



Preparation Doesn't Start on Game Day:

Program Design and Assessment Development
Processes that Enhance Security



SMART STARTS HERE

Security is all about preparation. . . .



Cheating Threats

Table 1. Categories of Cheating Threats

Cheating Threats	Description
Using Test Content Pre-knowledge	Test-taker obtains actual test questions prior to the test administration.
Receiving Expert Help While Taking the Test	Test-taker receives help from a teacher, proctor, or other source during the test.
Using Unauthorized Test Aids	Test-taker uses non-authorized aids during the exam, such as cheat-sheets, cell phones, headphones, programmable calculators, etc.
Using a Proxy Test Taker	Test-taker uses a professional proxy testing service or simply has a friend or colleague take the test.
Tampering with Answer Sheets or Test Results	Following the completion of test, a person tampers with answer sheets, changing incorrect answers to correct ones, hacks into the test scoring database in order to raise test scores, or forges score reports with inaccurate (higher) score information.
Copying Answers from Another Test-taker	Test-taker copies answers provided by another during the test.

Test Theft Threats

Table 2. Categories of Test Theft Threats

Test Theft Threats	Description
Stealing Actual Test Files or Booklets	At particular stages of test distribution when digital test files are stored on a server at a test site or test booklets are physically stored on location, test content is most vulnerable to theft. Poor access controls allow unauthorized individuals to capture entire test content along with answers.
Stealing Questions in Test through Digital Photography or Copying Devices	Test questions are captured as they are displayed during a test. The test-taker uses a hidden or otherwise undetectable high-resolution digital camera or other copying devices (e.g., pens that scan).
Stealing Questions by Recording Test Content Electronically	For technology-based tests only, the entire test session (including all test questions) is captured with an automated procedure by using a recording system connected to one of the computer's output ports.
Memorizing Test Content	Test-taker memorizes questions to be recalled at a later time. As part of an organized effort, this kind of theft is termed "harvesting."
Transcribing Questions Verbally	Test-taker uses oral or written recordings of test item content during the exam. This may involve audio recording devices, text recording devices (e.g., cell phones, or notepads/scratch paper). Test-taker uses two-way radios or cell phones to capture and transmit the content of the questions.
Obtain Test Material from Program Insider	An employee or contractor of a testing program gains unauthorized access to test content and distributes it without permission.

SCANTRON®

Categories of Consideration: Design

SMART STARTS HERE

Categories of Consideration (Design)

- *Linear Fixed-Form (Alternate Forms)*
- *Bank-Based Testing*
 - *Linear On-the-Fly Testing*
 - *Computer Adaptive Testing*



Linear Fixed-Form (Alternative Forms)

Characteristics That Increase Security

- Lack of predictability of administered exam form enhances security
- Decreases ability try to compare answers following the exam administration
- Reduces item exposure on examination re-takes

Business Considerations

- Requires less investment than bank-based exams
- Can be administered across both paper and CBT modes
- Less secure than designs that provide for controls on item exposure and thorough utilization of items in a large bank
- Regular replacement of forms is required to reduce item exposure

Linear-on-the-Fly Testing (LOFT)

Characteristics That Increase Security

- Item exposure is more broadly spread across a larger group of items
- Item shelf-life increases as exposure of each item is reduced
- Reduced likelihood for test-takers to memorize items that will be useful or impactful to them other test-takers in future administrations

Business Considerations

- Increased shelf life provides an increased ROI per item
- Requires a larger item pool than a linear fixed form model.
 - Typically suggested that a LOFT pool be, at a minimum, 10 times larger than the number of items delivered per form.

Linear-on-the-Fly Testing (LOFT)

Business Considerations (continued)

- Large item banks have cost implications
- LOFT is a more psychometrically complex design to implement, manage, and oversee
- Ensuring design is properly functioning in delivery system is more complex
- Verifying technical details is more complex and requires different staffing and longer development and implementation
 - Content balancing
 - Item selection
 - Item exposure controls
 - Scoring

Computer Adaptive Testing (CAT)

Characteristics That Increase Security

- Greatly reduces item exposure as test-takers typically receive different and fewer items
- Balances items and selects equivalent items with decreased exposure

Business Considerations

- CAT is generally used with large assessment programs due to:
 - Robust item banks required
 - More complicated test drivers needed

SCANTRON®

Categories of Consideration: Delivery

SMART STARTS HERE

Categories of Consideration: Delivery

Delivery Mode

- Paper-Based
- Computer-Based
 - CBT Delivery (Server-Based)
 - CBT Delivery (Application-Based)
 - Internet-Based Testing
 - Brick-and-Mortar
 - Live Online Proctoring
 - Remote Proctoring

SCANTRON®

Categories of Consideration: Presentation (Randomization)

SMART STARTS HERE

Fixed Form Presentation (Randomization)

Randomization of Exam Categories Presented
(Multiple Exams Presented Within One Testing Session)



Randomization of Exam Sections Presented



Randomization of Items Presented
(Randomized *Within* Sections or *Across* Sections)



Randomization of Item Options Presented

Randomization (Security Pros and Cons)

Characteristics That Increase Security

- Increased randomization = increased unique experience per test taker
- Answer key order cannot be memorized independently from the content

Business Considerations

- Any time that items are presented in a differing order, there is potential for item order effects
- To date, however, random presentation of content (during the exam) generally does not seem to be excessively disruptive to a test-taker and/or to have any significant impact on the ability to demonstrate proficiency

SCANTRON®

Categories of Consideration: Development Targets

SMART STARTS HERE

Development Targets

Exam/Item Bank Ratio

- Exam Design (Form-Based, Bank-Based)
- Number of Items per Form/Test Event
- Administration Windows/On-Demand Testing
- Retake Policies
 - Number of allowed retakes
 - Duration required between retakes
- Item Retirement Policies

SCANTRON®

Categories of Consideration: Publication Schedules

SMART STARTS HERE

Publication Schedules/Administration Window

Exam Publication Schedules

- The number of times an item is seen has a direct impact on its ability to discriminate between qualified and non-qualified test-takers.
- Increasing publication of unique exam forms limits the likelihood that the test-taker see items in future administrations
- More frequent publication reduces the performance advantage that may be obtained with the use of inappropriate preparation materials or taking the exam multiple times.

SCANTRON®

Categories of Consideration: Candidate Policies

SMART STARTS HERE

Program Considerations

Retake Policies

- Number of retakes allowed
- Span of time required between retakes

Item Retirement/Exam Retirement Policies (Reuse Policies)

- Number of exposures prior to retirement
- Presentation rules in sequential administration windows

Release of Item Content

- Volume of item content released
- Timeframe for content release

SCANTRON®

How can you prepare before game
day?

SMART STARTS HERE

Game Day Checklist

- *Design*
- *Delivery*
- *Presentation*
- *Development Targets*
- *Publication Schedules*
- *Candidate Policies*

SCANTRON®

Questions?

SMART STARTS HERE