

Digital Adaptation of the WJ IV: Goals and Considerations

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“Our future success is directly proportional to our ability to understand, adopt, and integrate new technology into our work.”

—Sukant Ratnakar, Founder and CEO, Quãntraz (“Change Anesthesiology”)



WJ IV DIGITAL BRIEF COGNITIVE BATTERY

First digital adaptation
of the WJ tests

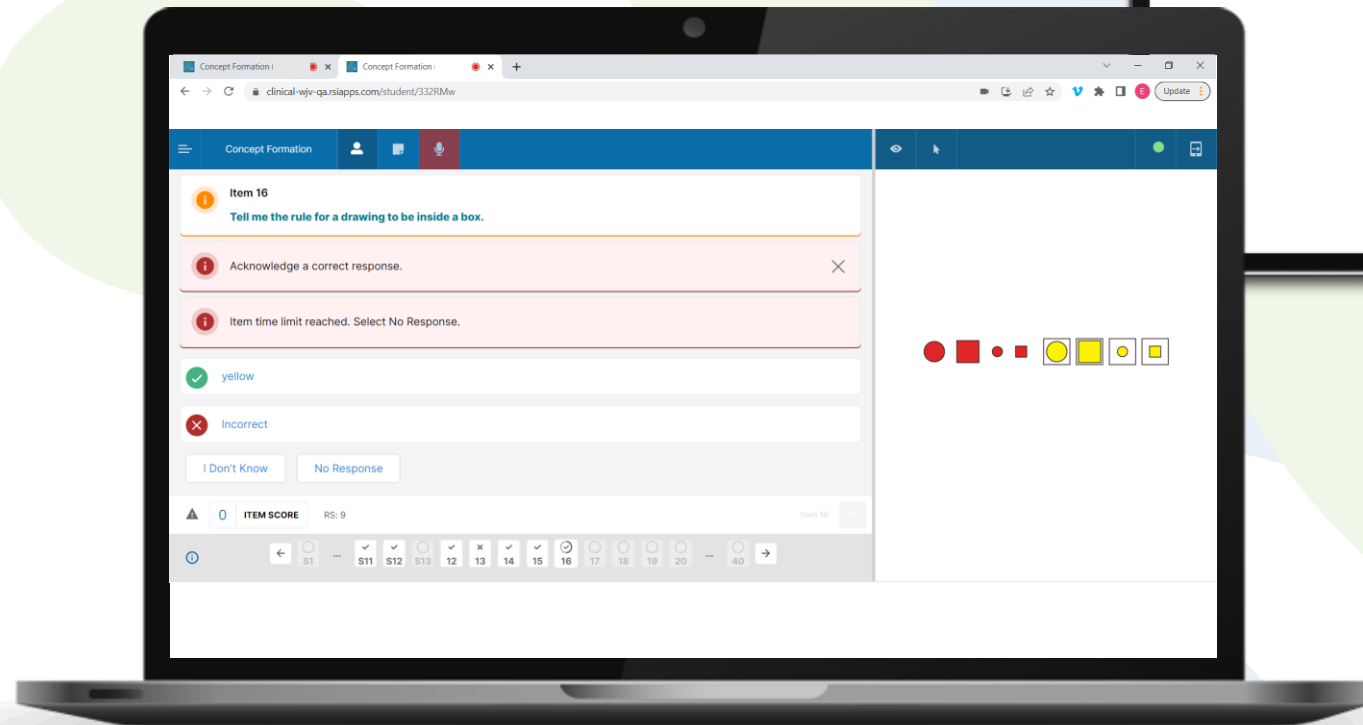
Oral Vocabulary (*Gc*)

Number Series (*Gf*)

General Information (*Gc*)

Concept Formation (*Gf*)

Lays the groundwork
for future adaptations





WJ IV DIGITAL TRANSFORMATION

THE ROAD TO THE WJ IV DIGITAL BRIEF COGNITIVE BATTERY

Plan

Identify goals and constraints, write requirements, and develop processes



Design/Build

Design UI/UX, build platform, write logic, adapt/ingest content, and QA



Pilot

Administer to a wide range of examinees; capture response, score, and timing data + session voice recordings



Evaluate

Analyze data, evaluate item and test characteristics, review qualitative data, assess equivalency with PP





TEAM INPUT AND PERSPECTIVES



UI/UX Designers

How will the user interact with the interface?

