Pieces of Knowledge: Multimodal Emergence and Trajectory in Socio-Scientific Educational Debates
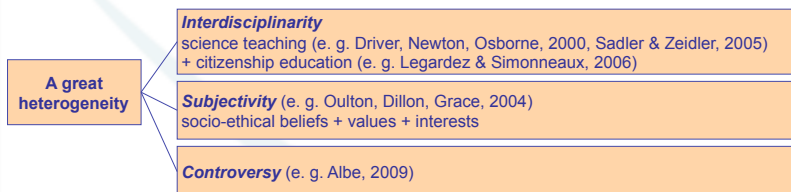
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UMR 5191 - CNRS / Université Lyon 2
Interactions, Corpus, Apprentissages, Représentations

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

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 & Simonneaux, 2006)

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

Controversy (e. g. Albe, 2009)

Polo, 2014

➢ **Appeal to students' "system of mental representations and knowledge"** (Beitone & Legardez, 1995, *système de représentations-connaissances*)
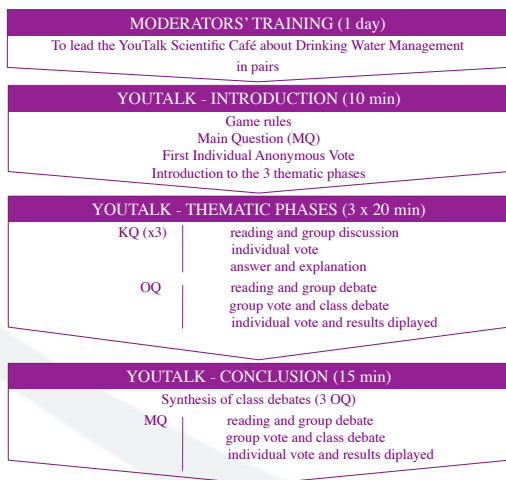
KNOWLEDGE-BELIEF

EMOTIONS

NORMS
values procedures
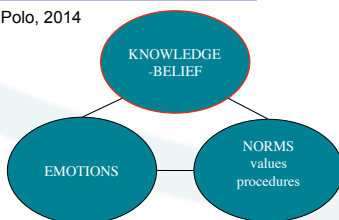
PIECES of KNOWLEDGE-BELIEF (Polo, 2014)

Source(s)	Logical level	Degree of generality	Relation to target knowledge
1. Own experience 2. Testimony 3. School 4. Previous *café* steps 5. Family 6. Media			Translable ? Favouring or disturbing acquisition ?

PEDAGOGICAL SETTING: the *YouTalk* Scientifiic Café

Participants: 12-14 year-old students

Specially trained student moderators): 15-17 year-old students

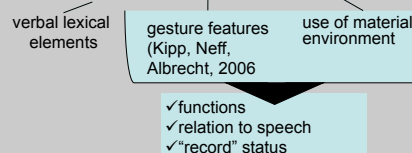Schools: 2 in Mexico, 1 in USA, 1 in France, 2 in Brazil

MODERATORS' TRAINING (1 day)
To lead the YouTalk Scientific Café about 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 (x3)   reading and group discussion
     individual vote
     answer and explanation
OQ   reading and group debate
     group vote and class debate
     individual vote and results diplayed

YOUTALK - CONCLUSION (15 min)

Synthesis of class debates (3 OQ)
MQ   reading and group debate
     group vote and class debate
     individual vote and results diplayed

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, Colletta et al., 2009, Goldin-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)	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"	Price / Cost

-Imprecise gestures
-Referential function
-Little redundancy with speech
  ➢Repetitions
	-Less and smaller gestures
	-Diversity of functions
	-More redundant with speech
	  ➢Reinvestment with other words or gestures

Exploitation of the material environment is not very sensitive to the knowledge content.	

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