ATP 2017
Innovations in Testing
Scottsdale, AZ

LEADING the CONVERSATION

Strategic Investments in Quality

A Guide for Developing Performance-Based Assessments

#atpconf

About the Presenters ...

ABOUT the PRESENTER

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  CFA Institute
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  CEO

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  ACS Ventures, LLC
  Partner

The Conversation Today: Performance-Based Assessments

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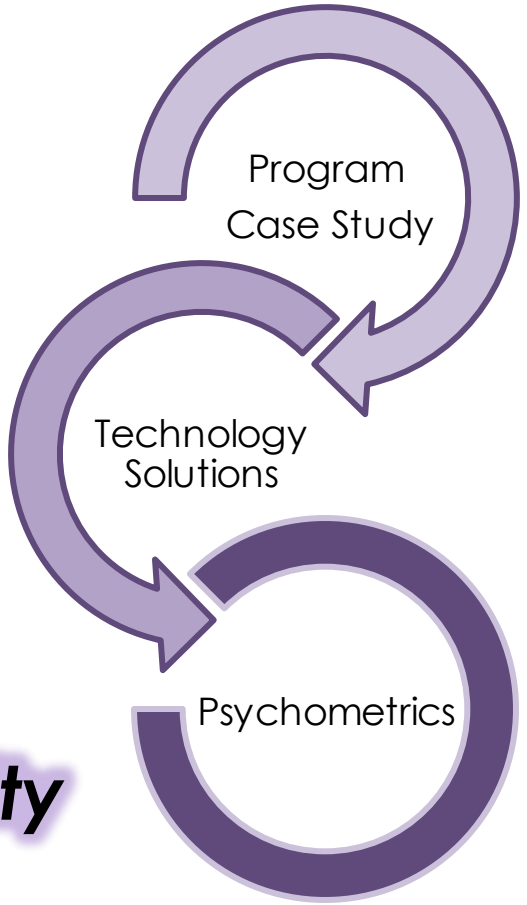
Assessing Candidate Responses

- Design
- Implementation
- Data Analysis



Strategic Investments in Quality

Program Case Study

Program Description

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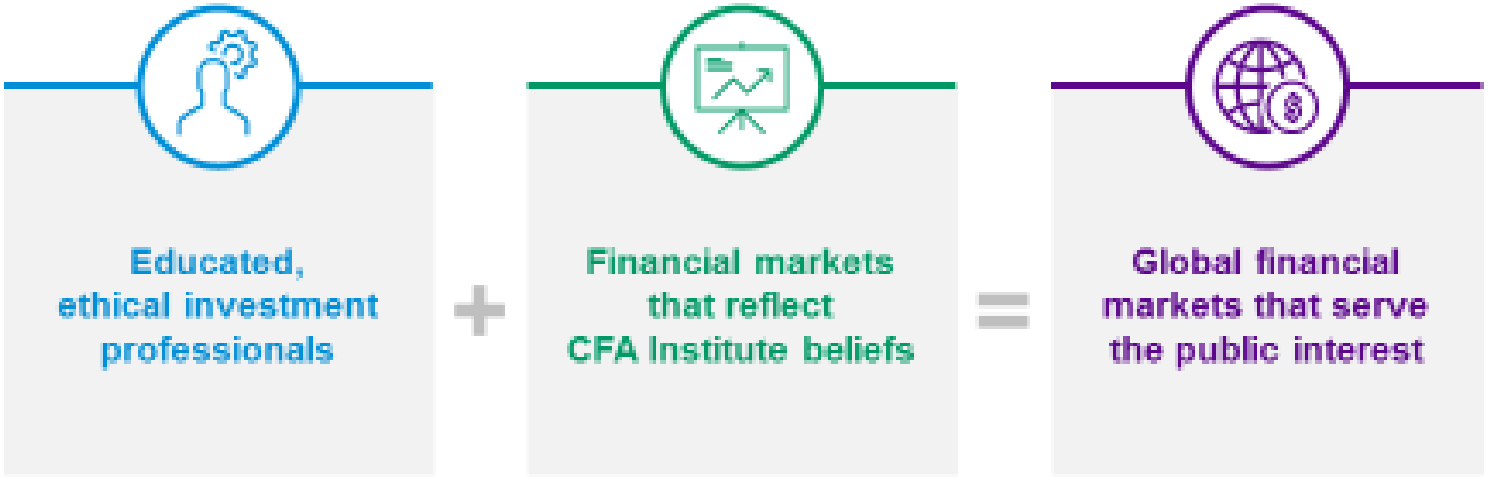
CFA Institute

