

2012

Multi-modal meaning making: Implications for small group explanation in primary science

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Acknowledgements



This presentation draws from a larger collaborative international study involving Australian, Taiwanese and German partners (EQUALPRIME) conducted at the Edith Cowan Institute for Education Research and funded by the Australian Research Council.

In addition to the authors, Dr. Susan Hill, Barbara Bowra, and Barbara Sherriff contributed significantly to the technical and analytic components of this work

Research Questions

1. How do multi-modal opportunities to make meaning influence explanation in primary science classrooms?
2. In what ways are multi-modal scientific explanations justified in small group settings?

Methodology

- Video ethnographic Case study
 - A Year 4 classroom in Western Australian Independent Public School
 - Topic: Spinning in Space – 9 weeks taught by specialist teacher (Year 6)
- Multi-theoretic lens (Clarke, 2011)
 - Social constructivism (constructivist and social)
 - Semiotics (representation)
 - Enactivism (interaction)
 - Socio-cultural theory (cultural mediation)

Methodology contd.

❑ Data collected- Video and audio data (Student focus group)

- Videos of lesson sequence
- Written pre and post tests
- Post lesson debriefs (video)
- Samples of work
- Video-stimulated multi-modally facilitated interviews

❑ Analysis - Ethnographic microanalysis of video

- Software - (Studiocode)
- Viewed and identified video clips that showed students understanding of how day and night are caused
- Identifying modes used to communicate meaning and how they helped the explanation to develop
- Documented moments when explanation was agreed upon and how.

Problem

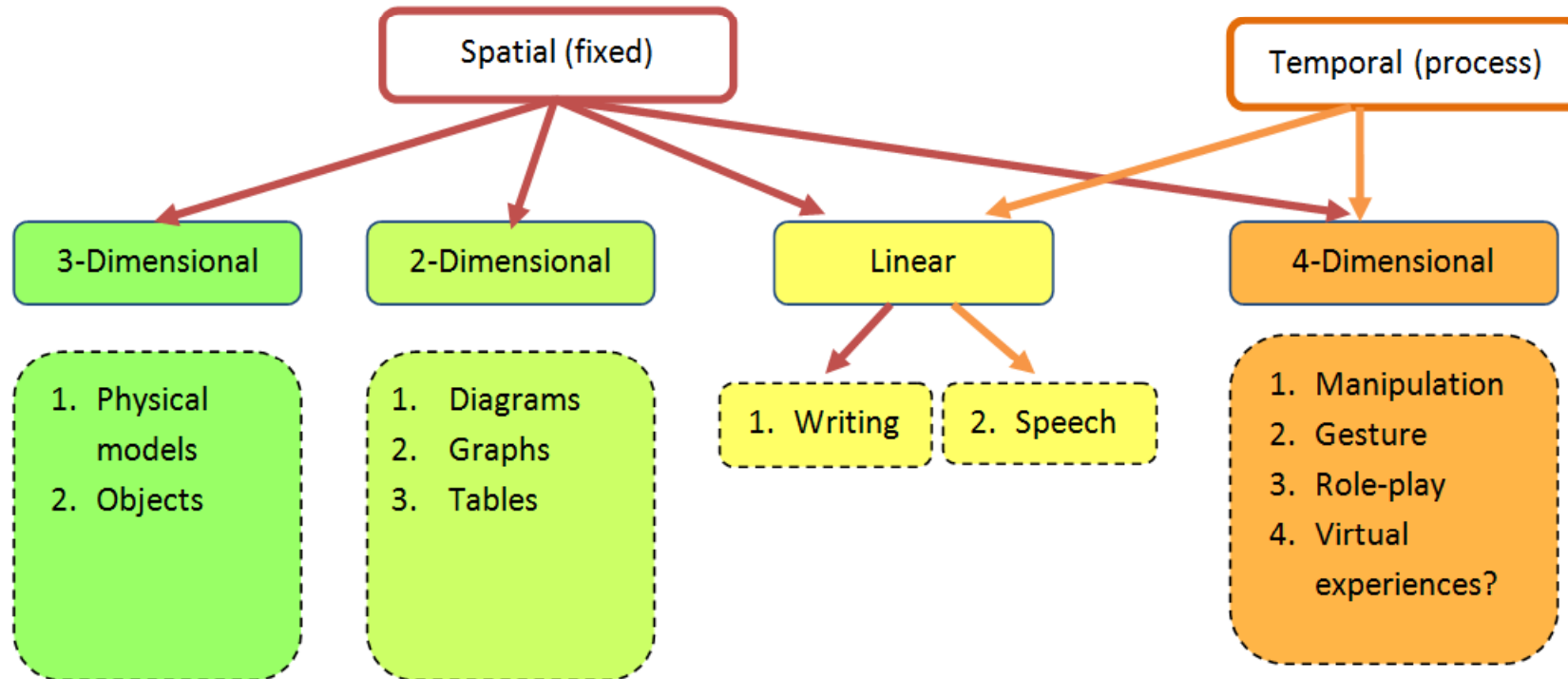
- How do students explain the process by which night and day are caused?
- [Explanations are] built from observations and evidence gathered in finding [causal] answers to the questions we ask

(Acara, 2011)



I-DIDI, (2012)

