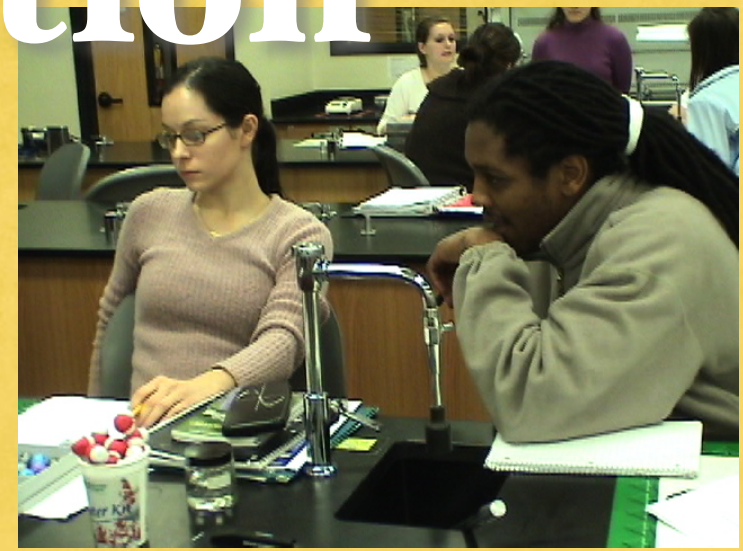
Representing Sodium Sulfate in Water

Dissociation

Cascadia Faculty Reflection



Faculty Reflections: What does it mean?

Cascadia Community College

Todd: It felt to me that they got into a model that none of them believed in, but they were all committed to, because that was what was sitting in front of them.

David: It also felt like the interpersonal dynamics played a huge part. Nathan was forceful and had a bunch of ideas. The others tended to go along, **"OK, I guess so. Yeah."**

Lesley: Did you notice Liz was cut off every single time? She never got to contribute to the group, and she was trying desperately to understand.

Lesley: I want to make clear, that at the end, their drawings were still not completely accurate. It is really interesting that it was left like that...

Lesley: ...recognizing this is the first quarter chemistry and you can't be expected to know all levels right away. I would like to discuss that idea: you can say that at some point, this is enough of a foundation. You are happy they are here and don 't need to be way up here.

