

An Ounce of Prevention: Proctoring and Test Security in 2023

 Brian McNamara, Product Manager for Customer Engagement

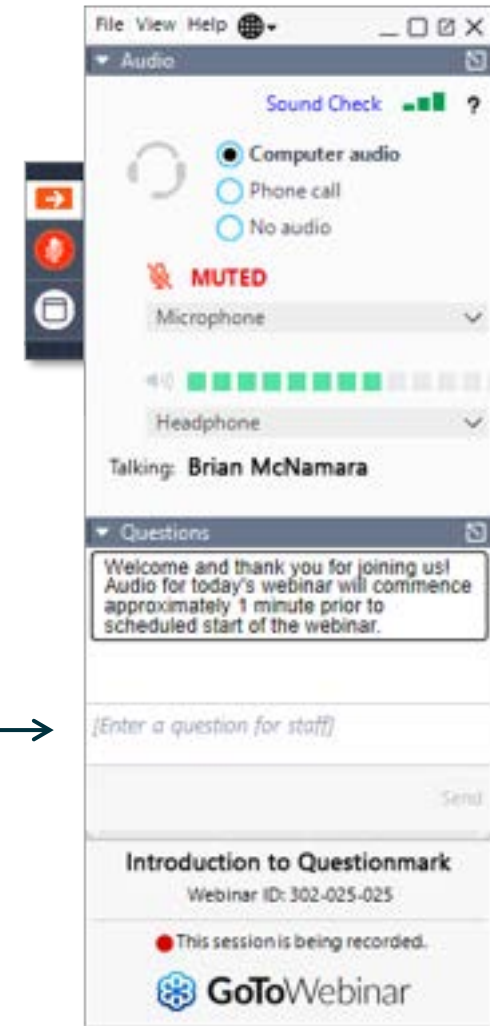


Before we get started...

Watch for an email after the webinar to:

- Download slides (PDF)
- View a recording

To ask questions, use
the "Questions" feature



**"Ounce of Prevention
is Worth a Pound of Cure"**





"In the first Place, as an Ounce of Prevention is worth a Pound of Cure, I would advise 'em to take care how they suffer living Coals in a full Shovel, to be carried out of one Room into another, or up or down Stairs, unless in a Warmingpan shut; for Scraps of Fire may fall into Chinks and make no Appearance until Midnight; when your Stairs being in Flames, you may be forced, (as I once was) to leap out of your Windows, and hazard your Necks to avoid being oven-roasted."

Benjamin Franklin (1736)

| If someone cheats on a test/exam

Can you trust your exam results?

- If exam results are not valid, neither are the decisions based on them.

What's at stake?

- Life, limb, livelihood
- Reputation of organization / certification program
- Potential financial implications

When someone cheats...

- Person may not be competent
- Person may not be safe
- Devalues certification and organization
- Person's credibility is in doubt
- Unfair to candidates/students who took tests honorably



| Threats to test security



Cheating

- Participant uses unauthorized aids to help them answer questions



Content Theft

- Content is stolen and sold / given to potential students



Identity Fraud

- Proxy takes the test on behalf of real student



| Threats to security throughout exam process

Before delivery

- Content theft from item bank

During test delivery

- Identity fraud
- Content theft
- Collusion
- Unauthorized test aids

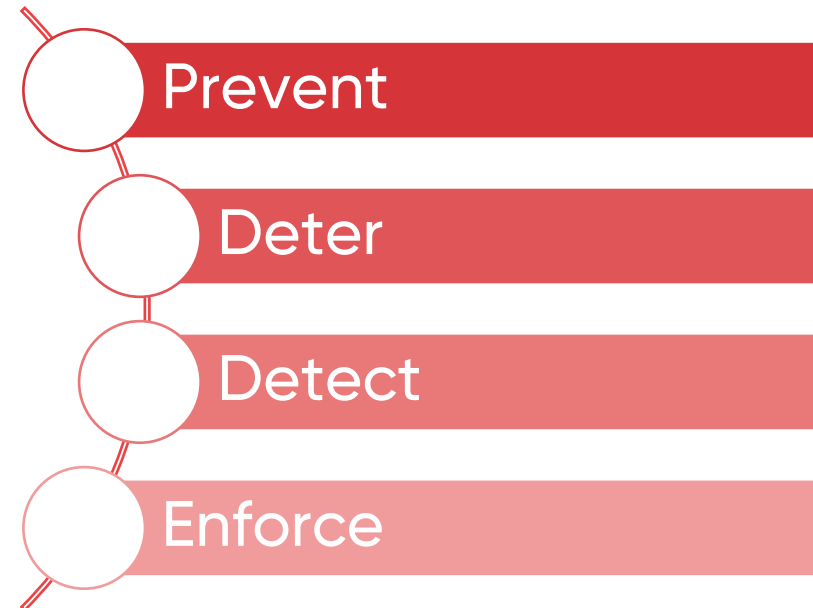
After delivery

- Tampering with results
- Unauthorized disclosure of results

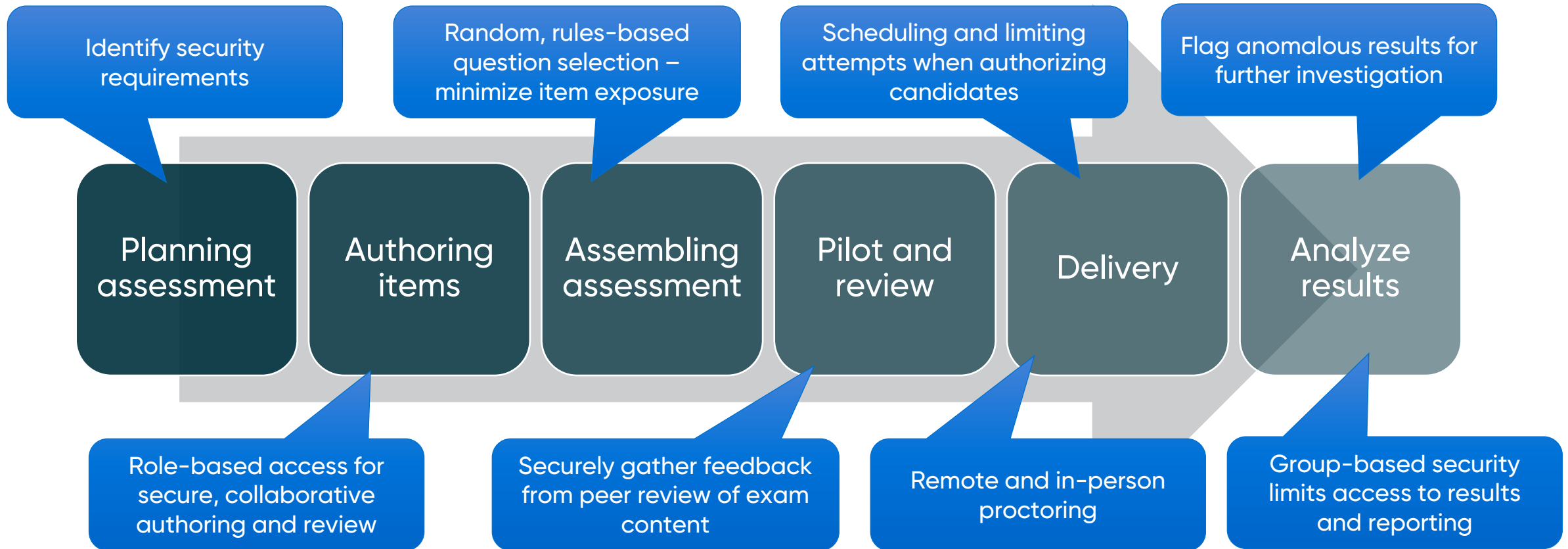


Mitigating Content Theft, Impersonation and Cheating

- Controls access to exam content
- Proctoring/Invigilation
- Secure lock-down browsers
- Legally enforceable agreements
- Vigorous follow up in infractions



Security throughout exam development and delivery



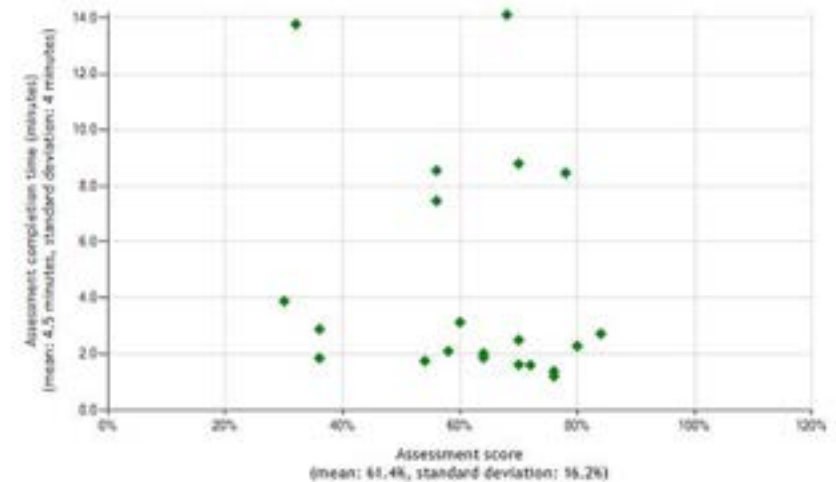
Assessment Completion Time report

- Spot anomalous completion times
- Identify potential cheating
- Flag potential content theft
- Determine if allotted time is sufficient for completing the assessment

Assessment completion time report

Assessment name: Course evaluation survey matrix
Date report produced: 29 March 2011
Date of results: All dates

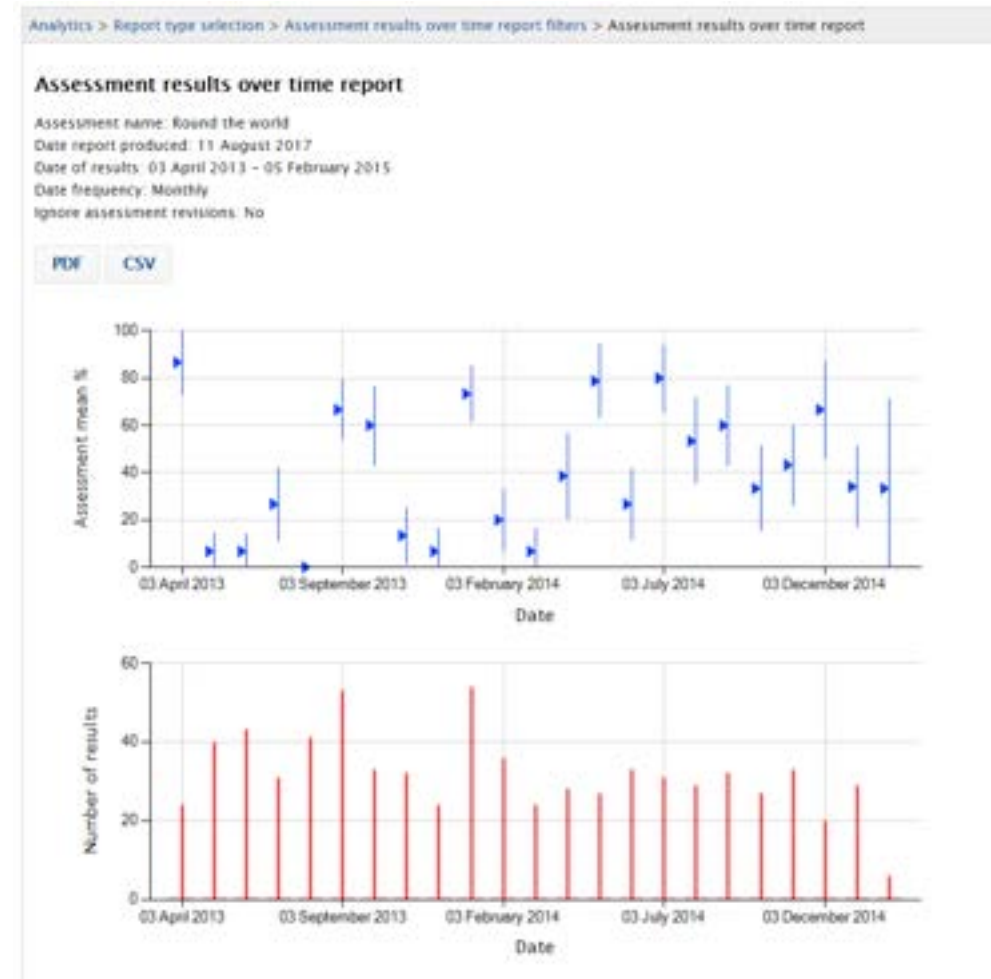
[PDF](#) [CSV](#)



