

# BUILDING A SUPER SECURE ONLINE TEST:



A COMPREHENSIVE GUIDE

# WE GET IT—EXAM DEVELOPMENT IS HARD.

Writing an excellent (and psychometrically sound) exam is a difficult, time-consuming, and expensive undertaking. And it is devastating when the exam you worked so hard to develop is stolen or exposed, and all that hard work (and money) goes down the drain.

Luckily, there is a solution. You can spare your team this heartache by *proactively* building security directly into your exam itself during the development process.

**Let's learn how.**



# THE BENEFITS OF SECURE ITEM & TEST DESIGN

## LONGER-LASTING EXAMS

Reduced exposure leads to longer-lasting item pools, so you can wait much longer between performing maintenance on your exams. Content is less likely to be breached or benefit test takers who've somehow gotten access to it.

## RESTORED VALIDITY

The combined power of more accurate measurement and increased security leads to the restored validity of test scores. Test takers and stakeholders will all be able to respect and trust the scores of your important exams (in case you didn't know—all of your exams are important!).

## REDUCED EXPOSURE

New forms of secure item and test design are primarily guided by the concept of reduced exposure. By reducing the relative amount of content your test takers see, you'll reduce the risk of item exposure to other groups.

## BETTER MEASUREMENT

In addition to bolstering security, the newer and more advanced item types and methods of test design can measure the abilities of test takers far better than their archaic counterparts.

## MITIGATED COSTS

Walking hand-in-hand with reduced exposure is the lovely benefit of mitigated costs. Longer-lasting item pools require less maintenance and damage control than traditional multiple-choice items.

# SO WHAT SHOULD YOU CONSIDER BEFORE YOU START?

## WHAT TYPES OF SECURITY DO YOU NEED?

Now that you know the impact of secure exam design, how will that affect the rest of your choices from this point forward? Perhaps write on a sticky note: "*What about the Security?*" and place it somewhere prominent to remind you to consider what you can do to improve security throughout each stage of the exam development process. (More on this later.)

## WHAT TYPE OF EXAM WILL IT BE?

Your first major security consideration should be *what type of exam will you build?* Not all are created equally. Research secure test & item designs that work for your content area.

## WHAT CAPABILITIES DO YOU NEED?

Do you need to research or vet test development systems, delivery vendors, proctoring solutions, or any other components of your exam workflow before you get started? Make sure your desired security features are supported.

## DO YOU NEED EXTRA TRAINING AND SUPPORT?

Is your team fully on board with the benefits of secure design? What type of training and support might they need to help smooth the implementation process?



# MORE DEVELOPMENT QUESTIONS TO MULL OVER WITH YOUR TEAM

- HOW WILL YOU MEASURE?**  
What is the best way to test the skills you're trying to measure? Essay questions, performance sections?
- WHO IS YOUR EXAM DEV TEAM?**  
Teams usually need a project manager, subject matter experts, and more. Who is responsible for ensuring security?
- WHAT FORMAT WILL YOU USE?**  
What testing format makes the most sense for your testing purposes? Keep in mind that some formats are more secure than others.
- WHAT ITEM TYPES SHOULD YOU USE?**  
Different item types work best with different content domains. Which item types suit your content best? How can secure item types be best utilized?

- WHAT'S YOUR BUDGET?**  
Make a list of your must-have security, development, and delivery needs. Allocate your budget accordingly.

- WHAT'S YOUR PROJECT DEADLINE?**  
Work backwards from there.





# THE 6 BASIC STEPS TO CREATING AN EXAM

## 1 PURPOSE

What need does your exam fill? The answer to this question should inform your process every step of the way.

## 4 ITEM WRITING & REVIEW

Item writing requires SMEs and writers to collaborate while building the exam.

## 2 JTA

This is when you'll start scoping the skills that you'll measure and defining your audience.

## 5 CUTSCORE SETTING

Psychometricians should help you determine your exam's cutscore for a minimally-qualified candidate.

## 3 BLUEPRINTING

How many items will be assigned to each skill outlined in your JTA?

## 6 LAUNCH AND TRACK

After your exam goes live, don't forget to observe your testing data for suspicious patterns.

Security can (and should) be built into each one of these steps. Some secure test designs (such as the SmartItem™) might change the flow of this process, streamlining certain areas and requiring more care and consideration in others. Remember, the end goal is to create a great, secure exam. The best process for you? Well, that is simply the one that gets you there.



