Pieces of Knowledge: Multimodal Emergence and Trajectory in Socio-Scientific Educational Debates
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ARGUMENTATIVE RESOURCES IN SOCIO-SCIENTIFIC EDUCATIONAL DEBATES

A great heterogeneity

- Appeal to students’ “system of mental representations and knowledge” (Beltrone & Legardez, 1995, système de représentations-connaissances)
- Subjectivity (e.g. Oulton, Dillon, Grace, 2004)
- socio-ethical beliefs + values + interests
- Controversy (e.g. Albe, 2009)

**PIECES of KNOWLEDGE-BELIEF** (Polo, 2014)

<table>
<thead>
<tr>
<th>Source(s)</th>
<th>Logical level</th>
<th>Degree of generality</th>
<th>Relation to target knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Own experience</td>
<td></td>
<td></td>
<td>Translatable?</td>
</tr>
<tr>
<td>2. Testimony</td>
<td></td>
<td></td>
<td>Favouring or disturbing acquisition?</td>
</tr>
<tr>
<td>3. School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Previous café steps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Family</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Media</td>
<td></td>
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</tr>
</tbody>
</table>

**HOW DO THE STUDENTS CO-CONSTRUCT AND REINVEST MICRO-UNITS OF KNOWLEDGE-BELIEF?**

- Temporal tracking (Transana)
- Spatio-communicative specificity
- Multimodal characterization (ELAN)

**ARE EMERGENCE AND TRAJECTORY FEATURES KNOWLEDGE-SPECIFIC?**

- Focus on units of different epistemic status
  - Knowledge piece specific to environmental education
  - Classical distinction between the cost and the price of a good or service, both school target knowledge in economics and part of daily life vocabulary.
  - Comparison of emergence multimodal features and spatio-temporal trajectory

**FIRST RESULTS FROM THE US CORPUS:**

Different spatio-temporal localizations associated with different scenarios of material environment exploitation

- Mostly consists of:
  - reading the slide or referring gesturally to the screen
  - using something to point
  - handling the clicker to display determination to select an option or emergency to get to a conclusion (positioning on/and interactional function).

**Exploitation of the material environment mostly occurs at the group level**

<table>
<thead>
<tr>
<th>Exploitation of the material environment mostly occurs at the group level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial group discussion for quiz elucidation (KQ)</td>
</tr>
<tr>
<td>Supporting meaning-making process (mostly referential functions)</td>
</tr>
</tbody>
</table>

**Different knowledge units associated with different gestural scenarios**

<table>
<thead>
<tr>
<th>“Virtual water”</th>
<th>Price / Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imitprecise gestures</td>
<td>- Less and smaller gestures</td>
</tr>
<tr>
<td>Referential function</td>
<td>- Diversity of functions</td>
</tr>
<tr>
<td>Little redundancy with speech</td>
<td>- More redundant with speech</td>
</tr>
<tr>
<td>Repetitions</td>
<td>- Reinvestment with other words or gestures</td>
</tr>
</tbody>
</table>

Exploitation of the material environment is not very sensitive to the knowledge content.

**PEDAGOGICAL SETTING:** the YouTalk Scientific Café

- **Participants:** 12-14 year-old students
- Specially trained student moderators: 15-17 year-old students
- **Schools:** 2 in Mexico, 1 in USA, 1 in France, 2 in Brazil

**MODERATORS’ TRAINING (1 day)**

To lead the YouTalk Scientific Café about Drafting Water Management in pairs

**YOUTALK - INTRODUCTION (10 min)**

- Game rules
- Main Question (MQ)
- First Individual Anonymouse Vote
- Introduction to the 3 thematic phases

**YOUTALK - THEMATIC PHASES (3 x 20 min)**

- **KQ (3)**
  - reading and group discussion
  - individual vote
  - answer and explanation
  - reading and group debate
  - group vote and class debate
  - individual vote and results displayed

- **OQ**

**YOUTALK - CONCLUSION (15 min)**

- Synthesis of class debates (3 OQ):
  - MQ
  - reading and group debate
  - group vote and class debate
  - individual vote and results displayed

**Notes:**

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- PhD in Education Sciences
- Post-Doc for the ASLAN LABEX

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