	Assessment score high flag (greater than 80%)	Assessment score between high and low flags	Assessment score low flag (less than 40%)
Assessment completion time high flag (greater than 10 minutes)		Participant 110 time = 14.1 minutes score = 68%	Participant 113 time = 13.8 minutes score = 32%
Assessment completion time between high and low flags	Participant 104 time = 2.7 minutes score = 84%		Participant 107 time = 1.9 minutes score = 36% Participant 115 time = 1.9 minutes score = 30% Participant 118 time = 2.9 minutes score = 36%
Assessment completion time low flag (less than 1 minutes)			

Assessment Results Over Time

- Spot anomalous results for specific participants
- Mean score
- Minimum score
- Maximum score
- 95% confidence interval

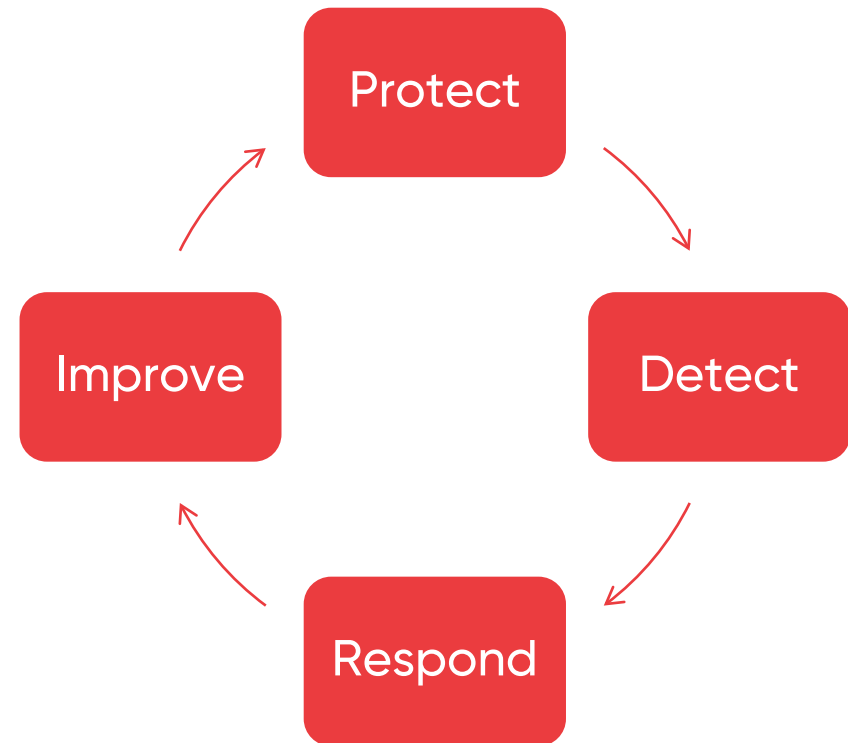


| Forensic Analysis Service


- Statistical analyses of candidate test response data
- Who took the test honorably? Which scores are trustworthy?
- Identify extremely unusual behaviors with potential of unfair advantage

Offered in partnership Caveon

Test Security Cycle



Proctoring

 In-person and Remote

| Proctoring/Invigilation Options



- Proctoring Onsite
 - In-person at test center/classroom
- Proctoring Online
 - Partnering with: Examity; Meazure Learning/ProctorU
- Proctoring Record and Review
 - Partnering with: Proctorio
- Proctoring Bring your own Proctor ("BYOP")
 - Partnering with: Mettl

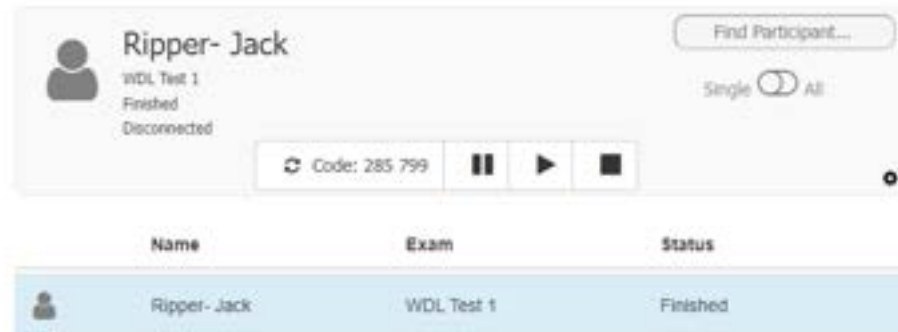


| Proctoring Onsite

- Proctor verifies identities of the test takers
- Proctor controls the start of the test
- Proctor can intervene during the test



Proctoring Dashboard



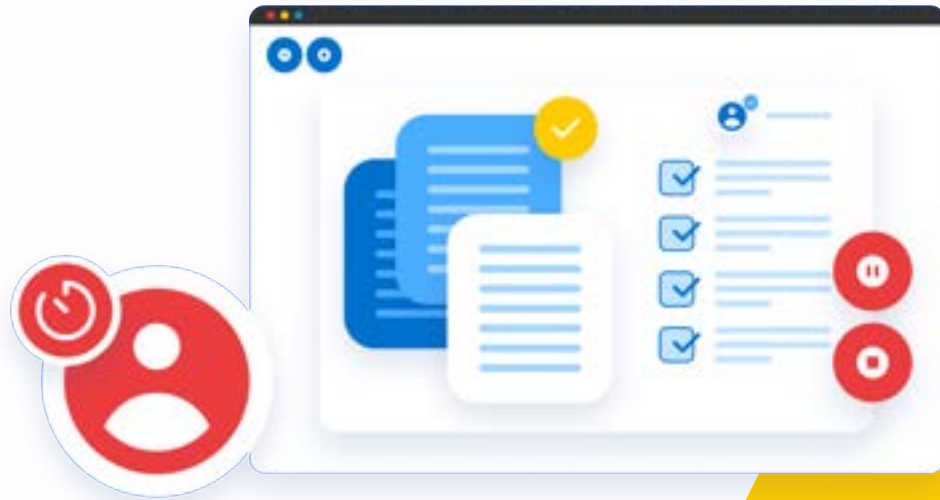
- Proctors can control and intervene in exam delivery:
 - Generate “unlock” code for test
 - Start, pause, un-pause and stop
- Dashboard to monitor exam status of each test taker
- Works with Questionmark Secure



Proctoring Online



Proctoring Online



For the test taker:

- Convenience of exam delivery at home or workplace
- Works with most standard webcams

For the test sponsor:

- Watchful eye of proctor to prevent cheating
- Proctor can start, pause, and stop exam



| Books proctoring appointment online

The screenshot displays the 'My Assessments' interface. At the top, there are navigation links: 'My Assessments', 'Buy Exam', and 'Register for Exam'. The user's name 'June Twenty-seven' is visible in the top right corner. The main heading is 'My Assessments', with tabs for 'Proctored' and 'Unproctored'. Below this, the 'Exam Name' is 'Driver Knowledge Test'. A modal window titled 'Schedule Exam | 90009' is open, prompting the user to 'Select your desired date *'. The date '08-17-2018' is entered. Below the date, there is a 'Select a time slot *' dropdown menu. The menu is open, showing a list of time slots from 12:00 PM to 06:30 PM in 30-minute increments. The '03:00 PM' slot is currently selected and highlighted in blue. To the right of the modal, there is an 'Options' section with a 'Schedule' button.

My Assessments | Buy Exam | Register for Exam | June Twenty-seven

My Assessments

Proctored | Unproctored

Exam Name: Driver Knowledge Test

Appointment: **Schedule Exam | 90009**

Select your desired date *

Date: 08-17-2018

Select a time slot *

- Select -
- 12:00 PM
- 12:30 PM
- 01:00 PM
- 01:30 PM
- 02:00 PM
- 02:30 PM
- 03:00 PM**
- 03:30 PM
- 04:00 PM
- 04:30 PM
- 05:00 PM
- 05:30 PM
- 06:00 PM
- 06:30 PM

Options: Schedule



| Initiates proctored exam session

The screenshot displays the Questionmark exam interface. At the top, the Questionmark logo is on the left, and the user's name 'Welcome: Howard Eisenberg | Student |' and the time 'Eastern Time: 07/19/2018 05:45 PM' are on the right. Below this is a navigation bar with links: Dashboard, Start Exam, My Profile, Exam Tools, Logout, Live Chat, Email Support, and Phone Support: 855-EXAMITY. The main content area is titled 'Start Exam'. It features a progress bar with three steps: 'examSHOW' (highlighted in orange), 'User Agreements', and 'Begin Exam'. Below the progress bar, a message states: 'Click "Proceed" to connect with your proctor.' followed by a note: '*Note that if you can't connect, make sure your popup blocker is disabled.' A blue 'Proceed' button is centered below the text. The footer contains the copyright notice 'Copyright © 2013 - 2018 Examity® All Rights Reserved.' and the same support links as the navigation bar.

Questionmark
powered by Examity

Welcome: Howard Eisenberg | Student | Eastern Time: 07/19/2018 05:45 PM

Dashboard Start Exam My Profile Exam Tools Logout Live Chat Email Support Phone Support: 855-EXAMITY

Start Exam

examSHOW User Agreements Begin Exam

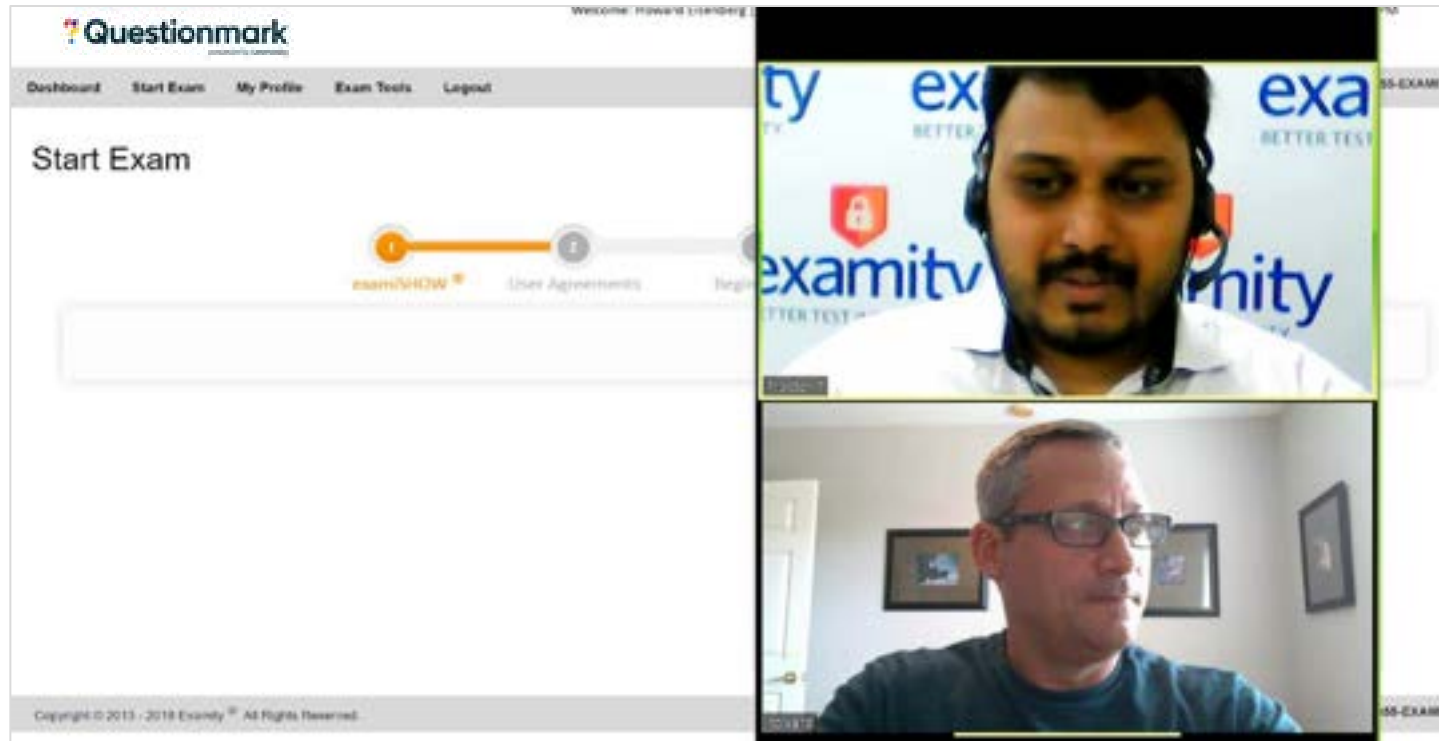
Click "Proceed" to connect with your proctor.
*Note that if you can't connect, make sure your popup blocker is disabled.

