

## Analyzing Student Discourse from an Epistemological Perspective – What Can We Learn?

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### Motivation for this Study

- Students respond differently to the same curricular materials, and epistemologies seem to play a role in this.
- Studying examples of student learning will help us understand this role and how to foster more productive epistemologies.

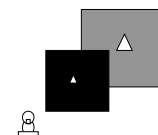
### Analysis

Analysis includes video data from tutorials and labs; problem-solving, essay, and tutorial homework; survey data; and interview data.

Students are often observed in the same groups doing different activities.

### Background for this Clip

Four Maryland students are working on a University of Washington Light and Shadow Tutorial.



Worksheet: “What do your observations suggest about the path taken by light from the bulb to the screen?”

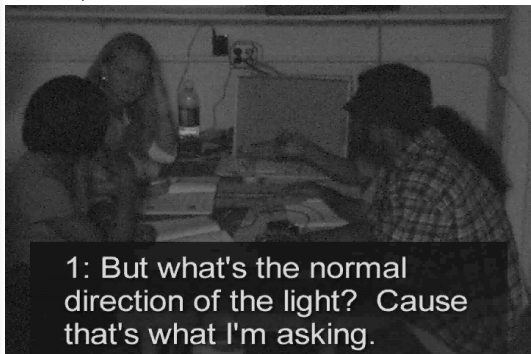
Student 3 (“Jan”): “So, does that mean the path is not a straight line?”

Discussion: Is the light “direct” or reflecting from the edges of the aperture?

[2 minutes into this part of the discussion.]

Pay special attention to students 2 and 3, “Veronica” and “Jan.”

Students	
2	3
1	4



1: But what's the normal direction of the light? Cause that's what I'm asking.

### What is happening in this clip?

They start in sense-making mode.

Building their model using everyday language;  
 Had been initiated by Jan

Jan: “So does that mean that the path is not a straight line? . . . Does that mean it's reflecting?”

Student 1: “Oh, that's a good point. I don't know.”

Veronica: “No, there's no mirror for it to reflect off.”

## What is happening in this clip?

### Jan's puzzling behavior

Jan: "So, it's kind of like polarized."

Veronica: "You're trying to make it more difficult."

### How to understand?

Conceptual difficulty?

"Trying to make it more difficult?"

## What is happening in this clip?

### Jan's epistemology

Jan tells us why she is behaving this way:

"Look, I see what you're saying, alright.

But, I'm just trying to make it like physics-, physics-oriented."

Veronica: "It is physics-oriented. That's just the way it is."

*For Jan, unlike Veronica, straightforward reasoning is not "physics-oriented"*

## Other Data

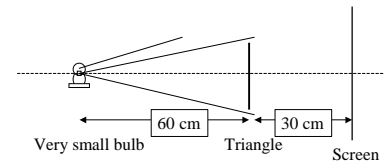
Tutorial Homework: quantitative and qualitative problems applying model.

Veronica performs very well on these problems.

Jan:

- Superficial application of the model.
- No calculations. Formalism not connected to qualitative model.
- Low confidence. ["maybe" and "I think"]

Predict the size and shape of the shadow that will be formed . . .



Sketch your predictions in the space at right.

***I don't know how else to think about it except for the rays from the light bulb.***

## What have we learned?

- Jan's difficulty in the tutorial was mainly epistemological, and that difficulty limited the benefit of her work on it.
- But Jan *did* have the resources to participate in that sense-making mode.
- An epistemological agenda for instruction: Help Jan associate those resources with physics, apply them to her learning, and become more proficient in their use.

For further discussion of this analysis, see Elby & Lising, Thursday