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Selecting Subject Matter Experts: Can Item Writing Success Be Predicted?

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Agenda

- Quantitative Data Analysis
 - » Method
 - » Results
 - » Discussion Points
- Qualitative Data Analysis
 - » Method
 - » Results
 - » Discussion Points
- Certification Program Perspective

Quantitative Analysis Results



Methodology

- Item data from the beta administration across 3 exams for the same certification program
- Exams are at the same expertise level
- Consistent facilitator across all the items analyzed
- For each subject matter expert (SME) considered:
 - » How many items were produced
 - » Of the ones chosen for beta, how many were kept/deleted based on item statistics/content

Limitations of Methodology

- Data is limited to one program/industry
- Limited amount of data
- Unable to look at cognitive complexity as a variable
- Not every item a SME wrote was chosen for beta

Defining Success

- How did we define success?
- Top performers were identified three different ways
 - » Quantity – Quantity of items produced was at or above the exam group mean
 - » Quality - Kept items from beta were at or above the exam mean for kept percentage
 - » Superstar – Top performer in both quantity and quality

Findings of Quantitative Research



Data Analysis Results - Quantity

Top Performers (items produced at or above group mean)									
	N SMEs	Items Drafted		% Selected for Beta		% of Beta Items Kept		% of Beta Items Deleted	
		Min	Max	Min	Max	Min	Max	Min	Max
Overall	21	14	38	31%	100%	35%	100%	0%	65%
Exam 1	7	16	24	31%	53%	56%	100%	0%	44%
Exam 2	7	14	26	67%	88%	43%	70%	30%	57%
Exam 3	7	17	38	61%	100%	35%	63%	38%	65%

Data Analysis Results - Quality

	Top Performers (kept items at or above mean for kept %)								
	N SMEs	Items Drafted		% Selected for Beta		% of Beta Items Kept		% of Beta Items Deleted	
		Min	Max	Min	Max	Min	Max	Min	Max
Overall	26	4	38	31%	100%	57%	100%	0%	75%
Exam 1	6	10	20	31%	47%	67%	100%	0%	33%
Exam 2	9	4	24	67%	100%	57%	83%	17%	43%
Exam 3	11	7	38	47%	100%	57%	83%	17%	43%

Data Analysis Results - Superstar

	Top Performers (Quantity and Quality)								
	N SMEs	Items Drafted		% Selected for Beta		% of Beta Items Kept		% of Beta Items Deleted	
		Min	Max	Min	Max	Min	Max	Min	Max
Overall	12	14	38	31%	88%	57%	100%	0%	43%
Exam 1	5	16	20	31%	47%	67%	100%	0%	33%
Exam 2	5	14	24	67%	88%	57%	70%	30%	43%
Exam 3	2	18	38	78%	84%	57%	63%	38%	43%

Are there demographic indicators of success?

- Compared demographics for 4 groups
 - » Quality Top Performers
 - » Quantity Top Performers
 - » Superstar -Top Performer for both Quality and Quantity
 - » Low performer – items produced were less than 1 SD below the group mean

Are there demographic indicators of success?

		Superstar		Quality		Quantity		Low Performer	
			N=12		N=26		N=21		N=5
Exam	Exam 1	5	41.7%	6	23.1%	7	33.3%	2	40.0%
	Exam 2	5	41.7%	9	34.6%	7	33.3%	2	40.0%
	Exam 3	2	16.7%	11	42.3%	7	33.3%	1	20.0%
Internal/External Employee	Internal	8	66.7%	17	65.4%	15	71.4%	2	40.0%
	External	4	33.3%	7	26.9%	6	28.6%	2	40.0%
Job Type	Engineer	10	83.3%	17	65.4%	16	76.2%	0	0.0%
	Consultant	1	8.3%	2	7.7%	2	9.5%	1	20.0%
	Manager	2	16.7%	2	7.7%	2	9.5%	0	0.0%
	Other	2	16.7%	2	7.7%	0	0.0%	1	20.0%
Experience in Current Position	less than 1 year	1	8.3%	4	15.4%	1	4.8%	1	20.0%
	1 to 5	4	33.3%	12	46.2%	12	57.1%	1	20.0%
	6 to 9	5	41.7%	6	23.1%	7	33.3%	0	0.0%
Experience in the IT field	1 to 5	0	0.0%	1	3.8%	0	0.0%	0	0.0%
	6 to 9	3	25.0%	5	19.2%	5	23.8%	0	0.0%
	10+	9	75.0%	16	61.5%	15	71.4%	2	40.0%

Are there demographic indicators of success?