Proceed

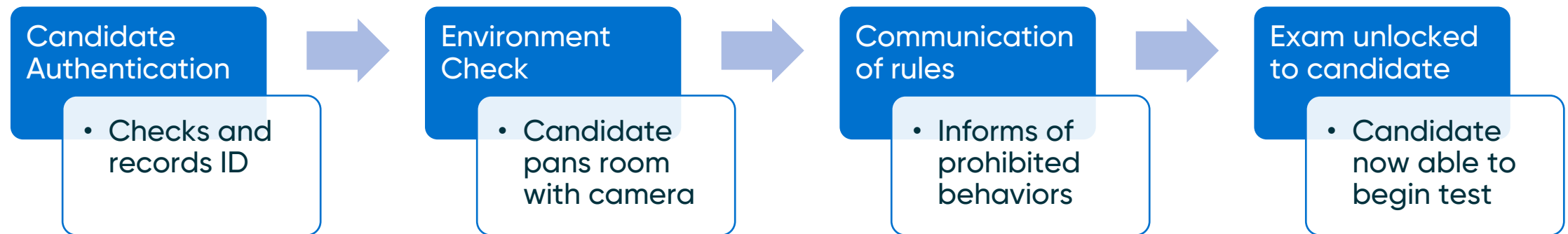
Copyright © 2013 - 2018 Examity® All Rights Reserved. Live Chat Email Support Phone Support: 855-EXAMITY



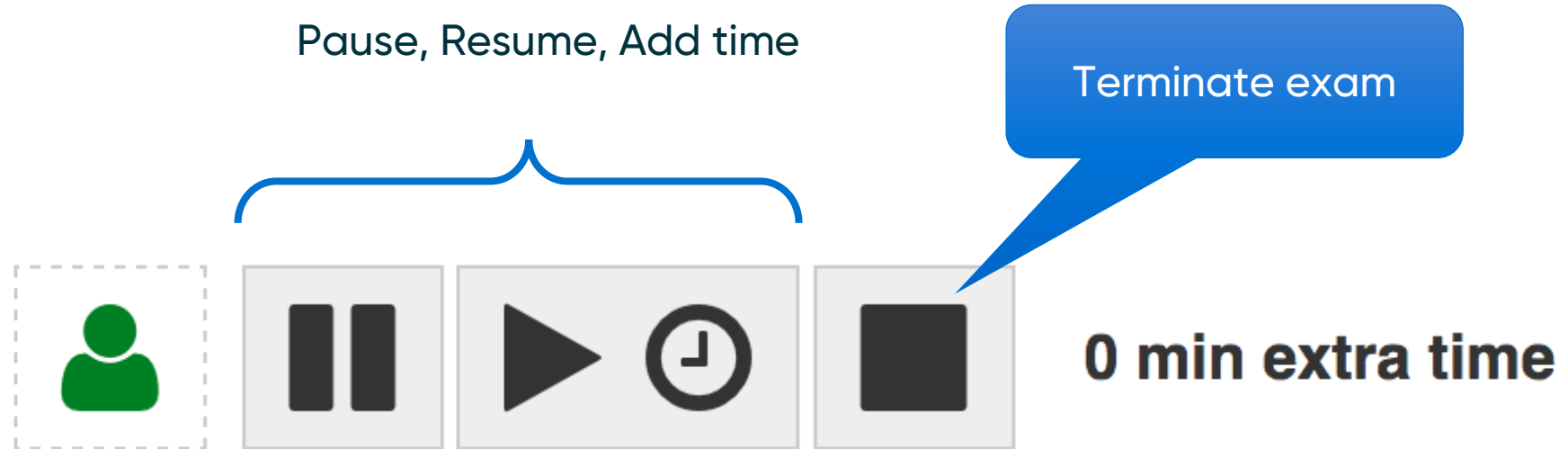
| Connects with Proctor



Example Proctor Protocol



| "In-Exam" Controls





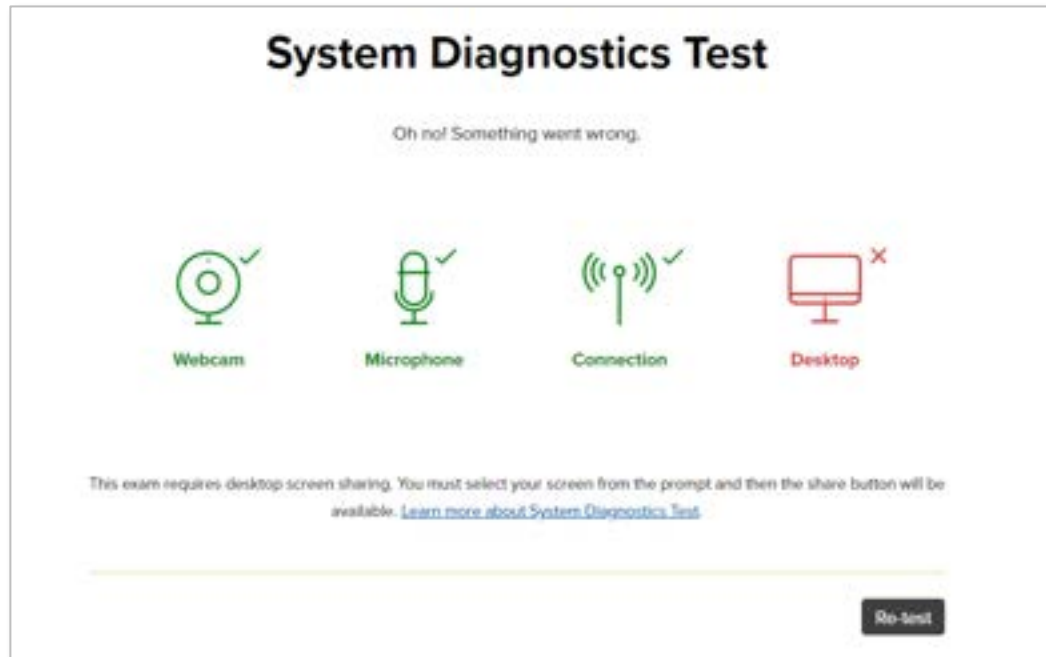
Proctoring Record and Review

| Proctoring Record and Review

- Automated
- No appointment necessary
- Records exam delivery
- Capture participant identification
- Lock down the test environment
- Configurable “suspicion scoring”
- Detects / flags abnormal behavior



Pre-exam checks



Camera/mic working?

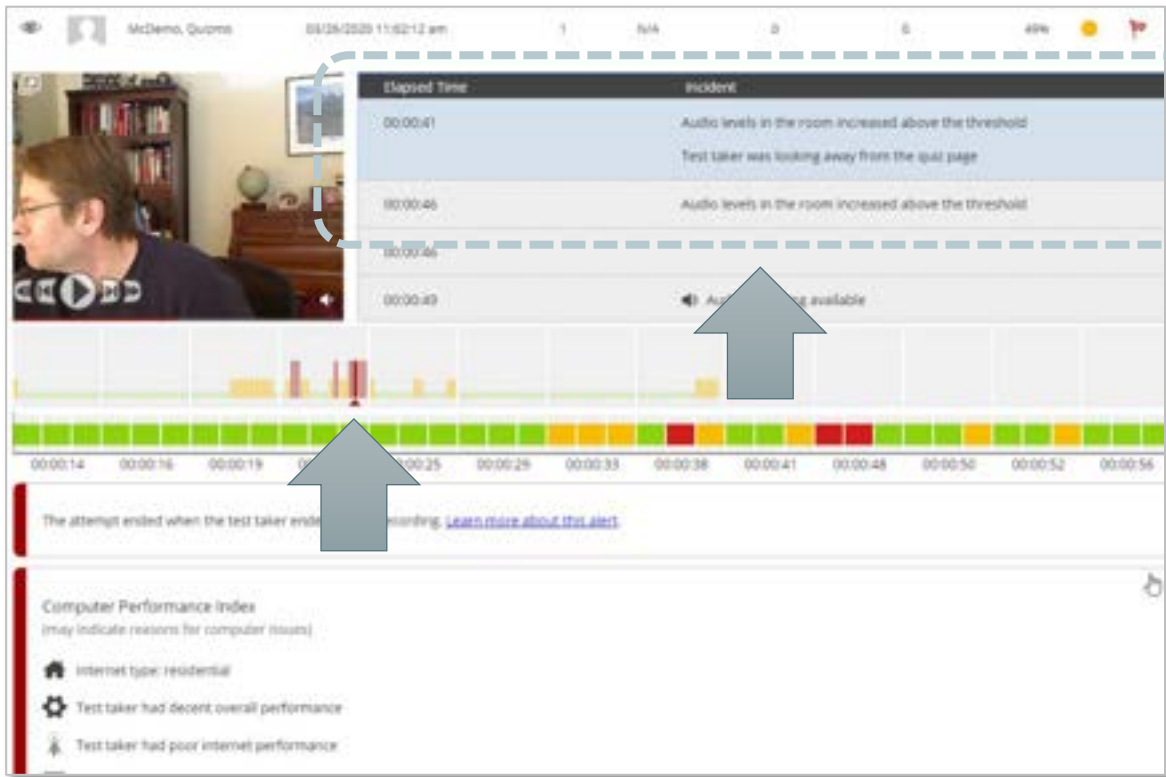
Desktop sharing?

Sufficient RAM?

Bandwidth OK?



Video, audio, screen captured, analyzed in real time



Video encrypted and streamed back to a secure server

Audio, video and interactions with the local device captured

Data analyzed for abnormalities and unusual behaviors



Generate PDF reports for stakeholders

- Configurable reporting to
 - Include or exclude participant's:
 - Name
 - Video
 - Screen
 - Location
 - Flag potential hardware issues
 - Show manual annotations from review

The screenshot shows a configuration panel for generating PDF reports. It includes several toggle switches and a button, each with a corresponding label and a link to learn more.

