Adventures in Crowdsourcing & Other Asynchronous Exam Development

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Corina Owens, Ph.D.
Director, IT Credentialing and Senior Psychometrician

Laura Brooks
Program Manager

Marco Alves
Technical Certification Lead at NVIDIA

Introductions

- Corina Owens, Ph.D., Director, IT Credentialing and Senior Psychometrician at Alpine Testing Solutions

- Laura Brooks, Program Manager at Alpine Testing Solutions

- Marco Alves, Technical Certification Lead at NVIDIA

Presentation Topics

- Defining asynchronous exam development and crowdsourcing

- NVIDIA's exam development – program background and needs

- Designing a custom approach

- Process outcomes

- Lessons learned

What is asynchronous exam development?

Asynchronous Exam Development

- Range of approaches, designed to reduce virtual or in-person meeting time
- Generally involves homework of some kind to be done on subject matter experts' (SMEs') own time
- Employs tools and feedback mechanisms to ensure active and thoughtful participation from SMEs
- Same work products as traditional methods

Crowdsourcing

- The practice of engaging a "crowd" or group for a common goal — often innovation, problem solving, or efficiency.[1]

- A joint process development or problem-solving technique that requires help from a network of people, or crowd. This network is usually connected via the Internet or through a specific website.[2]

- In exam dev, increasing your SME pool beyond your typical 8-12 SME participants

[1] https://crowdsourcingweek.com/what-is-crowdsourcing/
[2] https://www.techopedia.com/definition/27816/crowdsourcing

NVIDIA's Exam Development – Program Background and Needs

NVIDIA Program requirements

- NVIDIA's rapid growth in the data center warrants expanding education and validation of skills for IT Professionals
- Requires a certification program that meets the highest industry standards
- "Speed of light" means offering the program in a timely manner
- SME availability restrictions required a creative approach to the many sessions needed to build exams

Alpine's Innovative Approach

Alpine's Goals and Objectives

- Meet NVIDIA's needs with a solution that is psychometrically sound

- Participant experience must be high quality

- Reduce barriers to process participation

- Identify tradeoffs (risks, security, etc.)

NVIDIA's Domain Analysis Goals and Constraints

- Wanted to decrease time required on live facilitated calls

- Did not want to compromise psychometric rigor

- Needed a minimally qualified candidate definition, blueprint, item weights

- Wanted to ensure representation from diverse group of SMEs

Our Domain Analysis Approach for NVIDIA

- Domain Analysis
  - Basic assessment literacy video customized for NVIDIA
  - Define MQC in traditional way – created guardrails of domain of practice
  - Surveyed internal and external SMEs to gather domain-specific competencies
  - Reviewed, consolidated and refined list to group into overarching themes
  - Blueprint survey also conducted to gather additional validity evidence

- Results
  - Exam blueprint with section and objective weightings and item counts

Item Development

- Item Development
  - Created condensed item development training video
  - Invited SMEs to submit items via form outside of item bank (so no tool training required)
  - Decision to skip screening process – there was no back and forth of a traditional item development
  - All complete submitted items imported into item bank

