National College Testing Association
2014 Conference - Denver CO
Mining for Success

Current Developments and
Future Directions in Testing

Dr. Louis Woodruff
Bucks County Community College
Caveon Test Security
Presentation Topics

- Testing Markets
- Higher Ed and College Testing
- Psychometrics and Test Design
- Test Security and Data Forensics
- Technology and Test Delivery
- A Far Out Testing Future
- Q & A
Presentation Topics

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- Q & A
10,000 lb. Gorilla

55,000,000 CBTs

55,000,000 CBTs
Federally Mandated Assessments
Elementary and Secondary Schools

No Child Left Behind

Golden Goose

Financial Turkey
Federally Mandated Assessments
Elementary and Secondary Schools

The Common Core State Standards
California
Connecticut
Delaware
Idaho
Iowa
Kansas
Maine
Maryland
Michigan
Montana
New Hampshire
North Carolina
North Dakota
Oregon
Pennsylvania
South Carolina
South Dakota
Washington
West Virginia
Wisconsin
Wyoming
The Partnership for Assessment of Readiness for College and Careers
Common Core Assessment Timeline

- **SY 2010-11**: Launch and design phase
- **SY 2011-12**: Development begins
- **SY 2012-13**: First year pilot/field testing and related research and data
- **SY 2013-14**: Second year pilot/field testing and related research and data
- **SY 2014-15**: Full administration of Common Core assessments
- **Summer 2015**: Set achievement levels, including college-ready performance

**2014-2015 Full Administration of Common Core Assessments**
Disagreements Among States

Anti-Common-Core Movement

Legal Challenges

Readiness Concerns

Anti-Testing Movement

Political Pushback

Funding Issues

Fracturing of Consortia

Disagreements Among States
55 million CBT tests will launch

Multiple vendors will take the work

Testing programs will face serious technology and security challenges

Common Core Standards will not be used by all States

This will dilute its ability to serve as a national college admissions test

Its use as a placement tool will be negotiated in each State
Future CBT in U.S. Public Schools:

The loss of economies of scale from a nation-wide testing solution will leave State costs that are unsustainable.

A re-framed and re-named “common core” will be adopted.

States will accept commercial sponsorships to provide learning technology for every student.

Publishers will expand electronic curricula with embedded assessments, delivered through these networked devices.

These student learning devices will also be used to administer State assessments cost effectively, using off-line delivery models.
Testing Markets

Higher Ed and College Testing

Psychometrics and Test Design

Test Security and Data Forensics

Technology and Test Delivery

A Far Out Future
Higher Ed Funding as Predictors

Funding is up for On-Line Learning Programs

Funding is up for Remediation Programs

Funding is up for Workforce Development Programs

Funding is up for Dual Credit Programs (college credit / H.S.)

Funding is up for Industry Interface Programs

Opportunities above for College Testing Professionals?
Future Testing on Campus

• Most course examinations will be delivered on campus using student-owned electronic devices

• Campus administrators and faculty will become more aware of and more concerned with cheating

• Course level data forensics will become an expectation on most campuses

• The role of the testing office on campus will be altered as a result of these changes
Two Innovative Models
For Future Colleges
The Future College as a Validating Institution

“Content Commons” used as alternate learning sources (MOOCs, video modules, open courses, on-demand expertise and new social network space designs)

Prior Learning Assessment (PLA) Programs

Credit by Examination Programs

Badges/Digital-Credentials in place of seat time/credits

Opportunities above for College Testing Professionals?
If Higher Education Went to Shark Tank

For What Idea Might it Seek Funding?
The Future College as an Entrepreneurship Institution
The Future College as an Entrepreneurship Institution

Venture capital firms invest in the institution in return for an equity stake in new ventures launched by students and faculty.

The campus offers high-immersion work spaces, networking, mentorship and business plan development... individualized and self-paced.

Credential portfolios supporting student career paths replace traditional degrees.
Testing Markets

Higher Ed and CTPs

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A Far Out Future
Cognitive Diagnostic Modeling

Evaluate mental processes in addition to measuring knowledge
PSYCHOMETRICS

Latent Modeling

Study of unobservable groups for whom the test functions differently
PSYCHOMETRICS

Neuro-Psycho-Biology

Evaluating brain activity as part of the assessment design
Innovative Test Designs

**Examination Inoculation**

Weighing test and item design decisions against resultant quantified security risks

**Trojan Horse Design**

Planting compromised items, mis-keyed, within a test to reveal examinee pre-knowledge
Innovative Test Development

**Automated Item Generation**

Currently Template Based

Future Modeling of SME’s Work Data

**Social-Structured Test Development**

Adaptation of crowd sourcing techniques

Harvesting group generated test questions
Innovative Item Designs

Theft Resistant Items

- Resistant to Memorization
- Use of Simulations

Discrete Option Multiple Choice

- Regulates the presentation of answer options
- Prevents comparisons of answer choices
Testing Markets

Higher Ed and CTPs

Psychometrics and Test Design

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A Far Out Future
The Traditional Approaches to Cheating are Alive and Well
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The Traditional Approaches to Cheating are Alive and Well
A Well Intended but Insufficient Solution
New Technologies Offer New Cheating Opportunities
Smallest invisible spy cheating device in the world

Best offer on eBay

stores.ebay.com/storebg

iCheat

Fast shipping worldwide

bg store
Invisible Spy Earpiece HD Camera

- Neck-loop
- HD Camera & Mic
- USB Cable
- Invisible Earpieces
- Navigation Buttons

Preorder Now!
This thin neckloop placed over your neck sends an electromagnetic field to the smallest earpieces placed into your ear.

