Appendix

Interview Transcript

Me: Do you know the idea of the project?

Client: Explain to me again.

Me: It is an Arduino-based device that will detect the orbital period of a pendulum. That is my base idea. But I want to talk to you about what you would want out of that if you actually going to use this in a classroom based setting. What are some things that you would want the device to have? A couple that I came up with was would you want it to record a set of data and read it? Or would you want it to give you feedback as it comes in?

Client: What about a conical pendulum?

Me: Well, it would be possible, but it would be harder, yes.

Client: One of the things that is hard about the photogates that I do have is unless you get the object going straight through the middle of the object you can get a lot of error in your calculations because the timing is off. So anything you can do to try and help the idea that the detector can work well still and give reasonable data even with the pendulum is not going through the exact center of the pendulum. What I would love is – and I know this is hard – but I think if you were able to track the pendulum throughout the entire swing. That would be fascinating because then you could get rich data about how the speed of the pendulum changes over time. That gives you all sorts of insights into how the energy of the pendulum is changing over time. I don't know if that's possible.

Me: I can look into it.

Client: Those are my biggest thoughts. The raw data is the most important thing. But if there was a way to convert that data into some sort of energy graphs – potential energy over time, kinetic energy over time, using the speed and mass of the object. Those would be things that I can think of that would be very helpful.

Me: Cool. Let's see what else. Do think it would also be useful if the device things beyond just the orbital period? Like it also calculated the energy of the pendulum?

Client: Yes, the energy, the kinetic energy, the speed, height – if that's possible.

Me: Okay. I also had an idea where I could compact the device into a little case, so it just a couple buttons and a screen. It was battery powered, not hooked up to a computer and was stand-alone.

Client: Yeah because is nice to be able to move students around and not have to be tethered to one of these outlets. This spot right here doesn't really have an outlet anywhere close to it.

Me: Perfect. That is all I had in terms of questions.

Client: Cool.

Me: Thank you so much.

Problems: (Provided by the client)

1. Photogates don't always work unless they are going straight through the middle of the mass. This causes the timing to be off.
2. Tracking the pendulum throughout the entire swing.
3. Raw data is the most important.