Evidence-Centered Design in Large Scale Science Assessment

Goals

1. Using ECD, identify points for streamlining assessment design, development, and delivery processes.
2. Extend design components and tools developed in the PADI project to leverage identified efficiencies (generativity, reusability, interoperability), through a design layer that interacts with existing development infrastructure.
3. Capture validity argument in representations and tools (e.g., design patterns, narrative structures).
4. Implement the ECD methodology in the context of an operational large-scale, state-level, high-stakes accountability testing program.
5. Evaluate the effectiveness of the ECD strategies and tools over multiple operational assessment cycles.

Opportunities and Constraints

- Operational, high-stakes accountability assessment within Minnesota standards and test specifications
- Innovative MCA item types: scenario-based, figural response, multimedia
- Must maintain MCA item types and "look and feel"

Student, Evidence, and Task Models

- In MCA-II, use overall proficiency in science operationally defined across benchmarks and test specifications
- Maximizing reusability of expression of automated scoring rules - reusable work product forms
- Explicit reusable data structures, stimulus and work product forms supported by narrative structures and design patterns

Storyboard Writer Training Workshop Activities

<table>
<thead>
<tr>
<th>Activity &amp; Time Allocated</th>
<th>Goal</th>
<th>Materials Provided to Writers</th>
<th>Activity Outcomes</th>
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</thead>
<tbody>
<tr>
<td>I 45-60 min</td>
<td>Decide on storyboard topic and what will be assessed by examining benchmarks, background information, DP overview, Focal KSAs, and Characteristic Features</td>
<td>Standard and benchmarks, First pass of horizontal view, Partial list of topics and related background information, and model rationalization Blank topic selection form(s)</td>
<td>Select topic(s) and rationalize, Determine Focal KSAs required and draw implications for what will be assessed, Completed topic selection form(s)</td>
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<tr>
<td>II 30-45 min</td>
<td>Select Narrative Structure and examine Characteristic Features for implications for storyboard arc</td>
<td>Table that links Focal KSAs and benchmark assignments, and implications for what will be assessed (project-produced), Vertical view DP: Model-Based Reasoning, First pass of horizontal view, Partial list of topics and related background information, and model rationalization Blank topic selection form(s)</td>
<td>Completed Narrative Structure form, Draw implications from the Characteristic Features about the storyboard structure</td>
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<tr>
<td>III 90 min</td>
<td>Drafting storyboard scenes and item ideas using Potential Observations and Work Products</td>
<td>Forms completed in Activities I and II, Vertical view DP: Model-Based Reasoning, Second pass of horizontal view, DP (Focal KSAs, Characteristic Features, Narrative Structures)</td>
<td>Draft storyboard scenes and item ideas form</td>
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<tr>
<td>IV 60 min</td>
<td>Fine-tune storyboard scenes and item ideas using Additional KSAs and Variable Features</td>
<td>Project-produced materials from Activities I - III, Third pass horizontal view (Focal KSAs, Additional KSAs, Variable Features)</td>
<td>Final storyboard scenes and item ideas form</td>
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Leverage Points

- During development of the PADI project, use ECD to identify opportunities for streamlining assessment design, development, and delivery processes.

Project Evaluation

- Goals
  - Focus/Evidence
  - Efficiency/Streamlining: Impact of ECD-based structures such as Design Patterns on development time and writing process
  - Validity: Use and impact of argument structure supports (e.g., Design Patterns)
  - Development of Human Capacity: Observations and surveys of storyboard and item writers and project team members
  - Dissemination: Presentations, reports, Web-based resources including Assessment Design Support Tools (e.g., Design Patterns)

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