Pieces of Knowledge: Multimodal Emergence and Trajectory in Socio-Scientific Educational Debates
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**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>
<th>Translatable?</th>
<th>Favoursing or disturbing acquisition?</th>
</tr>
</thead>
</table>

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

- **Temporal tracking (Transana)**
  - Training, YouTalk pedagogical sequence
- **Spatio-communicative specificity**
  - Group discussion on quiz elucidation
  - Class explanation of correct answer
  - Group debate about an opinion question (OQ)
  - Class debate on an OQ
  - Group and class debate about the MQ
- **Multimodal characterization (ELAN)**
  - Verbal lexical elements: gesture features (Kipp, Neff, Albrecht, 2006), use of material environment
  - Functions: relation to speech, "record" status
  - (Bavelas et al., 1992; Coletta et al., 2009; Golden-Meadow, 2003; Kendon, 2004; McNeill, 1992, 2000)

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

- **Focus on units of different epistemic status**
  - Knowledge piece specific to environmental education aiming at changing practices with new conceptions "Virtual water": water for the production of other goods
  - 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 or/and interactional function)

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

- Initial group discussion for quiz elucidation (KQ)
- Supporting meaning-making process (mostly referential functions)
- Reinvestment in group debate to select an answer (OQ)
- Appeal to authority and interactional functions

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

<table>
<thead>
<tr>
<th>&quot;Virtual water&quot;</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>Reorientations</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.