

Hi everybody.

Thanks for the feedback. Again, this is far and away more than I've every received before... and very thought provoking. Below I list in no particular order some of the statements that I respond to. Below that are most of the statements you made verbatim.

It's been a wonderful opportunity for me to learn about your experience in this process.

Gratefully  
Pete

### **My responses to some statements:**

"I don't like how we approach multiple chapters of the physics text at once, and it makes the book difficult to use as a reference. If the class went through the book in a normal fashion it would be easier to study."

- I agree that it is difficult to study with the textbook when the single topic we are studying is scattered between several chapters in the textbook. We are planning to rewrite the OpenStax textbook this summer consistent with the parallel pedagogy. Please let me know if you're interested in working on this.

"One problem I see in your videos is sometimes you'll skip ahead and writing will appear on the board and I sometimes have trouble understanding where it came from."

- I chose to make the videos as condensed as possible in order to value students' time and keep attention. For the times that you need more time to think, I encourage you to say "wait Pete" and hit the stop button. I'll always wait. If there is something you need explained, then you can write it down for class or even send me an Email.

"I struggle most with the fact that we aren't given as much 'knowns' as I'm used to to solve problems, and we are more often using ratios as answers. I would rather find concrete answers. Also when we are estimating things such as forces and using triangles to estimate numbers."

- This (along with "using letters instead of numbers") is a challenge that many students share – not just in my class, but in all physics classes. I'm glad that you recognize this. Both of these skills have to do with wrapping your head around the conceptual nature of the problem. Developing this skill is helpful for any technical field... and maybe nontechnical fields too (but I'm not sure – let me know if you have any insight about this).

"I want there to be more lecture during class and have concrete examples with real values. I'm honestly not sure what happens during class and would like there to be more conceptual class lecture."

- I feel that the textbook does these examples better than I will and that class time is better for "peer instruction," which studies show is the most effective way to learn technical material. I encourage you to ask your group to explain the concepts and/or provide a good example. If they can't, please ask me. Maybe I can find one, or demonstrate for the class

or your group. If a whole group is having difficulty with something, I feel good extrapolating it to the whole class.

Several students expressed interest in getting more concrete answers in class: “I like working out problems in class but sometimes I feel like I get really confused and never get clarification. When I went to office hours, I didn’t feel like I got the answers that I needed in order to clarify.” *and* “I do feel like I am getting a better understanding of physics than I would if I were in a different physics class and I understand the concepts better. However, I do feel that I sometimes have trouble incorporating the concepts in the correct manner. I think if we did more in-class examples, where we get time to work in groups, but then saw you work the problem all the way through to the solution after, it would be extremely beneficial.” *and* “Going over one problem set question all the way would be awesome and help me understand how abstract concepts apply.”

- I agree that this may be helpful to some students and I think that the solutions should be available – through the problem set solutions or a video. If this time delay of a few days is too much... I wonder. Is there too much time delay in coming to an office hour to say, “I need this solution.” - I think it might be helpful for me to have an example of when you were not given the solution and how it might have been different and better. For instance – today’s neutrino problem. This is on PS#4. The solutions will be available on the website Monday. After you read through the solutions, maybe you could tell me if this was OK, or if a different mechanism could/should be invoked. If you come to an office hour and you are not getting the answers that you need, I request that you let me know explicitly and I will do my best to help.

“[in most school systems] instead of actually learning, students memorize information. The purpose of school is to help the student outside the class not just to waste students’ time during the day. This class in my opinion does a way better job of stimulating thought and applications compared to another. It’s like learning how an engine works and really knowing how to use a car vs. just knowing how to drive it.”

- This is interesting to me. The jargon, “black box” means you don’t know how it works, just know how to work it. For example, a microwave oven is a black box to most of us. We can press the buttons and get the food hot, but we don’t really think about the bundles of electrons being accelerated through a magnetic field. We can also learn physics this way: If I put the numbers in this formula, then I will get the answer – to 8 decimal places. However, we can also build an answer from the underlying concepts. By doing so, we are masters of the formulas we use, rather than the formulas being our masters.

“I still would prefer a typical classroom set up. You seem like a nice guy. And I like the demos. I wish we didn’t get marked down for not doing videos or Lon Capa or Classwork. I did good on the midterm, but I will be marked down for missing videos. This doesn’t make sense to me.”

