Exploring and Applying Physics

Facebook group

Member's posts from 2020

David Brookes
1. June 2020.

Hi People!
I want to add a brief description of how I ran the online portion of my semester using the ISLE approach. And, being from Chico state, we are required to go online this Fall as well, so I plan to do something similar with modifications this coming semester. So here is what I did and I'll add comments about how I'll modify it or difficult sticking points I experienced on the way:
I created a single Google doc master document. In that document I created a reference to every Active Learning Guide (ALG) activity I wanted them to do. I heavily modified several ALG activities to fit in with the online format, using resources available, for example some use PhET simulations, some refer to an online video or one of the textbook videos currently curated by Pearson. After each activity (or a cluster of activities) is a piece of text that says something like "now you've worked through these activities, please read section x.x in the textbook pp. yy - zz. Sometimes I was more specific and said stuff like: "If you're stuck on this activity look at worked example n.n on textbook p. yy for helpful hints." I also added in links to other online resources like some video explanations I've created in the past, or if I could find a good YouTube video that explained an idea, I put a link in to that.
Then I formed the class into "working groups" of 6-8. I gave them a weekly schedule: Basically "you need to complete this list of activities by Thursday when we will hold a whole-class discussion about them" The working groups were asked to set a 2-hour meeting time every week to work through the activities together. (Some of them broke up the time slots into 2 1-hour meetings, and some actually held more than 2-hours of meeting every week.) I also asked them to put their work/responses to the various activities into the Google doc. So basically their shared group google doc served as their "porfolio" showing me what they'd accomplished and also as a "study guide." I made a copy of the Google master-doc for each group and I shared it WITH THEM (the members of the group): Pro-tip: If you control the Google doc and share it with your students, things go MUCH better than if you let them share a document with you. I gave students participation points for attending their group meeting(s)and more participation points for making contributions to the Google doc. Giving them points for their contributions was really easy: You just go to the document history and look at who did what and you can immediately see if a person did nothing that week or not. I did not grade anything for correctness here.
I was on hand to work with the working groups during their meeting times. I obviously couldn't work intensively with every group all of the time they met. Fortunately enough of them set overlapping scheduled times to meet that I could have 3 working groups in 3 break-out rooms on zoom at the same time and they'd just call me when they needed help or guidance. I'd not recommend more than 3 simultaneous working groups for one instructor, that was about the limit of what I could manage and keep everyone on track. I showed them ways to collaborate either by using the zoom whiteboard or by using their phone as a document camera, suspended from some sort of stand above the page, so that people could see someone's work. I obviously blocked out a whole class meeting time every week, a meeting time that happened on Thursday although I found I often threw in a shorter meeting on Tuesdays just because I felt that there was more to be talked about than we could get through in one session.
I had students do their exams online in groups, working with their working group, open book open notes etc. "How to stop cheating or free-loaders," you might ask. The secret is the

"clarity" criterion of our rubric which requires students to verbally explain the key points of their process - most importantly WHY are you choosing to approach a problem a particular way and HOW do you know something in your problem statement is true. For example suppose the student solves a step of the problem by setting two forces equal to each other. They need to write something like "I know those two forces are equal because the object is not accelerating in the y direction." In other words, key steps of the process need that justification that connects it to the physics they've supposed to have learned. If students wrote an explanation that looked suspiciously like they'd copied someone else's without really understanding, I simply called them in for an oral exam - they needed to explain their reasoning to me in person. Also, I used a pass/fail system so there's no partial credit for doing an exam question. However, they can make multiple attempts and if they're close enough they can complete the question orally like I described above.
Well I think this post is long enough. I'll put my comments about what worked and what didn't and how I want to change it in the comments section. And I really am looking forward to your comments as well because I'd like to know what you think and which ideas you like or don't like.

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Allison Daubert
15. June 2020.

I just found out that more than likely, all of my lectures will be online in the fall and labs will be in person, but individual. 6 students at a time in the lab room, one per table, no group work. One one hand, it would be good to get face to face interaction with the students. On the other hand, I'm wondering if learning might just be better in group work labs from home. I probably have the power to move my labs to virtual from home so that they can work together on them. Any thoughts as I process this? I teach algebra based physics for science majors at a state university - 32 students/section. Thanks!

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David Brookes
17. June 2020.

Announcing Pivot Interactives online ISLE activities! Hi Everyone. We've been developing for the last couple of years a bunch of online activities using interactive video. Since they're part

of an NSF funded project they're freely available through pivot interactives. If you want to see them and have students use them, here's how:
Go to https://www.pivotinteractives.com/
Hover your mouse over "Learn More" and select "Pivot Interactives Library"
When you're in the library, put "vISLE" into the search box on the left and hit "search."
Select "sort by name" underneath the search box to put them in correct order.
All the ones that are labeled "free," if you click in to them you'll be able to access all the videos, the html 5 measurement tools, the table and graph functionality. etc. The only thing you can't have is the back-end submission and grading process because you'll need an account for that which is not free. These could be very useful for those of you who are doing things online in the Fall. I'll be using some of them for sure.