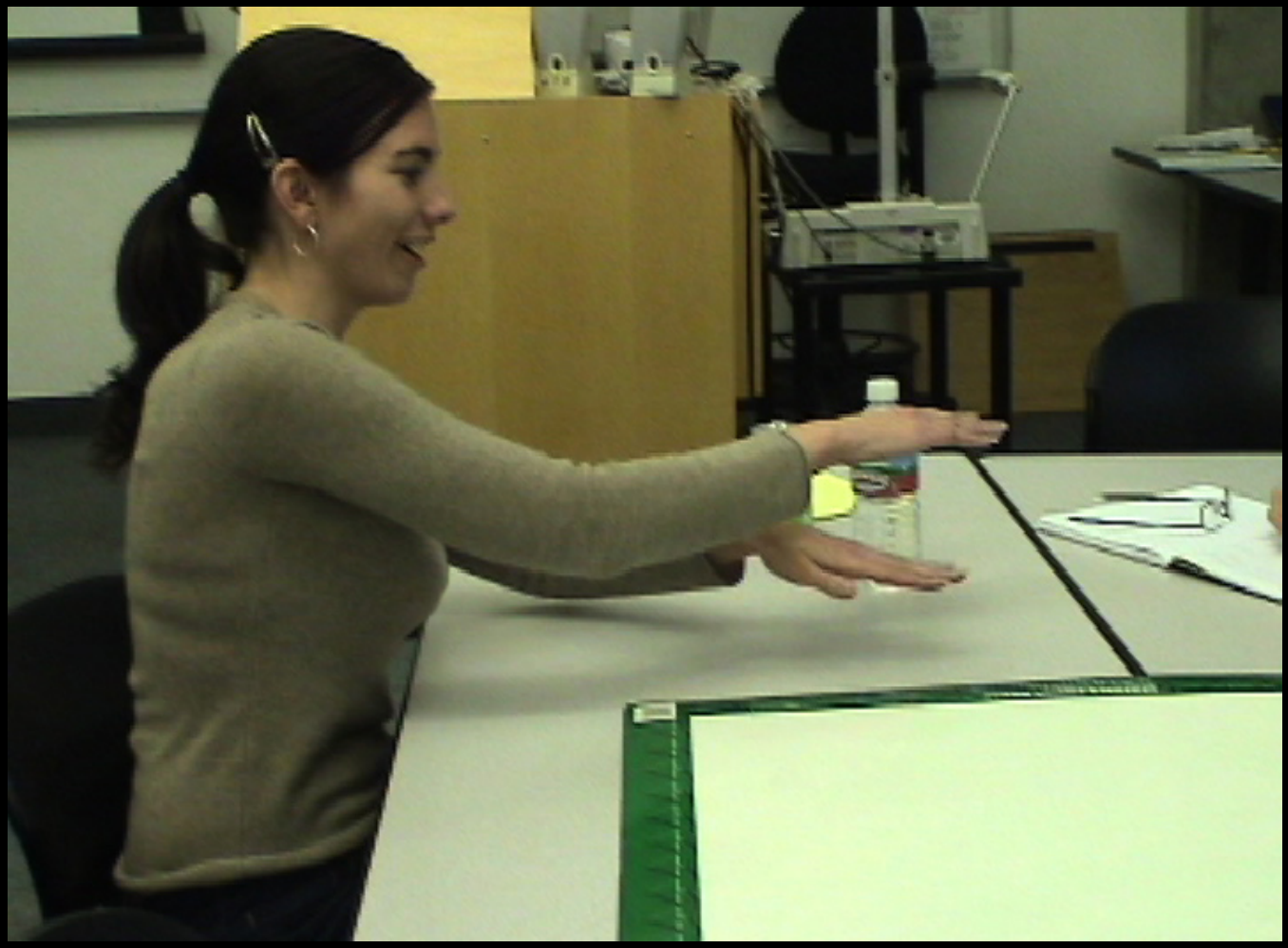
Julie: It looked to me like they were put in a position to be hungry to hear more and learn to go through the process. They grappled with questions that set them up to better learn about ions and ionic bonding.

Todd: It was interesting how much of their dialogue was about whether something was positive or negative. They had to keep asking each other, **"So this makes it positive, right?"** It seems to me that their model gets wrong at that point.

David: If you were the instructor in that class, would you want to say in the last ten minutes, **"OK. That's great, but here is what it is really supposed to be."** ?

Lesley: It looks like they had it about 85% right. William had started them on a pretty good path, but then they got really confused with mixing up different types of bonds...

Julie: They were throwing all these thoughts out. They were grappling with it.



Lesley: They were pulling things they had learned at some point and trying to build a model, but it's like building a house on sand. It was going here, then there's a limb, and there's a limb on that. They kept branching off without going back to the basics.

Lesley: It took the instructor to clarify — to jump in here — and that clarified all of these things that were wrong.

Todd: What was interesting to me was that no one said, "Wait a minute. I need to look at a book."

