Pragmatic Frameworks for iPad Project Assessment

Ruben R. Puente, Ph.D.
<table>
<thead>
<tr>
<th>Social</th>
<th>Mobility</th>
<th>Visualization</th>
<th>Storytelling</th>
<th>Gaming</th>
</tr>
</thead>
<tbody>
<tr>
<td>200,000 years</td>
<td>70,000 years</td>
<td>40,000 years</td>
<td>17,000 years</td>
<td>8,000 years</td>
</tr>
</tbody>
</table>

Surveying Seymour Papert’s Four Expectations

• **Expectation 1**: suitably designed formative/summative assessment rubrics will show improvement when compared to traditional instruction.

• **Expectation 2**: students will show more instances of work at progressively higher levels of Bloom’s Taxonomy.

• **Expectation 3**: student work will demonstrate more – and more varied – critical thinking cognitive skills, particularly in areas related to the examination of their own thinking processes.

• **Expectation 4**: student daily life will reflect the introduction of the technology. This includes (but is not limited to) directly observable aspects such as reduction in student attrition, increase in engagement with civic processes in their community, and engagement with communities beyond their own.
“Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited.”

Black and Wiliam: Defining Formative Assessment

## Bloom's Taxonomy: Cognitive Processes

<table>
<thead>
<tr>
<th>Anderson &amp; Krathwohl (2001)</th>
<th>Characteristic Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remember</strong></td>
<td>• Recalling memorized knowledge</td>
</tr>
<tr>
<td></td>
<td>• Recognizing correspondences between memorized knowledge and new material</td>
</tr>
<tr>
<td><strong>Understand</strong></td>
<td>• Paraphrasing materials</td>
</tr>
<tr>
<td></td>
<td>• Exemplifying concepts, principles</td>
</tr>
<tr>
<td></td>
<td>• Classifying items</td>
</tr>
<tr>
<td></td>
<td>• Summarizing materials</td>
</tr>
<tr>
<td></td>
<td>• Extrapolating principles</td>
</tr>
<tr>
<td></td>
<td>• Comparing items</td>
</tr>
<tr>
<td><strong>Apply</strong></td>
<td>• Applying a procedure to a familiar task</td>
</tr>
<tr>
<td></td>
<td>• Using a procedure to solve an unfamiliar, but typed task</td>
</tr>
<tr>
<td><strong>Analyze</strong></td>
<td>• Distinguishing relevant/irrelevant or important/unimportant portions of material</td>
</tr>
<tr>
<td></td>
<td>• Integrating heterogeneous elements into a structure</td>
</tr>
<tr>
<td></td>
<td>• Attributing intent in materials</td>
</tr>
<tr>
<td><strong>Evaluate</strong></td>
<td>• Testing for consistency, appropriateness, and effectiveness in principles and procedures</td>
</tr>
<tr>
<td></td>
<td>• Critiquing the consistency, appropriateness, and effectiveness of principles and procedures, basing the critique upon appropriate tests</td>
</tr>
<tr>
<td><strong>Create</strong></td>
<td>• Generating multiple hypotheses based on given criteria</td>
</tr>
<tr>
<td></td>
<td>• Designing a procedure to accomplish an untyped task</td>
</tr>
<tr>
<td></td>
<td>• Inventing a product to accomplish an untyped task</td>
</tr>
</tbody>
</table>

# Facione: Critical Thinking – Cognitive Skills and Subskills

<table>
<thead>
<tr>
<th>Skill</th>
<th>Subskills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation</td>
<td>Categorization</td>
</tr>
<tr>
<td></td>
<td>Decoding Significance</td>
</tr>
<tr>
<td></td>
<td>Clarifying Meaning</td>
</tr>
<tr>
<td>Analysis</td>
<td>Examining Ideas</td>
</tr>
<tr>
<td></td>
<td>Identifying Arguments</td>
</tr>
<tr>
<td></td>
<td>Analyzing Arguments</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Assessing Claims</td>
</tr>
<tr>
<td></td>
<td>Assessing Arguments</td>
</tr>
<tr>
<td>Inference</td>
<td>Querying Evidence</td>
</tr>
<tr>
<td></td>
<td>Conjecturing Alternatives</td>
</tr>
<tr>
<td></td>
<td>Drawing Conclusions</td>
</tr>
<tr>
<td>Explanation</td>
<td>Stating Results</td>
</tr>
<tr>
<td></td>
<td>Justifying Procedures</td>
</tr>
<tr>
<td></td>
<td>Presenting Arguments</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>Self-examination</td>
</tr>
<tr>
<td></td>
<td>Self-correction</td>
</tr>
</tbody>
</table>

### Wiliam: A Framework for Formative Assessment

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Clarifying learning intentions and criteria for success</td>
<td>Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding</td>
<td>Providing feedback that moves learners forward</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peer</th>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Understanding and sharing learning intentions and criteria for success</td>
<td>4</td>
<td>Activating students as instructional resources for one another</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learner</th>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Understanding learning intentions and criteria for success</td>
<td>5</td>
<td>Activating students as the owners of their own learning</td>
</tr>
</tbody>
</table>

Dylan Wiliam, *Embedded Formative Assessment*. Solution Tree (2011)
1. Clarifying, Sharing, and Understanding Learning Intentions and Criteria for Success

