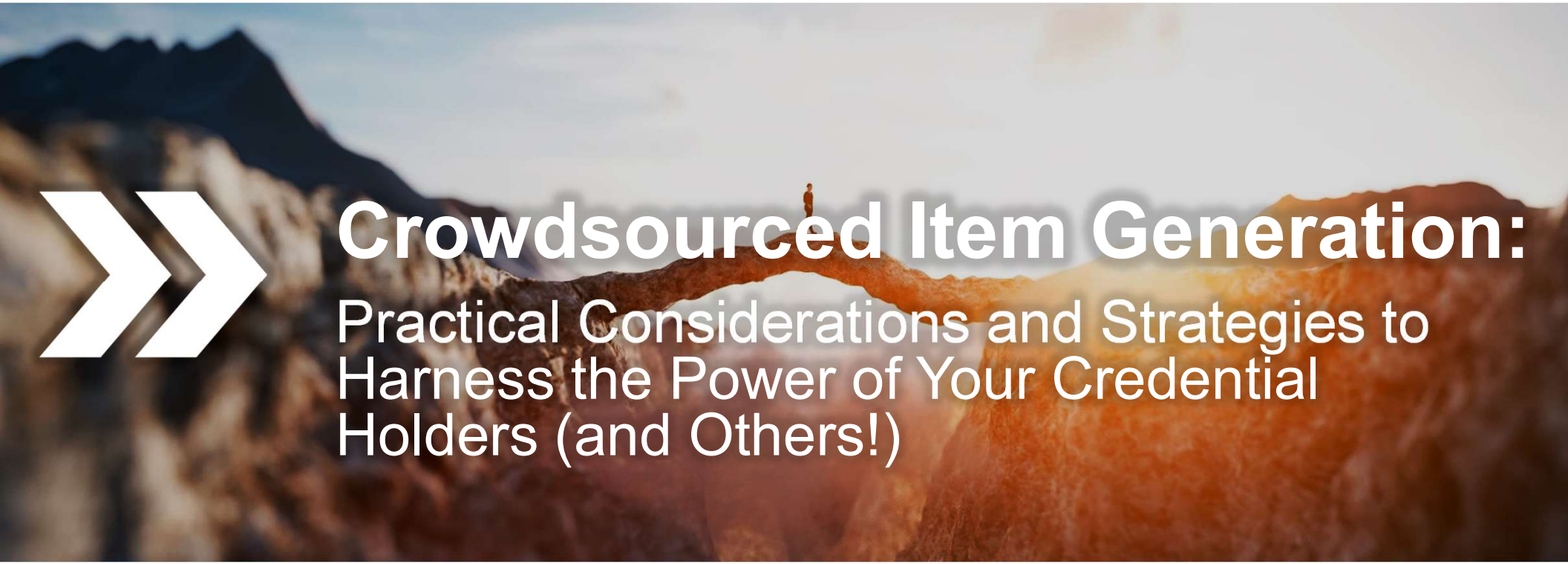
ATP GLOBAL

Innovations in Testing 2022
In-Person & Virtual



Crowdsourced Item Generation:

Practical Considerations and Strategies to Harness the Power of Your Credential Holders (and Others!)

Introductions

- **Marco Alves, Technical Certification Lead at NVIDIA**
- **Laura Brooks, Products and Services Portfolio Manager at Alpine Testing Solutions**
- **Sarah Hughes, Senior Test Development Professional at Alpine Testing Solutions**

Presentation Topics

- Defining asynchronous exam development and crowdsourcing
- NVIDIA's exam development – program background and needs
- Designing a practical approach to crowdsourcing
- Implementation and results
- Lessons learned

Standard Content Development

- **In-person or virtual live facilitated workshop with 8-10 SMEs**
- **Five days to write, review and approve 100-ish items**
  - 35 hours of dedicated SME time with full focus
- **Starts with 1-2 hours of facilitated training, include item writing rules and guidelines, item bank tool training, etc.**
- **Facilitator screening of items in real time**
  - Back and forth cadence with item writers to edit and refine in preparation for group review
- **Facilitated item discussion and review**
- **Two psychometric and grammar edits**

What is asynchronous exam development, and what is crowdsourcing?

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**

Designing a Practical Approach to Crowdsourcing

Goals and Objectives

- Meet client 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 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

NVIDIA's Goals and Constraints: SME Selection

- Wanted to ensure representation from diverse group of SMEs
- SME selection – everyone? Or a specific "crowd"?
- How NVIDIA recruited their crowd through thoughtful consideration

Item Development

- Created condensed item development training video
  - Viewed on demand following submission of NDA
- 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
- New items imported bi-weekly
- Blueprint required lower cognitive load; primarily recall and low-complexity scenarios

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)

Potential Risks and Expectations

NVIDIA:

- SMEs are perhaps less “SME-ish” than in traditional workshops
- Time disconnect from when SMEs took the course and when the wrote questions
- Unknown level of commitment from the “crowd”

Alpine:

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

Item Development Outcomes

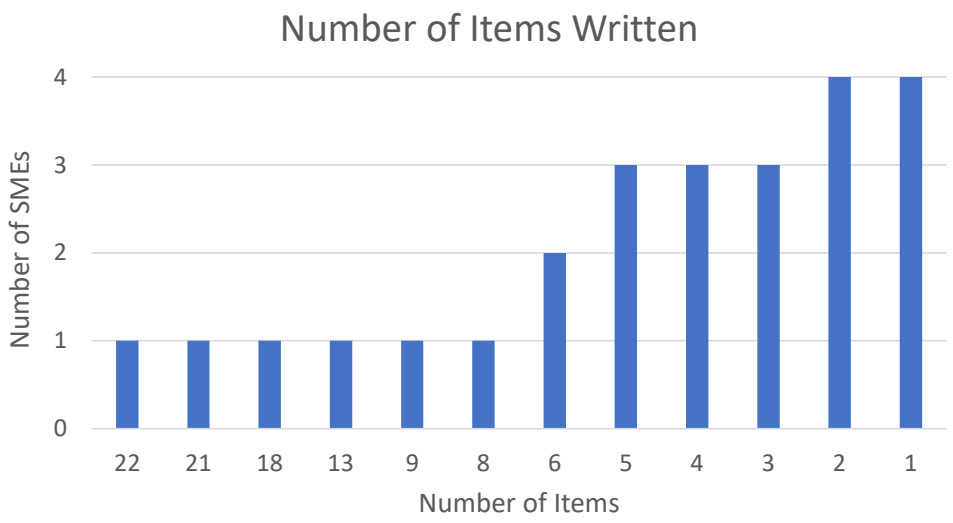
68 views of the training video by 49 SMEs

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:
- » Median number of external SMEs' submitted items: 3



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%)

Feedback on the Process

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
- **Reference materials 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

Best Use Cases

- Lower cognitive complexity blueprints
- Large pool of potential item writers
- Ability to run a beta exam as additional check on item quality
- Healthy pool of item reviewers

NVIDIA's Future

- **Will crowd sourcing work for all of NVIDIA's future efforts?**
- **Are there other implementation approaches for asynchronous work and crowdsourcing that will work for other NVIDIA exams?**
  - Associate vs. Professional vs. Expert

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**

Next Steps/Future Development

- Platform that allows for integrated just-in-time on-demand training and easy item submission
- Crowd-sourced item screening and review
- Automated item screening to flag for major issues
- Just-in-time continual feedback loops for item writing improvement
- AI-assisted item generation and review

Any Questions?