Psychometricians

How can we assess (and minimize) the psychometric impacts of a change in administration mode?

Content Developers

How do the test items and instructions need to change for digital delivery?

Product Managers

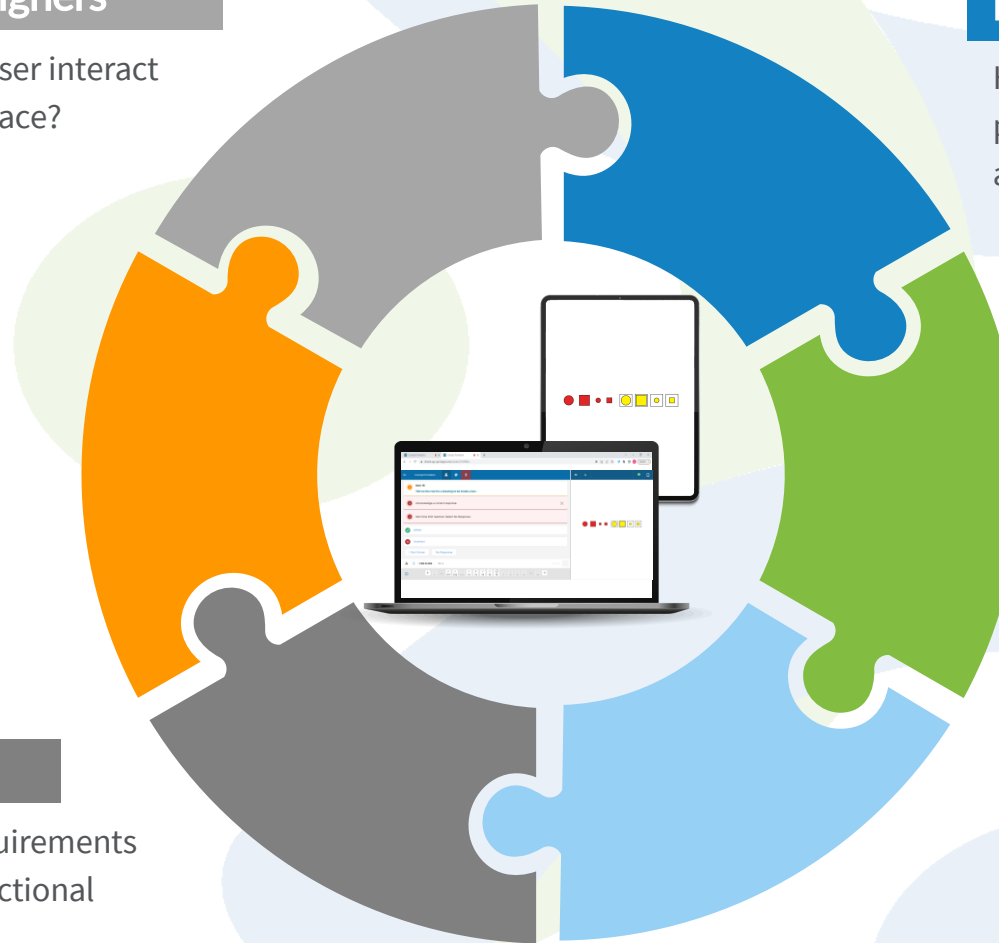
What are the market requirements and how do we ensure the platform meets those requirements?

Software Engineers

How to translate the requirements and UI designs into a functional platform?

Customers/Users

How will digital delivery impact the way I conduct my assessments?










HIGH-LEVEL GOALS AND CONSTRAINTS








Digital delivery *should*...