- I find this question/disagreement very valid. *If I’m being evaluated on learning the material, why should it matter how I learn it?* The answer to this is partly (1) a pragmatic response to my past experience with 141, and partly (2) a philosophical departure from the traditional meaning of a grade, though well within standard university practices. (1) In the past, the videos were not required before the class. The result was the students often crammed the videos just as students often cram studying before the exams. Some students would watch videos in class. I think that the added structure of credit for both

videos-on-time and classwork has resulted in much better group engagement in this class. (2) Traditionally, you are responsible only to yourself to receive a grade. Here you're responsible to yourself *and to others*. We have a group project and you are expected to come to class prepared to discuss, question, answer, teach, and learn. This may seem strange or wrong. However, this is not unusual as many classes have participation grades. In life (and in most upper division classes) we're evaluated on our ability to work with and support each other.

"Sometimes the videos are long. It would be nice to review the concepts covered to confirm my knowledge on it."

- My understanding is that shorter videos may be more effective. I am also interested by your idea to add summary questions at the end.?? Something to ponder for the next round of videos.

"It's really working for me. I always hated physics because I thought it was plug and chug, but since I've been learning it Pete's way, I've found myself really falling in love with physics. At first I questioned staying in the class – I wasn't sure if it would work for me. Now I am so glad I did – I'm now considering minoring in physics."

- I really like this statement for what it says in a broader sense: that we can be unsure of something beforehand but still approach it with an open mind and often the results are something unexpected and beautiful.

Two students indicate that the class is "decentralized" so they don't know what they are supposed to do. My efforts are to keep the class perfectly centralized – everything is on the daily webpage. If we talk, we might be able to find a mechanism to get everything done.

There is an expression of worry about grade because of not doing videos. I think it is important to understand the syllabus. Please read it and let's talk if there's something that's not clear.

"I hope that before the quarter ends, we can do a review of what we've covered to synthesize it all and solidify the connectedness of all the concepts."

- I'm open to ideas for this. I think that we are constantly solidifying how concepts are connected by the way we study phenomena in parallel. Additionally, I have two "big picture" videos. One you've seen. The other is for rotational physics after MT#2. So, I'm not sure how one could better "solidify the connectedness of all the concepts." However, am interested to see what happens and to hear what you think.

"I actually like using Trig/more mathy/equations because those make sense to me and actually help me understand concepts better than w/o."

- You're welcome to use trig after Friday. Until then, please don't use trigonometry and instead visualize components. This will help you develop your geometric logic.

"I headed your advice about working in a group more and it has helped me greatly. Just getting into the mentality of physics and discussing it in and outside of class has helped me just as much or more than working on problems etc. It seems to be that that is the hardest thing for new

students to embrace. Especially for somebody like me that comes from a heavy background of biology with memorization.”

- I am inspired by statements like these. Besides learning physics, many of you have begun to critically think about the nature of thought processes and how we learn... with increased “metacognition” awareness.

“I would like it if there was a bit more instruction about what we have to do for the upcoming group project.”

- If you go to the class project webpage where you are to post your projects, you can scroll down and see projects from past classes. If you have any questions, please ask in class or send me an Email.

A few students express that this method doesn’t work for them. In the past, some students would express that my conventional style didn’t work for them – that I am confusing. It could be that one style works for some and not for others. It could also be that physics is conceptually challenging and ... it’s *hard*. It may have little to do with the teaching methodology. For this reason, I encourage you to respond to this challenge with, “how will I make this work for me?” Rather than, “this isn’t working for me.” The latter approach empowers you more than the former. For this reason, I request that your feedback include comments about what you are doing and might do. The feedback on how the class is working for you is helpful for me. However, it is more helpful for you to focus on how your strategies are working for you.

**\*\*\*\*\*Statements that I don’t respond to, but am grateful for nonetheless\*\*\*\*\***

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“I’m learning to think critically and understand concepts instead of plug and chug.”

“I am learning patience ☺”

“Your energy brings the class to life...I love the demonstrations, keep those up.”

“Videos are a good way to look back at lessons for review. Problems in class allows for practice.”

“We are presented with very interesting and though provoking questions that force me to reevaluate my thought processes.”

“I feel like getting to know my group more has made it more comfortable for me to ask questions.”

“I still feel challenged and am often confused, which I know is a step towards understanding things on a deeper level.”

“my favorite parts of class are the physics demonstrations, like with the Newton’s cradle and breaking string.”