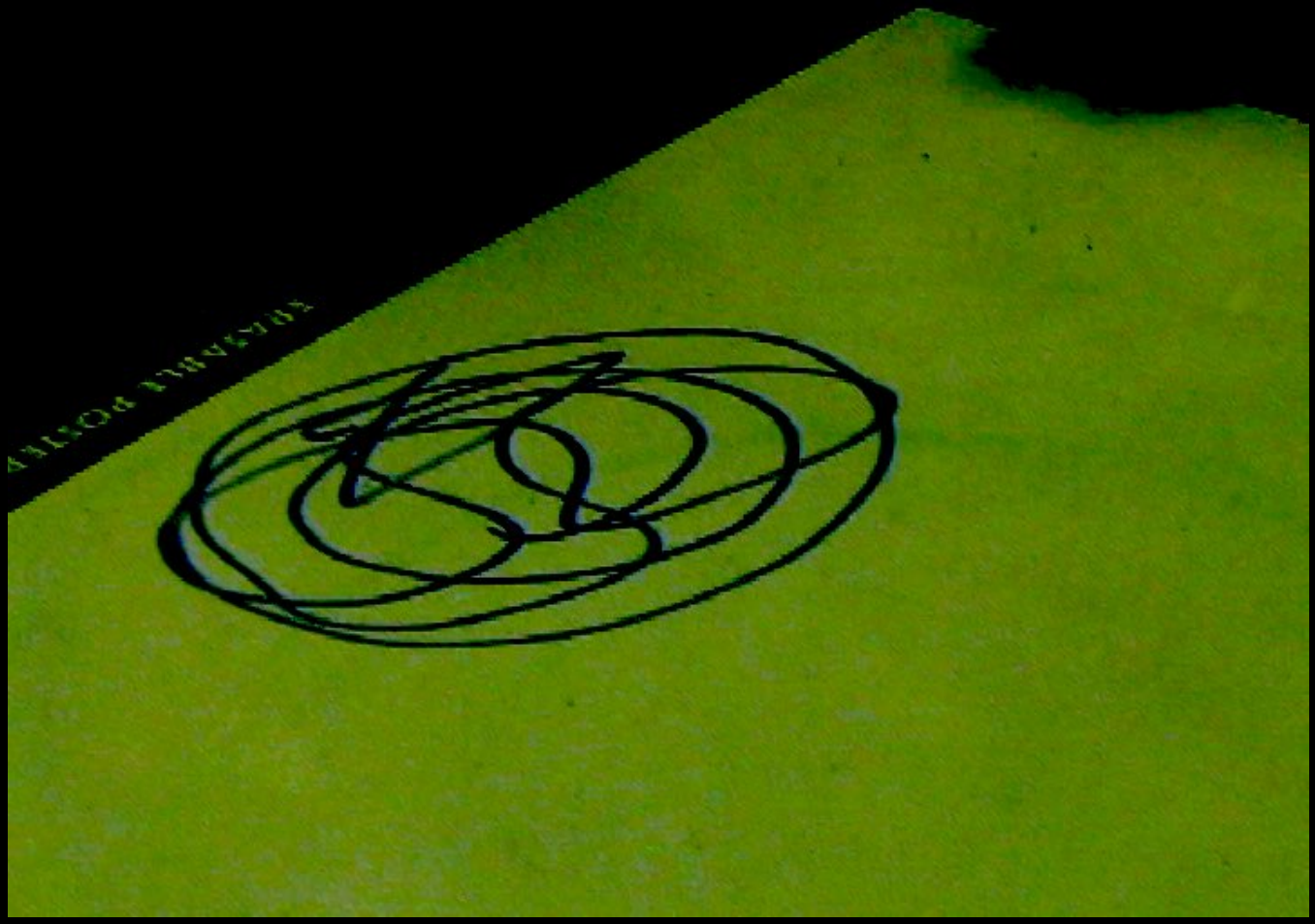
Laughter.

Todd: They continued to play with the models...

Lesley: Yeah, if we just stare at these models long enough, somebody who is really smart can tell us the answer.

Todd: I love your building idea. It is going on like this.

