Teaching Philosophy

When I started teaching, I was not sure of how to approach my students. This is owing to my learning experience in my undergraduate and postgraduate courses in a different learning environment than the one I seek to join now. Having undertaken my masters in Pakistan and a Ph.D. in Korea, I was exposed to a learning experience that was mostly a one way. During my undergraduate and master's, the lecturers used the old-fashioned lectures where students ideas were hardly considered or utilized in class. The lesson always involved professors and other tutors delivering the course material without engaging the students.

This presented a challenge for me once I got a job. Everything seemed new, and my ability to think critically and solve problems was limited to the knowledge I had. Today, as a lecturer, I believe learning should not only offer knowledge to students but also impart practical skills in their repertoire that can be useful in the workplace, so they do not have to undergo the same experience. To make this possible, my teaching philosophy involves a student-centered learning that utilizes active learning and problem-based learning.

The student-centered approaches that I use in my classes have three factors that include learning strategies, basic elements, and the resources that I use. The first factor in my teaching approach involves the strategies that I incorporate into the class. The strategies include group discussions, cooperative learning, problem-solving, simulations, and case studies as well as documentation of learning experiences. Cooperative learning allows students to exchange ideas and help each other when they face problems. Working with simulations offers a visual perspective into ways of using knowledge learned. Discussions are crucial in exchange of ideas as well as validation of the information students have. Some of the discussions take the form of debates where the entire class is involved. These strategies also help me in getting fast feedback concerning areas of weakness while discussions also help slow learners understand the concepts from their fast learners.

The second approach divides into five areas that include reading, speaking, listening, writing and reflecting. These areas actively engage the students' cognitive abilities that are necessary for drawing clarity to questions as well as consolidating new knowledge from new materials. With these elements, I am in a position to understand the students, assess their level of understanding of new material, and give proper feedback. This is one area I lacked during my education that I believe could have had a bigger impact on my understanding. In a recent lesson on Energy Conversion and Storage, I asked students to not only discuss the material learned but also give their insight into its application and importance in the society. The feedback was successful as several students presented ideas that help in conservation of energy. While they were not entirely accurate, it proved their willingness to delve deeper into not only the course material but also the application of such knowledge.

The final factor in my approaches revolves around the resources that I use to teach students. Physics, being a science requires the application of many resources to teach, and, in many cases, hands-on experience. In a Solid State Physics class, the students require experience with materials. To give them a better glimpse of the subject while also ensuring to show them its application, I provide them with transistors and semiconductors. These two pieces of technology are areas where Solid State PHY has direct application. This way, students gain insight into the use of the knowledge they acquire.

To ensure students learn how to deal with real-world issues, I incorporate problem-based learning. In this strategy, I present students with real-world problems and guide them on how to

use the knowledge acquired to solve them. In this approach, students become inductive learners where they seek to solve actual problems using their experiences in class as well as personal life. With this approach, I can make sure that students are not only introduced to new materials but also that their education is up-to-date with what happens in the real world as opposed to traditional learning where old information is constantly repeated.

Currently, I teach several courses such as PHYS 371: Solid State Physics, PHYS 201: Mathematical Physics CHEM 103: Physics for Chemical Engineers, PHYS 490: Research skills, PHYS 476: Nano Science and Technology, RENE-402: Energy Conversion and Storage, REEN 545: Materials Characterization, PHYS 371: Solid State Physics and PHYS 574: Materials Science. I can comfortably teach these courses at an introductory level as well as postgraduate.

In addition, there are several topics that I am interested in researching as well as teaching to advanced graduates and postgraduate. One possible topic in energy conversion and storage is prolonging the durability of life of fuel cells as well as stack materials. Within nano technology, I would like to pursue the use of nano materials as well as their structure for advanced energy conversion and storage considering they have a potential to provide greater efficiency as well as production within various fields such as agriculture and food. Another area of interest is in REEN 545: Materials Characterization, where I seek to undertake more research on thermodynamic, microstructural, atomic and multi scale modeling with an aim to improve or develop better materials by having a deeper understanding of their properties. These are just but some of the few areas of research that I seek to advance for both personal fulfillment as well as students.

In conclusion, I am enthusiastic to teach in a culturally diversified environment where I can affect students' educational experience while developing skills for the society. Having experienced a teaching philosophy that did not actively involve me, I seek to engage the participation of my students fully in the class. I am also enthusiastic to undertake research that can contribute new knowledge or improve on existing one, and use such information to teach the next generation of physicists. I believe that physics should not only exist within the class but also in the entire world.