

**METEOROLOGY WEEK
DURING PLYMOUTH STATE UNIVERSITY'S
PAKISTANI TEACHERS INSTITUTE**

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1. THE PAKISTANI TEACHERS INSTITUTE

For the second year in a row, Plymouth State University (PSU) hosted the Pakistani Teachers Institute (PTI) during the summer of 2005. The PTI is a five week program with the goal of helping secondary school teachers from Pakistan to enhance their subject knowledge, pedagogical skills and disposition toward new ways of teaching science and mathematics.

The Institute is funded by a grant from the U.S. Department of State, Bureau of Educational & Cultural Affairs and is a direct response to a recommendation from the 9/11 Commission Report to "... strengthen long-term U.S. and international commitments to the future of Pakistan..." (Kean *et al.* 2004).

The participants were divided into two strands of professional development (science or mathematics) according to their interests and teaching responsibilities. Figure 1 shows a picture of all of the 2005 science participants. The first three weeks were spent on intensive experiences related to various relevant subjects, which, in the case of the science strand, consisted of Meteorology, Physics, Chemistry and Biology. The last two weeks were used for developing leadership skills and learning techniques for English vocabulary improvement by using scientific content. Also, throughout the five weeks, they were involved in heritage studies, where they explored how their environment, culture, history, etc. can be used, not just to cherish their heritage, but as teaching tools.

2. METEOROLOGY WEEK

The first week of the program was designated as Meteorology Week. Of the four targeted



Figure 1. Author and science strand participants of the 2005 Pakistani Teachers Institute. Picture was taken at the observation deck of Mount Washington National Park.

subjects, meteorology is the only one that does not correspond to a core subject in the Pakistani science curriculum, but it is part of "general science", which is taught as a separate subject. The activities of the week took advantage of the PSU Meteorology Program and facilities to introduce the teachers to a wide range of experiences, such as the use of meteorological instrumentation and TV weather. Figure 2 shows one of the participants in the TV studio.



Figure 2. Uzma Hafeez discusses Pakistani weather in the Judd Gregg Meteorology Institute TV studio.

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The teachers learned how to decode weather observations and draw station models. They learned about atmospheric instability and how to determine it using environmental lapse rate. They measured temperature at the base and summit of Mount Washington, in the White Mountains of New Hampshire, then calculated lapse rate, determined instability and correlated with the conditions observed during our visit. Figure 3 shows them taking measurements.



Figure 3. Shazia Bahir, Sarwari Begum and Nasreen Begum take temperature measurements on top of the observation tower at the summit of Mount Washington.

The main feature of the week consisted of pedagogical discussions aimed to expose the teachers to new ways of improving their teaching, such as active learning exercises and classroom demonstrations. The concept of learning styles was especially eye opening for most of them. The teachers were then asked to choose a meteorology topic and prepare a lesson plan and twenty minute class where they had to incorporate as many of these concepts as possible.

Many of them chose to prepare PowerPoint presentations, which gave them the opportunity to improve their computer skills. Some had never used a computer before, making it very challenging, yet very rewarding to prepare their presentations.

At the end of the week, the teachers had become familiar with meteorological instruments and concepts, with high and low tech tools and with new pedagogical ideas and had come up with ideas on how to introduce these new concepts in their own schools.

3. USING LIMITED RESOURCES TO TEACH METEOROLOGY AND OTHER EARTH SCIENCES

The amount and type of resources available to schools in Pakistan varies widely. A few schools, especially in more affluent areas, are better equipped. But it is not unusual to have a school without blackboards, without electricity or without walls, never mind appropriate lab equipment. It is also not unusual to have classes as large as 80 students. Therefore, it is very important for teachers to develop techniques to deal with the lack of equipment and other resources.

The participants were encouraged to think of ways to enhance their teaching without the need of sophisticated technology. Some of the ideas specific to atmospheric sciences included:

- taking the students outside to learn about cloud classification
- learning about the climate of the region
- explaining the weather conditions occurring outside
- discussing and explaining the science behind current relevant topics such as air quality, global warming, etc.

Other ideas, not specific to meteorology, included:

- using materials from the surroundings, such as rocks, water, etc., to do demonstrations
- create games where the students act out a certain concept
- discussing and explaining the science behind current world events, such as natural disasters, Nobel prize awardees, etc.

4. OUTCOMES

The long term outcomes of this program are yet to be seen, but in the short term, all of the participants left with a new sense of purpose, motivated to be better teachers. Many left with the intention of starting local programs to share their newfound tools with their fellow teachers.

There are also plans for follow-up activities and post-training seminars and discussion forums, but they have not been implemented at this time.

The Pakistani Teachers Institute has been a great learning opportunity, not just for the Pakistani teachers, but also for the PSU faculty and staff, who learned that beyond our profound cultural differences, we all have the same goals of providing the best possible education for our students.

5. AFTER THE EARTHQUAKE

On October 8, 2005, a deadly earthquake (more than 79,000 killed) of magnitude 7.3 affected Pakistan. Figure 4 shows the location of the epicenter. The damages due to this



Figure 4. Map of Pakistan courtesy of the USGS. The epicenter of the earthquake, marked with a red arrow, was located 105 km NNE of Islamabad.

earthquake are extensive and far reaching in all aspects of life in Pakistan. From communications with Pakistan's Centre for Education and Consciousness Public Trust, PSU learned that up to 20% of the school age population (ages 5 to 18) has been lost in the hardest hit areas. Taking into account the loss of many teachers and physical infrastructure (95% of all schools destroyed in some areas), it is clear that the disaster will have a long-term impact in education.

From Personal communications of various PSU faculty members with the School Improvement Network of Pakistan (SINP), we have learned that the main focus right now is the revival of the educational process in the affected areas. Many Institute alumni have expressed their interest in being part of this rehabilitation phase.

In response to the disaster, Plymouth State University has setup a relief fund to help support the immediate humanitarian needs. Also, a fellowship is being developed to allow Pakistani teachers come to PSU as graduate students with the intention of help support the long-term process of rebuilding the educational systems of the affected areas.

As of the writing of this document, several of the 2004 and 2005 PTI participants have not been accounted for.

6. FUTURE OF THE PROGRAM

At this time, plans for the 2006 summer Pakistani Teachers Institute are being discussed with the U.S. State Department and Pakistani officials to determine if it is appropriate to postpone it.

7. REFERENCE

Kean, T. H., L. H. Hamilton, R. Ben-Veniste, B. Kerrey, F. F. Fielding, J. F. Lehman, J. S. Gorelick, T. J. Roermers, S. Forton and J. R. Thompson, 2004: The 9/11 Commission Report: Final Report of the National Commission on terrorist Attacks Upon the United States. U.S. Government Printing Office, 585 Pages.