

Field notes: High School Physics Class, 1989

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Today is November 13th, 2004. I am seated at my laptop making observations of a high school physics class conducted some 15 years before. According to the timestamp on the video, the recording was made on January 19th, 1989. Ironically, I, too was in high school when this tape was made.

Before beginning my most unorthodox observation of this time-displaced class, I will introduce my intentions for engaging in such an activity. Video records of events within the learning sciences are gaining merit as raw data from which research questions can be investigated and analyzed. With this emerging view of data, questions regarding the meaning of presence in research will be discussed and reconsidered in new ways. The purpose of this set of field notes is not to directly address these questions, but to provide for myself an exploratory activity to broaden my awareness of the issues that the community has and will engage in around new methods for capturing and using video data. My observation begins.

The portal across time and space is a small viewing window on my computer that reaches out to an unnamed camera person, sitting at the back of Mr. B's twelfth grade physics class at 12:31 pm at Palo Alto High School, 15 years ago. This video was made as part of a research project looking at the use of dynamic diagrams in science education. The camera person is the most attentive student. Unlike other students in the class who look down at notes, talk with one another, consider their latest manicure, this camera rarely wavers from its view of the teacher. Thus, I sneak glances at the students when I can, when the camera tilts or drifts unexpectedly.

There are about 25 students seated in haphazard rows of tables and desks. The ethnic composition of the class is a microcosm of the demographics of the United States. The students are well dressed, but not formally so. Broadsheet newspapers are scattered across the tables and students take advantage of the remaining few moments before the

commencement of class to read the student newspaper. The camera has briefly followed Mr. B to the back of the class, revealing a long row of windows across the back of the room. The camera over exposes the view of hazy trees in sunlight and turns quickly back from the dream to chalk boards, a darkened television in the corner, papers pinned to boards, miscellaneous physics apparatus.

Today class begins a few minutes late. Mr. B announces that he has been talking to a person from Apple who is one of the class's benefactors. He has a new proposal for an open-ended project. "On May 5th, you guys are gonna have the opportunity to join us on a field trip to Great America. Physics on rides, okay?" he tells the students.

"What our project that I proposed was that, that I would have students write these [hypercard] stacks, okay, and then, you would be there, like at a booth, next to the thing and students from all over Northern California would be coming by, and they could stop, and they could look at your stack, and that would teach them about some of the physics that they didn't already know it about that particular ride. Such as, you know, Tidal Wave, The Edge, or whatever."

The students join Mr. B in a discussion of the particulars. They want to know what day of the week it will be. How much it will cost? Will they bring one of the Mac IIs with them?

In his mid-thirties, Mr. B wears a button-up faintly striped white shirt. He is pale with dark hair that recedes slightly. He keeps a pen in his shirt pocket, wears large glasses and pleated grey pants with a black belt. While his appearance is that of stereotypically scientifically-minded person, his comportment is relaxed, joyful, optimistic. Mr. B is enjoying his student's excitement and is also now ready for the class to move on.

"Campaniles away, please," he says, taking a copy of the student-run newspaper off of the desk in front of him and folding it. One hand on his hip, Mr. B waits for order to come to the class. It arrives but moments later.

Writing on the chalk board, Mr. B begins to list the topics that will be on an exam the following Thursday. As he lists each concept: optics, mechanics, projectiles, work and energy, he turns back towards the class to provide key ideas in both words and gestures, followed each time with the word “okay?” The students appear attentive to the description of the upcoming exam. Then one student calls out, “Is the test gonna be all multiple choice?” Mr B replies, “Hang on, we’ll get there. Let’s hit the concepts first.”

After listing all of the topics for the exam, Mr. B, an eyebrow raised to the class, enquires, “Why would I put you through the effort of going back and reviewing all that material?” A student replies, “So you don’t forget it.”

In responses, Mr B says:

“I would like to, when you step into the car today, understand why you want to wear your seatbelt. Not just because your mom said, not just because the National Highway Safety Administration says, not just because Mr. Cortan says, but because you know that you have three ways of stopping....And, so, the numbers, you don't have to know the numbers, but you have to understand that there is a reason for it that you can, you can relate to the, the studies we've done.”

Mr. B then begins to quiz the students with practical questions of acceleration and shadows. The students reply with short answers and then Mr. B continues to discuss the concepts that will be on the test. One student asks if they can go through “the different things, like a plane mirror, a convex mirror, and a concave?” Mr. B suggests they save that review for Monday and to the student intones, “you can look at it over the weekend, and then maybe you won't have to ask the question, or, if it's still a question we can deal with it at that time.”

Mr. B then opens up a briefcase sitting on his desk. While the briefcase is covered with stickers, the file he pulls out and opens looks official. Glancing through the papers, he calculates aloud how many questions he thinks the students can answer per minute. There are immediate objections. Students call out “We can’t have that many” “I swear,

takes me two minutes with problems” “There’s no way. We can’t work at that speed for ninety minutes.” The discussion continues with Mr. B both lowering and qualifying his estimate while a student calls out for compromise. Another enquires as to whether it will be an open-note test.

Mr. B uses this question to redirect the class towards open-note test taking strategies and the textbook chapters associated with the test. For optics, he tells the students that he didn’t like how the textbook addressed the topic and warns them that they will have to jump around different sections of these chapters.

The class then breaks off into smaller discussions. Students take out their newspapers. Two young men at the front of the class ask about bonus problems. Another group of students at the back of the class use a calculator to determine percentages for the different parts of the test. And in-between these two groups, a pair of young women talking about the intersection between dating and parents. “I told’em that, I don’t even talk to him anymore. ‘Oh, why? He’s such a nice boy.’ I’m all, ‘Mom....”.

