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

**Science teaching** (e.g. Driver, Newton, Osborne, 2000; Sadler & Zeidler, 2005)
+ Citizenship education (e.g. Legardez & Simonneaux, 2006)

**Subjectivity** (e.g. Oulton, Dillon, Grace, 2004)
socio-ethical beliefs + values + interests

**Controversy** (e.g. Albe, 2009)

argarate and knowledge (Belote & Legardez, 1995, système de représentations-connaissances)

**Pedagogical Setting:**

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 ‘Drought Water Management’

**YouTalk – Introduction (10 min)**

Game rules:
- Main Question (MQ)
- First Individual Anonymous Vote

**YouTalk – THEMATIC PHASES (3 x 20 min)**

OQ (15 min)
- Reading and group discussion
- Individual vote
- Answer and explanation
- Reading and group debate
- Group vote and class debate
- Individual vote and results displayed

QO (10 min)
- Class debate on an OQ
- Class explanation of correct answer
- Group discussion on quiz elucidation

**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

**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 one interactional function).

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

- Initial group discussion for quiz elucidation (KIQ)
- Supporting meaning-making process (mostly referential 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>Precise 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>

**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>Translable ?</td>
</tr>
<tr>
<td>2. Testimony</td>
<td></td>
<td></td>
<td>Favoutr or disturbing acquisition ?</td>
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<tr>
<td>3. School</td>
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<tr>
<td>4. Previous café steps</td>
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<td>5. Family</td>
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<td>6. Media</td>
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</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

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