Pieces of Knowledge: Multimodal Emergence and Trajectory in Socio-Scientific Educational Debates
Claire Polo

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ARGUMENTATIVE RESOURCES IN SOCIO-SCIENTIFIC EDUCATIONAL DEBATES

A great heterogeneity

Interdisciplinarity
- science teaching (e.g. Driver, Newton, Osborne, 2000; Sadler & Zeidler, 2005)
- citizenship education (e.g. Legardez & Simonneau, 2006)

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

Controversy
- (e.g. Albe, 2009)

PEDAGOGICAL SETTING: the YouTalk Scientific Café

Participants
- 12-14 year-old students
- Specially trained student moderators

Schools
- 2 in Mexico, 1 in USA, 1 in France, 2 in Brazil

Moderators’ training (1 day)
- To lead the YouTalk Scientific Café about Drinking 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)
- 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
  - reading and group debate
  - group vote and class debate
  - individual vote and results displayed

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 or/and interactional function)

Exploitation of the material environment mostly occurs at the group level

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

Different knowledge units associated with different gestural scenarios

“Virtual water”

<table>
<thead>
<tr>
<th>Price / Cost</th>
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<tbody>
<tr>
<td>- Imprecise gestures</td>
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<tr>
<td>- Referential function</td>
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<tr>
<td>- Little redundancy with speech</td>
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<tr>
<td>- Reiterations</td>
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<tr>
<td>- Less and smaller gestures</td>
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<td>- Diversity of functions</td>
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<tr>
<td>- More redundant with speech</td>
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<tr>
<td>- Reinvestment with other words or gestures</td>
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Exploitation of the material environment is not very sensitive to the knowledge content.