-  improve administration ease and efficiency
-  reduce examiner administration and scoring errors
-  maintain the tests' psychometric characteristics
-  be engaging for the examinee
-  free up the examiner's attention to focus more on examinee characteristics and behaviors

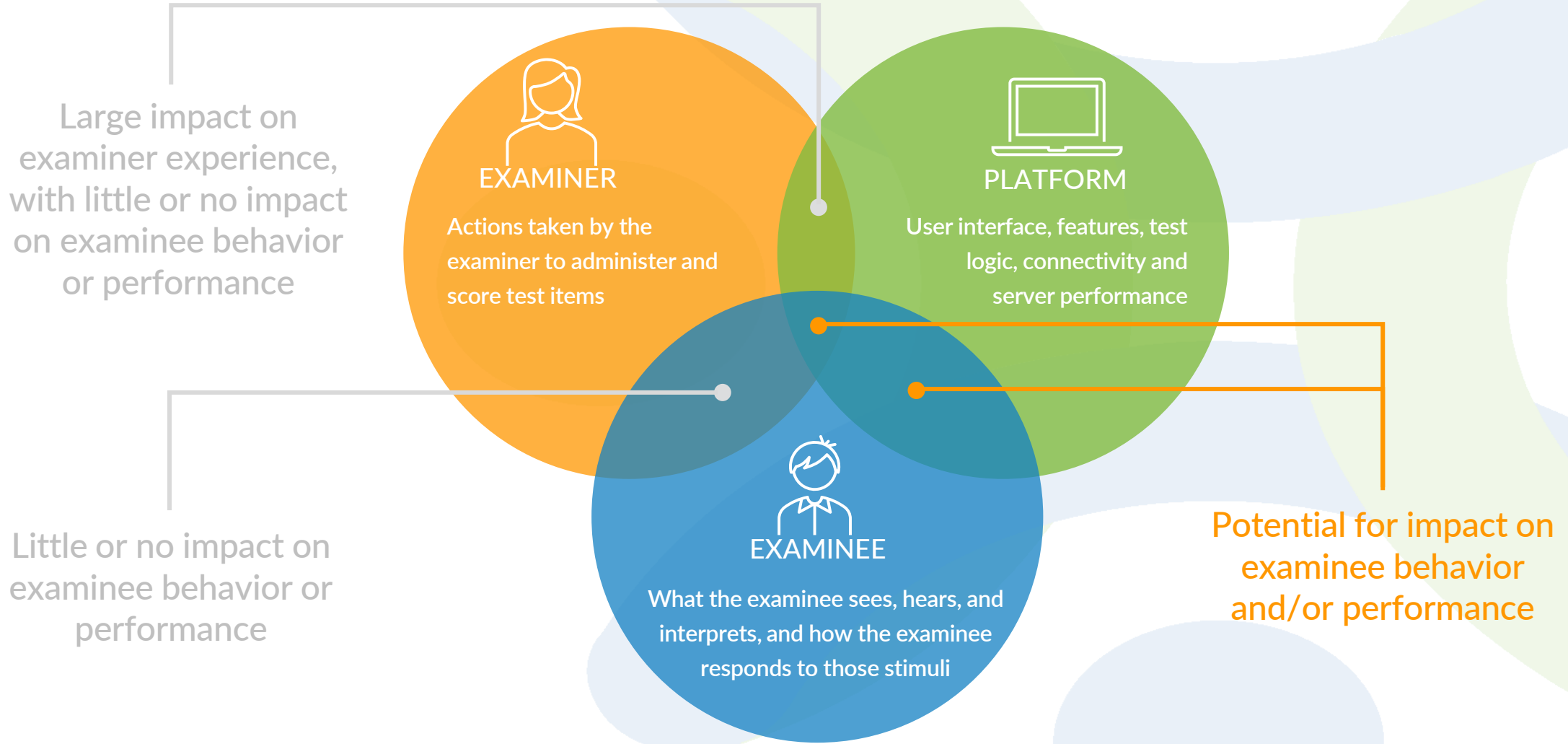


but *should not*...

