Can Remote Proctoring and Test Center Proctoring Live in Harmony?  
A Comparison of Statistical Outcomes and Examinee Experience

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In the first half of 2020, NCC engaged in NCCA’s Remote Proctor Pilot Study

- NCC offered the choice to candidates to take the EFM exam in Test Centers (TC) or with Remote Proctoring (RP)
- NCC and PSI performed a comparison of outcomes to evaluate whether RP is a viable proctoring modality long-term

Study Objectives

- Compare the psychometric properties of scores obtained with live remote proctoring (RP) to the same examinations administered in test centers (TC) with onsite proctors
- Describe the examinee perceptions of testing conditions between remote-proctored testing compared to traditional test site conditions
Remote Proctoring is not without controversy or criticism, but the effects of a global pandemic have accelerated its use.

Remote Online Proctoring was first used in distance education and now being used for credentialing.

Advancements in technology focused on secure assessment delivery have allowed remote proctoring to become a viable option for high-stakes testing.

Still, there is little published research examining remote online proctoring and the effects on test scores and the examinee experience.
Certification Program Studied

Administrations of NCC’s Electronic Fetal Monitoring (EFM) were studied

Eligibility: Licensed health care professionals in the US and Canada who utilize the application of EFM and interpretation of data obtain to provide care to obstetrical patients in both inpatient and outpatient settings – including MD/DO, House staff, CNP, CNM, CM, RN, PA, or Paramedic
Changes in Process

Here were a few areas that necessitated critical process changes

**Policies and Procedures**
- Proctoring Modalities Identified
  - Software: PSI Bridge
  - Proctors’ Administration Rules
  - Exam Security

**Relationship with Vendor**
- Weekly Implementation Meetings
- Monitoring of Statistical Outcomes
- No Changes to COI & NDA Agreements (All Proctors Sign COI and Non-Disclosure Agreement Already)

**Technology Configurations**
- Move to New Scheduling System was Needed
- New API to Transmit Candidate Date was Developed
- Single Sign-On was Implemented
Communication to Candidates

<table>
<thead>
<tr>
<th>Emails out to all EFM candidates who were already registered when the study was approved by NCCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Extension of eligibility windows for opportunity to test using LRP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computer specifications and technical requirements including audio and video were posted for both MAC and PC users</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Compatibility test link</td>
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<tr>
<td>• Webcam Test link</td>
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<table>
<thead>
<tr>
<th>Launch of a recruitment program for EFM certification using LRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Audience, message, and tactics were defined</td>
</tr>
<tr>
<td>• Pilot program to compare different testing methods for certification exams</td>
</tr>
<tr>
<td>• Marketing and notification about LRP and EFM research</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second-Chance-Free Promotion</th>
</tr>
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<tbody>
<tr>
<td>• If you took the exam using LRP and were not successful, retake the exam at a computer test site after a 90-day period at no cost</td>
</tr>
</tbody>
</table>
## Administration Period

<table>
<thead>
<tr>
<th>Test Center</th>
<th>Remote Proctored</th>
</tr>
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<tbody>
<tr>
<td>Test Centers closed between March 20 and mid-May</td>
<td>Remote Proctoring became available on April 1</td>
</tr>
</tbody>
</table>

- Candidates were free to choose either modality (when that modality was available)
- Due to pandemic, both proctoring options were not available during the whole period studied
- Candidates who experienced issues with RP process were directed to TCs
Security Measures

- **Lock-Down Browser**
  (NO copy, paste, screen capture, access other sites, use instant messaging, or run remote access/virtual machines)

- **Microphone and Webcam Check**

- **Candidate Authentication**, using valid identification

- **Camera Panning and Room Scan**

- **Proctor goes over all the exam rules and trouble shoots technical problems**

- **Exam Session**, including chat log, is recorded

- **Encrypted Data Transfer**
Enforcing the Rules

With guidance from PSI, NCC determined which rules to implement and whether it was a minor infraction (warning) or major infraction (end of session)

<table>
<thead>
<tr>
<th>Minor</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidate has another electronic device present in the room</td>
<td>Use of abusive language out loud or via chat</td>
</tr>
<tr>
<td>Candidate is not focusing eyes on the screen</td>
<td>Candidate places an object over the camera and obstructs the proctor’s view</td>
</tr>
<tr>
<td>Candidate moves temporarily out of the cameras line of sight</td>
<td>Someone enters the room</td>
</tr>
</tbody>
</table>
Proctoring and Quality Assurance

**PSI’s Trained Remote Proctors**
- Proctor Qualifications ensuring no involvement or vesting interest in the certification program or with the candidate taking the exam
- 1 proctor to 4 candidates maximum
- Live monitoring and use of scripting
- Termination Script for Major Violations
- Use of both Chat and audio
- Proctor Incident Log

**PSI QA and Channel Security Teams**
- Review Recordings internally at PSI
- NCC is notified of any incident and can review recording, proctor incident log, and chat log
- Perform random audits
- Ongoing record of all incidents and outcomes
# Issues Experienced

<table>
<thead>
<tr>
<th>Pandemic’s Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving organization completely online and away from office environment</td>
</tr>
<tr>
<td>Weekly Team meetings, new lines of communication, team chat, social chat, and email</td>
</tr>
<tr>
<td>Immediate in-demand “product” of on-line testing</td>
</tr>
<tr>
<td>Demand that grew to at least 400% of what was expected at that time</td>
</tr>
<tr>
<td>Mass use of the internet</td>
</tr>
<tr>
<td>Hire and training of proctors to meet demand</td>
</tr>
<tr>
<td>Increased demand impact on proctor scheduling</td>
</tr>
</tbody>
</table>
Issues Experienced

