

Pre-Service Educators Working Group Telecon  
February 17, 2005

Attending:

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Agenda items:

- Outcomes of January AAS meeting
- March Pre-Service Meeting in Houston in conjunction with LPSC

Outcomes of AAS

- AAS education sessions were well-attended
- Session attendees expressed interest in identifying items that pre-service teachers need to know and covering these items in their courses, along with a desire to learn what resources are available. Additional topics of interest included distance learning, and linking astronomy with language arts, art, music, science fiction, etc.
- Two members of the audience volunteered to join this working group as a result of this presentation: Carlton Pennypacker, Ph.D., Research Physicist Astrophysics Group, PI, Hands-On Universe.

Several comments were voiced at the AAS pre-conference E/PO workshop regarding strengths and needs that apply to preservice-focused E/PO efforts:

- Lots of expertise is available...but access to this expertise is not well distributed. There are many underserved communities. Access to science for students with disabilities is particularly challenging.
- Enabling technologies to facilitate outreach and involvement of diverse and special need communities is available...however, many who need these technologies are not aware of them, do not have access to them, and need training before they can successfully use them. [One example cited here was the virtual observatory project.]
- Individuals present reflected a wide variety of experience doing space science E/PO... need to find a way to encourage and keep active those who have been successful with E/PO projects—so that events are part of a sustained effort.
- Many of the federal astronomy and space science research centers in the region support special regional programs... however, there appears to be a lack of connection between the federal facilities' regional initiatives and existing regional resources.

Future Directions Emerging from Observations of AAS Sessions

- In transitioning from the topics of AAS to upcoming conferences, the group noted

- astronomy professors are frequently inundated with requests from teachers and others for classroom materials, and
- new teachers are often presented with materials that they did not encounter in their classes and that they do not know how to implement (GEMS and FOSS frequently fall into this category as many college instructors are reluctant to incorporate commercial products in their pre-service classes)
- The pre-service educators working group might be able to respond to this situation by providing introductory astronomy instructors with prioritized content and materials that could be provided to pre-service and new teachers – the goal here would not be to endorse one product over another, but to identify a selection of content and materials that hangs together and works well with the pre-service community, e.g. materials that are easy to work with when one is just starting out, and that can be used separately or together.
- Trends for coherent & modular materials etc. are emerging:
  - GEMS Space Science Core Curriculum Sequence will provide a natural flow of activities over a 6 to 8 week period; educators can use portions of the sequence
  - SETI Voyages Through Time (VTT) curriculum is a yearlong piece with six independent modules. These are all delivered electronically, and allow educators to pick and choose material.
  - Education Forums have put together daylong short courses & multi-day workshops that allow educators to experience a variety of content and activities within the overarching context of earth and space science
- Such a selection of content and materials would have to consider the needs of a range of clientele. Scientists prefer small modular materials that can be inserted in their curricula, as opposed to larger pieces with a lot of structure. Instructors at community colleges might want more structure than those at larger universities.
- Community colleges are a strong focus of the Center for Astronomy Education program initiated by the Navigator public engagement program at JPL. Workshops etc. held so far as part of this program indicate that the pre-service education is a strong draw for this community

#### March Pre-Service Educators meeting in Houston

- Audience includes the working group, pre-service faculty, in-service teachers, pre-service teachers, and scientists, with around 40 participants expected – the attendance may be lower than the usual 60-70 due to the large number of concurrent conferences this year
- The group is charged with developing recommendations on the role of earth and space scientists in pre-service education; the primary focus is to build an understanding of what's needed based on input from those who need it
- The conference includes three pieces – developing an understanding of:
  - Programs etc. that are already out there
  - Ways space scientists have been involved in pre-service education
  - The needs of the broader audience of pre-service education and scientists
- In response to questions about whether the scope was too broad and ambitious, working group members noted that it is important to learn about

- The ways in which the community is currently preparing undergraduate and masters students – what are the current constraints and issues? Note: elementary & high school teacher preparation is different
- The barriers and rewards that scientists have encountered in ongoing programs – How and why did they get involved? What are the needs of the community? What is and is not working?
- How can space scientists fit in – what are the needs of the community? What is the impact that they are seeing? Note: Evaluation efforts in place will not be able to measure the impact of NASA programs, but may be able to identify holes in current programs that could be filled with NASA programs. Defining and measuring impact is a huge effort.
- Considerations from known college programs:
  - Middle school often combines earth and space science. Better alliances between earth and space science may offer a solution. For example, the University of Washington is considering a quarter course that covers the “highlights” of earth and space science.
  - University of Washington offers graduate certification in education only – there is not an undergraduate major in education. Students pursuing education are advised to seek a chemistry or biology background, but not an astronomy/earth science background.
  - At the University of Arizona, Larry Lebofsky has offered a one-credit methods course on including astronomy in the classroom. The course is no longer offered as the credit system has changed and students no longer have room to take it. In general, offering a 3-credit course may not be the best solution; it may be better to integrate NASA content into existing courses
  - All pre-service educators take a science methods course – it may be possible to work an introductory experience (e.g. 3 hours) into those courses. The group discussed using those types of opportunities to teach pre-service educators “how to fish” – the process of integrating NASA materials & science content into their teaching and how to find/learn more, as opposed to just giving them materials
- The list of panelists for the meeting was reviewed, with additional suggestions provided.

#### ASP abstracts

- Based on the above discussion, the group agreed to submit an abstract for a session at the ASP meeting designed to examine ways to provide a thematic introduction to space science content and materials for pre-service educators, e.g. focusing on NASA materials that work well and techniques for integrating earth and space science materials into classroom teaching
- The group also discussed proposing a 30 minute session designed to get the issues surrounding pre-service education on the table, i.e. an information gathering session that would complement the work initiated at the Houston meeting. This could include a panel discussion with pre- and in-service teachers, with the in-service teachers providing insights into what they wish they had encountered in

their coursework – in retrospect, what would have helped them with what they are encountering in the classroom.

#### Closing Comments

- Two level certification is coming in some states; in Washington, teachers have to go back and get their masters within 5 years of certification
- NSTA is providing on-line, self-paced professional development programs
- Montana State University on-line programs have been oversubscribed

#### Action Items

- Advertise March conference & firm up participants
- ASP abstracts