# COMMON EXAM DEVELOPMENT MYTHS: DEBUNKED

## **CHEATING DOESN'T HAPPEN IN MY PROGRAM.**

This may hurt, but you probably need to hear it: Exam fraud happens all over, all the time, for all testing programs. For many otherwise honest people, the end justifies the means when an opportunity is at stake. In other words, every exam is a high-stakes exam, and yours is at risk.

## **ANY TYPE OF TEST OR ITEM FORMAT I USE WILL BE FINE.**

Not all item types are created equal. Some are easier to score, some are easier to implement, and some are far more secure. Consider scalability, budget, accessibility, and most importantly, security when choosing your item formats.

## **CHEATING IS AN ISOLATED BEHAVIOR PROBLEM.**

The impact of cheating hurts more than the wrongdoers themselves. It calls into question the validity of all the program's test scores, even the ones that are honestly earned. Unchecked cheating damages the overall reputation of a program.

## **ONCE I LAUNCH MY EXAM, THE HARD PART IS OVER.**

Well, yes and no. Exam maintenance is equally important. After launch, you'll want to track how well your exam is performing using security and investigative tools like web monitoring or data forensics. That way, you'll catch rampant fraud before it takes you down.

## **BUILDING AN EXAM OUT OF SELF-SECURING ITEM TYPES IS TOO FANCY FOR ME.**

Any testing program, large or small, can easily build a secure test with all the latest and greatest technology with relative ease. Solutions for self-protecting items and tests are becoming more and more accessible.

# CONSTRUCTION:

## EXAMPLES OF SECURE TEST AND ITEM FORMATS

### **RANDOMIZE**

Item order and option order can both be randomized.

### **CAT**

Computerized Adaptive Test (CAT) design adapts to you.

### **LOFT**

Linear on the Fly Test (LOFT) design is strong and secure.

### **SMARTITEM**

The SmartItem renders cheating and theft useless.

### **PERFORMANCE**

Performance-based items have an extra layer of security.

### **MULTIPLE FORMS**

Utilize multiple forms to reduce the effects of content exposure.

### **REPLACEMENT**

Rapid item or form replacement policies can mitigate damage.

### **AIG**

Expand your item pool with Automated Item Generation.

### **DOMC™**

Discrete Option Multiple Choice™ items reduce exposure.





# SECURITY-ENHANCING HACKS

## SECURITY STRENGTH



### **SCRAMBLE ITEM AND RESPONSE-OPTION ORDERS**

Randomizing your items and response options is a good first step in making it more difficult to steal your exam content and use it to cheat. Pre-knowledge is only useful when examinees see what the content thieves before them have seen.

### **MULTIPLE FORMS**

Having multiple forms decreases the amount of exposure your test questions get, since different test takers are seeing different forms. It also allows for exposed forms to be easily removed and replaced.



### **CREATE A LARGE ITEM POOL USING AIG**

The larger the item pool, the less content each individual test taker will see. Additionally, an expansive item pool gives you the option to replace exposed items quickly, avoiding widespread validity issues. Learn more about the benefits of a large item pool on the next page.



### **MAKE YOUR ITEMS "SMART"**

A SmartItem uses special technology during development and delivery so that the item renders differently each time it is given on a test. Translation—no two examinees see the same thing during testing, so “stealing answers” to gain an advantage is pointless. To encourage proper studying and instruction, the SmartItem is coded to completely cover the target standard or competency. No more “teaching to the test.”



# WHAT ARE THE BENEFITS OF AN EXPANSIVE ITEM POOL?

## LIMIT ITEM EXPOSURE

Numbers don't lie. More items in your item pool mean that fewer eyes see each item. Limit item exposure with AIG by rapidly increasing your item pool and staying one step ahead of content thieves and aging exams.

## BLOCK PRE-KNOWLEDGE

A larger pool of items can prevent test takers from using pre-knowledge. This will make it harder for examinees to predict what their test questions will be and prevent them from guessing what the correct answers are. Nice try!

## KEEP YOU AHEAD

To combat item theft, it is important to stay one step ahead of prying eyes. AIG makes it possible to refresh your item pool as often as necessary, as painlessly as possible.

## USE FEWER HUMANS

Maintain an extra layer of security by involving fewer individuals in the item writing process. AIG enables smaller teams to do more with less—efficiency and security all rolled into one.

