Coordinating an account of argumentation across contexts: Everyday and scientific

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Talk overview

- Background of argumentation in different settings

- Analytic tools for examining argumentation

- Interpreting pilot data using these analytic tools

- Implications & future work

Argumentation in school science

- Goals of science education (AAAS, 1989, 1993; NRC, 1996, Osborne, et al., 2003)
  - Engage students with scientific ideas
  - Encourage scientific thinking
  - Illuminate the workings of the scientific enterprise

- Include argumentation in the science curriculum (e.g., Bell, 2004; Driver, Leach, Millar, & Scott, 1996; Kelly and Bazerman, 2003; Kuhn, 1992, 1993; Newton, Driver, & Osborne, 1999; Osborne, Erduran, & Simon, 2004; Sandoval, 2003)

Argumentation in science

- Core epistemic practice (Bell, 2004; Duschl and Grandy, 2004; Kelly and Bazerman, 2003; Toulmin, Rieke, and Janik, 1984)

- Two types of scientific argumentation (Toulmin, Rieke, and Janik, 1984)
  - Regular scientific arguments (products of science)
    e.g., "Goiter is caused by a lack of iodine in the diet" (p. 333)

  - Critical scientific arguments (processes of science)
    e.g., peer review

Argumentation in young people's everyday lives

- Young people are surrounded by argumentation in the various setting of their lives and are expert at producing it (Kyratzis, 2004)

- Young people use argumentation to:
  – explore and hone their language capabilities (Goodwin and Goodwin, 1987)
  – practice theory building (Ochs, Taylor, Rudolph, and Smith, 1992)
  – signify status within and allegiance to their peer groups (Corsaro, 2003)
  – construct identities, create friendships, and create, maintain, and modify the social workings of their groups (Corsaro and Maynard, 1996)

Examining everyday and scientific argumentation

- Better understand argumentation activity in its own right
- Inform school science argumentation

- Young people come to their science classes very familiar with the practice of argumentation.

- How are young people's everyday argumentation and scientists' argumentation (both formal and informal) related?

What analysis tools appear useful for generating a coordinated account of argumentation?

Analysis tools – Toulmin's framework

- Toulmin's framework provides a structural tool for analyzing argumentation. It is used to identify and describe "the strengths and weaknesses of arguments" (Toulmin, Rieke, and Janik, 1984, p. 25)

- Toulmin's framework is sometimes difficult to use when analyzing everyday argumentation (Driver, Newton, and Osborne, 2000; Simosi, 2003)

Data → So (probably)   Conclusion

since   unless

Warrant   Rebuttal

because

Backing
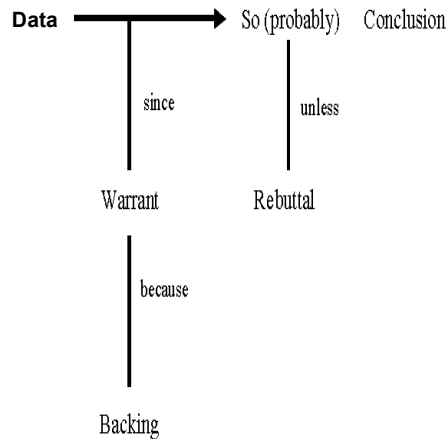
Kenneth Burke's pentad

- Analyzing human activity and motive through the use of a five part theater metaphor (Burke, 1969)

  - **Act** → Argumentation
  - **Scene** → Where is argumentation taking place?
  - **Agent** → Who is doing the arguing?
  - **Agency** → How is the argumentation enacted?
  - **Purpose** → Why is the argumentation enacted?

- Allows for a socio-cultural view of argumentation (Vygotsky, 1978)

Scenes and agents

Skateboard Park	Science Center	On-Line Forum
	 Photo from "The Bug Picnic" Exhibit at the Pacific Science Center. Used with permission.	
Teen Boys	Families and Kids	Teens

Data for pilot study collected through observations and recorded using field notes

Argumentation at a skateboard park

<u>Agency</u>: Skateboarder's tricks (e.g., "Lead with the Tail")

- Semiotics (Lemke, 1998)
  - Game of SKAT
  - "You've got to earn it."

<u>Purpose</u>: Signify status within and allegiance to this peer group

Argumentation at a science center

"**Eating insects makes good sense**. Insects are a good source of protein and many other nutrients. They're also more efficient to raise than many other food animals…People don't eat insects because they **have** to. People eat insects because they **like** them."
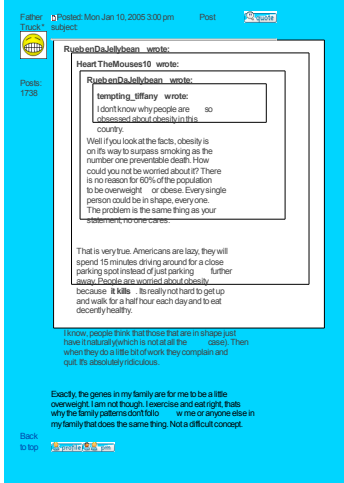
"I'm going to barf!" "Ewww!"

Agency: Semiotics (e.g., text, bugs)

Purpose: Critique and defend cultural models (Gee, 1999)

Photos from "The Bug Picnic" Exhibit at the Pacific Science Center. Used with permission.

Argumentation on-line

"**Ok girls stop lying…it's time to tell the truth.**"

Agency:

• Text-grabbing feature

– Argumentation as a distributed activity (Cole and Engestrom, 1993; Hutchins, 1995)

• Semiotics (e.g., colors, pictures)

Purpose:

• Construct identities, create, maintain, and modify the social workings of the group

• Critiquing and defending cultural models

Women have to be thin

- Cultural model about which teens are arguing

Defending the Model	Critiquing the Model
"Fat girls are ugly, disgusting, sweaty slobs"	"Woo Hoo! Finally someone who stands up for the short chubby girls in this world! The reason I say that is because I am a short chubby girl. I am not overweight or obese either. I am 5 3 and weigh about 140. Like I said I am just short and chubby. I don't have a problem with my body because I am unique. So if I don't have a problem with my body why do other people?"
"Well if you look at the facts, obesity is on it's way to surpass smoking as the number one preventable death. How could you not be worried about it? There is no reason for 60% of the population to be overweight or obese."	

Implications: Coordinating accounts of argumentation across contexts

- Analysis of argumentation as a socio-cultural activity versus solely a rational or a structural one

- Isolated perspectives are not likely to provide adequate accounts of argumentation (cf., Wertsch, 1998). Coordinating perspectives enables us to understand the similarities and differences between argumentation types
  – Young people's everyday argumentation across contexts
  – Everyday and scientific argumentation

- Coordinated perspectives could strengthen argumentation design work by taking into account young people's funds of knowledge (Gonzalez, Moll, and Amanti, 2005), prior knowledge (Bransford, Brown, and Cocking, 2000) and epistemic resources (Hammer and Elby, 2000)

Questions for future work

- What are the emic perspectives of everyday and scientific argumentation?

- Are we able to design school science curricular and pedagogical interventions that attempt to leverage this coordinated account of everyday and scientific argumentation?

- Do young people code-switch (cf., Blom and Gumperz, 1972) between the languages of science (Lemke, 1998), the languages of school science, and the languages of everyday life?