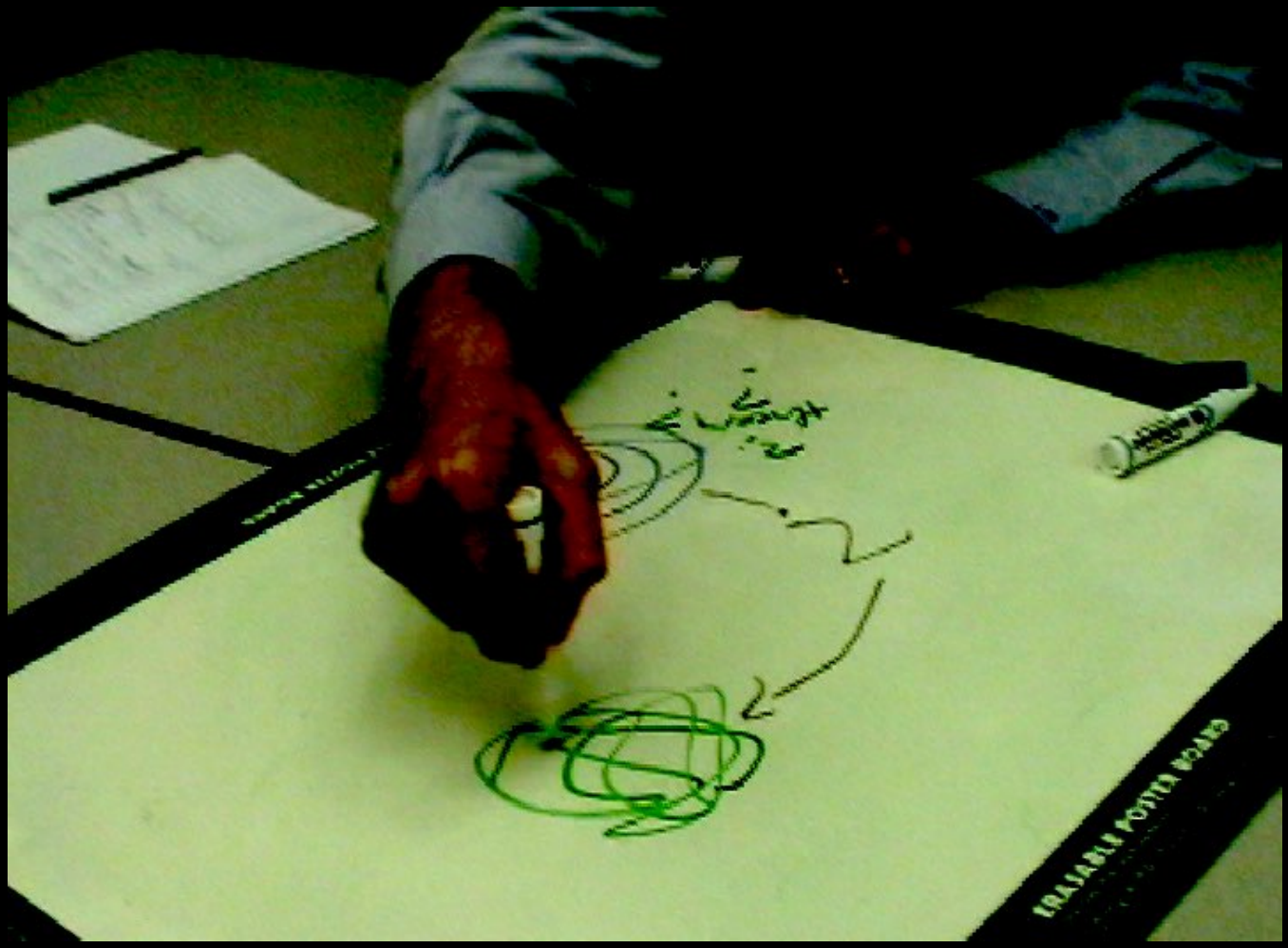
Julie: With the foundation here.



Todd: Then someone with more expertise walks into the situation.

Julie: I like how she checked on their current theories.
Todd: Right.

Todd: And she used that word. That was so beautiful. She said, **"So that's your theory, right?"** They had to say, **"Yep."** But they were also saying, **"We're not exactly sure."**



Todd: And there is a different question that takes you from where you were to another reasonably messy place that is closer to the physical description.