-  alter the tests' intended constructs
-  require a steep learning curve for administration
-  impact the difficulty of the items
-  adversely impact the examinee's behavior or performance
-  make the tests inaccessible to examinees with limited exposure to technology



POTENTIAL SOURCES OF VARIANCE





SOME POTENTIAL THREATS TO SCORE EQUIVALENCY

ANTICIPATING POSSIBLE SOURCES OF CONSTRUCT-IRRELEVANT VARIANCE

Plan



THREATS TO VALIDITY

PLAN FOR MITIGATION



Item Difficulty Changes

If an Examinee perceives the stimuli differently in digital format, the items may seem easier or more difficult than in paper

Maintain Item Stimulus Formats

Visual and auditory stimuli should be as close as possible to the paper version



Unintended Interactions

Unintended interactions between the Examinee and the Platform or Examiner could impact examinee behavior or performance

Streamline Admin Workflow

Design the admin workflow to allow brisk and efficient administration with minimal opportunities for Examinee distractions



Testing Disruptions

If the test session connection is interrupted, the standardized administration protocol could be compromised

Design and Test for All Scenarios

Design the platform so that typical WiFi disruptions have minimal, if any, impact on the testing session





WJ IV DIGITAL PLATFORM DESIGN DECISIONS



- User interface must be intuitive
- Audio record the test session for later Examiner review
- Automate many administration tasks:
 - Selection of SSP
 - Item order
 - B/C and cutoffs
 - Item scoring
 - Item response feedback triggers



- Retain PP stimuli presentation and item response modes (e.g., visual, oral, both)
- Present one item per page/screen
- Design for iPad portrait mode
- Maintain aspect ratio of visual stimuli, regardless of iPad screen size



- Minimize intended changes to examiner/examinee interactions



- Employ a browser-based platform to ensure auto-save in case of interruption
- Include a connection strength test and monitor signal strength throughout the test session
- Include a brief tutorial to introduce the test session, iPad, and iconography
- Automate complex item task introductions



WJ IV DIGITAL PLATFORM USER INTERFACE



The screenshot displays the WJ IV Digital Platform User Interface, divided into two main sections: the Examiner's Interface and the Examinee's View.

Examiner's Interface:

- Header:** "Oral Vocabulary--Synonyms" with navigation icons for home, user, and microphone.
- Item Information:** "Sample Item A, Trial 1" with an information icon. The instruction is "Tell me another word for **big**." An orange callout box points to the word "big" with the text: "Maintain WJ blue, boldface text for oral script".
- Response Area:** A list of words: "large", "gigantic", "huge" (all marked with a green checkmark), and "small" (marked with a red X).
- Other:** A section with a radio button, a score display "0 1", and buttons for "I Don't Know" and "No Response".
- Score and Progress:** At the bottom, it shows "0 ITEM SCORE RS: 0" and a progress bar with 31 items, with the current item highlighted as S1.

Examinee's View:

- The word "big" is displayed in a large font.
- An orange callout box points to the word "big" with the text: "What the Examinee sees on the iPad".



WJ IV DIGITAL PLATFORM USER INTERFACE



Oral Vocabulary--Synonyms

Sample Item A, Trial 1
Tell me another word for *big*.

large gigantic huge

small

Other: 0 1

I Don't Know No Response

big

0 ITEM SCORE RS: 0

Sample Item A, Trial 1

S1 S2 S3 S4 1 2 3 4 5 6 7 8 9 ... 31

Scoring keys provide the most common correct and incorrect responses

"Other" allows for non-keyed responses



WJ IV DIGITAL PLATFORM USER INTERFACE



The screenshot displays the 'Oral Vocabulary-Synonyms' interface. At the top, a blue navigation bar contains a menu icon, the title 'Oral Vocabulary-Synonyms', and icons for user profile, document, and microphone. Below this, a pink header bar reads 'Sample Item A, Trial 1' and 'Say: Another word for *big* is *large*. Let's try that again. Advance to the next item.'

