FLIP Roadmap Sessions

Mark Molenaar – Chief Technology Officer
Patrick Plichart – VP Software Engineering
Agenda

• Part 1: Platform functionalities + Introduction
  - Monday 15:30 – 17:00
• Part 2: Broad issues + GDPR
  - Tuesday 9:00 – 11:00
• Part 3: Technology enhanced items + Content Sharing
  - Tuesday 11:00 – 12:30
• Questions/Comments?
  - Any time!
Goals

**FLIP**
- Share knowledge & experience
- Share technology/costs
- Share content

**OAT/TAO**
- Share OAT Vision & TAO Product Strategy
- Receive feedback & additional requirements
- Define next steps for Roadmap
Technology Is Transforming Education In a BIG Way

From one-size-fits-all... To: Personalized Learning
TAO Roadmap

Enable and/or Provide Learner Analytics, Reporting, etc.

Capture Learning Dataflow

Master Assessment

2017  2019  2021

TAO as EdTech Platform Infrastructure
The Next Generation Digital Learning Environment (NGDLE)

“A learning environment consisting of learning tools and components that adhere to common standards.”

Source: http://www.ngdle.org

The Next Generation Digital Learning Environment
A Report on Research

Malcolm Brown, EDUCAUSE Learning Initiative
Joanne Dehoney, EDUCAUSE
Nancy Millichap, Next Generation Learning Challenges

ELI Paper
April 2015

Abstract
In partnership with the Bill & Melinda Gates Foundation, EDUCAUSE explored the gaps between current learning management tools and a digital learning environment that could meet the changing needs of higher education. Consultations with more than 70 community thought leaders brought into relief the contours of a next generation digital learning environment (NGDLE). Its principal functional domains are interoperability; personalization; analytics, advising, and learning assessment; collaboration; and accessibility and universal design. Since no single application can deliver in all those domains, we recommend a “Lego” approach to realizing the NGDLE, where NGDLE-conforming components are built that allow individuals and institutions the opportunity to construct learning environments tailored to their requirements and goals.

Source: http://www.ngdle.org
NGDLE Modules

- Itembanking
- Authoring
- Delivery
- On-site Proctoring
- Scoring & Marking
- Analysis & Reporting
- Learning Record Store*

External/Partners

- Administration
- Learning Environment
- Educational Apps
- Learning Analytics Engine
- Remote Proctoring
- Advanced Manual Scoring

* Potential licensed components
FLIP Requirements List

- 1. offline capability
  - 1.1 item caching
  - 1.2 local server support
  - 1.3 offline device
- 2. math tools
  - 2.1 geogebra item types (PCI)
  - 2.2 geogebra student tools (e.g. calculator)
- 3. online marking
  - 3.1 marking item response
  - 3.2 marking logistics
  - 3.3 external marking integration (API)
- 4. reporting tools
  - 4.1 external reporting tool integration
- 5. content sharing
  - 5.1 shared item banks
  - 5.2 shared plugins and extensions
- 6. accessibility
  - 6.1 dyslexia font support
- 7. item banking UX
  - 7.1 improved test assembly
  - 7.2 UX for staged adaptive
  - 7.3 improved item workflow
  - 7.4 simplified interface for teachers
- 8. PCI/student tools
  - 8.1 computational thinking
  - 8.2 scratch pad student tool
  - 8.3 chat simulator
Part 1: Platform functionalities

Authoring, item banking, scoring, accessibility, adaptive testing, etc.
Topics

- Authoring & Itembanking (20 minutes)
- Accessibility (20 minutes)
- Adaptive Testing (20 minutes)
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Authoring & Itembanking: Current

• Basic Workflow
  - Resource workflow
  - Resource versioning
  - Data/functional access control

• Automated scoring
  - Partial credit item scoring
  - Test level category scoring & cut score definition

• Improved Test Assembly
  - Use of search filters
Authoring & Itembanking: Future

• Advanced Workflow
  - Assignments, notifications, dashboards
  - Extended data access control

• Integrated Analysis Tools
  - Classical, IRT, other?

• UX improvements
  - Improved search
  - Simplified interface for teachers?
Accessibility: Current

- Accommodations (+ demo)
  - Color contrast
  - Item Level Zoom
  - Magnifying Glass
  - Keyboard Control
  - Highlighter Tool
  - Additional Testing Time
  - Line Reader
  - Text-to-speech (+ Invalsi)
  - Scratchpad student tool (+ ACT)

- Item level features
  - Answer Eliminator
  - Answer/area Masking
  - Flash Cards (+ Invalsi)
Accessibility: Future

• QTI 3 + PNP
  - Remodeling of APIP features
    • Taking into account Personal Needs & Preferences (PNP)
  - Cards & Catalogs
  - Extended W3C ARIA support, e.g. screen readers, braille
• Dyslexia font
  - Optional: linked to PNP?
Adaptive Testing: Current

