

Reinventing & Revitalizing Office Hours: What Would Socrates Do?

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When I was a graduate student at UC Berkeley, I really liked the alternative “office hours” program for Astro 101 students that my fellow graduate student, John Asher Johnson, and I started back in 2001 called The Astronomy Learning Center (TALC). John’s original motivation to start TALC was to help more students more effectively than the traditional serial

approach allowed. By helping groups of students instead of individuals, he could multiply his instructional power. Over the years I noticed several other pedagogical principles that made TALC successful:

- Students learn better by doing a problem than by watching someone do it for them.
- Students can often help each other more effectively than a professor can help them.
- Articulating and explaining a concept solidifies and deepens a student’s understanding of it.

I was so impressed with the TALC program at UC Berkeley that when I became an instructor at Penn State, we recreated the program here.

Instead of the traditional 1-on-1 office hours instruction where professors and TAs reprise bits of lecture and show students how to solve problems, we put students in charge. At TALC, students work with each other in small groups and solve their homework problems together at the chalkboards. TAs and professors observe and intervene as little as possible—only when necessary. When students are stuck and really do need help, the goal of the instructor is to engage the group in a Socratic dialogue, asking probing questions to find out where they are stuck and help them move forward. This is a difficult task for instructors, harder than lecturing, and doesn’t come naturally for most of us who are used to just giving the answer when we know it. It’s hard to withhold an answer when your instinct is to give it AND the student is begging for it. To prepare our TAs for this, we either hold a 1-2 hour training session at the beginning

of the year before they ever set foot in TALC, or have them start by pairing up with an experienced TALC instructor to observe and be mentored before setting out on their own. Ideally, we would do both. Training and practice is crucial because it instructs TAs in subtle implementation details, such as leaving a group as soon as it’s moving again so they don’t become reliant on you, recognizing and engaging a non-participating group member, or recognizing and using to your advantage a dominant group member.

Here are THE RULES OF TALC, posted on the wall in big bold type:

1. **Teachers don’t give out answers. We will help you figure out the answers.**
2. **Teachers won’t look at your paper. All work should be done on the boards.**
3. **Teachers won’t write on the board. Students write; teachers erase.**
4. **Students working at a board and in groups will receive priority assistance.**
5. **NO COPYING the work of others.**
6. **Help tax: if you receive help on a problem, you may be asked later to help your peers on that problem.**
7. **If teachers are busy, ask your fellow students for help!**

NOTICE:

- **No pens or pencils allowed**
- **All work is done at the board**
- **Boards will be frequently erased**

These “rules” may seem overly strict, but...

These notices let students know what to expect, so they are not surprised when a TA behaves accordingly. (The last three are important for avoiding copying.) TAs report that having these rules posted makes it much easier to enforce them. They can just point at the wall and say “Sorry, that’s the rule.”

Implementing TALC is a lot of work. It requires training TAs and instructors, regular access to a room lined with boards, 2 or more hours of weekly staffing, and buy-in by professors to advertise and sincerely encourage students to go. But the rewards make it worthwhile: As students recognize its utility and word spreads, attendance will exceed that of office hours. TALC is currently drawing over five times as

many students as traditional office hours, so it definitely meets John's original goal of helping more students. Students who attend, both strong and weak, will perform better on their homework and have increased understanding. I also believe the training the TAs are receiving is vital to their own professional development. Whether they become educators or other non-academic professionals, they will need to learn how to interact and communicate with a non-technical audience.

When I walk into the TALC room and I see a group of four students all at the board engrossed, gesticulating and talking over one another about a problem, and a TA standing back and monitoring three such groups, I'm thrilled. Now that I have seen how much more effective TALC is than my traditional office hours, I would feel guilty not providing this resource for my students.

Astronomy in Unexpected Places: Pop Culture and *The Big Bang Theory*

Columnist: Sara Mitchell, Goddard Space Flight Center



As I've written many times in my column in Spark's feature section *Astronomy in Unexpected Places*, relevance is absolutely crucial to hooking your audience. I try to look at every education and outreach project or product from the perspective of an audience member, and ask, "Why should I care?" This is the question that your audience may be asking, even just in their

heads, and you should think about it in the developmental stages of any content. It can be very difficult to engage the audience without making a personal connection to the content you're providing, especially when your audience isn't particularly science-interested. This is why I look for real-world connections, human stories, technology links, and other angles that let me respond, "This is why you should care!"

Some content makes it easy to find that connection and make it relevant to the audience. In my experience, relevance seems to decrease with distance. The closer an object (or concept) is to Earth, the more likely it is that we've explored it and that it has a direct impact on or connection with mankind. But as you start talking about more distant things in astronomy—other stars, other galaxies, distant black holes, extrasolar planets—that straightforward connection to *us* gets weaker. Sometimes I'm left scratching my head, wondering, "Where's the hook?"

How about... popular culture? There's plenty of astronomy in pop culture, and not just in science fiction. There are candy bars and cars named after various astronomical objects, songs about space travel and exploration, and plenty of television shows and movies that portray astronomers and astronomy (with varying degrees of realism). It's out there, and you don't even have to look very hard for it. But the important question is: How can you take advantage of it?

I produce NASA Blueshift, a project out of Goddard's Astrophysics Science Division that provides a "behind the scenes" look at what's going on in astrophysics through blogs, podcasts, social media, and more. Last summer, we were interviewing Britt Griswold, the designer of an educational beach ball imprinted with data from the Wilkinson Microwave Anisotropy Probe (WMAP). In the interview, he mentioned that the beach ball had been spotted on the set of the CBS sitcom *The Big Bang Theory*—it's in the background of one of the main sets, and it's been in nearly every episode for the past four seasons. We contacted Co-Creator/Executive Producer, Bill Prady, for a photo we could use of the ball on the set, and we got a whole lot more than we'd expected—a visit to the set to take the photographs ourselves, and a podcast interview with Bill about the science in the show and what they do to get it right!

When we'd started working on the interview about the beach ball, we were just going to use it as a fun little story about an unusual educational product. Thanks to the pop culture connection, it quickly became something much larger—a series of blog posts, a podcast, and a NASA web feature that was picked up by news outlets worldwide. Demand for the

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