Feature	Toggle	Link
Display potential hardware issue events	<input type="checkbox"/>	Learn more about detected potential hardware issue events.
Display Suspicious IDs	<input checked="" type="checkbox"/>	Learn more about suspicious ids.
Gradebook Tour	Start Tour	
Sort by Last Name	<input checked="" type="checkbox"/>	
Display Help Icons	<input checked="" type="checkbox"/>	
Infinite PDF	<input type="checkbox"/>	
Show unmatched attempts	<input type="checkbox"/>	Learn more about unproctored attempts.
FERPA Controls		
Hide ID	<input type="checkbox"/>	Learn more about FERPA controls.
Hide Names	<input type="checkbox"/>	
Hide Grades	<input checked="" type="checkbox"/>	
Hide Video	<input type="checkbox"/>	
Hide Screen	<input type="checkbox"/>	
Hide Location	<input type="checkbox"/>	

Exam Results

Exam Information

Test taker Name Jones, Neville
Overall Suspicion Level 54%
Score N/A
Started 03/26/2020 04:29:23 pm
Completed 03/26/2020 04:31:03 pm
Exam Title Proctorio Exam
Course Course
Generated By Instructor/Admin
Generated On 04/30/2020 10:17:49 am



Behavior Settings

Setting	Weight	Occurrences
Video Tamper	5	13
Page Tamper	5	0
Navigating Away	1	5
Keystrokes	0	0
Copy & Paste	1	0
Browser Resize	1	1
Audio Levels	1	19
Head and Eye Movement	1	75
Eye Movement	1	0
Multi-Face	1	0
Leaving the Room	0	0

Exam Results

Proctorio Exam Settings

The exam settings determine what information will be collected and what actions will be restricted.

Recording Options	ON/OFF
Record Video	ON
Record Audio	ON
Record Screen	ON
Record Web Traffic	ON
Record Room	OFF

Lock Down Options	ON/OFF
Force Full Screen	OFF
Only One Screen	OFF
Disable New Tabs	OFF
Close Open Tabs	OFF
Disable Printing	OFF
Disable Clipboard	OFF
Block Downloads	OFF
Clear Cache	OFF
Disable Right Click	OFF
Prevent Re-entry	OFF

Verification Options	ON/OFF
Verify Video	ON
Verify Audio	OFF
Verify Desktop	
Verify ID	
Verify Signature	

- Video, audio, screen recordings saved for review
- Generate PDF report to document exam attempt

Exam Results

INCIDENT LOG



Elapsed Time 00:00:18

- Audio levels in the room increased above the threshold
- Test taker was looking away from the quiz page



Elapsed Time 00:00:46

- Potential audio/video hardware issue detected
- Test taker was looking away from the quiz page



Elapsed Time 00:00:47

- Potential audio/video hardware issue detected
- Test taker was looking away from the quiz page

Exam Results



Elapsed Time 00:00:47

- Potential audio/video hardware issue detected
- Test taker was looking away from the quiz page



Elapsed Time 00:00:48

- Potential audio/video hardware issue detected
- Test taker was looking away from the quiz page



Elapsed Time 00:00:48

- Potential audio/video hardware issue detected
- Test taker was looking away from the quiz page



Elapsed Time 00:00:49

- Potential audio/video hardware issue detected
- Test taker was looking away from the quiz page

The top right corner of the slide features four diagonal bars of varying lengths and shades of blue and yellow, creating a modern, abstract design.

Bring your own Proctor (BYOP)

| Remote proctoring with your own proctors

- Customer provides own proctors
- Live monitoring and recording (video, audio, desktop) during exam
- Automated flagging of anomalous/suspicious activity



| How it works

- Proctor can control exam in real-time
 - Check ID against candidate photo
 - Unlock, pause and terminate exam session
 - Allocate additional time for timed exams
- Proctor communication
 - Chat (text) with candidate
 - Make announcements to all candidates currently taking exam
- Reports on each exam attempt
 - Summary views grouped by schedule
 - Sortable by "Credibility score"
 - Attempt reports include video, desktop recordings, ID and candidate snapshots



Candidate Experience

Go to list of classic schedules

Name	Attempts left	Available from	Available until	Delivery	Actions
BYOP demo 2022-03-21 : WDL Test 1	3 of 3	20-Mar-2022 14:30	30-Jun-2022 14:29	Proctoring Online	
BYOP demo2 2022-03-22 : WDL Test 2	3 of 3	20-Mar-2022 14:30	30-Jun-2022 14:29	Proctoring Online	
demo 22mar : WDL Test 2 timed	2 of 2	21-Mar-2022 14:30	30-Jun-2022 14:29	Proctoring Online	 

Before starting your exam

This is a proctored exam, in order to start the exam please follow the steps

1: Launch and connect to your Proctoring Service

Please click the button below and follow the instructions

2: Come back to this Exam Tab

Once you finish connecting to your proctoring service, leave the window open and come back here to start your exam

3: Start the exam

The exam will be started by the proctor once you are ready

Launch



System Check



Checking Browser Settings

Screen Share Permissions

Webcam and Microphone Permissions





Provide your snapshot

Take snapshot of ID card

Guidelines

- Ensure Uniform & Proper lighting on face.
- Look towards the camera.

Good



Bad



Blurred Image



Face is Cut



Uneven Light on face

Position yourself in the center of the frame



Capture your face



Provide your snapshot

Take snapshot of ID card

Recapture your ID in case of the following issues



Captured ID card Preview



Recapture your ID card

Submit



Please wait...

The exam has not started

« +

Live Chat

Exam Proctor
Mettl Proctor

↗ ✕

Hello! This is your chat with your proctor. Here you can communicate with your proctor directly. Feel free to hide this chat and click on 'Live Chat' when needed.

3:27 PM


Write your message here...


Please wait...

The exam has not started

« +

Live Chat

 **Brian McNamara**
Mettl Proctor




Hello! This is your chat with your proctor. Here you can communicate with your proctor directly. Feel free to hide this chat and click on 'Live Chat' when needed.

3:27 PM

Please pan camera around your workspace.

3:32 PM

Write your message here...





Start Exam

The exam has not started

« +

Live Chat

Brian McNamara
Mettl Proctor

✕

proctor. You can communicate with your proctor directly. Feel free to hide this chat and click on 'Live Chat' when needed.

3:27 PM

Please pan camera around your workspace.

3:32 PM

Thank you, you exam will now begin.

3:32 PM

Write your message here...

➤


WDL Test 2 timed

1 of 4

Does A come before B?

- ☒ Yes
☐ No

Live Chat

 **Brian McNamara**
Mettl Proctor

proctor, you can communicate with your proctor directly. Feel free to hide this chat and click on 'Live Chat' when needed.

Please pan camera around your workspace.


Thank you, you exam will now begin.

Write your message here...

Time remaining: 00:19:26
Proctor paused your exam.

« +

Live Chat

**Brian McNamara**
Mettl Proctor

↗

✕

proctor. Please feel free to communicate with your proctor directly. Feel free to hide this chat and click on 'Live Chat' when needed.

3:27 PM


Please pan camera around your workspace.

3:32 PM

Thank you, your exam will now begin.

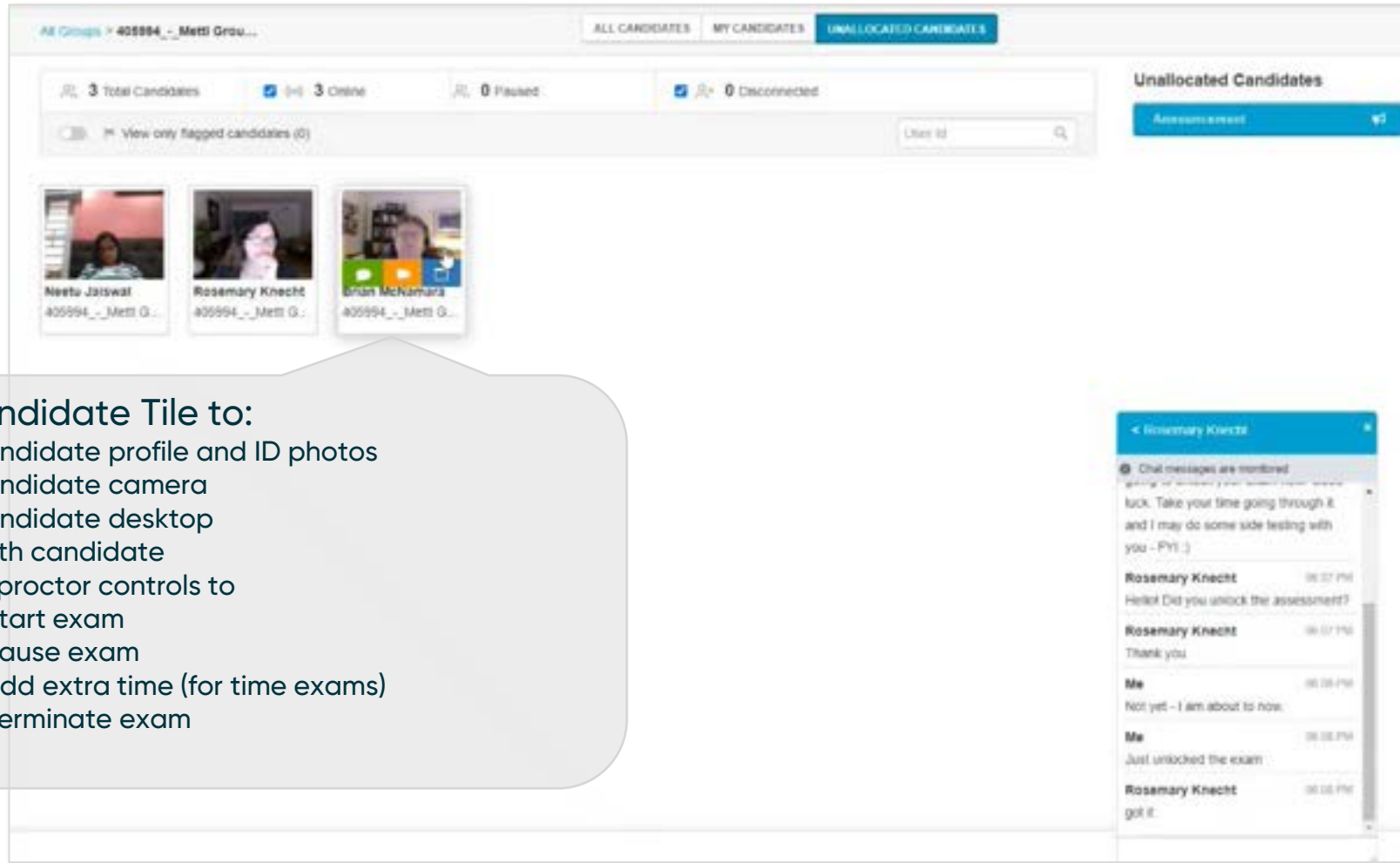
3:32 PM

Write your message here...

