

Group Report: Physics Education

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Aims of the group:

- to advise the National AIP Council on educational matters
- to be responsible for the Education program at National Congresses
- to provide a communication channel by which AIP members in each state, concerned about Physics Education, can communicate with each other, on educational issues
- to develop a network of university physics societies to benefit undergraduate and postgraduate students
- to encourage State branches to conduct special workshops on science education and in-service training courses for teachers
- to have a special concern for the popularisation of science
- to be aware of what is happening in Physics Education outside of Australia, and to investigate the possibility of bringing workshop speakers from interstate/overseas
- to establish an on-line resource for physics teachers around Australia
- to develop a program of activities and support for teachers of physics in both the secondary and tertiary sectors
- to provide feedback to high school teachers on the strengths and weaknesses of the current curriculum materials
- to ensure that at each Congress there is at least one overseas Physics Education plenary speaker, sponsored by the national AIP
- to advise the Congress committee on the names of suitable Physics Education plenary speakers.

Activities for January, 2012 – January 2013:

- 2012 AIP Congress Physics Education stream
Sessions were well-attended and generated discussion.
AIP Education Medal awarded to Manju Sharma.
General Meeting of PEG held, with elections to the positions recorded above.
- Discipline-specific Day as adjunct to Australian Conference on Science and Mathematics Education
Workshop progressing group development of agreed academic standards (Threshold Learning Outcomes) specific to Physics. Chair of Workshop – Margaret Wegener

- Development of Threshold Learning Outcomes for Physics

With changes in regulation and the establishment of TEQSA, there will be development and deployment of nationwide teaching and learning standards. This group has engaged in a process of developing standards that the physics community agrees on. Some financial support from the Australian Council of Deans of Science enabled face-to-face discussions amongst a small group, from which a Draft Statement of Learning and Teaching Academic Standards for Physics was produced in late 2011. It used, as a basis, general Science Threshold Learning Outcomes, and those specific to Chemistry, developed by other academic groups. In 2012, development progressed through several different strategies and document revisions. Considering that it will be compulsory for institutions to conform to the TEQSA standards, it would be useful if the AIP Accreditation process and the TEQSA framework were aligned - discussions with the Chair of the AIP Accreditation Committee have resulted in general agreement. Through the PEG email contact list, members were invited to offer suggestions for revision. A Workshop at ACSME, with contributions from about 20 members, used discussion about what makes physics graduates unique to check and refine the proposed standards. This version was distributed to all Heads of Physics in Australia with a request for feedback from their institution (and with notification that unless heard otherwise by the deadline, approval of the Physics TLO's document in its current form would be assumed). Responses to these comments were incorporated. The resulting document was presented as an invited talk at AIP Congress.

- Input into National Curriculum for Schools

A small group of members had direct discussion with the organiser of the revised Senior Secondary Physics curriculum (facilitated by Australian Council of Deans of Science)

- Collaborative research

Group project: "Advancing science by enhancing learning in the laboratory (ASELL)", which includes Physics component. Participation in ASELL workshops by PEG members.

- Publicising of opportunities

Email notifications of workshops, conferences, funding opportunities, etc related to physics education, sent to list of 170 interested persons.

Planned Activities for 2013

1. **Discipline-specific Day** as adjunct to **ACSME**. The PEG is likely to host a satellite meeting to this Australian science education conference
2. **Application for funding** to support physics education network. A number of individual science disciplines in 2011 gained funding for setting up networks for educators in their fields. Although unfunded, the Physics Education group has been participating in some discussions with leaders of other science/mathematics education networks and in ACDS-sponsored events. Discussions to develop a proposal and preliminary work on writing a funding application to the Office of Learning and Teaching has already occurred
3. Update PEG content on AIP website

Summary Activities for 2013

1. A **discipline-specific roundtable was held as adjunct to ACSME 2013**. The theme of presenters and discussion was about how the Physics education community can best respond to the various accreditation processes (AIP, TEQSA, etc). The discussion produced several concrete proposals which were documented and are being summarised and distributed to attendees for comment in coming weeks. Most attendees seemed to agree that a pro-active approach amongst Physics educators will allow us to use the process to further our collective aims, and that a strong network is an important part of realising this.
2. An **unsuccessful application was made to the OLT for funding** to support a Physics education network along the lines of previously funded networks in Biology and Chemistry. Although the application received high rating from reviewers, it was refused on the grounds that a substantial amount of money has already been allocated to 'science networks. The Australian Council of Deans of Science (ACDS) have agreed to support certain aspects of the Physics Education Network (e.g. the development of Threshold learning outcomes, space on the ACDS Learning and Teaching website).
3. A **Physics Education Network blog** was created and updated on an ad-hoc basis with material of interest to the Physics Education community. The mailing list has been updated and several emails sent to members to draw their attention to the blog as a repository.
4. The Threshold Learning Outcomes (TLOs) were developed and integrated into the ACDS science threshold learning outcomes process. Preliminary discussions were held with some AIP office bearers to examine the possibility of harmonising the TLOs with the accreditation process.

Planned Activities for 2013

1. Update PEG content on **AIP website and provide links** with PEG blog and ACDS Teaching and Learning website.
2. Organise the **Education components of AIP Congress** along the lines of previous years.
3. Pursue **alternative sources of funding**, e.g. through ACDS.
4. Continue to build the Physics Education Network, specifically by
 - a. Disseminating the suggestions arising from the ASCME discipline day
 - b. Extending and more actively updating the PEN blog
 - c. Identifying **interested early career academics** and introducing them to each other, e.g. via Google hang-outs
 - d. **Borrowing strategies** from successful networks in other disciplines, e.g. RACI/ChemNet
 - e. Using the AIP congress as a focal point of networking activities
5. Resolve discussions around **integrating TLOs with the AIP accreditation** process