- Rubric Dichotomies:
  - Task-specific vs. generic rubrics
  - Product-focused vs. process-focused
  - Official vs. student-friendly Language

- Rubric Design:
  - Three key components in presenting learning intentions and success criteria to students:
    - WALT: we are learning to
    - WILF: what I'm looking for
    - TIB: this is because
  - Make explicit progressions within rubrics, and progressions across rubrics

- Students and Rubrics:
  - Have students look at samples of other students' work, then rank them by quality
  - Students become better at seeing issues in their own work by recognizing them in others’ work
  - Not a “somebody wins” exercise, but rather a quality exercise that engages students
  - Have students design test items, rubrics
2. Eliciting Evidence of Learners' Achievement in the (Extended) Classroom

- Asking questions in class:
  - Chosen to act as a discussion/thinking trigger
  - Should provide info for varying instruction on the fly and in the long term
- Examples:
  - ConcepTest
  - POE (Predict-Observe-Explain)
  - TPS (Think-Pair-Share)
  - Virtual Whiteboard
3. Providing Feedback that Moves Learners Forward

• The feedback process must provide a recipe for future action

• Feedback should:
  • Be more work for the recipient than the donor, i.e., not just right/wrong – make them think about what did not work
  • Be focused: less is more
  • Relate explicitly to goals/rubrics

• How:
  • Scores or praise alone do not provide this; comments do
  • Supplying minimal scaffolded responses (i.e., where the student got stuck) >> supplying a full response to the problem
    • This emphasizes the crucial role of the draft object and process
  • Oral feedback >> written feedback
    • Consider using recordings
  • Create (sometimes together with students) process rubrics that embody this scaffold
  • Provide time for students to use this feedback

• Minimize grading:
  • Avoid false stopping points
  • Avoid ratchet effect
4. Activating Students as Instructional Resources for One Another

- Two key elements:
  - Group goals
  - Individual accountability

- Effectiveness due to (in order of importance):
  - Personalization
  - Cognitive Elaboration
  - Motivation
  - Social Cohesion

- Reciprocal help only works when it takes the form of elaborated explanations:
  - Not simple answers or procedures
  - Looks to the upper levels of Bloom for both participants

- Reciprocal help is more effective (by a factor of up to 4) if the product being assessed is the result of the aggregate of individual contributions, rather than just one group product
5. Activating Students as Owners of their Own Learning

• Effective self-assessment is up to twice as effective as other-assessment

• Two key components:
  • Metacognition:
    • Metacognitive knowledge: know what you know
    • Metacognitive skills: what you can do
    • Metacognitive experience: what you know about your cognitive abilities
  • Motivation:
    • Traditionally viewed as a cause (intrinsic/extrinsic), but is better viewed as an outcome:
      • Flow (M. Csikszentmihalyi): the result of a match between capability and challenge
        • Students are motivated to reach goals that are specific, within reach, and offer some degree of challenge

• Three sources of info for students to decide what they will do:
  • Perceptions of the task and its context
  • Knowledge about the task and what it will take to be successful
  • Motivational beliefs

• The role of the draft process and object resurfaces as a crucial component here

• Important Tools:
  • Learning logs and journals
  • Learning portfolios
The past decade has seen developments on several fronts in the understanding of flow. In large part this has been due to longitudinal ESM (Experience Sampling Method) studies of adolescent and adult samples being collected for one week. A quasi-random schedule with data collection points occurring at random intervals during waking hours has been used as a repeated measure to examine the duration. A more traditional paper-and-pencil measure has been the most commonly used tool, as opportunities for action rela-
tionships to skills dropped off; and a region of minimal opportunities for action do not lead to flow, regardless of whether the actor experiences a balance between perceived challenge and skill. Much of TV viewing exemplifies the region of the deep flow experiences described in their daily lives, and have skills adequate to engage in those for a standardized set of everyday activities with the resolution of this phenomenological mapping. However, time in flow also reflects the range of challenges and/or intensity of this experience. The study of situated experience, including optimal experience. Full descriptions of the Experience Sampling Method (ESM) has been used as a repeated measure to study motivational states, providing a tool for building the questionnaire vary depending on the re-
tional state of sampled individuals. The interview and questionnaire approaches are limited to those for a standardized set of everyday activities with primary flow activities with dimensions for primary flow activities with the Jackson PRF. Adapted from Csikszentmihalyi (1975/2000): a model of the flow state.

Figure 7.1a The original model of the flow state.

Figure 7.1b The current model of the flow state.
Substitution
Tech acts as a direct tool substitute, with no functional change

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Modification
Tech allows for significant task redesign

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
Substitution
Tech acts as a direct tool substitute, with no functional change

Modification
Tech allows for significant task redesign

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
**Redefinition**
Tech allows for the creation of new tasks, previously inconceivable

**Modification**
Tech allows for significant task redesign

**Augmentation**
Tech acts as a direct tool substitute, with functional improvement

**Substitution**
Tech acts as a direct tool substitute, with no functional change
**Redefinition**
Tech allows for the creation of new tasks, previously inconceivable

**Modification**
Tech allows for significant task redesign

**Augmentation**
Tech acts as a direct tool substitute, with functional improvement

**Substitution**
Tech acts as a direct tool substitute, with no functional change
This work is licensed under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 License.