Leads the investment profession globally by promoting the highest standards of ethics, education, and professional excellence for the ultimate benefit of society



CFA Level III – Constructed Response Exam

- 28,884 people took the Level III exam in 2016
- Pen & paper assessment

Description of Grading, circa 2014

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Description of Grading, circa 2014

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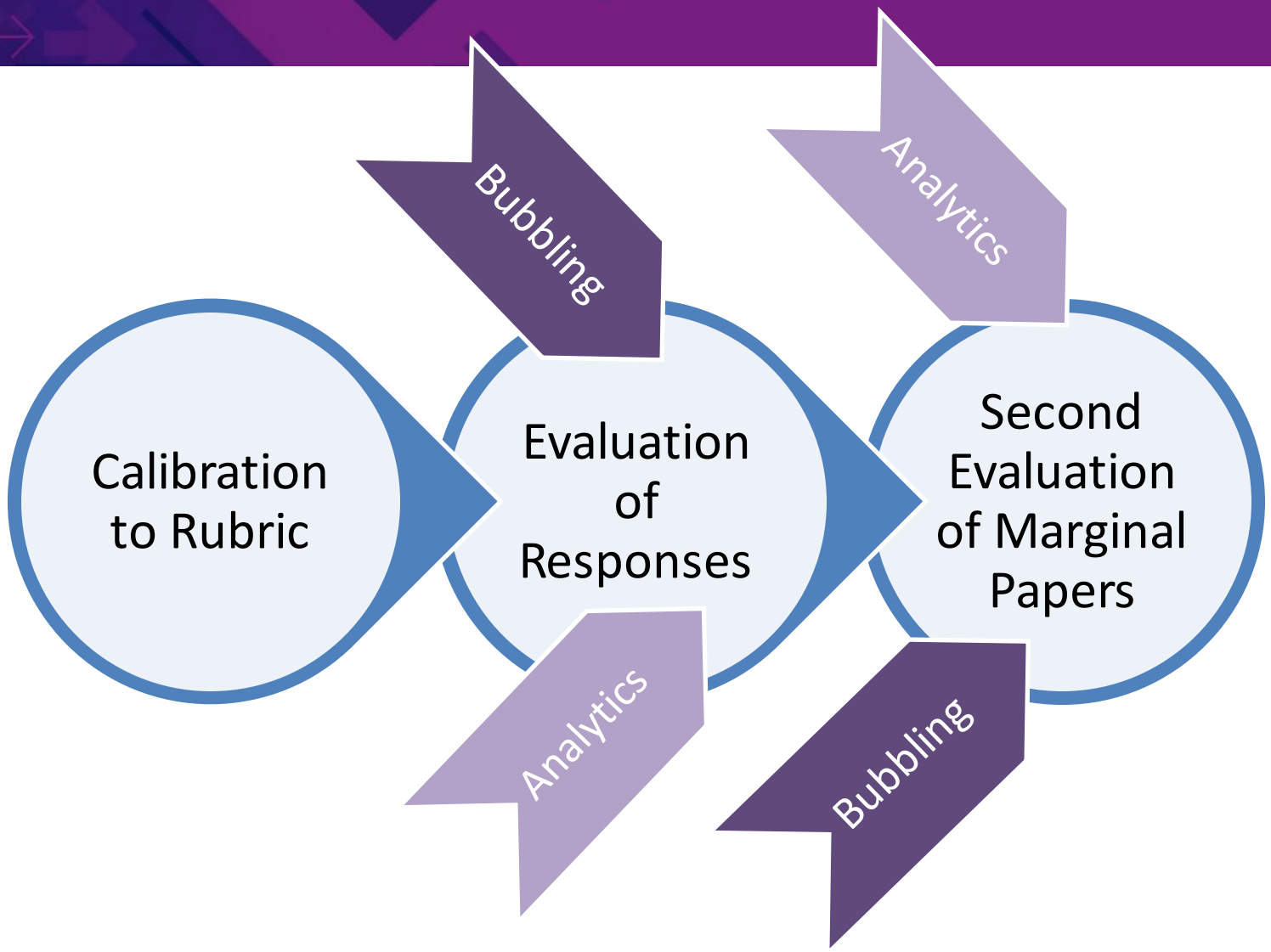

Sample scored candidate answer

Template for Question 1-E
Note: Assume no transaction costs or liquidity needs.