The main area features three input fields. The first field contains 'large', 'gigantic', and 'huge', each with a checkmark icon. The second field contains 'small' with a red 'X' icon. The third field is labeled 'Other:' and contains '0' and '1'. Below these fields are two buttons: 'I Don't Know' and 'No Response'. To the right of the input fields, a large white area displays the word 'big'. An orange callout box points to the 'small' response with the text: 'Error feedback script, if applicable, is automatically triggered upon selection of an incorrect response'. Below this callout, a smaller box contains the error message: '♦ A: Error or No Response. Score item 0. Say: Another word for *big* is *large*. Repeat Sample Item A.'

At the bottom of the interface, a status bar shows '0 ITEM SCORE' and 'RS: 0'. A blue button labeled 'Sample Item A, Trial 2' with a right arrow is positioned to the right. Below the status bar is a progress indicator with icons for items S1 through S9, followed by an ellipsis and item 31, with a right arrow.

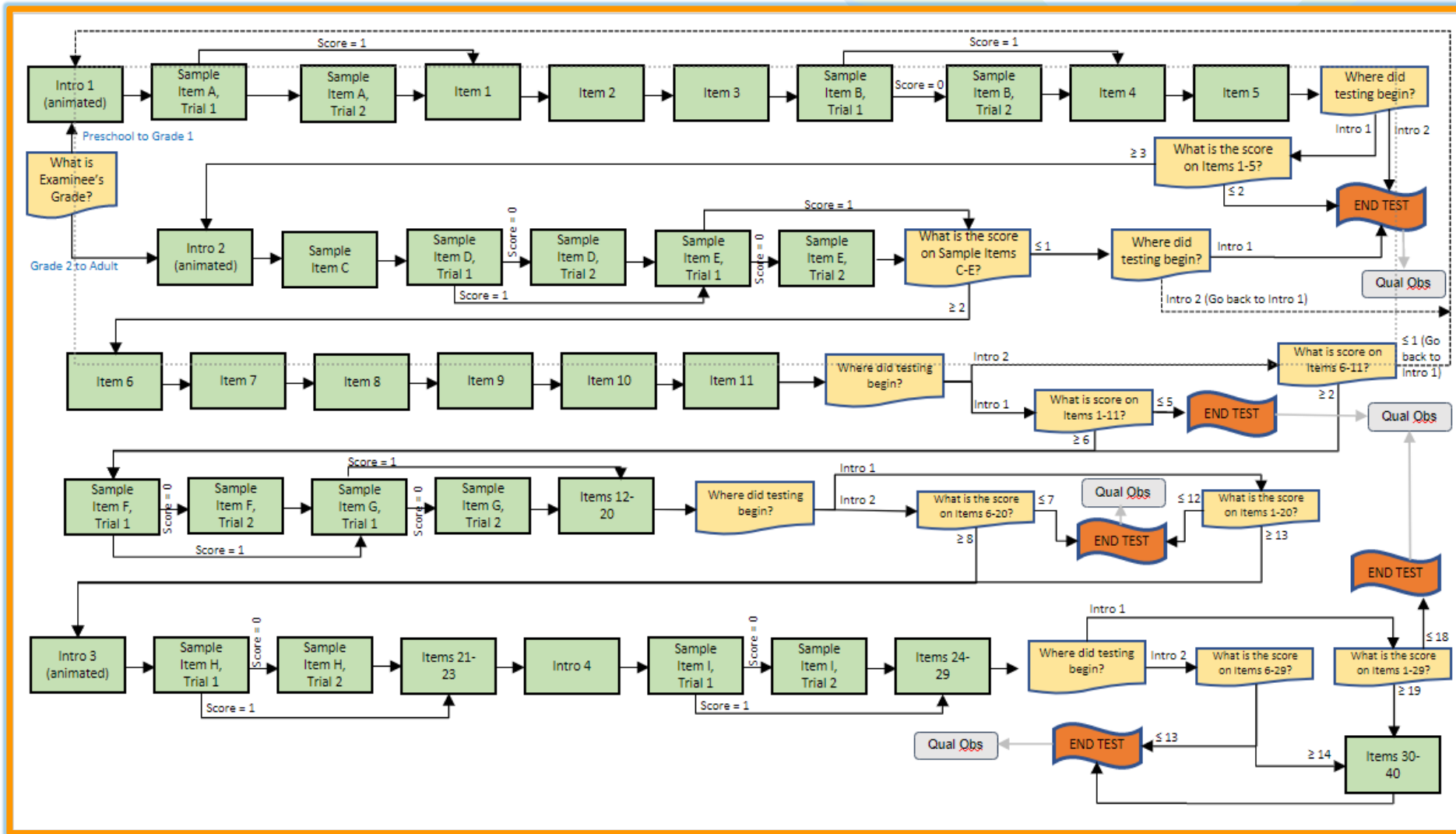
An orange callout box at the bottom right points to the 'Sample Item A, Trial 2' button with the text: 'The platform selects the appropriate next item'.