Only 2 of the 5 submitted biographical information!



		Superstar		Quality		Quantity		Low Performer	
			N=12		N=26		N=21		N=5
Highest level of Education	High school	2	16.7%	1	3.8%	2	9.5%	0	0.0%
	Trade diploma	1	8.3%	1	3.8%	1	4.8%	0	0.0%
	Associates	2	16.7%	2	7.7%	2	9.5%	0	0.0%
	Some College	1	8.3%	3	11.5%	1	4.8%	1	20.0%
	Bachelors	6	50.0%	13	50.0%	9	42.9%	1	20.0%
	Masters	0	0.0%	0	0.0%	3	14.3%	0	0.0%
	Ph.D.	0	0.0%	1	3.8%	0	0.0%	0	0.0%
Based in the US	Yes	10	83.3%	18	69.2%	16	76.2%	2	40.0%
	No	2	16.7%	5	19.2%	4	19.0%	0	0.0%

Discussion topics

- Only a subset of top performers exceeded in both quantity and quality
- Each program must decide how to define success
- How can we identify “superstars”?
 - » There is not a resume characteristic that indicates item writing success
- Programs should track item writers success in order to identify who to invite to subsequent workshops
- What else should be considered when identifying successful item writers?

Qualitative Analysis Results



Methodology

- Focus group/collaborative discussion
 - » Multiple gatherings of 6-8 test development facilitators
- **Main question:** In your experience facilitating item writing and congruence and accuracy review workshops, what traits or characteristics make for the most efficient/quality item writers?
- Four main categories
 - » Personality traits
 - » Professional traits
 - » Background/Skills
 - » Group characteristics

Defining Success

- **Efficiency** – The number of acceptable items created in the time spent item writing
- **Quality** – The number/percentage of items that successfully pretest to become operational items
- Considerations
 - » **Cognitive complexity** – Quality memorization items significantly easier/faster to create than high cognitive complexity level items

Limitations of Methodology

- Based on observations from experts in the field of test development
- Different domains may have different desirable characteristics
- Quantitative analysis needed to validate these conclusions

Findings of Qualitative Research



Personality Traits that Correlate with Success

- **Creative** – able to think outside of the box
- **Persistent** – determined and **motivated** to “get it right” (but not obstinate)
- **Cooperative** – works happily with other panelists and the facilitator(s); receptive to following the rules; buys into the process (willing to follow the process even if he/she doesn't fully understand); engages in the workshop
- **Flexible** – receives feedback well; accepts constructive criticism; collaborates effectively; thick skinned; open minded

Professional Traits that Correlate with Success

- **Experienced** – broad and sophisticated content knowledge
- **Connected to individuals new to the domain** – understands common misconceptions/mistakes of people new to domain

Background/Skills that Correlate with Success

- **Fluency in the language of the test** – able to articulate their thought process
 - » NOTE – this does not mean advanced grammar skills
- **Basic writing skills** – structure and organization abilities in the language of the test
- **Education or training** – more reflective thinking about the domain

Group Characteristics that Correlate with Success

- Representative of the domain, but also diverse
- Mix of educators/trainers and practicing professionals
- Supportive group environment; sense that everyone is working for the good of the program rather than for individual interests
- Ability focus on the task at hand; not multitasking with other work, or pulled out for other responsibilities
- Motivated to produce results for the program

Next Steps in Validating this Research



Measurement Tools that May Correlate with Identified Characteristics

- Two of the most popular personality assessments evaluated:
 - » DiSC® Classic 2.0 assessment – about \$25-\$35 an administration
 - » StrengthsFinder® 2.0 -- \$15 for the basic assessment
- Chosen because of focus on work strategies, increasing productivity
- Why not create our own instrument?
 - » There are established instruments that have been well researched and documented. There is data available on their reliability and underlying latent structure.