Asset class	**i. Determine the "sell" amount of bonds and the "sell" amount of equities to achieve the *most* tax-efficient allocation in *each* account (tax-deferred and taxable).**	
	Tax-deferred Account	**Taxable Account**
Bonds	*0*	*USD 500,000*
Equities	*USD 500,000*	*0*

Asset class	**ii. Determine the "buy" amount of bonds and the "buy" amount of equities to achieve the *most* tax-efficient allocation in *each* account (tax-deferred and taxable).**	
	Tax-deferred Account	**Taxable Account**
Bonds	*USD 500,000*	*0*
Equities	*0*	*USD 500,000*

iii. Justify, with *two* reasons, why this is the *most* tax-efficient allocation.

1. *Morbi faucibus orci fermentum ipsum euismod pellentesque. Sed lacus odio, laoreet a interdum porta, aliquam vitae arcu. Sed eu justo lobortis sapien varius mollis. Aenean pellentesque posuere fringilla.*

2. *Proin ut lacus ac ipsum auctor ultrices. Donec hendrerit ligula lacus. Integer vitae velit a erat imperdiet adipiscing. Cras ut erat gravida lorem feugiat tincidunt.*

1
1
1
1
2
0
E=6

Process Improvements

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We were ready for the next process improvement

Technology

Examiner Calibration (on paper)

- Captains learn about results through volunteer information (or never)
- Bandwagon effect
- Scaling problems around oversight and quality

Examiner Calibration (on tablets)

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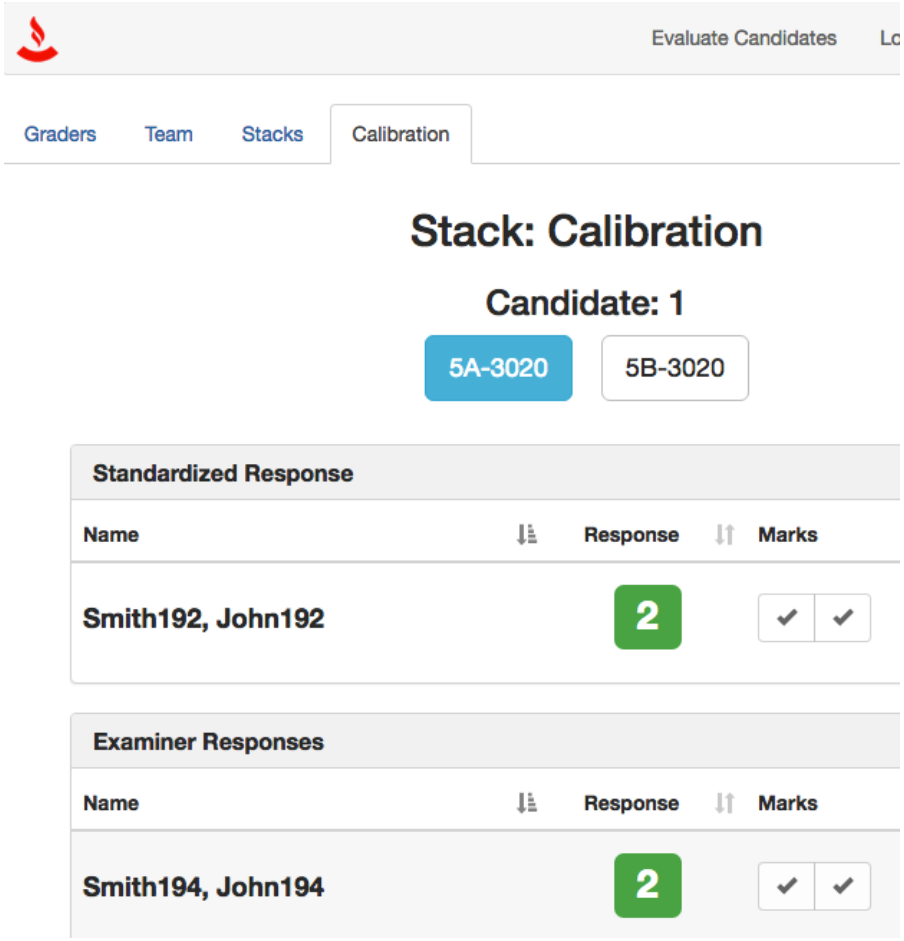
Scalable, Quality Interactions