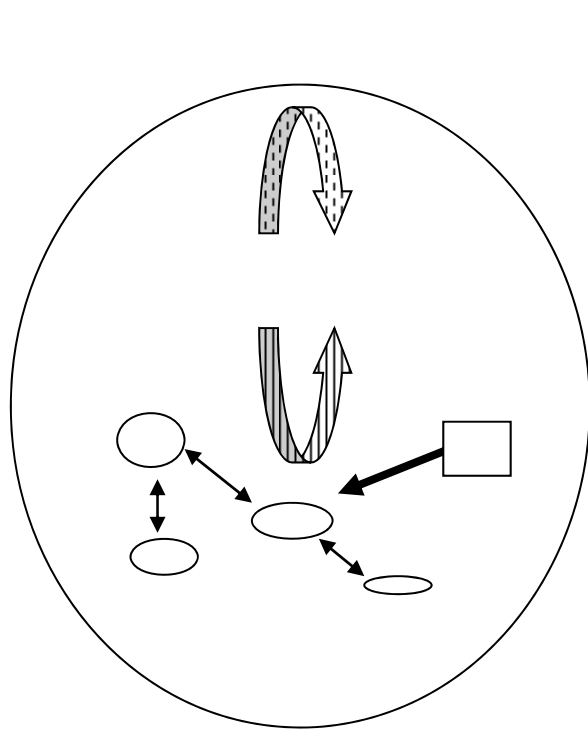
Semiotic Affordances



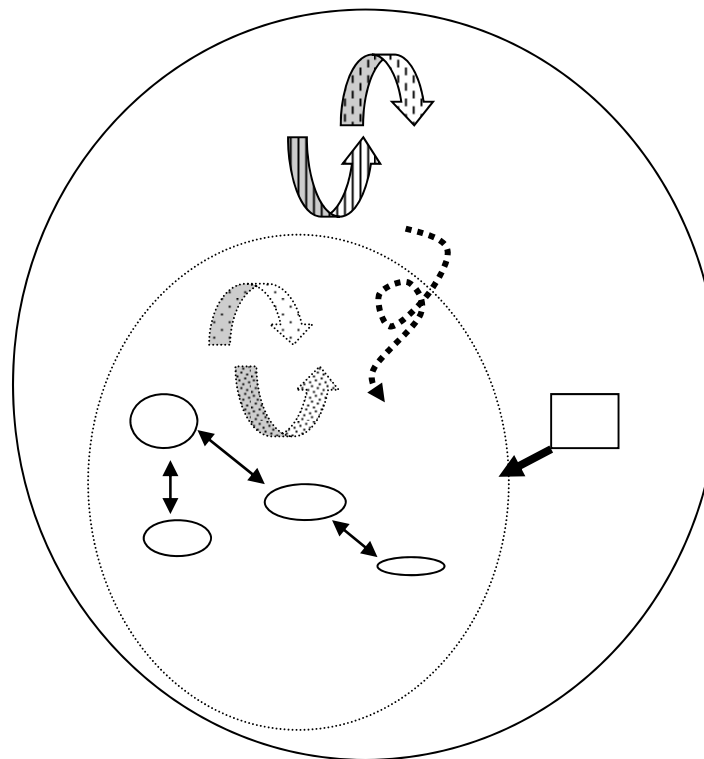
Constructing explanation

Turn	Time	Speaker	Verbal Transcription	Semiotic Resources	Analytic commentary
008	00:00:16.25	C	So.. the sun (gesture- emphasis of position) would be on this side (intonation and gaze to Kane-questioning)	Gesture Intonation Gaze	Seeking confirmation to locate position of sun
009	00:00:20.24	B	Yep (Chelsea starts to draw the sun)	Drawing	Agreement – relative position of sun
010	00:00:23.29	E	We need a big sun...		
011	00:00:24.13	B	The sun is...(Draws - Elisha reaches over and rubs out the sun)	Drawing	Emphasizing contestation
012	00:00:26.10	E	Bigger! (Draws - a bigger sun)	Drawing	Clarification – Size of sun
013	00:00:29.06	E	Yeah (Kane and Brady look on). And it looks like an oval.	Gaze	Agreement – Size of sun, noticing representational fit
014	00:00:31.29	K	Who cares? Its (unclear) look like the sun (Chelsea finishes drawing sun). Well. It doesn't have to look like a sun	Drawing	Clarification – Establishing relevance of shape of sun to emerging explanation

Validation-in-action



Small Group



Small Group within whole class

	Teacher
	Student
	Enabling
	Constraining
	Non-dialogic interaction
	Dialogic Interaction
	Boundary negotiation

Tentative Claims

1. The partial and semiotic distribution of modal affordances in multi-modal communication in small group settings suggests:

Multi-modal explanation is enacted

(Gordon Calvert, 2001)

2. Such explanation involves a less regulated, more dynamic, responsive, and non-reductive form of justification:

Validation-in-action

(Ibrahim-Didi, 2007)

Implications for practice

- Pedagogical implications:
 - ❖ How does the concept of validation-in action inform teaching?
 - Teacher awareness – for preparation

 - ❖ What can be done to ensure access to the often veiled instances of small group meaning making that may constrain as much as they enable?
 - Explicitly checking in on group discussions
 - Enabling group summaries to be made public
 - Using professional vision to 'notice' how groups explain
 - Set up ways to "fix" and mark the multi-modal developments in groups (technology)

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Questions?

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