The Other Side: Are You Ready?

Ruben R. PuentePiedad, Ph.D.
Learning: Nuts and Bolts
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

Ruben R. Puenteedura, As We May Teach: Educational Technology, From Theory Into Practice. (2009)
<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>

• Zone of Proximal Development (ZPD):
  • Region between:
    • what a learner can accomplish independently (the Zone of Current Development, ZCD)
    • what they can accomplish with assistance from a “more knowledgeable other” (MKO)
  • “…what a child can do with assistance today she will be able to do by herself tomorrow.”

• This is an iterative process:
  • The ZCD and ZPD change over time;
  • Independent practice is required to close the loop.

Vygotsky on Play and Learning

“...play creates a zone of proximal development of the child. In play a child always behaves beyond his average age, above his daily behavior; in play it is as though he were a head taller than himself.”
Iconic

Enactive

Iconic

Symbolic

Constructionism

• Learning is a reconstruction, rather than a simple transmission of knowledge

• Learning is most effective when part of an activity the learner experiences as constructing a meaningful product

• The product need not be a simple physical object

Seymour Papert, A new opportunity for science education. NSF Grant Application. (1987)
The flow state is a complex experience that involves a balance between perceived challenge and skill. Csikszentmihalyi's original model includes three regions of experience, each characterized by different combinations of challenge and skill levels.

1. **Challenge Low, Skill Low**: This region is characterized by low challenge and skill levels. It is associated with boredom and disengagement.

2. **Challenge High, Skill Low**: This region is characterized by high challenge and low skill levels. It is associated with anxiety and stress.

3. **Challenge Low, Skill High**: This region is characterized by low challenge and high skill levels. It is associated with apathy and boredom.

4. **Challenge High, Skill High**: This region is characterized by high challenge and high skill levels. It is associated with optimal experience or flow.

Flow experiences are associated with a state of deep focus, concentration, and enjoyment of the activity. The flow state is typically measured on 10-point scales, and it is dynamic, with a person's rating of the flow state changing throughout a given activity.

Recent research has also explored the broader concept of autotelic personality, which encompasses individuals who engage in activities that are self-motivating and intrinsically rewarding. The flow concept is often used to describe such experiences, emphasizing the intrinsic motivation and enjoyment that individuals derive from engaging in activities that they find challenging and meaningful.
http://padlet.com/wall/bett14design
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.

S. Papert. *An Evaluative Study of Modern Technology in Education.* MIT Artificial Intelligence Laboratory Memo No. 371. (June, 1976)
“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

## Wiliam: A Framework for Formative Assessment

<table>
<thead>
<tr>
<th>Role</th>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
</tr>
</thead>
</table>
| Teacher| 1  
Clarifying learning intentions and criteria for success | 2  
Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding | 3  
Providing feedback that moves learners forward |
| Peer   | Understanding and sharing learning intentions and criteria for success | 4  
Activating students as instructional resources for one another | |
| Learner| Understanding learning intentions and criteria for success | 5  
Activating students as the owners of their own learning | |
# Bloom's Taxonomy: Cognitive Processes

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

### Facione: Critical Thinking – Cognitive Skills and Subskills

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

Where are we going?
The 2013 K12 Horizon Report

- Mobile Learning
  - Time-to-Adoption: One Year or Less
- Open Content
  - Time-to-Adoption: Two to Three Years
- 3D Printing
  - Time-to-Adoption: Four to Five Years
- Cloud Computing
- Learning Analytics
- Virtual and Remote Laboratories
The 2009 K12 Horizon Report

- **Collaborative Environments**
  - Time-to-Adoption: One Year or Less

- **Online Communication Tools**

- **Mobiles**
  - Time-to-Adoption: Two to Three Years

- **The Personal Web**
  - Time-to-Adoption: Four to Five Years

- **Cloud Computing**

- **Smart Objects**
The 2010 K12 Horizon Report

- Collaborative Environments: Time-to-Adoption: One Year or Less
- Cloud Computing
- Mobiles: Time-to-Adoption: Two to Three Years
- Game-Based Learning
- Flexible Displays: Time-to-Adoption: Four to Five Years
- Augmented Reality
The 2011 K12 Horizon Report

- **Mobiles**: Time-to-Adoption: One Year or Less
- **Open Content**: Time-to-Adoption: Two to Three Years
- **Personal Learning Environments**: Time-to-Adoption: Four to Five Years
- **Cloud Computing**
- **Game-Based Learning**
- **Learning Analytics**
The 2012 K12 Horizon Report

- Mobile Devices and Apps: Time-to-Adoption: One Year or Less
- Personal Learning Environments: Time-to-Adoption: Two to Three Years
- Natural User Interfaces: Time-to-Adoption: Four to Five Years
- Tablet Computing
- Game-Based Learning
- Augmented Reality
The 2013 K12 Horizon Report

- **Mobile Learning**: Time-to-Adoption: One Year or Less
- **Open Content**: Time-to-Adoption: Two to Three Years
- **3D Printing**: Time-to-Adoption: Four to Five Years
- **Cloud Computing**
- **Learning Analytics**
- **Virtual and Remote Laboratories**