- Considerations
  - Adhered to only three-option multiple choice item structure
    - Content dictated that was appropriate based on cognitive load of competencies to be evaluated
  - Blueprint required lower cognitive load; primarily recall and low-complexity scenarios
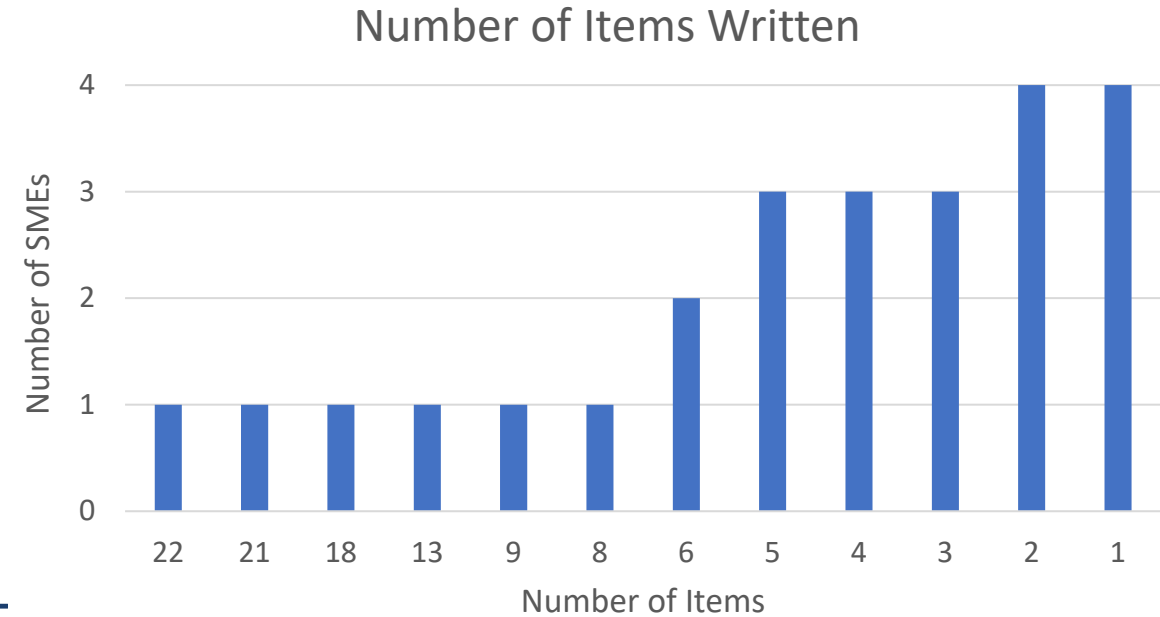
Item Review

- Item Review
  - Adhered to traditional facilitated congruence and accuracy review process
  - Panel of internal NVIDIA super SMEs
  - More "fix on the fly" work than in a traditional approach, as there was no pre-screening or editing of items
  - Formal psychometric and grammar edit after items were approved for content (significant edits required additional SME review)

- Considerations
  - Anticipated lower approval rate
  - Anticipated increased review time per item

Item Development Outcomes

- 68 views of the training video by 49 SMEs

- 151 submitted items by 25 SMEs,

  + 33 written during C&A
  - 4 NVIDIAns
  - 21 external SMEs

- Range of 1 to 22 items submitted per SME
  - Median submitted items: 4
  - Median number of NVIDIAns' submitted items: 8
  - Median number of external SMEs' submitted items: 3

Number of Items Written

Number of SMEs (y-axis), values 0–4

Number of Items	Number of SMEs
22	1
21	1
18	1
13	1
9	1
8	1
6	2
5	3
4	3
3	3
2	4
1	4

Number of Items (x-axis)

Item Review Outcomes

- Held review calls as we went – could provide some feedback to internal item writers as we reviewed

- 107 items approved (overall acceptance rate of 58%)

- Positive feedback from review SMEs:
  - "Very satisfied with the process"
  - "I'm not sure it could have been done better!"
  - Of the SMEs who responded, 100% felt very confident in:
    - Test question congruence with the blueprint
    - Test question writing rules and guidelines
    - Technical accuracy

Process Considerations

Process Considerations

- Development timelines (still dependent on similar factors)
  - Size of domain, # of SMEs, SME availability, item targets, cognitive load of blueprint, item types
- Outputs required (e.g., MQC, BP)
- Can go as quickly or slowly as SME availability allows
- Rate of retained items will vary

Lessons Learned & Process Refinements

NVIDIA's Lessons Learned

- Partnering with Alpine allowed us to meet our "speed of light" goal
- The guidance provided by an experienced partner has been crucial to offering a quality end-product
- Using a hybrid approach to SME engagement allowed us to obtain valuable perspectives and an efficient use of SME time
- Alpine's flexibility and creativity permitted us to meet the development timeline and end user expectations

Alpine's Lessons Learned

- Having a partner willing to be flexible and take some risks with us was critical
- Be willing to adapt mid-process to reflect changing needs and outcomes
- Make sure you have an item banking tool that is either configurable for SMEs' item submissions directly, or allows for simple imports
- It's not all or nothing

Any Questions?

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