The electromagnetic field forces the small magnets to vibrate. Human brain accepts this motion like a sound. This sound is lower than usual sound from normal headset but is enough for cheating on exams, for example.
Soon: a Micro-Camera on a Contact Lens
Student Cheating
Is Not Necessarily
Our Greatest Risk
We have created...

The Perfect
Test Security
Storm
Mandated assessments tied to federal funding

Schools and teachers evaluated on test scores

Teachers and principals feeling unjustly treated

Test security left in the hands of the teachers and the principals

The Perfect Test Security Storm
Los Angeles

6 charter school principals gave copies of state tests to teachers
Pennsylvania

60 schools with questionable scores on State tests

Cheating scandal under investigation in Philadelphia
DC schools

More than 100 schools implicated in cheating scandal
Texas

699 instances of cheating by principals and teachers
Atlanta

179 educators implicated in dishonest test practices

Superintendent under indictment and over 100 teachers face dismissal
Is There A Solution?

Correct social factors limiting learning readiness

Change local, state, federal power structures

Alter the current values toward education

Remove politics from all decision making

Provide unlimited funding to schools
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Is There A Solution?

Catch Them - - - - - Stop Them

Data Forensics
Data Forensics Debate

The Basian Probability Approach

Identify the probability that cheating happened and the perpetrator(s) probable identity

The Frequentist/Empirical Approach

Identify anomalous events or patterns in test data to determine if a particular score cannot be validated and therefore needs to be canceled
Data Forensics

Test data analysis for indications of security anomalies

Analysis of:

- Score Anomalies
- Response Patterns
- Erasure Irregularities
- Sub-Group Statistics
- Time Allocation Anomalies
- Odd Score Gains or Losses
- Testing Location Anomalies
- Regional Score Variances
Data Forensics

- Was the test compromised? When? Where?
- Was there copying? By Whom?
- Was there evidence of pre-knowledge?
- Which items and to what degree?
- Were test questions being memorized?
- Were answers changed after the test?
- Was there possible impersonation?
Leading Edge DF

Imbedded Verification Models

Populating a test within a test to reveal security anomalies by analyzing examinees’ behaviors and performance. (i.e. item pre-knowledge)

Chamaeleon Items

Disguising items suspected of compromise to lead the perpetrators to answer them incorrectly, thereby revealing themselves and devaluing their brain dump content.
Near Future DF:  **Real-Time Data Analyses**

Identifying anomalous data patterns during testing, either locally or across a network, with real-time proctoring or test delivery response options

Far Future DF:  **Cognitive Diagnostics**

Identifying anomalous variances between an examinees’ measured mental processes and their response behaviors patterns
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A Far Out Future
Students Today: Technology R’ Us
Large Scale P&P Testing Continues
Large Scale Off-Line CBT on Student-Owned Laptops is Growing
Large Scale Off-Line CBT on Student-Owned Laptops is Growing
There is much talk about tests on smart phones

The challenge is not delivering tests on phones

Testing apps abound for smart phones

The challenge is securing the phone for testing
Remote Proctoring Today

- Remote Computer Lock Down
- 360 Degree Monitoring Camera
- Audio Monitoring
- Real Time On-Line Observation
- Recorded Test Sessions
- Biometric ID Confirmation
- Real Time ID Authentication
  - Keystroke Biometric
  - Digital Facial Monitoring
Remote Proctoring Standards

- The physical environment
- Delivery system parameters
- Video and audio monitoring
- Proctoring standards
- Interface with examinee
- Recording requirements
- ID authentication
- Biometric monitoring

Currently under review by the International Standards Organization (ISO)
Future Remote Proctoring

Remote proctoring performed by robots.
Future Test Delivery Technology

Project the interactive test on any surface
Future Test Delivery Technology

Project the test on an eyepiece display
Two Innovative Technologies
Still in Search of a Market
Smart Paper

Immediate Answer Sheet Scoring!
Smart Clothes

Computerized “Test Coat” for electronic test monitoring!
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A Far Out Testing Future
Future Device Implants

Taking a test on the palm of your hand
Hand Projection Prototype

testing at the tips of your fingers
Future Projection Technology

Will future exams be delivered as projected images?
An Over the Top Prediction!

With future testing delivered in non-traditional locations, on many different devices, incorporating multiple media, how do we achieve the standardization necessary to produce valid scores?

In the distant future, standardization will be achieved through the management of examinees’ perceptions during testing.
An Over the Top Prediction!

brain mapping    psycho-pharmacology
An Over the Top Prediction!

Future **brain mapping** and **psycho-pharmacology** will enable the selected modifications of the brain’s perceptions to achieve absolute virtual standardization - from the inside out?

Virtual testing environments will be transmitted, integrated with the test. Standardization will be achieved as an altered state of consciousness!
How about a more reasonable future testing prediction?
Imagine Combining . . .

Device Based Test Delivery    (work already underway)

Wireless Remote Proctoring    (capability coming soon)

Continuous Biometric Identification    (a can do)

Projected Secure Personal Testing Space
   (a.k.a. “cone of silence” - prototype now available)
Someday we could see

Any Test . . .

Any Time . . .

Any Place . . .
A Resource for the Future
Current Developments and Future Directions in Testing

Dr. Louis Woodruff
Bucks County Community College
Caveon Test Security

woodruff@bucks.edu
lou.woodruff@caveon.com
609-947-4040