## GET ADAPTIVE

Secure test designs such as CATs, LOFTs, and the use of multiple forms require fairly large item banks to pull off. That hasn't always been attainable, but thanks to Automated Item Generation, it's now possible to do more with fewer resources.



# WHAT MAKES AN ITEM SMART?

## ✓ **It can render in millions of ways.**

One well-designed SmartItem can render in millions of ways and present different renderings of the item to each test taker. That's an amazing amount of variability!

## ✓ **It promotes fairness.**

SmartItems actually enhance the fairness of your exams by eliminating the two largest sources of unfairness: testwiseness and cheating.

## ✓ **It prevents cheating.**

With so many renderings, you can no longer cheat by sharing test content, buying questions and answers, asking a friend to take the test and tell you what they saw, etc.

## ✓ **It mitigates testwiseness.**

Success on an exam should depend on the depth of an examinee's knowledge, not their ability to tactically take tests. DOMC™ items have also been shown to reduce the effects of testwiseness on scores.

## ✓ **It can curb ballooning costs.**

SmartItem technology ensures that you don't need to replace or fix your test until the skills you are measuring are revised. This curbs the draining costs that typically accompany content theft endeavors or security breaches.

## ✓ **It can't be stolen.**

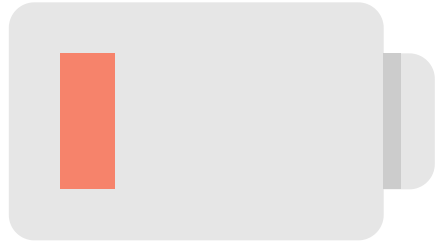
Well, it can, but it won't matter. A SmartItem covers the entire breadth and depth of a skill, rendering differently for each test taker. So, memorizing a SmartItem answer key would be a much poorer tactic than just studying the materials.

## ✓ **It works with any item type.**

No matter your question type—multiple-choice, drag-and-drop, short answer, or others—converting them into SmartItems is possible. A SmartItem is not an item type; it's a *treatment* for any kind of item. Whatever item types you use, you can make them render in unlimited ways.

# THE LIFE OF A SECURE TEST

## UNSECURED TESTS

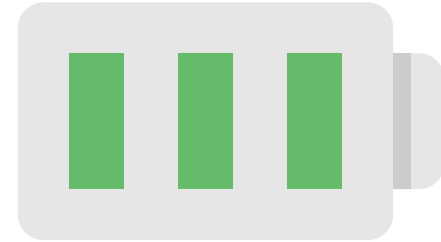


Likelihood of Exposure: **HIGH**

Likelihood of Theft: **HIGH**

Useable Lifespan: **SOMETIMES WEEKS**

## SECURED TESTS



Likelihood of Exposure: **MINIMAL**

Likelihood of Theft: **MODERATE**

Useable Lifespan: **SOMETIMES EVERGREEN**

## THE PROOF IS IN THE PUDDING—SECURE TEST DESIGN WORKS

“One of SailPoint’s core values is innovation, or developing creative solutions to real challenges. We teamed up with Caveon to do just that. Our SailPoint certification staff had been aware that IT certification programs can have their exams stolen within days of being released, and we wanted to ensure that any certification exams bearing the SailPoint imprimatur would be as secure as the available testing technology would permit. Therefore, in 2018, in our first certification ever, SailPoint decided to use the Caveon SmartItem for 100% of each exam. We confirmed the promised benefits of SmartItems, including stellar protection, reduced costs, psychometric quality, and more candidate preparation. Due to the very positive experience, SailPoint has begun developing a third exam using SmartItems.”

—Arthur Altman

Program Manager, Global Education Services  
SailPoint Technologies Holdings, Inc.

# LEARN WITH US

This learning resource was created by Caveon.

At Caveon, we recognize that validity, reliability, and fairness can only be achieved when exams are secure. Quality exams that are secure benefit assessment programs, test takers, and society alike.

That's why, for more than 18 years, Caveon has driven the discussion and practice of exam security in the testing industry.

Today, as the recognized leader in the field, Caveon's offerings have expanded to encompass innovative solutions and technologies that provide comprehensive protection: Solutions designed to detect, deter, and even prevent test fraud. We are committed to integrity in testing. Period.



caveon®

801-208-0103

[alison.foster@caveon.com](mailto:alison.foster@caveon.com)

[www.caveon.com](http://www.caveon.com)