Information on the DiSC®

- A leading personal assessment tool
 - Focuses on improving productivity, communication, teamwork
 - Categorizes “predictable actions and personality traits within human behavior”
 - Four categories:
 - » Dominance
 - » Influence
 - » Steadiness
 - » Conscientiousness
- Sample report



Adobe Acrobat
Document

DiSC® Intensity Index

D	i	S	C
28 egocentric	28 enthusiastic	28 passive	28 perfectionist
27 direct	27 gregarious	27 patient	27 accurate
26 daring	26 persuasive	26 loyal	26 fact-finder
25 domineering	25 impulsive	25 predictable	25 diplomatic
24 demanding	24 emotional	24 team-person	24 systematic
23 forceful	23 self-promoting	23 serene	23 conventional
22 risk-taker	22 trusting	22 possessive	22 courteous
21 adventuresome	21 influential	21 complacent	21 careful
20 decisive	20 pleasant	20 inactive	20 restrained
19 inquisitive	19 sociable	19 relaxed	19 high standards
18 self-assured	18 generous	18 nondemonstrative	18 analytical
17 competitive	17 poised	17 deliberate	17 sensitive
16 quick	16 charming	16 amiable	16 mature
15 self-reliant	15 confident	15 stable	15 evasive
14 calculated risk-taker	14 convincing	14 mobile	14 "own person"
13 self-critical	13 observing	13 outgoing	13 self-righteous
12 unassuming	12 discriminating	12 alert	12 opinionated
11 self-effacing	11 reflective	11 eager	11 persistent
10 realistic	10 factual	10 critical	10 independent
9 weighs pros and cons	9 logical	9 discontented	9 rigid
8 meek	8 controlled	8 fidgety	8 firm
7 conservative	7 retiring	7 impetuous	7 stubborn
6 peaceful	6 suspicious	6 restless	6 arbitrary
5 mild	5 pessimistic	5 change-oriented	5 rebellious
4 quiet	4 aloof	4 fault-finding	4 defiant
3 unsure	3 withdrawn	3 spontaneous	3 obstinate
2 dependent	2 self-conscious	2 frustrated by status quo	2 tactless
1 modest	1 reticent	1 active	1 sarcastic

DiSC® Indicators that May Correlate with Item Writing Success

- Moderate **Dominance**- focus on results, problem-solving, task at hand
 - » May correlate with **persistent**
 - » Very high intensity index could indicate domineering, egocentric behaviors
- Moderate to high **Influence** – enthusiasm, cooperation, optimistic
 - » May correlate with **cooperative**
 - » Very low intensity index could indicate distrust in the process, pessimistic approach

DiSC® Indicators that May Correlate with Item Writing Success

- Moderate to high **Steadiness**— patience, stability, flexibility
 - » May correlate with **flexibility**
 - » Very low intensity index could indicate hypercritical behaviors
- Moderately high to high **Conscientiousness**— contemplative, accuracy, competency
 - » May correlate with **persistence** and/or **flexibility**
 - » Very low intensity index could indicate rigidity, stubbornness, defiance

Information on StrengthsFinder® 2.0

- Designed to provide “measure of personal talent that identifies areas where an individual’s greatest potential for building strengths exists”
- Feedback is provided to “foster intrapersonal development”
- Seeks to identify “themes” based on patterns of thoughts, feelings or behavior.
- 34 different themes; instrument yields top 5 themes for an individual

Source: <http://strengths.gallup.com/private/resources/csfttechnicalreport031005.pdf>

StrengthsFinder® Types that May Correlate with Item Writing Success

- **Creative** may correlate with:
 - » Communication® “find it easy to put their thoughts into words”
 - » Ideation® “fascinated by ideas”
 - » Input® “craving to know more”
 - » Strategic™ “create alternative ways to proceed”
- **Persistent** may correlate with:
 - » Achiever® “take immense satisfaction in being busy and productive”
 - » Deliberative® “anticipate obstacles”
 - » Focus™ “can take a direction, follow through, and make the corrections necessary to stay on track”
 - » Responsibility® “take psychological ownership of what they say they will do”
 - » Restorative® “good at figuring out what is wrong and resolving it”

