden	0	0	8/18/2021 10:10 AM	MAC	8/18/2021 10:10 AM	MAC
Why asking	1	5	8/18/2021 10:10 AM	MAC	8/18/2021 10:28 AM	MAC
Does not have info	1	16	8/18/2021 9:46 AM	MAC	8/18/2021 10:25 AM	MAC
confused	1	2	8/18/2021 10:10 AM	MAC	8/18/2021 10:26 AM	MAC
Has the information	1	23	8/18/2021 9:45 AM	MAC	8/18/2021 10:27 AM	MAC
COVID	1	4	8/18/2021 9:53 AM	MAC	8/18/2021 10:02 AM	MAC
Definitions	1	31	8/18/2021 9:47 AM	MAC	8/18/2021 10:28 AM	MAC
HC2	0	0	8/18/2021 10:31 AM	MAC	8/18/2021 10:31 AM	MAC
Burden	0	0	8/18/2021 10:31 AM	MAC	8/18/2021 10:31 AM	MAC
satisficing or estimating	1	9	8/18/2021 10:33 AM	MAC	8/18/2021 10:51 AM	MAC
Does not have the data	1	15	8/18/2021 10:32 AM	MAC	8/18/2021 10:51 AM	MAC
Has the data	1	28	8/18/2021 10:31 AM	MAC	8/18/2021 10:51 AM	MAC
Why asking	1	2	8/18/2021 10:40 AM	MAC	8/18/2021 10:50 AM	MAC
COVID	1	3	8/18/2021 10:34 AM	MAC	8/18/2021 10:49 AM	MAC
Confusion	1	10	8/18/2021 10:34 AM	MAC	8/18/2021 10:50 AM	MAC
HC3	0	0	8/18/2021 10:52 AM	MAC	8/18/2021 10:52 AM	MAC
Burden	0	0	8/18/2021 11:09 AM	MAC	8/18/2021 11:09 AM	MAC
Has the data or willing t	1	22	8/18/2021 11:09 AM	MAC	8/18/2021 11:24 AM	MAC
Does not have the data	1	36	8/18/2021 11:09 AM	MAC	8/18/2021 11:25 AM	MAC
Why asking	1	1	8/18/2021 11:18 AM	MAC	8/18/2021 11:18 AM	MAC



# Example 1: Human Capital

- Goal was to capture information about formal training employees receive

- Types of formal training**

- Expenditures for formal training**

- Hours of formal training**

- Cognitive interviews found that training records are inconsistent, the concepts were not easily understood, the questions were burdensome, and they caused privacy concerns
- Questions will not appear on the EC22

# Example 2: Business Technologies

- Goal was to provide a new detail regarding which types of firms and subsectors are adopting business technologies

**In 2022, did this establishment use [business technology] in its own operations?**

**How did this establishment acquire the [business technology] used in its own operations?**

Types of technologies: Touchscreens/kiosks, Additive manufacturing (3d printing), Radio-frequency identification (RFID), Industrial robots, Service robots, Automated guided vehicles (AGVs), Automated storage and retrieval systems, and Augmented reality

- Questions were asked of all industries, but many respondents felt they weren't relevant to them
- Difficult to create definitions that all respondents understood, if they weren't already familiar with the technology
- Revised questions will be on EC22 -- Reduced the number of questions from eight to six, re-ordered and clarified instructions

# Example 3: Remanufacturing

- Goal was to provide new detail on remanufacturing
  - What percent of the \$,000.00 of Sales, Shipments, Receipts, or Revenue reported in Item 5 was from remanufactured goods produced at this establishment?
- Concept of “remanufacturing” and provided definition did not resonate with respondents in Round 1
- For Round 2, drafted a new version of a current question about products to evaluate whether respondents could report “new” vs. “remanufactured”
- Many respondents in Round 2 did not notice the breakout of “new” vs. “remanufactured” and some respondents still found definitions confusing
- Clarifications and revisions to the wording/instructions were recommended and accepted
- Selected products will be broken out into “New” and “Rebuilt or remanufactured” and will be collected in the products section on EC22

# Example 4: Retail Health Clinic

- Goal was to provide new detail regarding Retail Health Clinics
  - A retail health clinic is an in-store clinic with a health care professional who provides medical care (e.g., health screenings, treatment of minor injuries and illnesses, or management of chronic medical conditions).
  - Exclude:
    - Patient care services delivered only by pharmacists such as dispensing vaccines and medications.
- Questions about Retail Health Clinics were tested for both Services and Retail industries
- This term did not resonate with respondents in either industry
- Most did not understand what types of establishments this definition referred to
- Questions will not be asked on EC22

# Lessons Learned

- Multiple rounds of cognitive interviews (iterative design)
- Allowed for revisions to improve question wording
- Determined which questions should NOT be included on EC22

## 19 topics

- 12 included on EC22
- 7 not included on EC22

## 65 questions

- 37 included on EC22
- 28 not included on EC22

# Lessons Learned (cont)

- Use of innovative technology supported completion of 230 cognitive interviews in a completely virtual environment (high volume testing)
  - Statistical analysis software
  - Online survey platform
  - Chat functionality
  - Qualitative data handling software
- Allowed us to keep project on target but also maintain flexibility
- Able to identify poorly performing questions and determine if they could be further refined or should be removed from testing
- Able to quickly change wording and pathing based on feedback from respondents and stakeholders

# Thank you!

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