“I need to take the online lectures more seriously! I just skim it. I also need to read the book!”

“This class is very confusing the longer it goes on. It seemed OK at the beginning, but now it seems like we’re just jumping around and never really focusing on a topic for long enough. I also just don’t understand when you explain a problem, but that’s probably just because we’re different people and our brains work differently.”

“At first I was having a hard time with how we were learning because I was confused after class a lot, but I’m learning a lot more than I realize.”

“I really like that you are going a little more in depth on the topic in class as it really helps drive home the ideas we learn about from the videos.”

“I like the in-class examples and explaining lenses.”

“Self: Need to start on problem set sooner.”

- I wasn’t able read what this person wrote about the class.

“I thought this system would not have worked for me but I’m molding into the system. I have to take notes more consistently to gain all the advantages from this system.”

“The continual development on all the concepts gives me the knowledge to attempt most problems.”

“I wish I was more organized in my work and could express my thought processes more clearly.”

“Class has been good, though I have been having fewer revelations about what we are learning but that could just be because the material is harder.”

“This class is amazing because it is a flipped class allows you to learn at your own pace and also see what’s coming ahead. It also allows you to ask questions more often.”

“I feel like I am learning a lot. I watch most of the videos and even if I forget to watch them before class, I watch them after.”

“I enjoyed the flipped classroom it is a more enjoyable and encouraging way to learn. Class is made interesting – isn’t made into a chore like other classes.”

“It was difficult to adjust to the way Pete grades. However, now I concentrate more on the concepts of physics and understand it better. I have been doing well.”

“I slack off outside of class and that is when I struggle but when I am actively participating in the videos, doing the problem sets and asking questions it is going really well. I like getting a good base of knowledge rather than just learning how to plug #'s in.”

“After watching the videos, I should read the textbook to gain a deeper understanding.”

“This class has gotten easier over the last few weeks but it is still hard for me to correctly explain and have you see what I am thinking. I have enjoyed the fact that you are giving more examples / doing the work for the most part in class Thank you!”

“I don’t understand how missing a part or two to each question can bring my grade down by two letters.”

“your introduction to new topics is still as if everyone knows basic concepts of physics. I have gotten accustomed to identifying each problem with the lens it should be approached with.”

“I don’t like flipped classes – don’t feel like they work well. Or if it has to be flipped you should spend some time in class reviewing everything a little bit in order to make sure everything was understood because peers don’t always know the answers or are good at explaining. And help us work through the problem sets instead of just correcting them and handing them back. There’s also a lot (almost too much) outside of class because we have to watch videos and do Lon Capa and do problem sets. Personally, I’m not doing very well because I don’t understand hardly anything.”

“I prefer the ‘normal’ way of learning & get extremely stressed when doing problem sets and exams. I watch the videos & work w/ my group but regardless, it’s stressful & I can’t do most of it. I think it’s stressful because we only briefly go over material & focus more broad ideas rather than the correct way to do problems. By the time we go over the correct process of solving a problem, I’m already extremely confused.”

“At first, I was hesitant about this class. It took a little while to get used to explanations and lenses instead of straight formulas, but now I understand the methods and am enjoying it. Thinking about the logic and concepts behind a problem before we are thrown into solving it has been really helpful.”

“Since I haven’t see the protocol video, it is messing with my grade slightly by a letter grade.”

“Not using numbers really frustrates me but I realize I’m going to have to get over that.”

“I should try and do a better job when it comes to watching the class videos before class.”

“Good enthusiasm in teaching helps me learn.”

“I need to put more effort into the reading and the problem sets.”

“...when you introduced the neutrinos and we have no idea how to do it, I need more explanation. I would give us more info before letting us do the problem.”

“I should go to office hours more...”

“I like the class so far and I feel like I’m learning a lot. I’m getting more used to the way the class is run. I’m not doing as well as I want to, but I feel like I just need to be less afraid to ask questions and rewatch some videos.”

“It takes me some time to get underlying concepts in entirety, but I know I have the resources to completely understand something.”

“Big Exams” are helpful to see where I’m at with this class.”

“...I do better working independently, but believe there are several advantages of working with others.”

“I am pleased because I am putting a lot of time/work into this class and seeing results.”

“Last time we gave feedback I was really critical. This time, I’m really pleased. I think you took my suggestion for clearly defining what is due and when, and I feel that the class is a lot more organized.”

“...I find meeting up with my group on the weekend to study helps me the most.”