- Captains see *real* data immediately
- Independent grading



Reduce Cognitive Load

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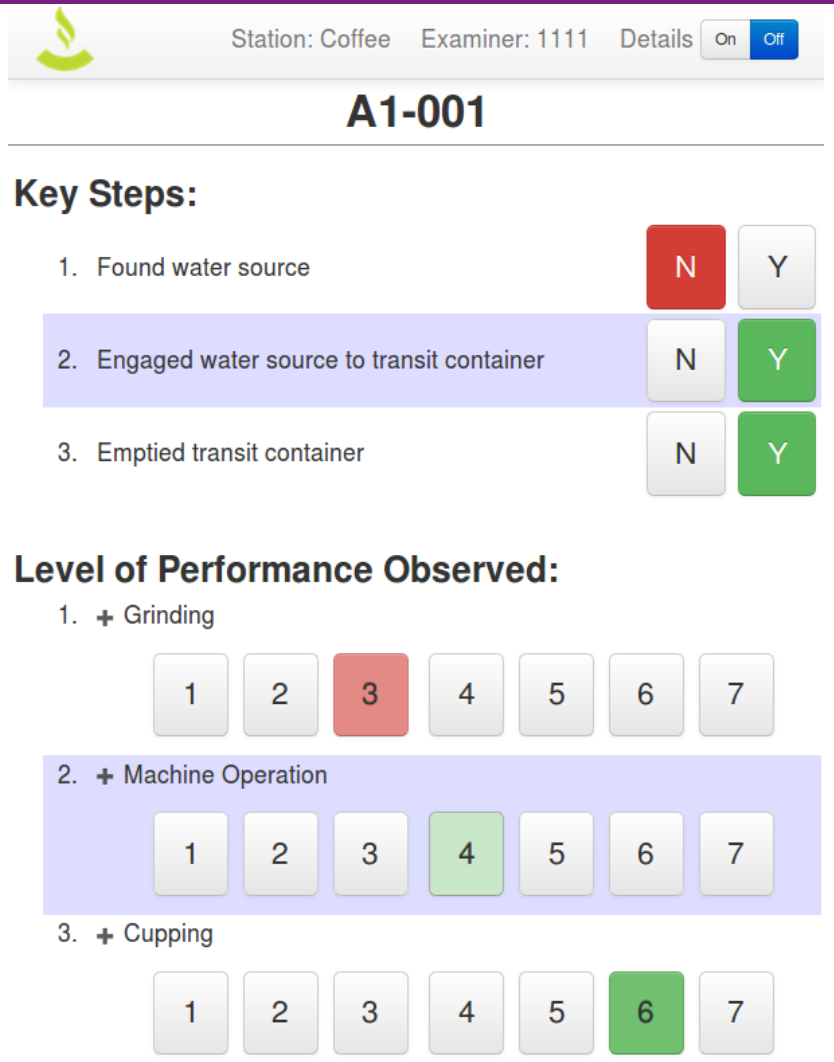
- No more red pens
- No more double checking
- No more 2+1=4



Real-time data

Grader Analytics

Name	Books	Mean	Std Dev	0s	Full	Calibration Rating
Smith, Jon0113	20	2.51	2.23	7	7	86%
Smith, Jon0179	10	2.60	2.37	4	4	95%
Smith, Jon0196	20	1.70	1.95	10	3	23%
Smith, Jon0225	10	2.65	2.20	0	9	92%

