Institute for Credentialing Excellence
EXG2021

The Exchange is Where We Will Tackle Challenges Together

NOVEMBER
15-18
2021

NASHVILLE, TN

Overview

- Background
- Method
- Results
- Conclusions/Recommendations

Presentation Goals:

- Show case test center vs. remote proctored data comparisons
- Discuss outcomes and conclusions for CompTIA's program
- Review some recommended best practices

Remote Proctoring – Here and now

- Pandemic forced credentialing programs to consider alternate delivery options
- Most programs want to offer remote proctoring as an optional alternative to in-person testing rather than a complete replacement
  - Dual-mode delivery of Traditional Test Centers + Live Remote Proctoring (rather than full switch to remote)
- Dual-mode delivery offers more flexibility to candidates but can present psychometric challenges

CompTIA Programs - Background

IT Certification Portfolio

- Job role certifications mainly for entry-level IT jobs

- Certifications issued globally

- English/US deliveries comprise majority of volume

- Some exams are translated: Japanese, German, Spanish, etc.

Sampling of CompTIA Programs

CompTIA A+ Certification: Tech Support Specialist

- Hardware/software support and troubleshooting

CompTIA Network+ Certification: Junior Network Engineer

- Install, maintain and support small/medium sized networks

CompTIA Security+ Certification: Cybersecurity Engineer

- Maintain and update security posture of IT infrastructure

Sampling of CompTIA Programs

Other CompTIA programs:

- Server+
- Cloud+
- Linux+
- Project+

- CySA+
- PenTest+
- CASP+

Exploring Remote Proctoring

CompTIA began research in 2016

- Pilots conducted in 2017/2018

- Exploring potential rollout and operational changes

- And then Covid hit!

Quick transition!

March 2020 – April 2020

- Test centers shut down around the globe
- CompTIA's entire organization pivoted resources
- Close coordination with Pearson VUE
- Launched remote proctoring operation by mid-April

Volume Trend Q1 to Q2 2020

Q1 & Q2 2020 - Test Delivery
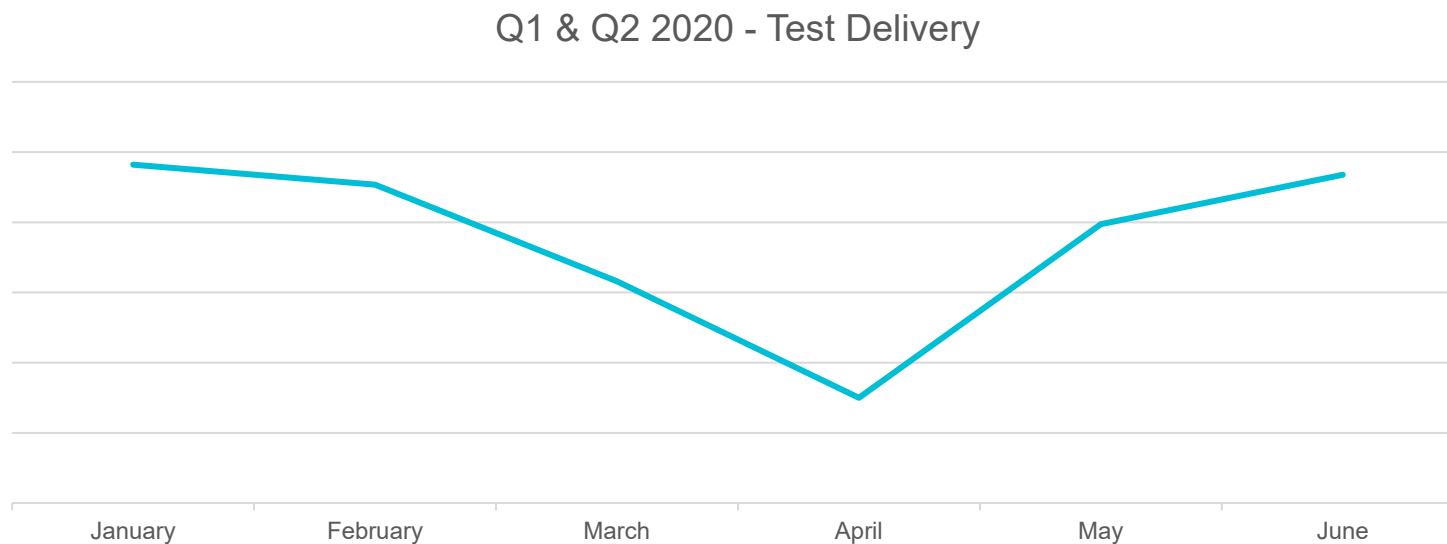
Validity of Scores & IP concerns

CompTIA's main concerns:

- Are test center results equivalent to remote proctored results?

- Is remote proctored more/less secure than test center proctored?