David: I keep thinking about how this would work in a philosophy class. It could work that same way if they were trying to figure out the text. What is this person is saying? What is the argument here? **"I think she said this." "I think she said that."**

David: ...but the book is right here.

Lesley: It has a lot of application in math and biology. This is exactly like what happens in the classroom. They are reading the book. All of these ideas are coming out…

Lesley: ...and if you say, “Define this,” they can regurgitate it for you.

Lesley: But the idea of critical thinking — actually putting it together in some sort of framework as a useable base...

Julie: They learn it, right?

Lesley: Yes. A useable base of knowledge, not just these things that you are told.

Lesley: Someone says sodium has a plus charge. Chlorine has a minus charge. OK. If you ask them to use that knowledge when they see something with a plus and minus charge to explain what happens, they can't.

Lesley: So what does that say? They know how to copy an example. The same thing happens in math. I hear them say, **"I wish they would give me a problem on the test that was straight from the homework, because I know how to do that."**

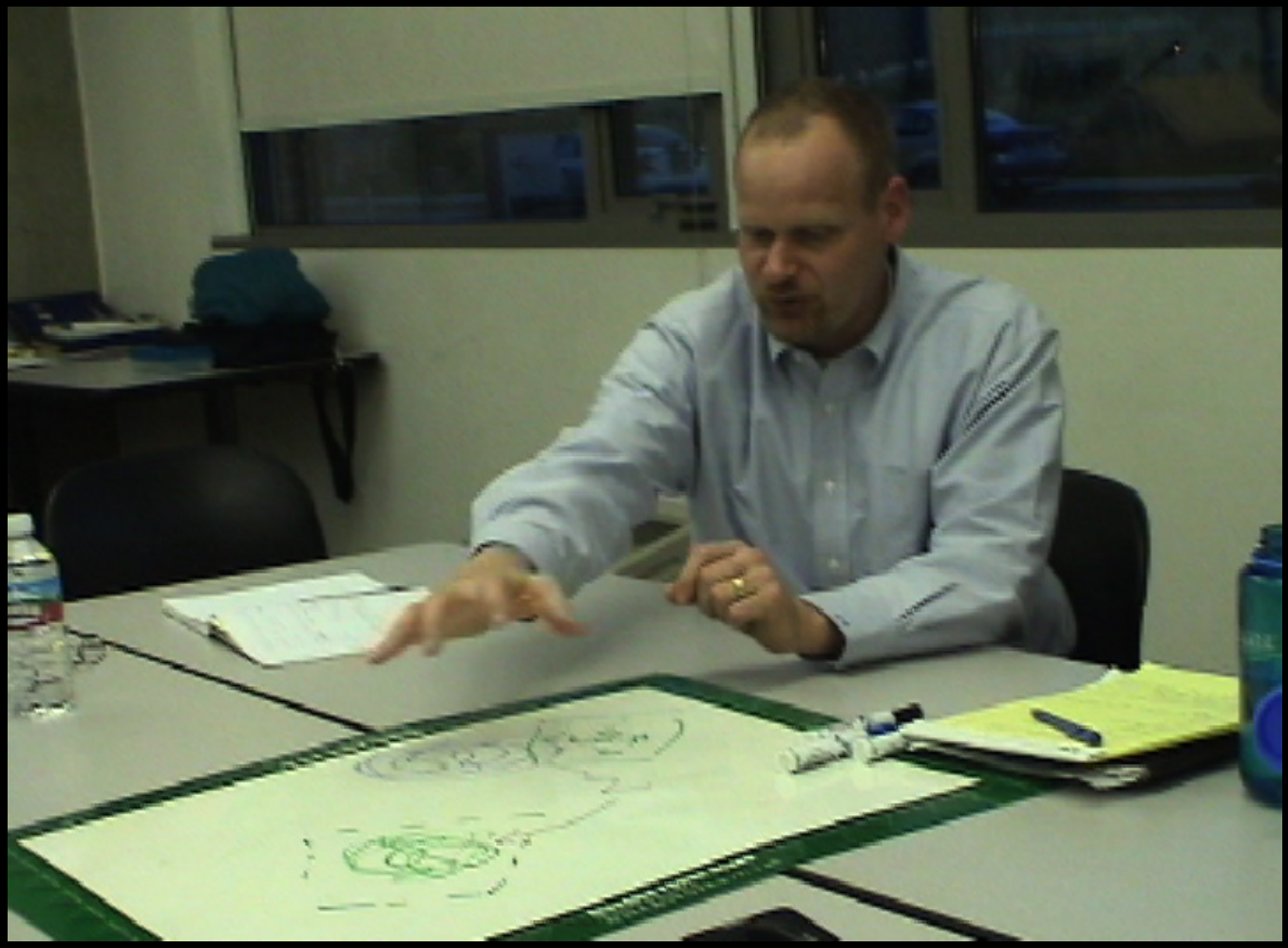
Lesley: I am sure it probably happens in Philosophy and English. You give someone a template, and they know how to copy it, but how does it actually apply?