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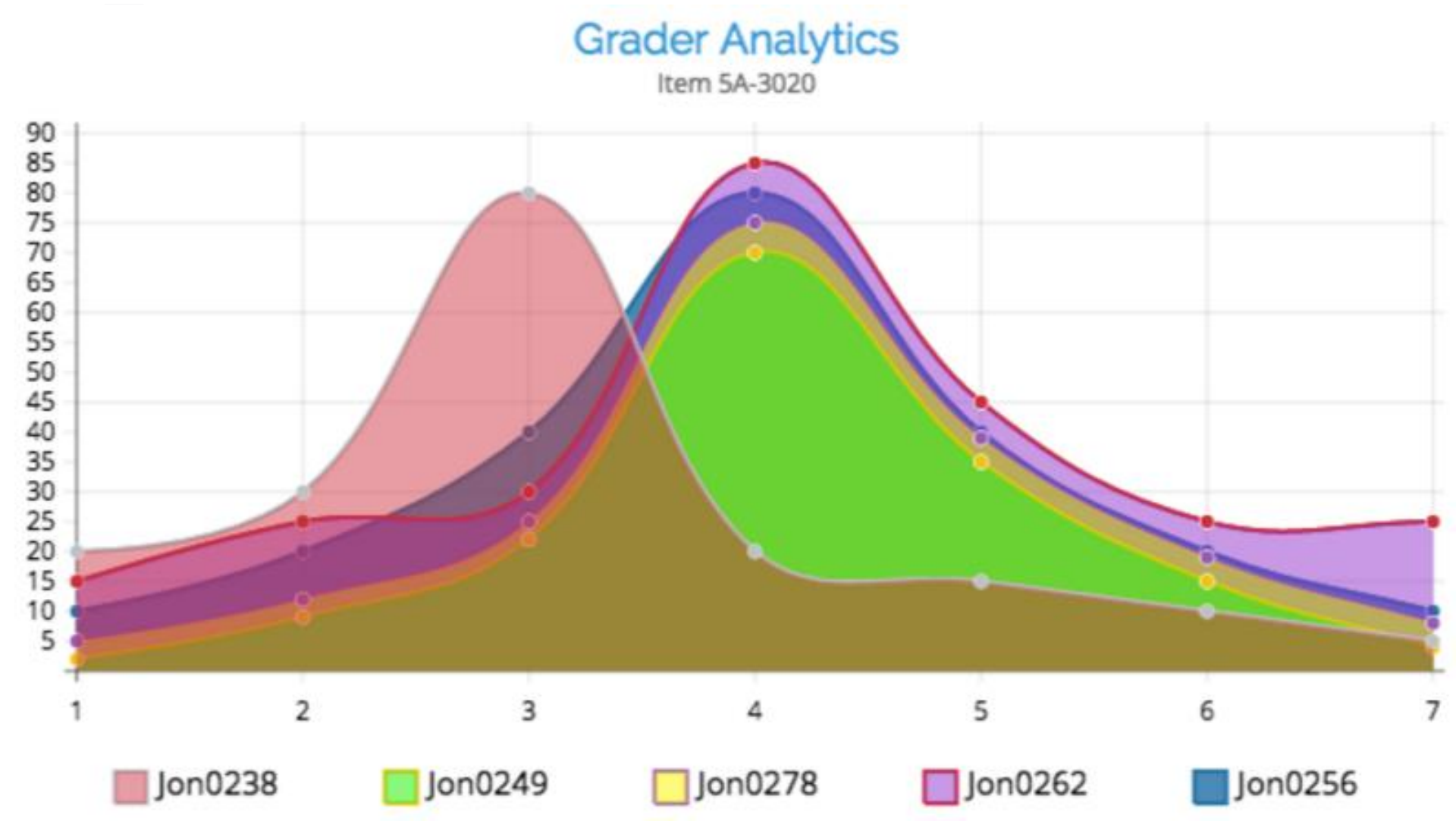
Real-time data



Usability: Paper vs. Tablets

Which is more usable, paper or tablets?

Ask Bob [redacted].