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Carolyn Sealfon
19. June 2020.

What does everyone think about assigning roles to lab group members? Has anyone used POGIL-like role assignments with ISLE? Any links to references or best practices?

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Chance Theriot
5. July 2020.

Does anyone have a universal gravitation lab they're happy with? I've tried several, but I haven't found one that works well for the students.

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Eugenio Tufino
13. July 2020.

Hello! this article is beautiful and is in theme with the ISLE philosophy! https://aapt.scitation.org/doi/10.1119/10.0001390

https://www.facebook.com/groups/320431092109343/posts/728013414684440/?__cft__[0]=AZXm9ofYoOLeHyy_KPviscl5vl68b2-LfUEknvfzCZGmrR7PlxQpFVp9sS28nal2MNaOytV8DUCVNNfzrzOHq1cfNerQnvG-aRX9XRGtZRE_K2ICvqv38ixeVC-9urTPFndyN4-4p1Do4hLGGThgD8I_&__tn__=%2CO%2CP-R

Danielle Buggé
15. August 2020.

Hi Everyone! I spent the last two days co-running a 12 hour ISLE workshop for middle and high school educators and wanted to share some reflections I made after instructing through ISLE in a virtual setting. First, it is mentally exhausting being at your computer for 6 hours a day, so the more variation in activities we add in for our students, the better! Encourage them to get out of their seats and do some of the activities in their home. One suggestion from the participants was to assign materials as 'homework' for the next class so students will be ready and/or you can form groups if someone does not have the materials and/or space. The teachers we worked with are very excited about incorporating ISLE into their classrooms in a few weeks. They said they felt like they were part of a community - virtually. The learning community is an essential component of ISLE so it is important to make sure this still exists virtually. We used breakout rooms and a dedicated space for participants to share their work (Eugenia's idea based on her experience earlier this summer was to use a Google Slides presentation that everyone could edit; that worked very well!). Combining learning the content through the ISLE approach with learning how to collaborate virtually over zoom was challenging so activities took longer than expected. We also had to frequently remind them to share their screen while working and post pictures of their whiteboards because some people worked on paper while others had a second monitor (or computer). So many students join Zoom meetings on their phones; we need to encourage them to join from their computers for easier collaboration. After doing this for 12 hours, I strongly believe that this approach can work with our remote students this year.
Also, I converted OALG 1.1.4 into a Jamboard activity where the participants could add sticky-notes to map the activities and developed ideas onto the elements of the ISLE cycle. Jamboard is a collaborative white board tool available through Google. We used it three times during the workshop. I think it went well and is definitely something I will try with my students in the fall. If you are curious, here are two examples (not all perfect):
constant motion (OALG Sections 2.5 and 2.6): https://jamboard.google.com/.../1DpAULLUb77XE7Q.../viewer...
12 cameras & wine glass (OALG 1.1.1 and 1.1.2): https://jamboard.google.com/.../1DuVSWyqtHtLn75.../viewer...

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David Brookes
17. August 2020.

Hi Everyone,
This is an expanded re-post about Pivot Interactives. Many of you are probably looking around for suitable lab activities that can be done online this fall.
This document is accessible at
https://docs.google.com/.../15-r_7hBb.../edit...
It takes you through the steps to find the activities and also links out to instructor guides that you may find useful if you want to understand the motivation for the various activities. I am posting the document in full below and you can always locate it at the link above.

The video-based Investigative Science Learning Environment (vISLE) Project:
We have created 5 sets of video-based activities and labs associated with 5 topics in mechanics. Being part of an NSF-funded project, these are available for free. The activities and their questions are accessible for free if you follow the following steps:
Go to https://www.pivotinteractives.com/
Hover your mouse over "Learn More" and select "Pivot Interactives Library"
When you're in the library, put "vISLE" into the search box on the left and hit "search."
Select "sort by name" underneath the search box to put them in the correct numerical order.
All the ones that are labeled "free," if you click into them you'll be able to access all the videos, the html 5 measurement tools, and the table and graph functionality. However, your students cannot fill out the textboxes and submit them. You don't have access to the back-end submission and grading process because you'll need an account for that which is not free: Students have to pay roughly $10 per student per semester for full access to pivotinteractives.
You will also not be able to access the instructor guides that are linked within the instructor view (which you cannot access without an account). Links to the instructor guides are provided below. Needless to say, please don't share these guides with your students!
VISLE 3: NEWTON'S SECOND LAW:
https://docs.google.com/document/d/1hleXPznuDUk5sOk_S7H_f6Pw6bUfqWn0VAZhHXWoaoc/edit?usp=sharing
VISLE 2: NEWTON'S THIRD LAW
https://docs.google.com/document/d/1fq83Y1O-i1rcl1S7zTJ3jTZYlstw6Yr_SGlojmBT66o/edit?usp=sharing
VISLE 4: CIRCULAR MOTION
https://docs.google.com/document/d/1y3ry38E5WrfZQ3SJZhHcOz71TDP1h5-SHxYh8-ZwoF8/edit?usp=sharing
VISLE 1: MOMENTUM
https://docs.google.com/document/d/1pVGLRWQGXUrfkgqgsC9r6AeQZH7YcYG3Jtq7JzmVVs4/edit?usp=sharing
VISLE 5: VIBRATIONS
https://docs.google.com/document/d/1CFg4fiRtDRGg_YP-_swb50GSmT9Nz6yrcS0ahm6Xdpl/edit?usp=sharing
If you have any questions about these, please contact David Brookes dbrookes@csuchico.e

