DEVELOPING REFLECTIVE CAPACITY

Using an AI Formative Assessment to Build Reflection in EiT
OVERVIEW

• How core concepts of developmental psychology have evolved

• Formative developmental assessment

• Zone of proximal development and skill development

• Design of application for EiT
JAMES MARK BALDWIN

- Father of human development as a field

- Introduced concepts such as:
  - Assimilation
  - Accommodation
  - Cognitive structures
  - Lines of development

- Major influence on Piaget and Vygotsky
JEAN PIAGET
JEAN PIAGET

• Genetic epistemology – Talking to kids about playing marbles

• Stages only as instruments of analysis

• Emphasis on cognitive processes
  • Equilibration
  • Reflective abstraction
  • Internalization
LAWRENCE KOHLBERG

- Application of Piaget to moral development

- National attention (in the US) and influence on schools, prisons, military and politics

- Research – influenced a generation of students
LAWRENCE E KOLBEBERG

- Stages defined by clear criteria:
  - Qualitatively different
  - Invariant sequence
  - Structured whole
  - Hierarchical integration

- Pre, Conventional and Post

- Methodology distinguishing structure from content
• Skill as an integrative concept

• Linked context (operant conditioning) with cognitive skills

• Dynamic variability of performance

• Learning is about building skills dynamically in contexts, with others

• Centrality of emotion in learning
<table>
<thead>
<tr>
<th>Tiers</th>
<th>Levels</th>
<th>Age of Emergence</th>
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<tbody>
<tr>
<td>Actions</td>
<td>Sm1. Single Actions</td>
<td>3–4 months</td>
</tr>
<tr>
<td></td>
<td>Sm2. Mappings</td>
<td>7–8 months</td>
</tr>
<tr>
<td></td>
<td>Sm3. Systems</td>
<td>11–13 months</td>
</tr>
<tr>
<td></td>
<td>Rp2. Mappings</td>
<td>3 1/2 – 4 1/2 years</td>
</tr>
<tr>
<td></td>
<td>Rp2. Systems</td>
<td>6–7 years</td>
</tr>
<tr>
<td></td>
<td>Rp4/Ab1. Single Abstractions</td>
<td>10–12 years</td>
</tr>
<tr>
<td></td>
<td>Ab2. Mappings</td>
<td>14–16 years</td>
</tr>
<tr>
<td></td>
<td>Ab3. Systems</td>
<td>18–20 years</td>
</tr>
<tr>
<td></td>
<td>Ab4. Principles</td>
<td>23–25 years</td>
</tr>
</tbody>
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Lectical Scale

12
11
10
9
8
7
6
5
4
3
• Common core metric

• Domain independent Lectical assessment system

• Aim to bring developmental, formative assessments into K-12 education
LECTICAL ASSESSMENT SYSTEM (LAS)

• Determination of
  • Explicit logical structure
  • Implicit conceptual structure

• In relation to hierarchical complexity of cognitive task demands
CLAS

- Artificial intelligence computer program for scoring Lectical assessments
- Free demo version of Lectical Reflective Judgment Assessment (LRJA)
- Application to EiT
EXPERTS IN TEAMS

• Group process report as 50% of grade

• Reflection as key skill for this

• Anecdotal evidence of difficulties for some students in understanding expectations about reflective activities
MAPPING THE GAP

- Invitation to students in three EiT villages and in RAD3700 to take LRJA demo. 26 participants.
- EiT Book of Reflections = 11.2

Distribution of scores:

- 10.2-10.5
- 10.5-10.7
- 10.7-10.9
- 11.0
- 11.2
- 11.3
CLOSING THE GAP

• Vygotsky’s zone of proximal development (ZDP, or “Goldilocks Zone”) and scaffolding

• Lectica’s Virtuous Cycles of Learning (VCoLS)

• Design of learning activities keyed to Lectical scores on LRJA demo