Two minutes pass and Mr. B returns with an arm full of magnifying glasses. “Okay, okay. Yoo-hoo!” he calls, and the class reassembles more slowly this time. After the pragmatic crumpling of a newspaper belonging to a student in the first row, the lesson begins. Mr. B leads the students in considering the characteristics of the Fresnel lenses and their similarity to concave mirrors. Half way into the ten minute lesson, a young man walks into the class carrying a Millar balloon. Stopping mid-scientific sentence Mr. B acknowledges the camera, “Interrupt your camera, again,” he says. He wonders aloud if it someone’s birthday. A student replies that “It’s an ‘I’m sorry’ balloon”. But by this time two athletes at the front of the class are engaging Mr. B in a discussion of an upcoming basketball game.

A minute passes, and Mr B returns to the lesson. “I’m not asking for the world, just ten minutes. Okay,” he says.

The students are then prepared to use the magnifying glasses/Fresnel lenses as concave lenses, to see the outside world behind them turned upside down and projected onto held up bits of paper in front of them. Never once glancing behind themselves, the students face the front of the room, hold up the lenses and most successfully conjure up visions of the outside world.

The camera now travels from student to student as they exclaim “Here’s a tree” “That is so cool. I’m gonna get the UPS truck” “There’s a balloon. Oh weird, I can see your balloon. Right here! Look! Come here, quickly!” The students continue to observe their projections. One student turns his magnifying glass, hoping the rotation will right side up the image. Another looks through the glass in an attempt to see better and his shadow hides the projection.

Finally, Mr. B whistles for their attention and asks aloud what sorts of difficulties students had when they first got started. The class has not stilled this time and Mr. B commences to clap his hands. “Yoo, everybody! I know its Friday. I’m anxious to leave too!” Mr. B moves on to discussing the fact that the Fresnel lenses are more commonly used as magnifying glasses. but the class does not follow him, still wrapped up in upside-down worlds, weekends, and newspapers.

Taking a copy of the newspaper into his hand, Mr. B then stands in the front of the room and stares at the students. His face is impassive and as the camera zoom in on his expression, he looks like a non-violent protestor. Twenty seconds pass as the students slowly recognize his stance and shush each other.

When the students finally return, Mr. B continues, but students are slowly packing up their things. He whistles once more for their attention, and announces “Last but not least. Now this, this last part I’d like you to take really seriously. As serious as your seatbelt.” He proceeds to tells them of magnifying glasses gone wrong: of fifty thousand, of a hundred and forty thousand dollars of damage, of burnt down homes in Mountain View and Atherton. Families leaving magnifying glasses sitting on couches and loosing everything. His final warning to his students before the weekend that awaits them is that

they have “a toy that has a hidden danger”. The video tape ends now. I assume that class is dismissed.

Watching this class, some 15 years removed, I wonder what has become of these young people. For all of the Friday afternoon struggle, it is clear that this is a classroom where competence is cultivated. From sponsored open projects that require computer programming and leadership at an amusement park, to the suggestion that students catch themselves up on the weekend, this class appears to be rich with opportunity and expectation. Mr. B’s discussion with the students of the upcoming test’s design and recommended preparation practices are activities that well serve the development of metacognition, as well as negotiation skills. Mr. B wants his students to understand and think with concepts, that at the end of the day the students don’t need to remember numbers, they need to be able to make sense of the world.

In my first set of field notes I observed a statistics classroom. Sitting in the class, I experienced more information than I was able to write down. But when I went to construct my field notes, I found I was able to draw my imagination into the process, pulling on sensory memories to understand how the statistics classroom felt. I was able to explore my sense of the class, and portions of my paper easily took form within my mind.

In contrast, in this paper, my view has been the view of the camera. I have seen the backs of students’ heads and the front of Mr. B’s. By tying my perceptions to that of a prerecording by camera and the microphone, I have diminished my ability to gain what Merleau-Ponty refers to as the optimal grip:

“For each object, as for each picture in an art gallery, there is an optimum distance from which it requires to be seen, a direction viewed from which it vouchsafes most of itself: at a shorter or greater distance we have merely a perception blurred through excess or deficiency. We therefore tend towards the maximum of visibility, and seek a better focus as with a microscope.”

(Merleau-Ponty, 1962 p.302)

Having lost the ability to manipulate my perception of the scene through embodied action, my access to this scene is mediated by the persistence of this record, regardless of its flaws. I am able to watch the scene over and over again, pausing frames to glimpse at edges and object that hint to that which I cannot see. I can listen to the recorded sound and read from transcription. In essence, I am making a comparison between what embodiment affords and what a prerecorded event enables.

When the unnamed camera person becomes my physical and social surrogate, I am granted the role of the unobserved observer. I have neither the social cost nor social benefit of embodiment within this event. I am far enough removed from the event that I feel little obligation to the people I have observed and thus my observations seem to have less consequence for the classroom. I also have fewer relationships to ponder as I have not engaged in any. My evaluation of the tools and experience of remote viewing instead take on primacy. I do not yet know what happens to the ethnographer when a primary instrument of observation, the body, is removed from the scene. My observation from writing this paper is that once the video is fully viewed, there is no other perceptual data to work from. Mr. B' expectation of his students was that they focus not on every detail, but instead understand the reasons for why things happen. The video is successful in recording every detail within its field of view, but I am not certain this is enough to understand why things happened within this class.

Reference:

Merleau-Ponty, M. (1962). *The phenomenology of perception*. London: Routledge.