Todd: What is interesting to me is that the question, **"Is that your theory?"** gets them to say what framework they are working with. Then she offered, **"What if you try a different framework?"**

Todd: Then there is that beautiful moment when William asked a question and Nathan went, **“Oh!”**

Todd: So the question becomes interesting to me, what situations do you put students in, in various disciplines, where they are going to have this kind of interaction?

Todd: And, an ethical question: what situations do you put them in where they are going to be wrong? That is essentially what you are trying to put your finger on.



Todd: And then another question: what do you use that is manipulable to get a representation of an alternative theory, so you can ask, “Is that your theory?”

Julie: I think this would be applicable to library instruction, in evaluating web sites and scholarly texts, for example. It would be interesting to watch. We do check in with the theories people use, like she did, but the grappling process is really insightful.

Todd: Right. And to show it back. In my discipline we have a topic of paragraph structure, but it's ultimately about thinking. It isn't about talking about paragraph structures in what you have read — or even your own paper. Neither is going to do it.

Todd: The thinking may be more like the processes involved in using "track changes" to make a better paragraph about a topic we are all working on together, and then go back to talk about why it became better. You have to make arguments and come up with some theory about what a paragraph is — what it does in an actual, real world context — the scene matters. We are dealing with actual material from which this knowledge is constructed.

Lesley: I want to know, out of this group of four, how many of them really understood it at the very end. How many were just going along with the group?
"I don't understand it enough to fix the fundamental flaws of my model. I am saying I understand it, because everybody else says they do. I am going to look over at you and draw what you are drawing."

Julie: They are grappling with thinking.
They started to approach the foundation of the house, after all this went on, including the guided inquiry...

Julie: ...and then they had to write it. They had to construct an individual visualization.

Lesley: But they weren't constructing an individual visualization. A couple of people were looking at other's drawings…

Julie: Yes, but it is a different process when you have to individually take responsibility to write it down. It is a new plateau, especially when they weren't 100% right.