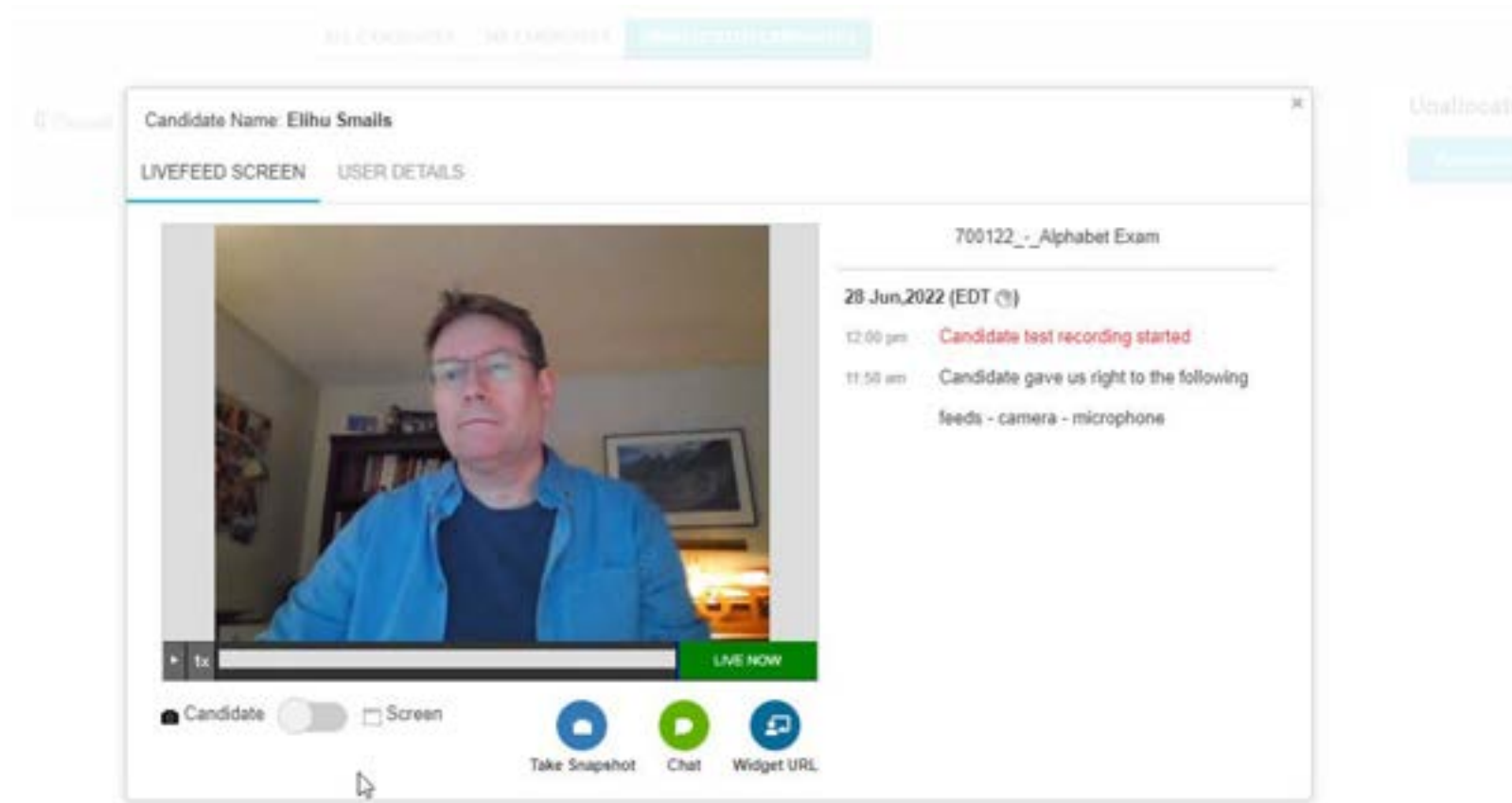


Proctor Experience

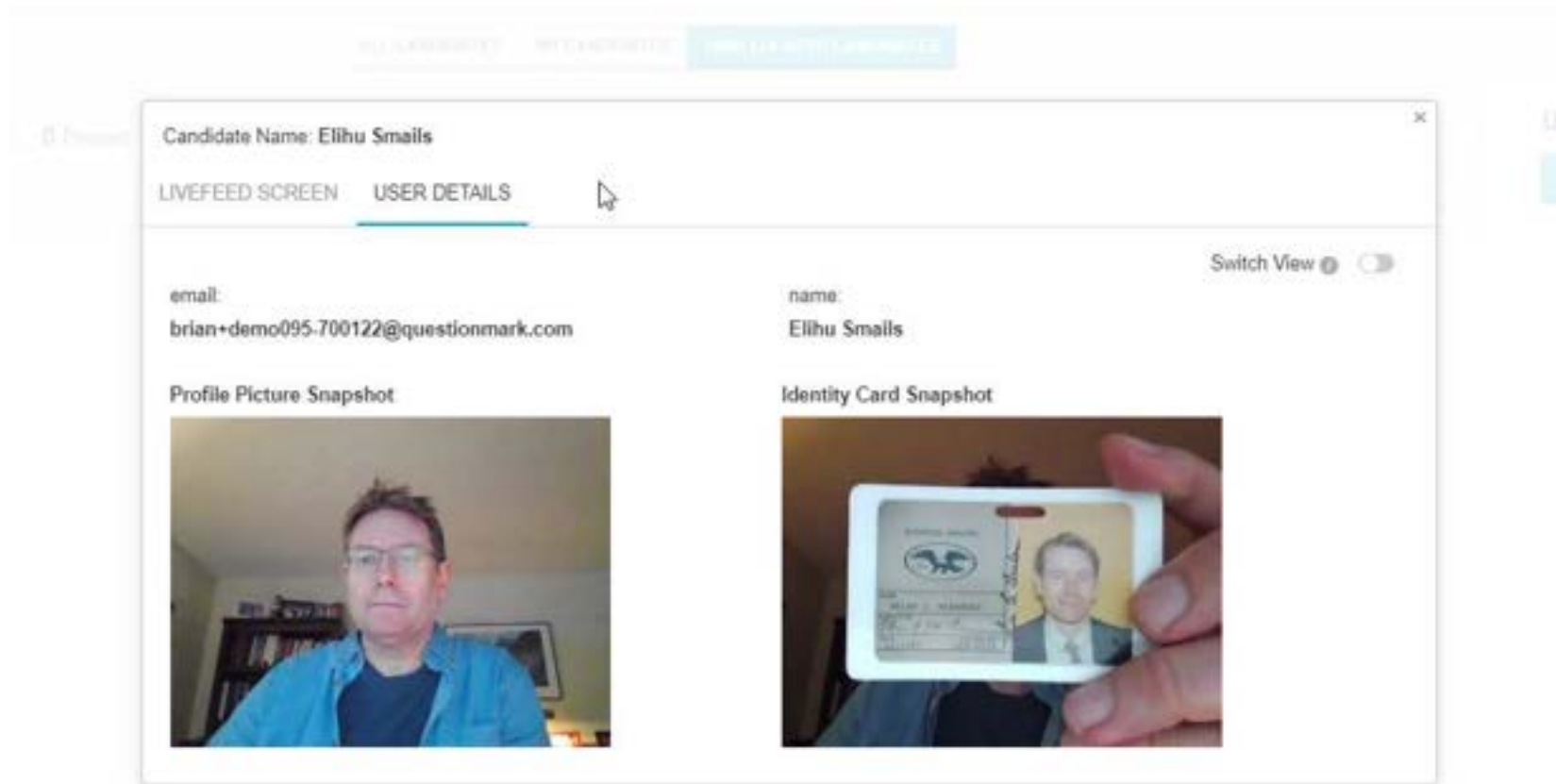
Proctor views candidates waiting to start exam