- Auto-navigation (+ Invalsi)
  - Guided test “on rails”
- Multistage testing (+ DEPP)
  - Predefined branching rules
- Item-by-item adaptive by using Standard on CAT (+ Cito)
  - Live IRT-based algorithm
IMS Standard on CAT

Workgroup established May 2016
Elsevier, Pearson, ACT, CITO, OAT, PCG, PARCC

Problem
- Delivery and Adaptive Engines implemented as proprietary integrations and are tightly coupled

Goal
- Improved interoperability and broader use of algorithms while protecting intellectual property

Solution
- Treat CAT engine as a “Black Box”
- Clearly describe interface that provides the greatest flexibility
- Define best practices
Adaptive Testing: Future

• Graphical User Interface for Staged adaptive (branching)
  - Currently operations
• Release of Standard on CAT
  - Public release: November 2018
  - Including IMS conformance testing & certification program
Part 2: Broad issues

Security, confidentiality, usability, data analytics, reporting, etc.
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Topics

• Offline & Apps (30 minutes)
• Online marking (30 minutes)
• Analytics & Reporting (15 minutes)
• Security & Privacy (15 minutes)
Offline & Apps: Current

• Item Caching
  - Precaching x items up front

• TAO Sync
  - Synchronize assignments, test-takers & deliveries (scoped)

• Local Server (+ IAVE demo)
  - Deployed by Virtual Machine
  - Dedicated hardware or USB
  - Scalability considerations

• App prototype (+ video)
  - Utilizing Apache Cordova
Offline & Apps: Future

• Offline support tools
  - Auto sync, updates
  - Operational Scalability challenges

• Release native Apps
  - Different mobile platforms
  - Integrate lockdown components?

• Mobile friendly GUI
  - Usability considerations
  - Responsive design
  - Mode effects?
Online Marking: Current

- Defining scoring rubrics during authoring
  - Traits ~ QTI outcomes
- Custom external integration
  - By use of QTI Results API, e.g. OSCAR
- IAVE marking solution
  - SCOI demo by Helder
Online Marking: Future

- External Integration by use of (IMS) open standards
  - IAVE, OSCAR, others?
- Re-using rubrics, traits across items
- Built-in TAO basic marking capabilities
  - Including basic workflow, which?
Analytics & Reporting: Current

• Results export
  - Comma Separated Values (CSV)
  - QTI Results Reporting

• Custom Client Solutions
  - Custom export formats
  - DEPP Portals (+ demo?)
Analytics & Reporting: Future

- Common test-taker reports
  - Which ones?
- Common item/test analysis reports
  - Which models?
- External tool integration
  - R packages (e.g. DEPP, Cito Dexter), SAS, SPSS, others?
Security & Privacy

• Thierry: end-user perspective?
• Impact of GDPR on solutions?
  - Hosting location
  - Personal data storage
• Identity web service (+ DEPP)
• Other solutions?
Part 3: Technology Enhanced Items

Portable custom interactions (PCI), 21st century skills
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Topics

• TEI/PCI Introduction (10 minutes)
• Math tools (30 minutes)
• Other student tools (30 minutes)
• Sharing Content (20 minutes)
TEI/PCI Introduction

Technology Enhanced Items (TEIs)

- “... are computer-delivered items that include specialized interactions for collecting response data. These include interactions and responses beyond traditional selected-response or constructed-response.”

- To enrich “traditional subjects” assessments
- To explore “new” competences (e.g. 21st CS)
- Considerations
  - More expensive to develop: use IMS PCI specification to allow for portability & sharing
  - Hard(er) to analyze?

Portable Custom Interaction (PCI)

- “… is a best practice on creating custom item types which go beyond the capabilities of QTI, retaining interoperability”

- PCI ~ item-type
  - Can be configured by parameters
  - Combined with other interactions

- One-off vs. Generic types
  - One-item type, e.g. very specific simulation
  - Generic type, e.g. Likert
Math Tools: Current

- Math Input PCI (Invalsi)
- Formula cheat sheet (Invalsi)
- PARCC PCI (+ demos)
- Geogebra integration prototype
- DEPP/Luxembourg Math PCI (+ demo Franck)
Math Tools: Future

- Geogebra integration by open standards
- Geogebra student tools
  - Scientific calculator
- Computer Algebra System (CAS) integration
Other Student Tools

- World Language Input Control (NYC)
- Computational Thinking
  - Programming tools, different age groups
- DEPP Science PCIs (+ demo Jean Philippe)
- Chat simulator (+ demo)
Sharing Content by Open Standards

**QTI + PCI**
- Tests
- Item banks
- Components
  - Adaptive engines
  - (Generic) PCIs
- Other content?

**LTI**
- Launch test deliveries
  - Launch proctoring separately
- Launch item preview
- Launch item authoring
Sharing Content: Future ("TAO Exchange")

- Sharing of content and systems that “work with TAO”
  - Data/Functional Access Control
- Itembanks
  - Items, tests
- Components/Building blocks
  - PCIs, Adaptive Engines
- Proven system integrations
  - Text-to-speech engines, (AI) scoring systems, reporting tools, etc.
- Other?
Thank You!

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