Usability: Paper vs. Tablets

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Based on Analytic data, Bob is one of CFA's most accurate graders

Usability: Paper vs. Tablets

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Bob is 89 years young

Psychometrics

Data collection

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Design

- Articulating scoring criteria
- Identifying important sources of error

Implementation

- Training and calibration
- Operational scoring
- Audit papers
- Captain's review

Using results of data analysis

- Formative uses
  - Accuracy of scoring
  - Consistency of scores
  - Consistency of decisions
  - Scoring criteria
  - Calibration
- Summative uses
  - Evaluating evidence for validity of candidates' scores
  - Quality control decision rules
    - Rescoring policies
    - Grader evaluation

Examples of feedback

Formative

Feedback from audit papers

- % of agreement with known scores/decisions
- Exemplars of higher/lower scores with mentoring

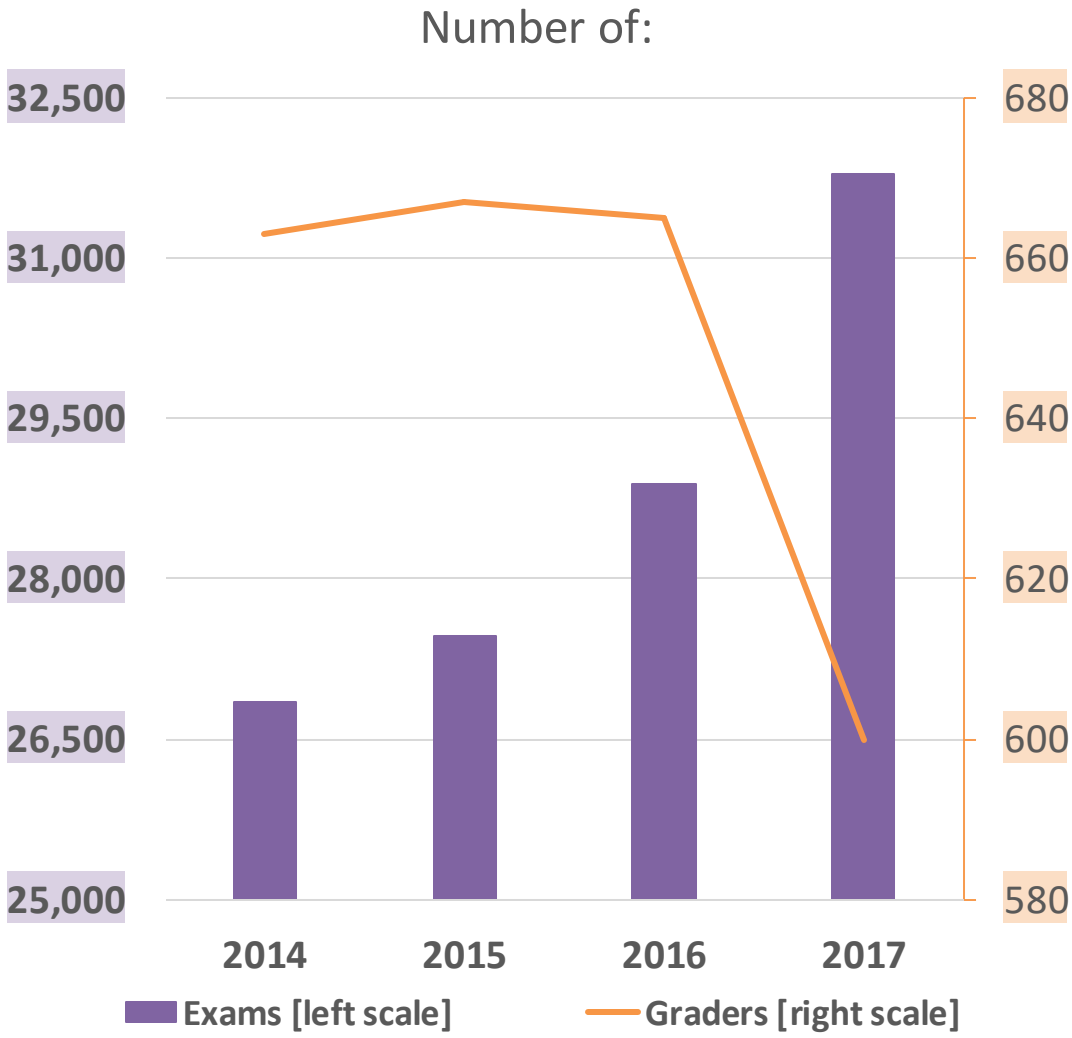
Summative

Grader evaluation

- 95% classification consistency on audit papers (dichotomous decisions)
- 80% exact agreement on known scores (e.g. 4-point scale)
- Rescore, retrain, rehire