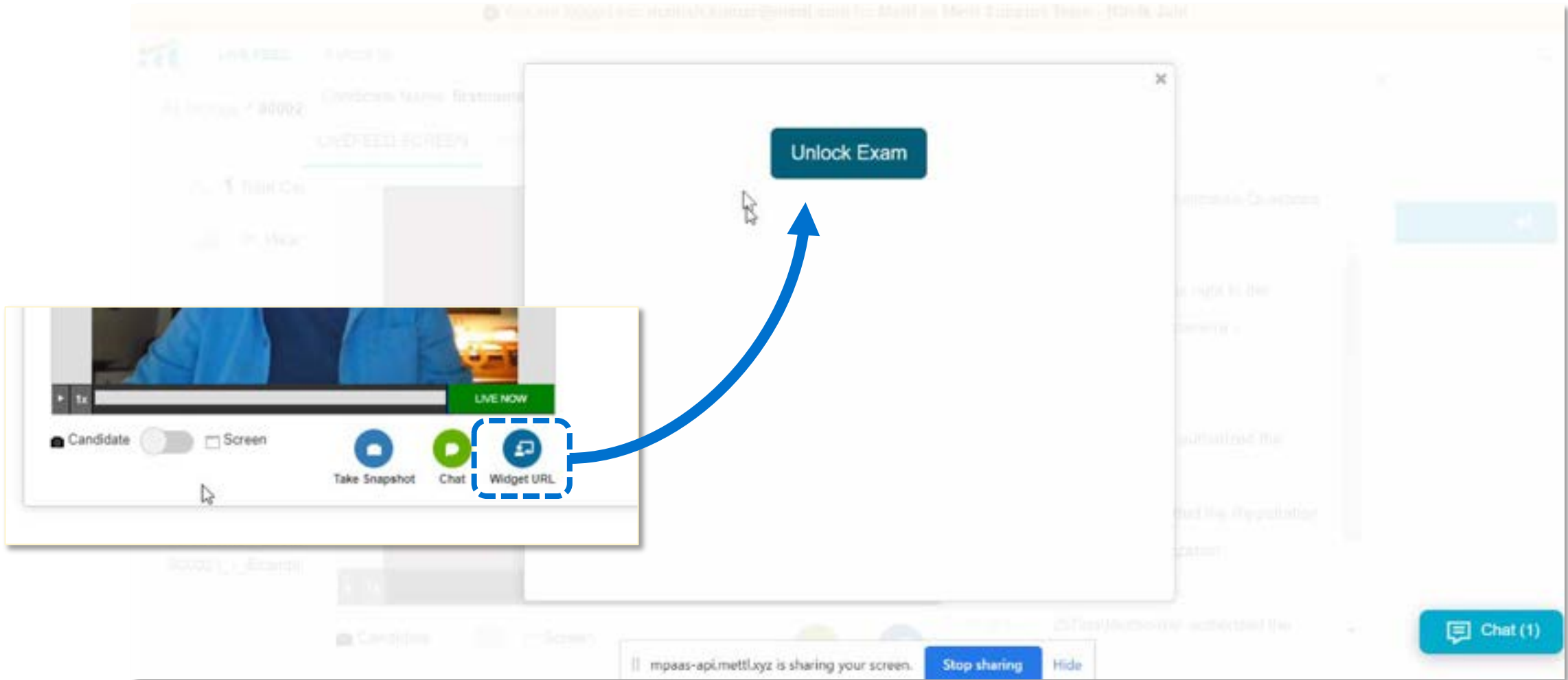
Proctor clicks a candidate tile



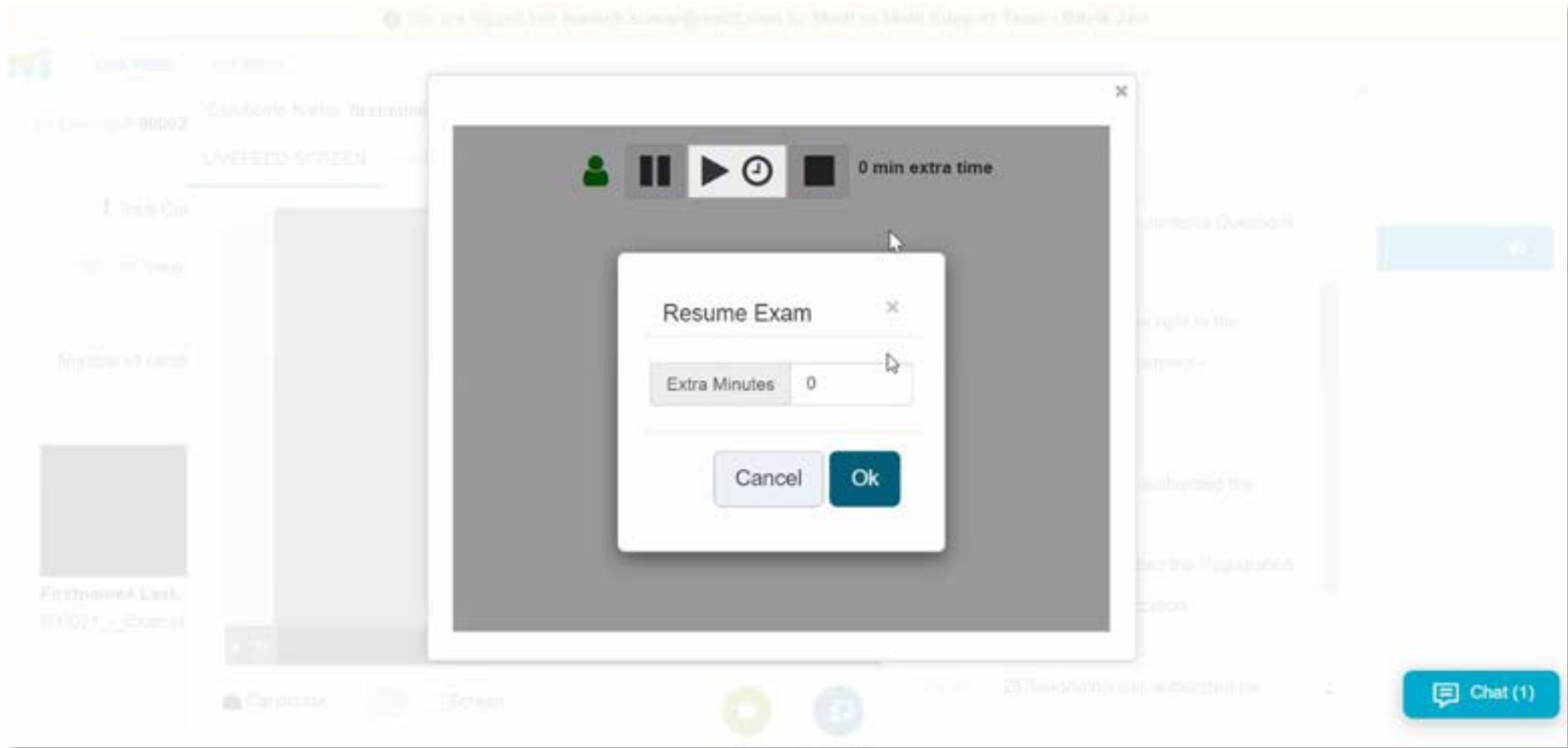
| Proctor checks candidate ID



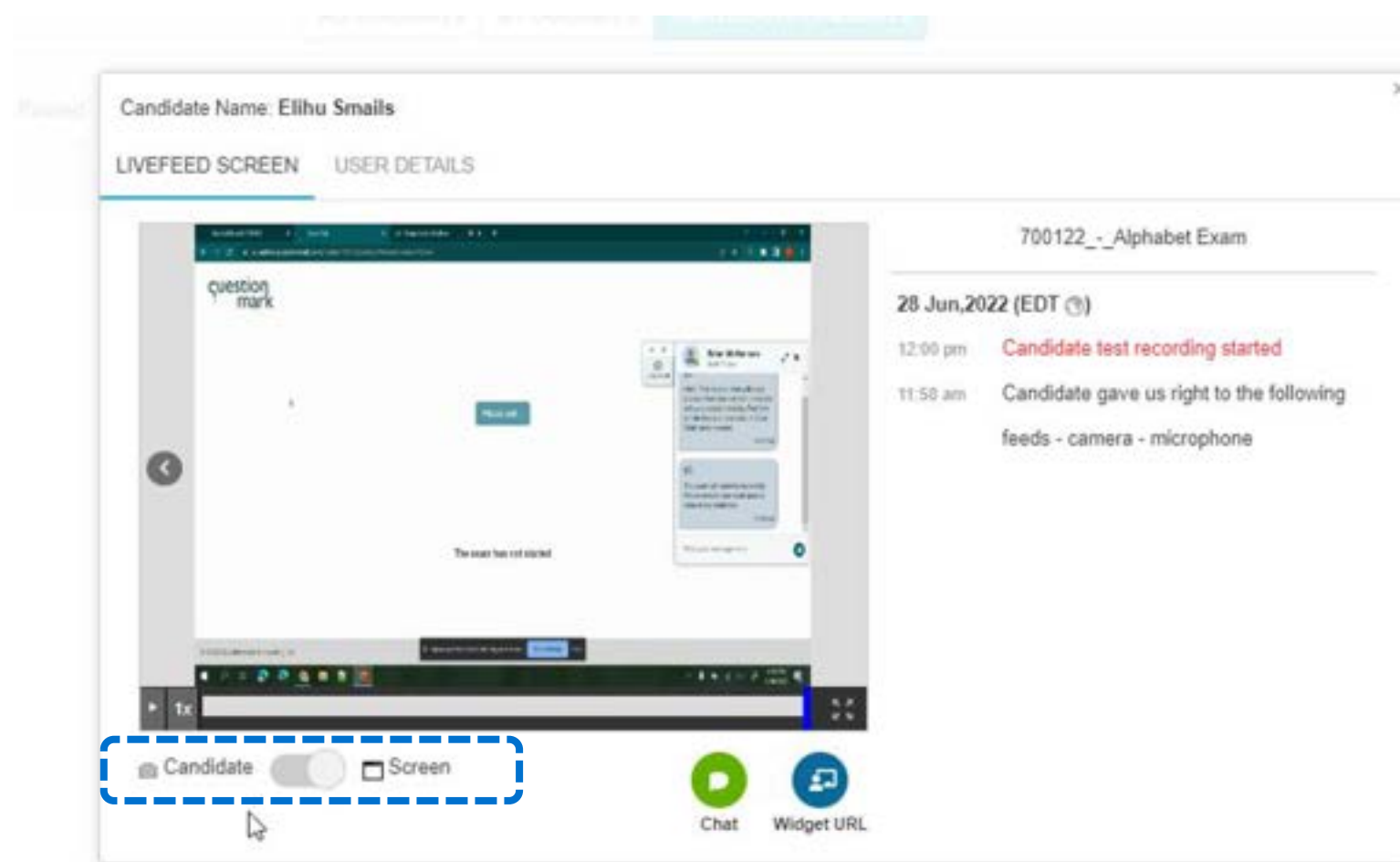
Proctor Uses Widget to Unlock Exam



Proctor can pause/stop exam, add extra time via widget



Proctor toggles between candidate webcam and candidate screen views




System highlights candidate tiles when anomalies detected

All Groups > 405994

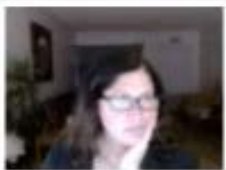
ALL CANDIDATES MY CANDIDATES UNALLOCATED CANDIDATES

9 Total Candidates 9 Online 0 Paused 0 Disconnected


View only flagged candidates (3) User Id




Neetu Jaiswal
405994_-_Mettl G...




Rosemary Knecht
405994_-_Mettl G...




Brian McNamara
405994_-_Mettl G...




Tricia Allen Osbo...
405994_-_Mettl G...




Steve Lay
405994_-_Mettl G...




Vivek Sharma
405994_-_Mettl G...



Manish Jaiswal
405994_-_Mettl G...



Howard Eisenberg
405994_-_Mettl G...



Christian Rowen...
405994_-_Mettl G...

Detected behaviors flagged "Red"

- Candidate Not Present
- Face not Visible
- Another Person
- Mobile Phone Detected
- Away From Window

Detected behaviors flagged "Yellow"

- Candidate looking away from Screen
- Candidate Face Partially visible

Proctor clicks on flagged candidate for detailed view

Detected behavior:
Additional Person Detected

The screenshot displays the Questionmark Proctor interface for a candidate named Christian Rowenstrunk. The interface is divided into two main sections: a live video feed on the left and a list of detected behaviors on the right.