(UNDER THE HOOD)



An example of a test "logic map"





WJ IV DIGITAL PLATFORM USER INTERFACE



The screenshot shows the user interface for an Oral Vocabulary-Synonyms test item. The main area displays the item number (15) and the word 'conceal' with its phonetic transcription '(kən-sēl')'. Below this, there are two rows of synonyms: one with a green checkmark and one with a red X. The 'Other:' section has a score of 0 out of 1 and buttons for 'I Don't Know' and 'No Response'. At the bottom, there is an 'ITEM SCORE' of 0 and 'RS: 10'. A navigation bar at the very bottom shows item numbers 8 through 19, with item 15 highlighted.

Item 15
conceal (kən-sēl')

cover camouflage cloak enclose hide mask secrete

close closed hold keep open shut trap

Other: 0 1

I Don't Know No Response

0 ITEM SCORE RS: 10

8 9 10 11 12 13 14 15 16 17 18 19

... analogous to the Test Record in the paper version

The Raw Score and bottom navigation provide a quick summary of the Examinee's progress on the test

1A: Synonyms
Basal: 6 lowest correct
Ceiling: 6 highest incorrect

Score 1, 0

	First Trial	Last Trial	
A	0	1	big-large
B	1		nap-sleep

1 1 angry-mad
2 1 small-tiny
3 1 mom-mommy
4 1 giggle-laugh

5 1 look-glance
6 1 chef-cook
7 1 beautiful-gorgeous
8 1 lawn-yard

9 0 car-vehicle
10 1 street-road
11 0 attempt-try
12 0 artificial-insincere

13 0 devour-consume
14 1 untamed-unruly
15 conceal-cover
16 portion-piece

conceal



WJ IV DIGITAL PLATFORM USER INTERFACE



The screenshot displays the WJ IV Digital Platform user interface during a test completion. The main window shows a dark blue header with the title "Oral Vocabulary-Synonyms" and a notification "You have finished this test." A central dialog box is open, titled "This test has ended because the examinee has reached a ceiling." The dialog box contains the following information:

- Test 1: Oral Vocabulary-Synonyms**
- (*) Mark all that apply.
- Four checkboxes for clinical observations:
 - Demonstrated good understanding of vocabulary
 - Displayed age-appropriate speech and articulation
 - Retrieved words fluently
 - None of the above
- Two action buttons: "Need a break? Go back to Dashboard" and "End administration and start review/submit process".
- Two buttons at the bottom: "Back to Dashboard" and "End Session".

Two orange callout boxes provide additional context:

- The first callout, pointing to the dialog box title, states: "The test automatically ends when the Examinee reaches a ceiling".
- The second callout, pointing to the checkboxes, states: "The Examiner can capture clinically useful information about the Examinee's approach to the task".

The bottom of the interface shows a score bar with "0 ITEM SCORE RS: 10" and a "End Test" button. A navigation bar at the very bottom includes a back arrow, a list of item numbers (S1, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 31), and a forward arrow.