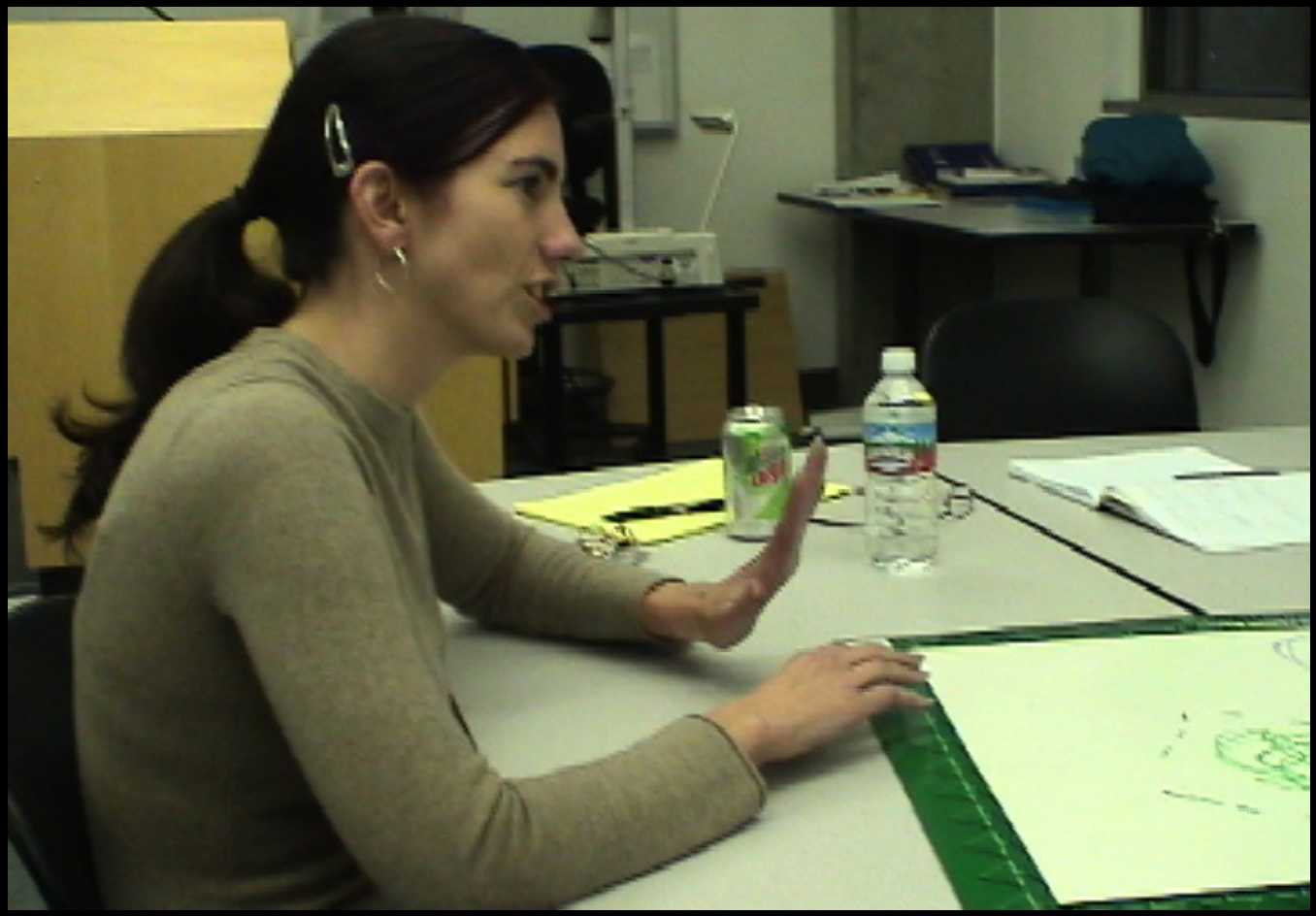
Lesley: In the end drawing she had one positive charge and one water molecule sitting next to it.

Lesley: In order for it to actually dissolve, it would have to be completely coated, as Kalyn said, **"They can't find it."**

Todd: You are saying something that I find interesting in looking at her practice as a teacher. She would pose a question that led to a response that led to another question. She affirmed what they said and went for more precision.

Todd: It's like what you were saying, David, this whole issue of right or wrong. You want them in a certain ballpark.

David: But how are they going to assess this? This may be great learning taking place, but is it going to be on the test? **"Do I know it enough to succeed on the test?"**



Lesley: Yes, but I want to know if this was really valuable for everybody in that group. I think two people might have thought it was valuable; a third was participating. The fourth person, Liz, whose words I was representing, left, I think, with as much confusion as she came in with.

Julie: But that is because everybody is on a different schedule, don't you think? How they process and how much time it takes to process...