Candidate Name: Christian Rowenstrunk

LIVEFEED SCREEN | **USER DETAILS**

06:24 pm Additional person there

405994 - Mettl Group Test

16 Mar, 2022 (IST)

06:24 pm Candidate Looking Away from Screen

06:26 pm Candidate test recording started

06:26 pm Candidate Looking Away from Screen

06:25 pm Candidate Looking Away from Screen

06:24 pm Additional person there

06:24 pm Candidate Looking Away from Screen

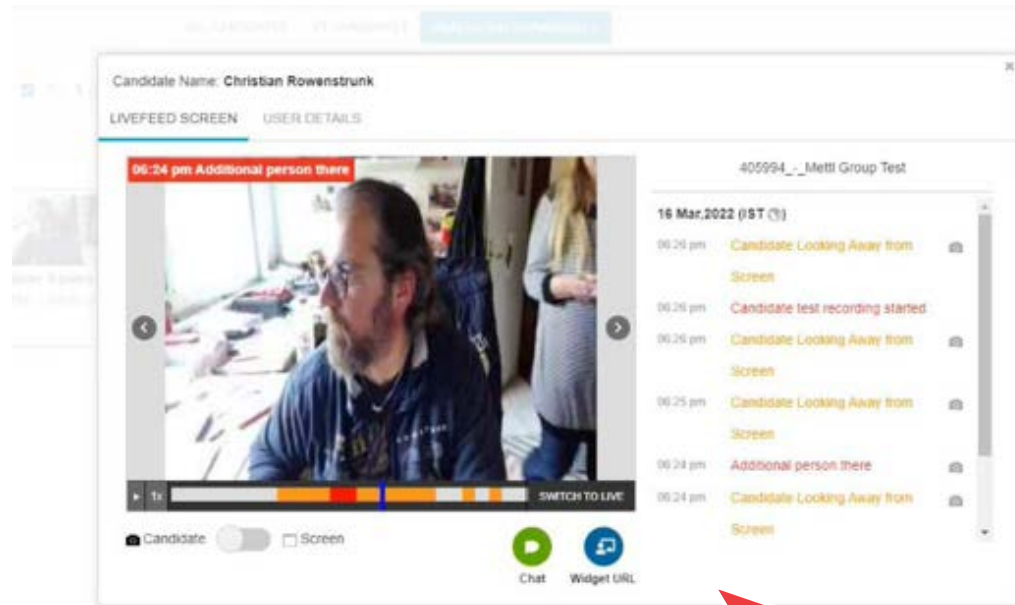
1x **SWITCH TO LIVE**

Candidate ☒ **Screen** ☐

Chat **Widget URL**



Proctor clicks on flagged candidate for detailed view

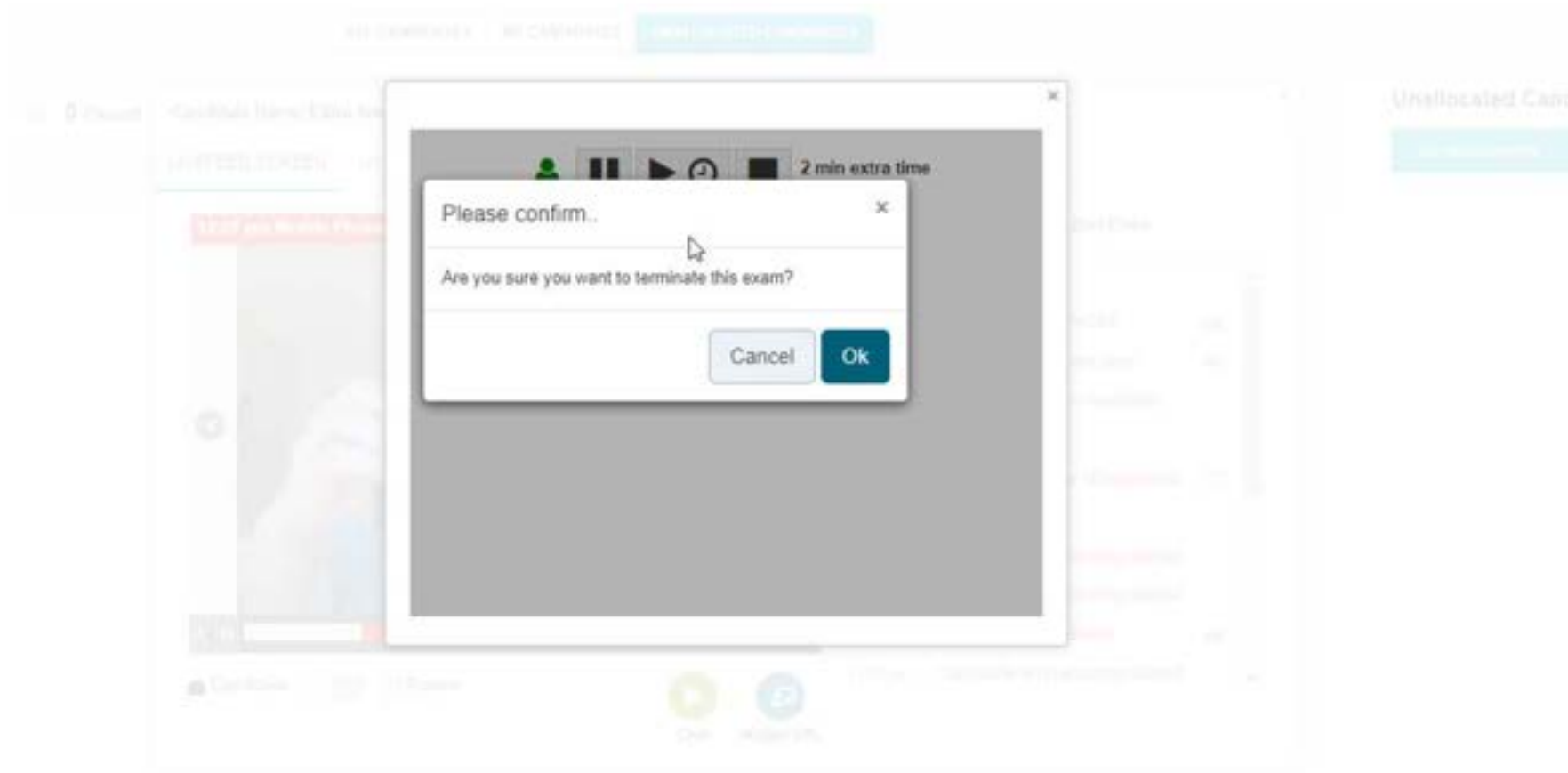


Additional person detected



Phone detected

| Proctor Terminates Exam, prompted to confirm



Reviewing Results

List and summary of exam attempts

Launch detailed review of selected exam session

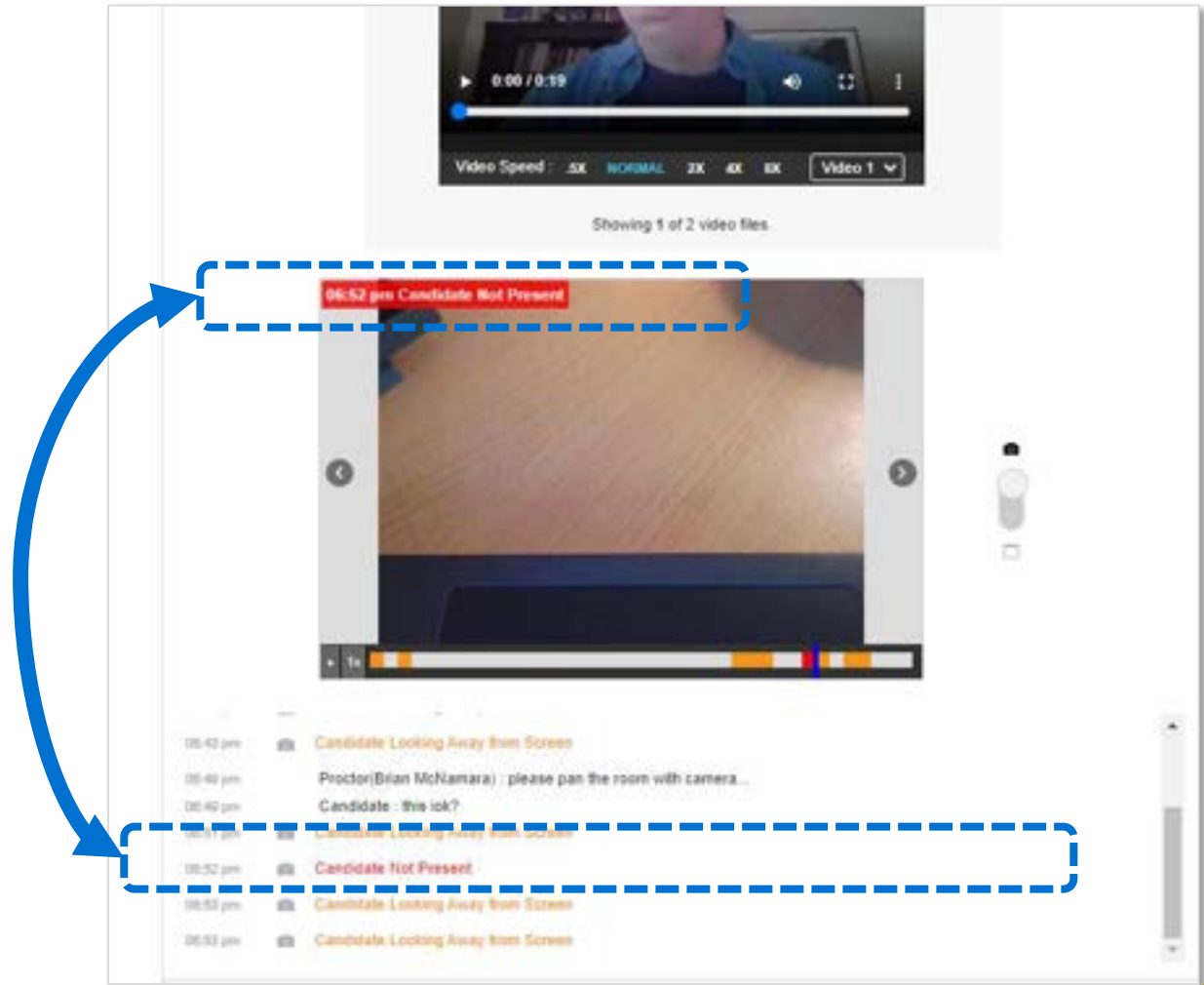
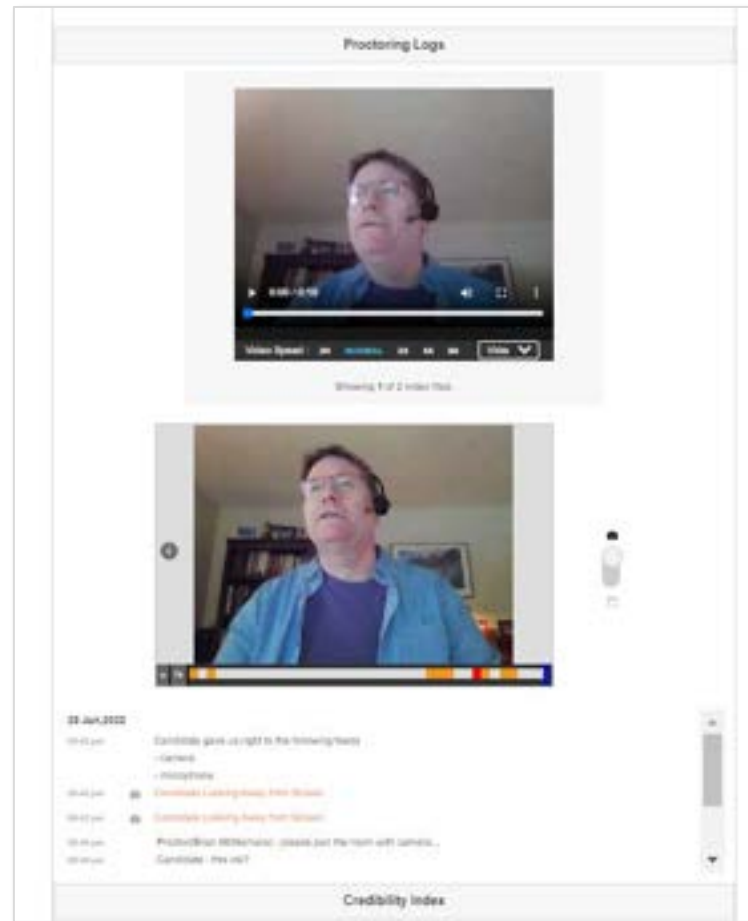
Review Results - BYOP demo2 2022-03-22 : WDL Test 2

Total 11 Suspicious Attempts 2

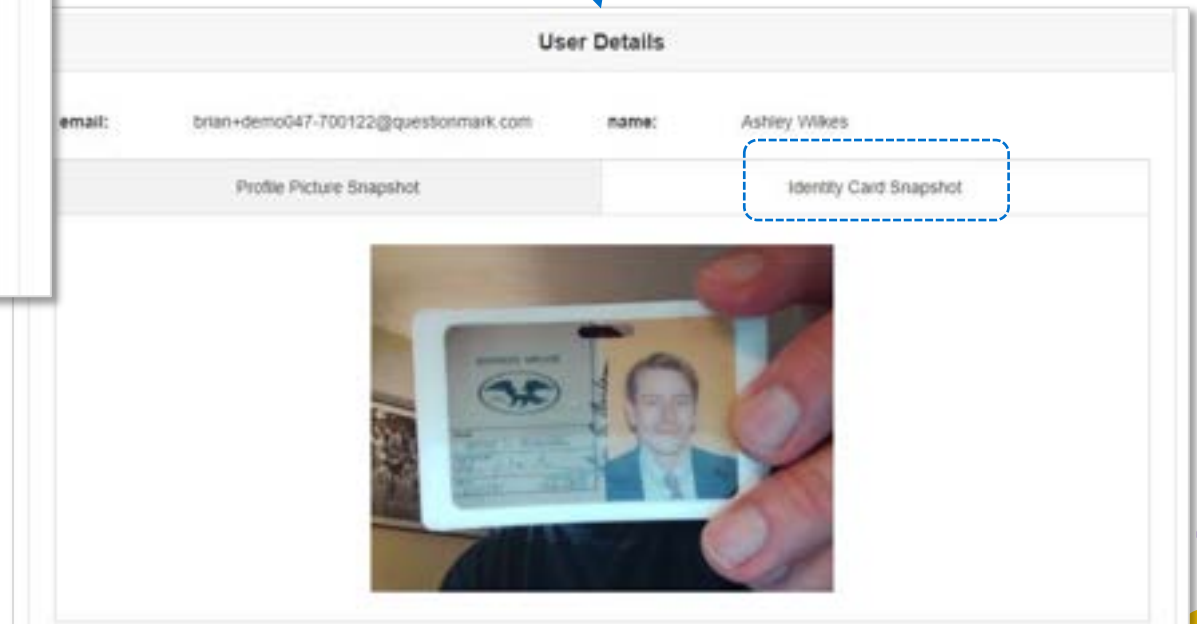
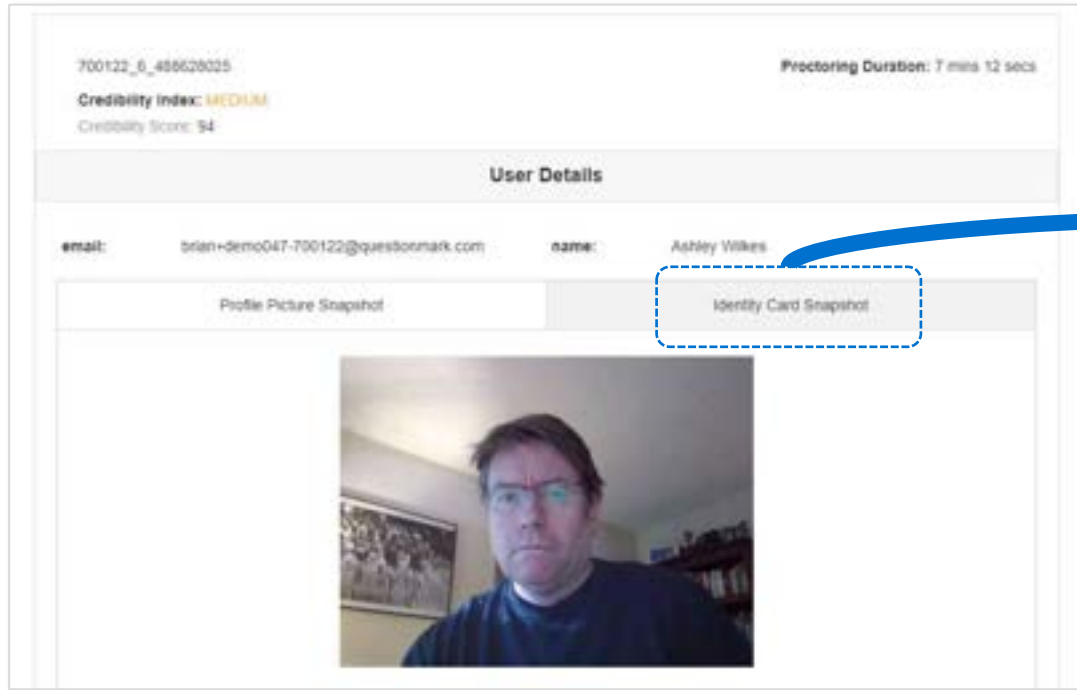
Search

