Teaching the Public for Fun and Profit: Getting Hooked on Public Outreach at the University of Chicago

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Overview

- Setting the context
- Outreach at existing places
- Outreach through existing programs
- Starting my own programs
- Lessons learned
- Status now

Goal: by hearing about my experiences, you’ll learn something to apply in your world.

http://spider.ipac.caltech.edu/staff/rebull/
“If I could explain it to the average person, I wouldn't have been worth the Nobel Prize.” -- Richard Feynman
This is *not* an acceptable attitude!!!!
Some sciences have it easier in reaching the public … e.g. every little kid wants to study space and/or dinosaurs…

My degrees are in astronomy and physics, and I’m also a webmaster (the first site I designed was in 1994).
Context: UofC

- Private school, founded 1890-91
- ~13,000 students, only ~4000 undergrads
- Gothic…
- *Deeply* theoretical (and education dept actually disbanded!)
- Urban campus
- …Ivory towers!

http://www.uchicago.edu
Context: UofC

- Physics Dept – ~50 profs, ~110 grads(!)
- Astronomy Dept – ~30 profs, ~50 grads
- Physical sciences grad students are paid – RA (research) or TA (labs/grading; at UofC, more teaching than W&M grad students, but not as much as in other state schools)
- In astronomy, funding ~guaranteed
- In astronomy, quality (not quantity) support for EPO

Outreach at existing places

- Walk in and donate your time.
- Let someone else worry about framework.
First planetarium in western hemisphere
Commitment to research – UofC, NWU
Volunteer corps, plus professional astron
Special events corresponding to astronomical events (eclipses, etc.)
One example:
  Web was new, with ~1400 images available

Lessons from EPO at Existing Places

- Volunteering (e.g. at a museum) for a special event – takes an evening or day, may get a free t-shirt!
- Minimal work for the volunteer – infrastructure, context already in place.
- People pay up front – different expectations.
- More informal type of education.
- Get to enjoy the “a-ha moment” – without grading! But only one chance to get it right.
- Nice entry-level way of getting hooked into EPO!
Outreach through existing programs

- Framework for finding students.
- Framework for finding instructors (and possibly paying them).
CARA=NSF STC, funded 1991 (for 10 yrs, $3M/yr), to “establish an observatory at the South Pole and to pursue a set of astrophysics research projects which exploit the unique advantages of the high Antarctic site.”

- Required strong EPO component (still 1% $).
- Office of Special Programs (OSP) @UofC – 30-year-old effort to prepare educationally disadvantaged minority youths for college.

→ Space Explorers program

http://astro.uchicago.edu/cara/
Space Explorers

- CARA established grad student teaching assistantship (TA) in astronomy.

- Three examples:
  - Comet impacts – different world!
  - Electronics class – abstract thinking
  - Website – virtual tour
Virtual Antarctica
Space Explorers today

- 60% come from inner-city public schools
- 90% go on to college
- 54% are MSET majors
- Program taken over by CfCP and still going strong!

http://cfcp.uchicago.edu/ -- R. Landsberg, director of education and outreach
Lessons from EPO through Existing Programs

- Personally, I learned about tremendously different learning styles, environments. Not a traditional TA, not just the rich smart kids, and I got to design lesson plans. (CARA funded me for multiple years too.)
- There is a wealth of existing EPO – don’t reinvent the wheel.
- Increasingly, NASA and NSF require an EPO component in proposals.
- Make points with funding agencies when you leverage efforts and work with existing projects.
- Working with (or through) existing projects help with infrastructure, including TAs.
Starting my own programs

- Saw a hole and filled it.
- Learned from previous two experiences.
CUIP and Science Partners

- Two related projects I helped found in 1996-97.
- DuSable project (B. Brown, M. Mac Low, D. York) – networking 1 school.
- Du Sable teachers: now what?
- Coincided with several grad students looking at the dwindling job market and wondering how to learn how to teach, fast, and in practical (not theoretical) terms.

http://cuip.uchicago.edu
Science Partners

- Established one-on-one graduate student / teacher partnerships for curriculum development projects.
- Developed a relationship in which the graduate student gains an inside look at teaching while the teacher gains a source of current scientific knowledge. Partnership of EQUALS!
- Communicated electronically to create a project of the partners’ own design over a quarter. (DuSable teachers plus other volunteers.)
We didn’t necessarily work with students. (Legal issues preclude being left alone with kids.)

We didn’t do science fairs.

Tremendous diversity in partnerships.

Average of a few hours/week (electronic communication makes this possible).

Most important thing I learned in my partnership was KWLs.

