

Lessons learned and unlearned: A lifelong journey with 'Active Learning' as a constant companion

The lifelong journey from a post-graduate student, who did some part-time teaching, to a retired physics professor can be long and very rewarding – especially with Active Learning by your side as a constant companion. This talk discusses the key milestones in my progression from a 'Sage on the Stage' to a 'Guide on the Side'. The journey from 'teacher-centred' traditional lecturing (based on logic, enthusiastic presentation, and personal control) to 'student-centred' active learning (where students are given opportunities to confront and correct their physics misconceptions) involves a very winding path, with several dead ends. To successfully navigate such a difficult path requires a clear bearing and a good compass. In my case the 'bearing' was the belief that active learning was an effective way of teaching, and my 'compass' was physics education research (PER), which I used to guide me in determining the efficacy (or otherwise) of my active learning interventions. This talk will illustrate my active learning journey via some examples of my traditional demonstrations and interactive lecture demonstrations (ILDs). The talk will also show how PER helped me modify ILDs to become more effective teaching tools.

Active learning is a 'teaching and learning' philosophy that is best shared—with students and with other teachers (from my own university and beyond). As a member of UNESCO's Asian Physics Education Network, I was able, along with colleagues (Minella Alarcon and David Sokoloff), to introduce active learning to our Network, and then to many teachers throughout Southeast Asia via hands-on, minds-on, Active Learning Workshops (ALWs) in physics. Later we focused our attention on applying the active learning philosophy to one particular branch of physics—optics. With the help of UNESCO, we developed a 5-day, full-immersion, teacher-training program for academics and high school teachers. The program was called 'Active Learning in Optics and Photonics' (ALOP). ALOP has been designed to empower teachers from developing countries by: 1) refreshing their skills in optics, 2) introducing them to active learning methods and PER, and 3) using low-cost and locally-available teaching materials, so that they can use active learning with their own students. The ALOP program also developed extensive student and teacher guides. The ALOP guides were originally written in English, but have been translated into French, Spanish, Arabic, and many other languages. Between 2004 and 2019, there have been 35 ALOP workshops in the developing countries of Asia, Africa, Central and South America, and Eastern Europe. Some examples from the ALOP program will be presented in this talk.