StrengthsFinder® Types that May Correlate with Item Writing Success

- **Cooperative** may correlate with:
 - » Harmony® “look for consensus”
 - » Includer® “make an effort to include [all]”
 - » Positivity® “upbeat and can get others excited about what they are going to do”
 - » Relator® “find deep satisfaction in working hard with friends to achieve a goal”
- **Flexible** may correlate with:
 - » Adaptability® “take things as they come”
 - » Arranger™ “can organize, but they also have a flexibility that complements this ability”
 - » Learner® “have a great desire to learn and want to continuously improve”
 - » Restorative® “good at figuring out what is wrong and resolving it”

Discussion Points

- DiSC® - May be best used to identify “red flags” rather than any ideal set of personality traits
- Particular domains/programs may have specific needs/characteristics for item writers
- Personality traits should not supersede content expertise

Discussion Points

- How to use this research:
 - » Individual item writer recruitment
 - Look at personality characteristics, professional traits, background/skills
 - » Building a group of item writers
 - Collect diverse mix of item writers, isolate them from other responsibilities (as possible), manage group dynamics, create a culture of motivation
- Next steps:
 - » Deliver personality assessments to SMEs
 - » Review past item writing productivity/success and determine if quantitative data support these correlations

Certification Program Perspective



F5 Certification Program

- About F5
 - » Who we are
 - » What we do
 - » Our market
- About our Certification Program
 - » Why we developed a certification program
 - » Our candidates
 - » Where we're at today
 - » The value of the certification program



The F5 Certified![™] Professional Certification Program bridges traditional networking knowledge and advanced understanding of the application layer to enable the entire application stack.

This integrated perspective is critical to successfully managing today's increasingly complex world.

The Numbers

14,373 Candidates.

500 SMEs.

30% of Candidates Certified.

5 Certifications.

1.40 Certifications per Certified Candidate.

7 Exams.

F5 Certified! Professional Certification Program

**F5 CERTIFIED!
BIG-IP ADMINISTRATOR**
(F5-CA)

BIG-IP Administrator

Future Admins

**F5 CERTIFIED!
TECHNOLOGY SPECIALIST**
(F5-CTS)

BIG-IP
LTM

BIG-IP
GTM

BIG-IP
ASM

BIG-IP
APM

Future Technologies

**F5 CERTIFIED!
SOLUTION EXPERT**
(F5-CSE)

Security
Solutions

Cloud
Solutions

Enterprise
Application
Solutions

Future Solutions

**F5 CERTIFIED!
ENGINEER**
(F5-CADE)

Application Delivery Engineer

**F5 CERTIFIED!
ARCHITECT**
(F5-CADA)

Application Delivery Architect

Getting the SMEs you need

- Recruiting the right SMEs
 - » Through the proper channels
 - » Directly to SMEs
 - » Creative outreach
- Building a community of advocates
 - » Reward & recognize SMEs contributions
 - » Create competition
 - » SMEs will become champions of your program

F5 Ideal SME Item Writers

- Diverse group
 - » Global participation
 - » Variety of job functions
 - » Different levels of experience & expertise
- Necessary skills
 - » Subject matter knowledge
 - » Writing & reviewing
 - » Appropriate egos
 - » Ability to have fun

Conclusions and “Take Aways”



Based on our research.....

- There is not a “magical” resume checklist
 - » All three successful groups (quantity, quality, and superstars) had diverse demographics
- Specific traits of item writers have been identified as correlating with item writing success
 - » Personality, professional, and background/skills
- Group dynamics matter!!!
 - » The sum of the individual parts matters

“Take Aways”

- As a program, define what success is
- Track the performance of item writers
- Don't just focus on demographics when choosing item writers
- Personality instruments may be a good tool to identify roles for SMEs
 - » Quantitative research needs to be done to test qualitative research results
- Increase item writers' motivation
- Build a program that creates a community
 - » Have SMEs WANT to be part of the program

Questions?