Attempt Id	First Name	Last Name	UserName	Email	Submission Time	Attempts	Credibility Index	Credibility Score	Action
81	Reggie	Dunlop	Reggie Dunlop	brian+demo059@questionmark.com	January 19, 2023 at 09:30:26	1/2	Medium	89	Report
83	Philip	Vandamm	Philip Vandamm	brian+demo107@questionmark.com	January 19, 2023 at 08:49:29	1/2	High	97	Report
77	Buck	Turgidson	Buck Turgidson	brian+demo155@questionmark.com	January 19, 2023 at 08:39:07	1	High	100	Report
79	Lionel	Mandrake	Lionel Mandrake	brian+demo083@questionmark.com	January 19, 2023 at 08:35:53	1	Medium	94	Report
75	Fawn	Liebowitz	Fawn Liebowitz	brian+demo053-700122@questionmark.com	January 18, 2023 at 17:23:55	1	Low	85	Report
25	Ashley	Wilkes	Ashley Wilkes	brian+demo047-700122@questionmark.com	June 21, 2022 at 08:24:42	1	High	97	Report
27	Elihu	Smails	Elihu Smails	brian+demo095-700122@questionmark.com	June 10, 2022 at 08:20:59	1/3	Medium	94	Report
21	Philip	Queeg	Philip Queeg	brian+demo107-700122@questionmark.com	March 22, 2022 at 08:49:02	2/2	High	97	Report
20	Philip	Queeg	Philip Queeg	brian+demo107-700122@questionmark.com	March 21, 2022 at 18:27:43	1/2	High	100	Report
30	Elihu	Smails	Elihu Smails	brian+demo095-700122@questionmark.com		2/3	Medium	94	Report

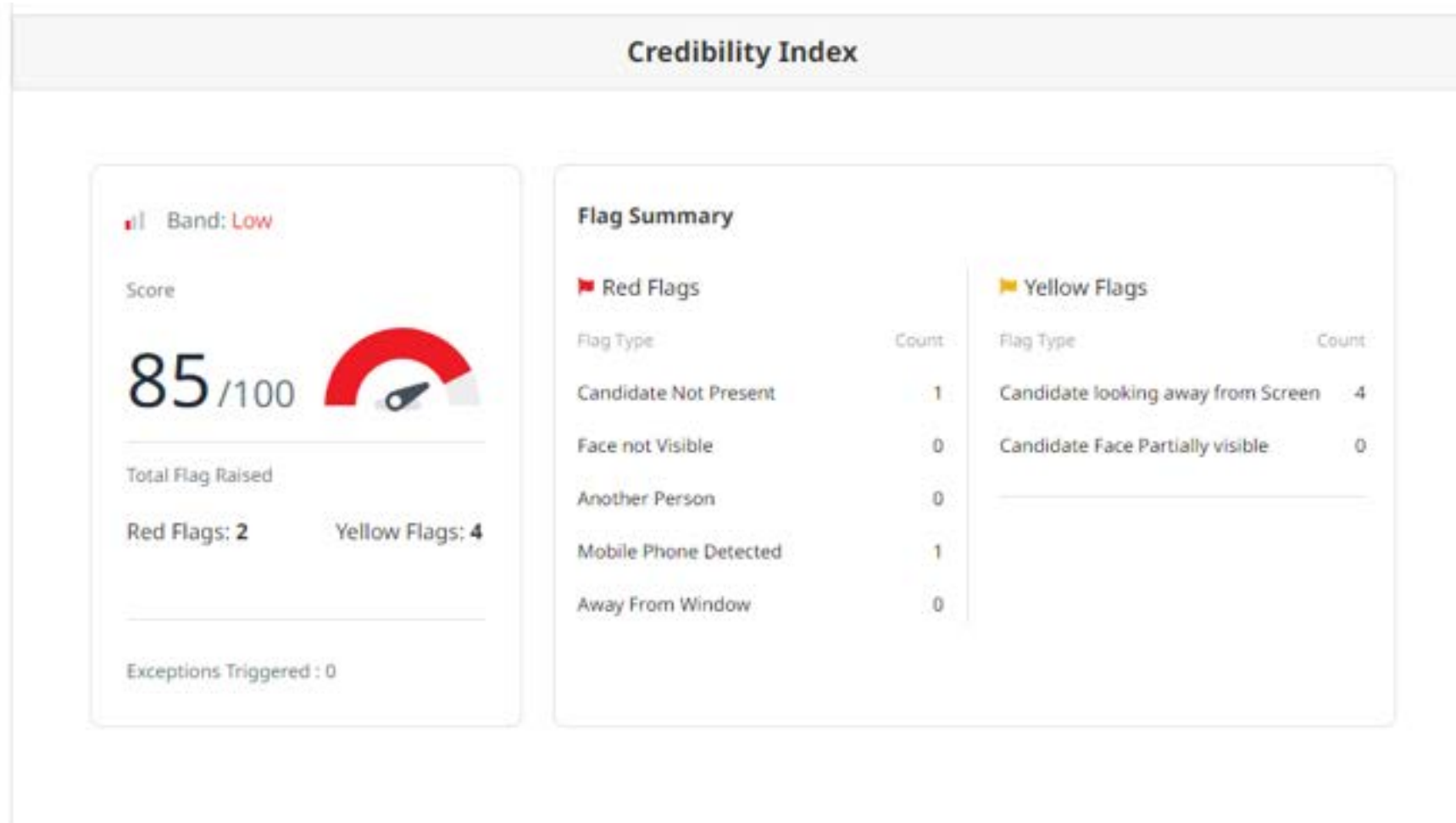
Proctoring logs, video, and screen capture review



Review ID Card compared to candidate photo



“Credibility index” provides objective analysis of session



| BYOP benefits

- Your own proctors
- Prevent access to exam pending ID check
- Real-time intervention to pause, stop exam
- Automated flagging of suspicious / anomalous events
- Detailed reporting



Privacy and Regulatory Considerations



| Test taker privacy concerns

- You will be videoing my private space
- A stranger will see me at a time of stress
- How do I need to dress?
- Why should my teacher see where I live?
- What happens if my child / dog / someone else walks in
- What happens if you are hacked and my video recording is leaked?
- Does the proctoring software put spyware on my computer?
- How long will you keep my recording for?
- Do you take a copy of my passport / government ID, what happens to that?

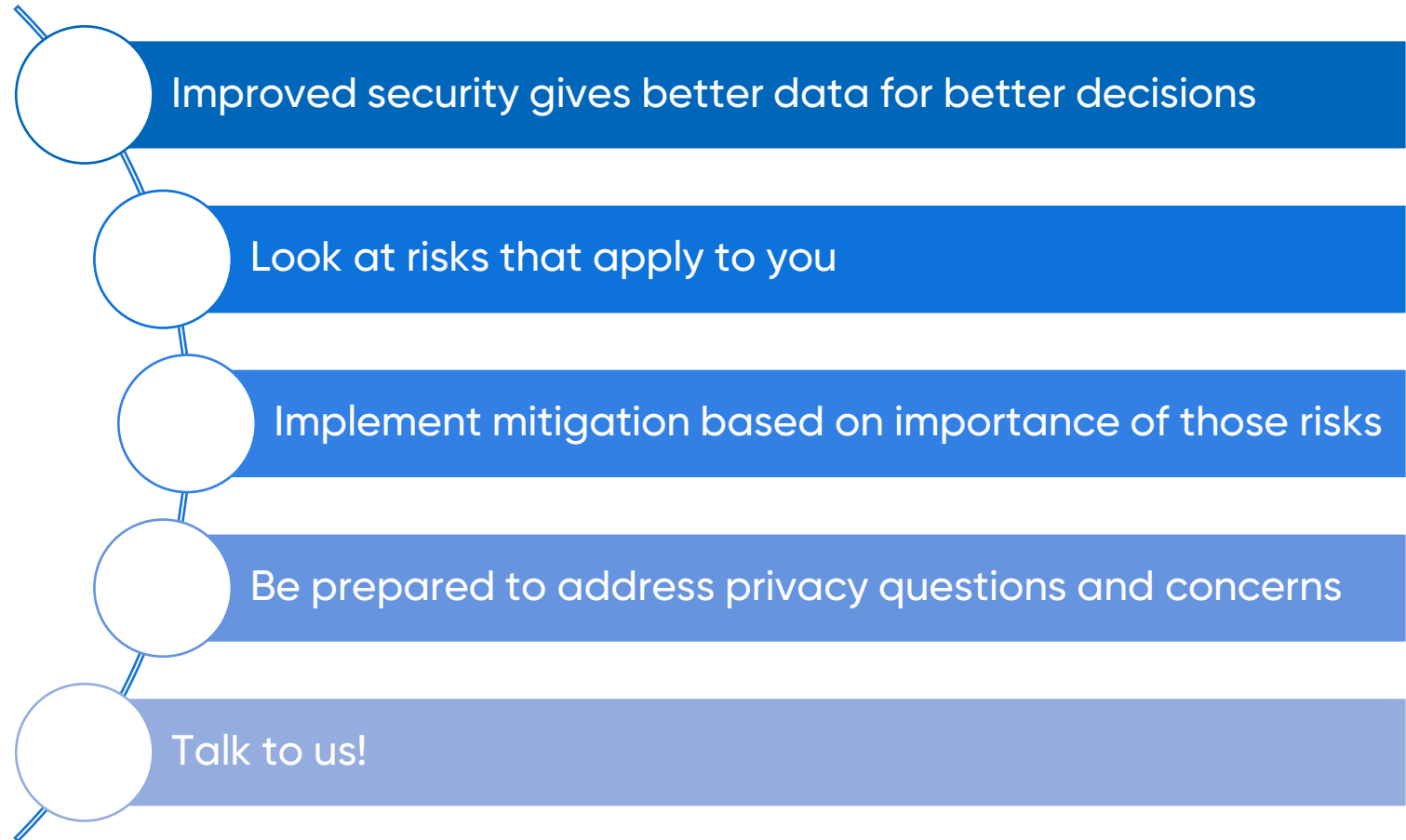


| Balancing privacy and security

- Identify a lawful basis for processing video data in testing. It's useful to write a formal Legitimate Interest Assessment to document this.
- Apply purpose limitation and data minimization. Part of this is you should usually only use video data for assessment security purposes.
- Retain video data for only the time needed. Record video only when necessary and justify the retention period carefully.
- Be transparent and open in communication with test-takers. Inform in advance they are being videoed and how the data will be used.
- Be consistent in responding to test-taker requests. Define a policy and apply it consistently.
- Consider carefully when using automated decision making. Allow automation and AI to flag issues for human review, not for decision-making.
- Adopt a written policy relating to video. Helps with consistency and accountability.



| General advice




Questions?



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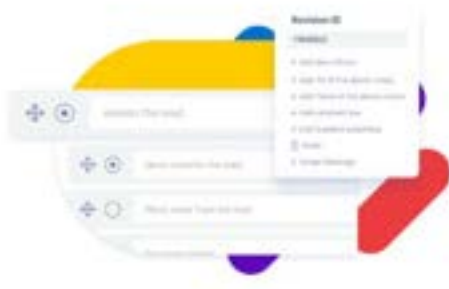
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