NITARP Summative Evaluation Report: 2013 Class

http://nitarp.ipac.caltech.edu/

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"This program has been the greatest professional development experience of my life."

– NITARP Participant

What is NITARP?

NITARP, the NASA/IPAC Teacher Archive Research Program, **provides educators with an authentic astronomical research experience**. We partner small groups of educators with a mentor astronomer for a year-long original research project, during which the teams echo the entire research process: writing a proposal, conducting research, writing up and presenting the results at an AAS meeting. This program differs from other programs that we know of that get real astronomy data into the classroom: (a) Each team works on an original project. (b) Each team presents their results in AAS posters, in science sessions. (c) The 'product' of each project is the scientific result, not curriculum. (d) Teachers involve their students throughout the program. As part of quantifying NASA Astrophysics E/PO Impact, we report here on our summative evaluation of the 2013 NITARP class; their intensive work ran from Jan 2013-Jan 2014. The findings are highlighted below, but include the conclusion that **NITARP is an invaluable authentic research experience that clarifies for educators the true nature of scientific research**.

NITARP's Goals for Educators:

Provide a professional development experience for teachers that enables them to experience the real research process, through which we deepen their understanding of the nature of research and ultimately affect their current and future students via changes in their teaching styles.

The Numbers Over A Decade

- Posters: 45 science, 52 education
- Refereed articles: 7 astronomy, 2 education
- 93 educators from 37 states
- ~250 students (gr 7-13) travel to AAS and/or Caltech
- NITARP educators teach ~21,000 students/yr
- ~4,300 other educators reached with NITARP information

2013 class summative evaluation results

Summative Evaluation

We recently formally evaluated just the 2013 NITARP class (18 educators) in detail, to determine both the cognitive and affective impacts of NITARP on educators, with a specific goal of assessing impacts on teaching. There were 5 separate rounds of data collection (interviews and surveys): pre-program, Spring, Summer, Fall, & post-program. The poster below this point reports results from this summative evaluation.

NITARP @ 2014 winter AAS – 2013 class finishing up (teachers+students), 2014 class starting up (teachers), and many self-funded alumni (teachers+students).

Goal: Provide a professional development experience

- Class participants reported that **NITARP was unsurpassed** as a professional development experience.
- Clear personal and professional growth reported at every stage.
- NITARP met/exceeded expectations for 17/18 participants, successfully **fulfilling all motivations and expectations**.
- Educators wanted an **intense professional development experience**, and that is precisely what they got. Challenges were incredibly rewarding to all participants and in some cases, the impact described as "recharging mental batteries" and helping them remember why they love science.
- *"This was professional development beyond what I could ever have accomplished in my career alone. I have new professional relationships; new friendships. This program has been the greatest professional development experience of my life."*

Goal: Affect current and future students

- Students were not directly a part of this evaluation, but impacts could still be revealed via conversations with educators.
- NITARP provides an **important social and eye-opening experience for student participants**.
- Students and teachers alike realized that **scientists are "normal people"** with senses of humor, hobbies and other interests – an outcome especially important for students whose perceptions of "scientist" were completely changed by the experience.
- Students also saw first-hand that science is **not as cut and dried** as their textbooks convey.
- Students also **gained social skills and self-confidence** as a direct result of being given the responsibilities they had in their projects, and having to work in teams with people they didn't know.
- **Suddenly the world of scientific research is a lot closer and tangible**, and the educator can share with future students the intangible aspects of it like personalities, excitement, struggles, breakthroughs, etc. from first-hand knowledge.

Goal: Deepen understanding of the nature of research

- NITARP is an **invaluable authentic research experience** that clarifies for educators the **true nature of scientific research**.
- Participants entered the program with positive perceptions of science research, what it takes to be a scientist, and what it's like to do science, which rendered any progress in these areas difficult to achieve and measure.
- Some evidence that they absorbed idea that research is highly collaborative.
- *"The biggest message you take away from this is that real scientific data is not perfect, it's not exactly the way they show you in the books. It's going to be ugly and you're going to have to evaluate data and verify that it makes sense. That's something that's not well-taught without experiencing it."*

Goal: Change teaching styles

- NITARP **reminded educators of what it's like to be a learner struggling with difficult content**, engendering empathy for students and improving teaching practice.
- NITARP resulted in **great increases in their confidence in science knowledge and their motivation to learn and teach.**
- NITARP provides educators with an incredibly rewarding and inspiring **learning experience that translates into more enthusiastic teaching**.
- The missing link for even these well-educated, highly motivated educators was the **first-hand experience**. Telling students words is one thing; passionately sharing a personal, life changing experience makes the facts come to life, and **this is where NITARP excels beyond any other intended or unintended outcome**.
- NITARP **changed teaching practices or methodology for STEM** and the nature of science. Primary change-factor was becoming comfortable with open-ended questions and realizing that "real science" is messy, and that's okay.

"I just wanted to let you know that this 38 year veteran teacher believes [NITARP] is one of the greatest types of professional development I have ever done."

"You and this program (NITARP) have been truly remarkable and has already changed my life forever. I'm just waiting to see what happens next."