WJ IV DIGITAL PLATFORM USER INTERFACE



Test 12: Concept Formation
Read the instructions below or [begin the test](#).

Administration Overview

- Before testing, adjust the volume to a *comfortably loud level* on the examinee's headphones or tablet speaker.
- The platform selects an appropriate starting point based on the examinee's highest grade level and presents items until the examinee fails to meet the continuation requirements.
- Test tasks are introduced with short videos. Confirm that the examinee is ready before starting.
- On Items 6 through 35, acknowledge the correct responses by nodding or saying "yes" to the response.
- On Items 36 through 40, acknowledge the correct responses by nodding or saying "no" to the response.
- Items 41 through 45 are multiple choice. Select the correct response.
- No response is required for Items 46 through 50.
- If the examinee uses a synonym or a word similar in meaning to the correct response, the platform will mark the response as incorrect.

Scoring

- For each item administered, select the response option from the scoring key that matches the examinee's response. If the examinee selects a response that does not match the scoring key, select incorrect.
- If the examinee provides a response that requires querying, click the response and then click the "Query" button. The platform will display the scoring key that matches the examinee's next response.
- The platform assigns a score of 1 to correct responses and a score of 0 to incorrect responses.
- The platform computes the total raw score by summing the item scores for all administered items. For examinees who start with Introduction 2 and test forward, the platform assigns 1 point each for Items 1 through 5.

[Let's Begin](#)

Things to know:

- This test presents some instructions via video animations.
- This test uses voice capture.

[Check Audio Settings](#)

Before you start the test, please confirm the starting point.

Test 12: Concept Formation

Grade 2 to Adult

Preschool to Grade 1

Grade 2 to Adult

This test requires the examinee to connect with a tablet device. Confirm that the examinee's equipment is properly set up before starting.

Voice Capture is active.

[Start Test](#)

The platform will suggest the starting point for the next test based on the Examinee's grade













WJ IV DIGITAL PLATFORM USER INTERFACE



The screenshot shows a digital platform interface with a blue header bar containing a menu icon, the text 'Concept Formation', and icons for user profile, chat, and microphone. Below the header, there is a white information box with an orange 'i' icon and the text: 'Introduction 2 Say: **You will watch a short video, and then I will ask you to solve some puzzles. Are you ready?** Confirm that the examinee is ready and then click Play on the Examinee's View. When the video ends, advance to Sample Item C.'

Paper version

		First row: Some drawings are red (point to red circle on subject's page), other drawings are yellow (point).
		Second row: Some drawings are big (point), others are little (point).
		Third row: Some are round (point), others are square (point).
		Last row: Sometimes there are two drawings together (point), and sometimes just one (point).
		

Each puzzle has a drawing inside a box (point to yellow circle in box on subject's page) and a drawing outside the box (point to red circle).

For each puzzle, you need to figure out the rule that tells why one drawing is inside a box (point to yellow circle). For example, the rule for this puzzle is yellow. The color yellow is what is different about the drawing inside the box (point to yellow circle) from the drawing outside the box (point to red circle).

Turn page without giving further explanation.

Animated Introduction videos replace the complex oral/pointing instructions on the Concept Formation test.

Digital version

You are now in control of the examinee's view.

Introduction 2 →

S6 S7 S8 ... 40 →



NEXT STEP: EVALUATE

THE ROAD TO THE WJ IV DIGITAL BRIEF COGNITIVE BATTERY



Compare Examinee score data from the paper and pencil version to the digital version to assess item parameter invariance



Evaluate scores from administrations with and without connectivity interruptions to assess impact of those interruptions on Examinee performance



Review voice recordings from a sample of test sessions to gather qualitative information about Examinee and Examiner experience



Review the Test Session Observations responses from Examiners to identify any other unforeseen issues or concerns with the digital platform



Evaluate

Analyze data, evaluate item and test characteristics, review qualitative data, assess equivalency with PP





THANK YOU

Questions?

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