VERY well-received by teachers according to evaluators.
CPS/UofC Internet Project = CUIP

- Networking the 3 public high schools around the University and all their feeder schools. (A T-1 to each of 29 schools!)
- 1100 teachers, reaching 16,000 students.
- True partnership between CPS, UofC.
- Didn’t just bring in the wires and leave.
- Goal of fostering *self-sustainable computer cultures* in each of the schools.
- Working **WITH** the CPS, teachers to achieve common goals…

http://cuip.uchicago.edu
CUIP initiatives

- **Infrastructure.** Wiring, power, computers.
- **System management/maintenance.** Troubleshooting, administration.
- **Training.** Individuals and groups, specific skills and/or technology integration.
- **Classroom technology integration.** Curriculum development.
My role in CUIP

- TAship to help support curriculum, training end of things. (Other TAs too, across University.)
- Started programs, liaisons between other institutions and CUIP schools.
- Coordinated growing organization, solved problems.
After the first year

- Schools really surprised we were still there and working hard.
- Teacher partners from Science Partners disappeared, despite giving rave reviews to the evaluators.
- Terribly discouraging!!
- Insight from former CPS principal… “this project is too good for us” (!)
CUIP today

- 12 FTEs, many more part-timers and volunteers.
- Technology Resource Advisors – full-time CUIP employees, advisory and training roles in schools.
- Web Institute for Teachers – 4-week intensive summer training for teachers, curriculum development, not just CUIP teachers.
- Digital Library.
- Web Docent Project – working with museums.
- Neighborhood Schools Program: Classroom Project and Technology Support (partnerships!)
- Student Computer Club support.
- Technology Fair, Principal’s Advisory and Leadership Group, …
CUIP funding

- Initially, Joyce Foundation, ~$800K over 3 years. (Renewable every 6 months.)
- Now, $1.2 million budget
  - ~$428K from CPS
  - ~$450K in-kind from UofC
- Initial 5-year mandate (would expire June); now extending basic mission 1 more year.
- Other funding includes State of IL, museums (MSI, Adler, Field, OI), and other organizations ($$ and 1200 computer donations)
My benefits from CUIP

- Funding for (another) 1.5 years!
- Thrown into “real world” problems, interactions. (Run meetings; networking [both sorts]; non-academic world; sensitivity to perceptions, politics [incl. city-level]).
- Became part of community.
- Met lots of gifted, dedicated educators facing the impossible.
My Big Lessons Learned

- Respect for educators!
  - Do research into what’s gone before.
  - Get at least one on your team.
- Hire evaluators. Helps with funding, future planning.
- Make powerful allies. Hold onto them.
- Have patience with inertia of large institutions.
- Teamwork between ivory towers and community can move mountains. Need support from everyone (CPS, UofC, Astro).
CUIP lessons learned

- Principals of schools central to all change. Establish strong trust relationships, early.
- Patience with the pace of change! Takes time and a medium-term (~5 year) commitment.
- Get teachers involved in initiatives, else they will feel put upon and reject your proposals. They have heard enough from “the experts.”
- In-school technology coordinators are key to success. There should be 1 TC per 500 students.
CUIP: other thoughts

- Close partnership with principals – retreats and visits. Educate and support them. Retreats/visits lent air of importance to CUIP, created positive attitude, respect, and trust.
- Monitoring and tracking – track your progress and the schools’. Focus efforts based on what you learn.
- Patience – “CUIP was there through the good and the bad times.” Listen to schools, work with them. One size does not fit all.
- Communications – make sure email and web services are reliable.
- School year rhythm, capacity for change – e.g. when is best time to approach school with new initiatives?
- Insider/Outsider status – Do not stand in judgment, develop trust relationships. Common interest in education, but different worlds.
- Challenge of sustainability – ultimately, work with them for self-reliance.
Starting your own program

- Look at what has gone before:
  - In your community
  - On the web
- Enlist others (educators!) as equal partners.
- Make it really easy to volunteer, and/or fit grad students into traditional TA model.
- Tie to realities of job market.
- Single-shot deals to classrooms don’t cut it. (See Project Astro, STScI resources.)
Epilogue: Post-CUIP Era

- Burnout. Serious burnout. And I really needed to graduate. Did web development to get out.
- Postdoc: decided to try being an astronomer!
- Small items, e.g. talks, press releases, email.
- SIRTF – NASA owns me right now. L-46d. (I’m shared by MIPS and OST.)
- BUT, my [CUIP] experience in multitasking was crucial to my getting this SIRTF job.
- Real life isn’t 100% research. *EPO TAs (especially CUIP) were real life training.*
SIRTF EPO

- Space Infrared Telescope Facility (SIRTF) – strong interest in infrared
- Infrared zoo– what does an alligator look like in IR?

- Ball before and after being bounced

More information & Acknowledgements

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(*) Available via email for questions.