Pieces of Knowledge: Multimodal Emergence and Trajectory in Socio-Scientific Educational Debates
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**Pieced of Knowledge: Multimodal Emergence and Trajectory in Socio-Scientific Educational Debates.**

**ARGUMENTATIVE RESOURCES IN SOCIO-SCIENTIFIC EDUCATIONAL DEBATES**

<table>
<thead>
<tr>
<th>Interdisciplinarity</th>
<th>Subjectivity</th>
<th>Controversy</th>
</tr>
</thead>
<tbody>
<tr>
<td>science teaching (e. g. Driver, Newton, Osborne, 2000; Sadler &amp; Zeidler, 2005) + citizenship education (e. g. Legardez &amp; Simonneaux, 2006)</td>
<td>(e. g. Oulton, Dillon, Grace, 2004) socio-ethical beliefs + values + interests</td>
<td>(e. g. Albe, 2009)</td>
</tr>
</tbody>
</table>

> Appeal to students’ “system of mental representations and knowledge” (Bétonne & Legardez, 1995, système de représentations-connaissances)

**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 Anonymous Vote**
- **Introduction to the 3 thematic phases**

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

- **MQ (x3)**
  - reading and group discussion
  - individual vote
  - answer and explanation
- **OQ**
  - reading and group debate
  - group vote and class debate
  - individual vote and results displayed

**YOUTALK - CONCLUSION (15 min)**

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

**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 or/and interactional function)

<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>
</tbody>
</table>

**Supporting meaning-making process (mostly referential functions):**

- Appeal to authority and interactional functions

- Different knowledge units associated with different gestural scenarios

<table>
<thead>
<tr>
<th>“Virtual water”</th>
<th>Price / Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imprecise 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.

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

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

- **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**

**PÉCIES 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>9.</td>
<td>10.</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>
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<tr>
<td>4. Previous café steps</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5. Family</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Media</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

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