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

An important heterogeneity

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

Subjectivity
- (e.g., Oulton, Dilton, Grace, 2004)
- socio-ethical beliefs and values

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

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 Drying Water Management
- In pairs

YOUTALK - INTRODUCTION (10 min)

- Game rules:
  - Multi Question (MQ)
  - First Individual Anonymously Vote
- Introduction to the 3 thematic phases

YOUTALK - THETMATIC PHASES (3 x 20 min)

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

OQ
- Group debate about an opinion question (OQ)
- Class debate on an OQ
- Group and class debate about the MQ

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

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