Results

Results: Optimized Resources



Results: Improved Accuracy

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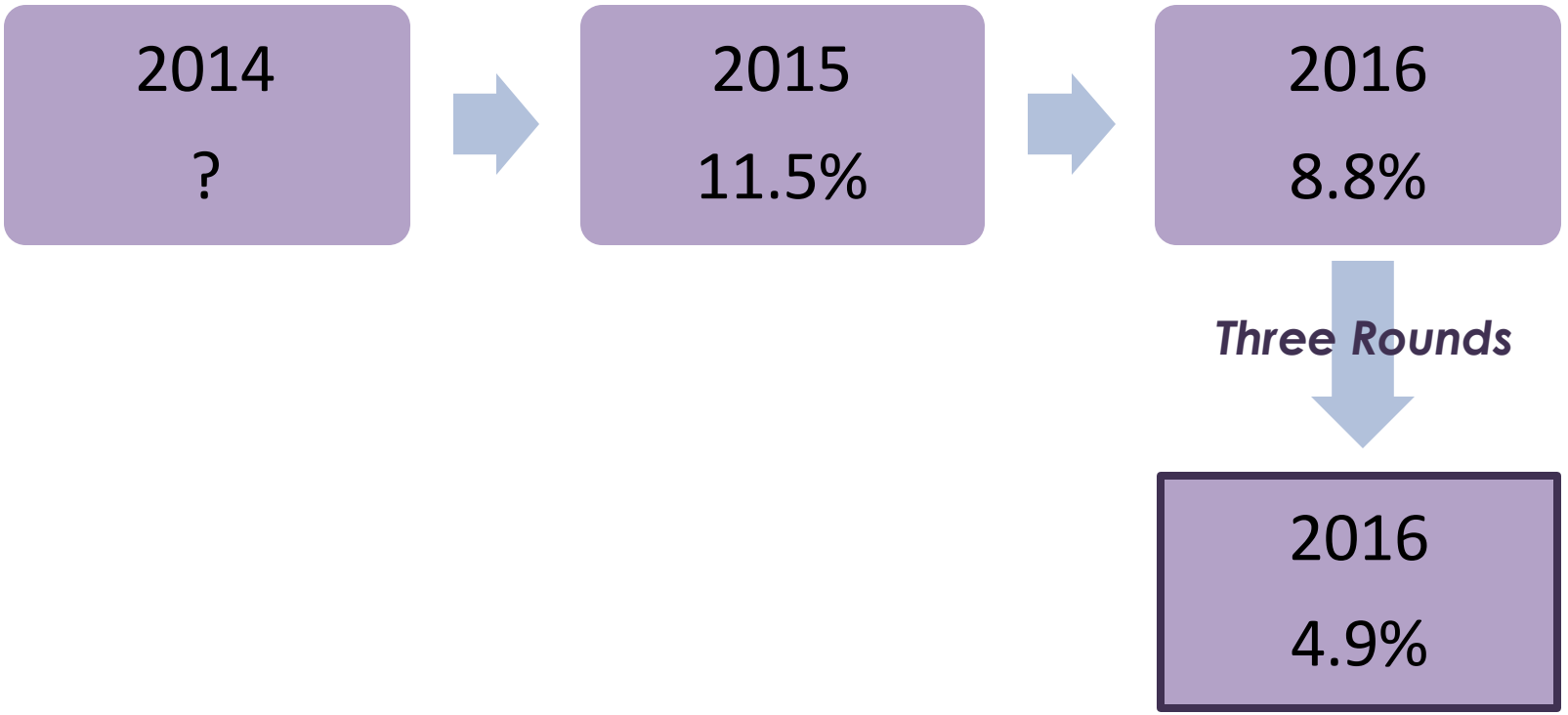
- Disagreement in Scoring, through two rounds:



What the Future Holds

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2017	Future
• Rehiring decisions • Additional calibration – before live grading	• Disagreement • Additional calibration – during live grading • Digital capture of responses • Automated scoring engines

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