- Is CompTIA's IP more or less secure with remote proctoring?

Security

- Top concern
- What can we do to mitigate content exposure and security breaches?
- As always, regardless of delivery mode, engage in rapid and robust content development to support regular form republication
- Conduct data forensic analyses at a routine cadence
  - Both more standard anomalous behavior analyses as well as analyses to explore patterns by test delivery modality

Security – Data Forensic Analyses

Routine analyses

- Potential form piracy
- Item exposure problems
- Unexpected candidate testing trends

Extended analyses

- Explore patterns by test delivery modality
  - Psychometric comparative analyses
  - Secret shops

Psychometric Comparative Studies

- Four exam programs
  - Two analyses compared results from the same programs during different time frames
    - A+ 1001
    - A+ 1002
  - Two analyses compared results from the same programs during the same time frames
    - Network+
    - Security+

Psychometric Comparative - Methods

- Form Level Analyses
- Item Level Analyses
- Anomalous Records & Security
  - Moving Average Trends
  - Differential Person Functioning (DPF)
  - Bivariate Score by Time (BST)
  - Differential Item Functioning (DIF)

Results – Form Level Analysis

- Score variability was slightly higher for the set of candidates who tested via remote proctoring

- On average, varying degrees of pass rate differences in favor of candidates who tested via remote proctoring
  - Ranging from 3.0% to 7.8%
  - Not surprising given higher Rasch ability estimates for those who tested via remote proctoring

- Similar average time on test
  - Ranging from 0.1 to 1.1 minute difference

Results – Item Level Analysis

- Similar rate of flagged items based on difficulty across delivery modes
- Slightly higher item flagging based on low or negative discrimination when delivered via remote proctoring
  - Ranging from 6 to 15 more flagged items

Results – Moving Average Trends

- Reviewed trends in overall scores, Rasch measures, and exam time over administration period
- No notable differences between delivery modes for all four exams

Results – Differential Person Functioning

- Reviewed performance of candidates on subsets of items (i.e. scored versus unscored) to determine variant score behavior by test delivery mode

- Similar rates of anomalous behavior across test delivery modes
    - Less than 1% difference in number of candidates who were flagged for variant score behavior
        - A+ 1001, A+ 1002
    - Approximately 4% difference in number of candidates who were flagged for variant score behavior
        - Security +

- Network + slightly higher rates of anomalous behavior for the remote proctoring test delivery mode (~9% difference)

Results – Bivariate Score by Time

- Reviewed number of candidates flagged for having unusual combinations of score and time (i.e. High Score, Low Time) compared to a baseline distribution of scores and times by test delivery mode

- Similar rates of flagging across test delivery modes

Results – Differential Item Functioning

- Compared performance of items (item difficulty in particular) between test delivery modes

- A+ 1001 and Security+
  - No comparisons were flagged

- A+ 1002 and Network +
  - One comparison, each, was flagged

Secret Shops – Process Flow

1) Developed a smartsheet (automated communication/tracking mechanism) to request test voucher.
2) Requested Exam Svcs team members perform at minimum, one secret shop per quarter.
3) Register for the exam
4) On the date of testing, attempt to circumvent various processes
   a. Authentication process – ID check
   b. Room scan
   c. Leave items on desk
   d. Attempt to use cell phone during delivery
   e. Etc
5) Report findings within template feedback form.
6) Upload feedback form to smartsheet as a permanent record
7) Report back to test delivery service provider with findings, requesting remediation when necessary.

Sampling of Results – Secret Shops

- CompTIA staff member was able to take a snapshot of onscreen exam content using cell phone – no warning from a proctor.

- CompTIA staff member was able to get up briefly, walk away, and return to exam with a warning from the proctor.

- CompTIA staff member was unable to breach any policies – proctor was very thorough and strict throughout the entire session.

- CompTIA staff member had a third party enter and leave the room during test delivery – warning from a proctor.

- CompTIA staff member used a cell phone during test delivery – exam was revoked by the proctor.

Lessons Learned

- Be prepared for an increase in customer support issues
  - Whether they are related to breach of security or simply connectivity/delivery issues, there will be more issues to address with a dual-modality approach vs. a single modality approach
  - Be prepared to add resources/staff accordingly
- Be prepared to quickly update policies and procedures to address new forms of breach
- Be willing to explore new psychometric studies/analyses
- Be prepared to tackle additional complexity to address ADA requests
- Adopt a flexible organizational culture, ready to adjust/change "on-the-fly"

Conclusions

- Content theft is a systemic and pervasive risk regardless of testing modality

- Assessing equivalence across test delivery modes should be an on-going activity

- Remote proctoring and dual mode delivery *can* present potential psychometric, logistical, and policy challenges to certification program
  - Risks can be mitigated with advanced planning and continued monitoring

Questions?

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