Technical Issues

Monitor transfer of answer strings delivery from PSI to NCC

Delay due to a programmatic feature: Submit button on exam had to be clicked by candidate (3% experienced this issue)

QI: auto-submit function runs nightly

Monitor transfer of registration information to PSI

Testing Issues new to NCC Staff such as audit records and review of proctor logbooks

Integration of the PSI portal with single sign-on: Missing schedule links in their accounts (4% experienced this issue)

Exam Start Delays

Average wait time to connect to a proctor was 31.8 minutes

46% within 20 minutes
54% outside this window

Candidates were told after 30 minutes they could request a reschedule (12% choose this option)

Implemented QI on 5/31 with increase in number of proctors and improved scheduling

Average wait time 13.3 minutes (80% of candidates

20% with delays more than 20 minutes
# Results

## Infractions

Out of 892 administrations, we had only 19 infractions

- **18 Minor infractions**
  - Candidate asked someone to come into the room
  - Exam was terminated immediately
  - Review of Recording and Proctor decision
  - Candidate was later allowed to sit for the exam at a test center

- **1 Major infraction:**
  - Candidate asked someone to come into the room
  - Exam was terminated immediately
  - Review of Recording and Proctor decision
  - Candidate was later allowed to sit for the exam at a test center

## Technical Issues

- 76% did not have any issues
- 24% had the following issues:
  - Connectivity Issues (13%)
  - OS issues (6%)
  - Monitoring issues (4%)
  - System Error (1%)

- 99% completed the exam when scheduled
- 1% could not complete using RP

## Accommodations

- Most common request is more time, which was the case here too
- No requests for private testing or quiet space
- No readers requested but not allowed to read question out loud with RP anyway
- Four requests received during trial all for extended time
Now that both modalities are more freely available, about one third choose RP

More examinees have tested since, but this was the collection of administrations studied and reported to the NCCA
Scale-Level Statistics

No Differential Item Function (DIF) Found

$\chi^2 = 0.000, p = 0.995, df = 1$

$\chi^2$ for items was 0.000 or 0.001
A Candidate Experience Survey was administered to all examinees who tested on April 1 and on:

- 777 of 892 LRP examinees completed the survey (87%)
- 65 of 66 TC examinees completed the survey who took the test on April 1 or later (99%)
### Post-Test Survey Results

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>SCALE</th>
<th>TC</th>
<th>RP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with <strong>registration and scheduling process</strong></td>
<td>Satisfied or very Satisfied</td>
<td>94%</td>
<td>93%</td>
</tr>
<tr>
<td></td>
<td>Dissatisfied or Very Dissatisfied</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Satisfaction with the <strong>date and time of the testing session</strong></td>
<td>Satisfied or very Satisfied</td>
<td>94%</td>
<td>89%</td>
</tr>
<tr>
<td></td>
<td>Dissatisfied or Very Dissatisfied</td>
<td>6%</td>
<td>11%</td>
</tr>
<tr>
<td>Satisfaction with the <strong>temperature, lighting, noise level, and seating</strong></td>
<td>Satisfied or very Satisfied</td>
<td>95%</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>Dissatisfied or Very Dissatisfied</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>Satisfaction with the <strong>proctor's instructions and support</strong></td>
<td>Satisfied or very Satisfied</td>
<td>100%</td>
<td>96%</td>
</tr>
<tr>
<td></td>
<td>Dissatisfied or Very Dissatisfied</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Satisfaction with <strong>screen size</strong></td>
<td>Satisfied or very Satisfied</td>
<td>95%</td>
<td>98%</td>
</tr>
<tr>
<td></td>
<td>Dissatisfied or Very Dissatisfied</td>
<td>5%</td>
<td>2%</td>
</tr>
</tbody>
</table>

93% who selected RP took the exam from home
# Post-Test Survey Results

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>SCALE</th>
<th>TC</th>
<th>RP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with the <strong>ease of the Computer Testing System</strong></td>
<td>Satisfied or very Satisfied</td>
<td>95%</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Dissatisfied or Very Dissatisfied</td>
<td>5%</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Overall satisfaction level</strong> with the delivery modality you selected</td>
<td>Satisfied or very Satisfied</td>
<td>98%</td>
<td>84%</td>
</tr>
<tr>
<td></td>
<td>Dissatisfied or Very Dissatisfied</td>
<td>2%</td>
<td>16%</td>
</tr>
<tr>
<td>Did you <strong>experience technical problems</strong> during your exam? (e.g., connectivity, accessibility)</td>
<td>YES</td>
<td>6%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>94%</td>
<td>56%</td>
</tr>
<tr>
<td>Would you <strong>choose this method of testing again</strong>?</td>
<td>YES</td>
<td>99%</td>
<td>87%</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>1%</td>
<td>13%</td>
</tr>
</tbody>
</table>

While RP candidates appear to be somewhat less satisfied overall (perhaps due to technical issues), almost all would select that modality again.
Future Improvements

- Gaze detection – ensures candidate remains in view and looking at the screen or camera
- Facial Recognition – monitoring of candidate image from photo taken at start of exam
- Audio Indicator – volume threshold
- Auto detection of mobile devices in environment
- Automated candidate motion alert

Improvements are Scheduled to Launch in December 2020
Conclusions

Comparability of Outcomes
Statistical analysis suggests that outcomes in either proctoring modality do not differ; and candidate satisfaction with process appears to be similar in most respects.

Interpretability of Results
Candidates were free to choose either proctoring modality, but test center administration was not feasible for a portion of that time.

Not Just the Flip of a Switch
As with any change in test administration, work is needed to update policies, procedures, and candidate communications.
Thank You

Time for Questions