Lesley: But when you do a group project like this when a final answer just shows up on the table, don't you have a tendency to just say, **"Great. Good job. Goodbye."**

Lesley: You don't actually assess each person in the group. One person can carry the whole group. You rely on that one student to clarify everyone else's misconceptions of it.

Julie: That's the whole complaint about group work.

David: I'm not sure the whole discussion helped William. He put out his idea. It was run roughshod over. He stepped back, waited until the teacher reappeared, and demonstrated that he understood better than any of them.

David: I think he might have been fairly frustrated. **"Oh, just go do your thing. I know that I am on the right track."**

Lesley: The people are still trying to grapple with this idea of bonds, and he is thinking, **"When you get there, we'll talk again."**

Todd: Where this gets really interesting to me is that you bring this back into a different scene. Instead of the scene where you use the manipulables to figure it out, the scene now is to take a look at this. What happened?

Todd: Now lets look at the picture out of your textbook, that isn't just 85% right, but is a fairly precise representation what is really going on.

Todd: That gives the frustrated person a chance to say, **"I was frustrated."** It gives Liz a chance, if she was still fuzzy about it...

David: Ok. **"Then why did we just waste a half hour doing this? Why didn't you just tell me the right answer?"**

Julie: But Liz still may not have gotten it.

Lesley: Anytime you do something like this it takes an immense amount of time. You're hoping that the time is valuable. It is frustrating from a teacher's standpoint to give an exam question on where you did group work and a third of the class still gets it completely wrong.

Lesley: "So? Where were you?"

When you do something like this, you really want to make sure that everyone gets something out of it. You don't want to leave anyone behind. How do you assess that?

Todd: We are back to the question we started with. How important is having the right answer?

Todd: I put you in this space where you jumped into the right theory. You jumped into it in a setting where you were interacting with three other people, and you had a teacher poking you, asking some questions.

Lesley: This problem not only had a "right" answer, it relied on knowledge and application of a lot of theories. It is like putting the stacks on top.

Lesley: If you get any of those off, you won't be able to get here.

Lesley: So, Kalyn was posing, **"Let me put these all together and stack it up for you."**

Lesley: If some people are off way down here, all you have to do is shove that piece back in the stack.

Julie: If you just lectured, instead of doing this activity, would it have the potential to lead the "left behind" ones to be more engaged?

Lesley: No. I think there was a lecture that preceded what we saw. This was, **"Now I want to see if you understand it."** This activity is great, and it will catch at least half of the people.

My question is how do you get the other half?

Todd: This speaks to the stacking of pedagogies the way the theories are stacked, too. This may be fairly early in the stack. We are making stabs at it. We are going to come back at it, maybe in a different group opportunity.

Todd: This is a viable collaborative learning situation. They could do something in a group that they couldn't do by themselves: they could ask each other what is going on and argue each other into a position.

Todd: Speaking in terms of outcomes, I wouldn't expect them to get it exactly right. What I am really looking for is that moment of **"Oh! It's like this."**

Todd: In this case I don't really care if their pictures were wrong.

Julie: I understood that they had 2 weeks devoted to this. This group activity will get them more engaged than just lecturing at them for 2 weeks and doing it at the end.

Lesley: When you give people a brainteaser like this, they really become engaged. They have a personal investment in finding the answer.

Lesley: People may think they understand something, but it isn't until they are placed in a position of having to teach somebody else and explain it that they go, **"Ummm, I don't know."** Yet my question remains, how do you reasonably do this within an 80-hour work week and bring everybody in?

Todd: In some ways the outcome I think Kalyn was looking for was, **"I want you to understand that what theories you stack up matters profoundly."** That was the **"Oh!"**

Todd: Having the right answer is almost irrelevant. What is really important is the experience of noticing that you were applying the wrong theory.

Todd: What I want to go back and help people see would be, **"Did you notice how they were applying the wrong framework and could not see what they were looking at? When they shifted to a different framework they suddenly saw."**

Julie: Starting to see.

Lesley: Yes, starting to.

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Faculty Reflections: What did you notice?