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Daneil H. Lee
22. November 2020.

Michelle Bellinger Did a bit more research and it turns out the chinese actually precede the arabics as well in terms of use of magnetic objects; I attached an artcile for the arabic nations, but couldn't find one for the chinese ideas; if you know someone who know chinese culture, might be a good resource for this as well as I personally can't read chinese, but its important to note that both applications came centuries before being used in Europe.

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Gorazd Planinsic
14. December 2020.

Hi all. Today I am posting a link to the video of a simple experiment that allows you to boil small amount of water in 15 sec by doing work https://youtu.be/gpKFH_UqpW0 . You can use it as an observational experiment in the unit on 1st law of thermodynamics (you can connect it with the story about Count Rumford) or as an application experiment (ask students to estimate the minimum power for a person while doing work on the tube – all data that they need are in the video). I first saw this experiment at the exhibition of the experiments by Stray Cats during GIREP conference in Lund, Sweden (2002) (Stray Cats are Japanese group of physics teachers that often visit AAPT and GIREP conferences).

https://www.facebook.com/groups/320431092109343/posts/845925616226552/?__cft__[0]=AZUwbxGOC3S-P1ejQM6-G028wbrpPiAOwsRr6hioNp6yYZ-xIf2WaMkMoMUgUStJ8ohhVD_bhepEwuIvv1tQ0qKPEPJD6wJ9mYF26DneX8hAJAZQhCFrtjrMxoiSJHXxhAs&__tn__=%2CO%2CP-R

Yuhfen Lin
19. December 2020.

For my class, I use weekly journal to required students to reflect on their learning and have a private channel to talk to me.
For the last week of semester, this is what I assigned:

This is the last journal. Please write about this entire semester of our physics class.
1. What is the most important thing you have learned from this physics class that you think you will be using in the future?
2. What elements of this class have contributed the most of your physics learning? Why?
3. If you could go back in time, what would you have done differently in studying for this class?
4. Is there anything else you want to say to me?
And again, thank you all. This is really a wonderful class. I really enjoy working with you all this semester!

After finish grading the exams, right now I am reading their last journals and seeing their growth from this class.
Do you assign anything like this? What do you ask your students? What did you get from your students for this difficult term?

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Carolyn Sealfon
20. December 2020.

Hivemind: What are solutions to having students demonstrate "sketch" and "diagram" representations online?

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David Harrison
28. December 2020.

One of the many good things about teaching physics as advocated here is the emphasis on discussing and explicitly applying the scientific method throughout the curriculum. I've recently had cause to think further about the scientific method, and in particular the work of Charles Sanders Peirce (1839—1914), whom I hadn't thought about in a long long time.
The issue is how do we collectively decide whether a proposed scientific theory has merit? The answer is that every person is entitled to replicate the data, re-do or criticise the analysis, or to attack the conclusions. Eventually if a consensus is reached that the theory is sound, then the theory is provisionally accepted. So scientific knowledge is essentially a social phenomenon.

Explicitly adding this aspect of scientific validation to the explorations of phenomena in our classes just re-inforces the group dynamic which we are all trying to achieve.
Peirce's writings are often pretty dense. A very nice and accessible discussion of science including Peirce is Jonathan Rauch's 'Kindly Inquisitors'.

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Katie McGowan
31. December 2020.

My school is hybrid, but I have been teaching remotely from home all fall due to a health condition. My superintendent insists that I (and all other teachers who are remote) teach remotely from campus starting Jan 4. My "office" will be the school weight room (don't ask!). Usually I teach momentum before energy, but I am thinking of taking advantage of my environment and trying to do a work/energy/power unit in the weightroom. Does anyone have any materials or recommendations that might be fun to incorporate? The kids won't be in there with me (which would obviously be more fun) but they can still use data from things that I do...
There are the obvious power calculations related to cardio machines, but I am wondering about some more interesting options...taking a slam ball and finding the difference in energy of a dropped ball vs a slammed ball or comparing a bunch of different exercises?

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