Conference: Transforming Science Education

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Dr. Carl Weiman, a 2001 Nobel Laureate and a renowned professor at University of Colorado, presented his study of “Education in the 21st Century: a Scientific Approach to Science Education” at Loyola Marymount University on December 5, 2006. Professor Weiman studied the need for science education to be more effective and relevant for the general population. He observed the concept of effective teaching for students who are not interested in science. Dr. Weiman challenges science educators and not teach the “traditional” way. Traditional teaching in the science class is defined as lecture style and do homework. He observes and provides data that this way of teaching generates dismal results. The cognitive load of any human is limited, especially in one class setting. If a student has received enough information, it is limited and it will not process additional new information. Dr. Weiman encourages educators to review research on, and use the findings to improve their teaching practices.

Dr. Weiman focused his study on an introductory college physics course for non-majors. This group was chosen because of convenience. As a college professor he can directly see the impact of his teaching style to a lecture type class. One of the ways he collected data was through assessment. Conceptual tests were given to his class on the first day of classes and at the end of classes. These tests show that on average, students learned less than 30% of concepts at the end of the class. Dr. Weiman correlates these results to the teaching styles of professors, large class size, and even the institution. Data was also collected in small group settings. Students were taught concepts, and in the same class session, questions were asked about the same concept. Only 10% of the students were able to retain the information. Exit interviews were also conducted. Students were asked what was the class about at the end of each session. Just like the other data, only a small amount of students were able to retain the data. Dr. Weiman proposes a change in the instruction of science. He encourages educators to look towards data
and use the findings of brain research to improve their teaching practices. Strength of his study was the multiple ways he gathered data. He did not rely on one method and showed the trend in variety of ways. I applaud his study in the college level. More educators and politicians need additional data. The study can be improved by doing it in all science disciplines and also study high school classrooms. Seeing that this does not just happen in physics classes will strengthen the need to listen to research and to improve the quality of science education in all levels.

After hearing his talk, it was refreshing to hear all the things we already know be applied in a college setting. Professors and teachers forget that we do need to add variety in our everyday teaching practices. The mentality of “I learned this way, so the students will learn this way” has to change. I am talking about the traditional science classroom, lecture and notes. Through my credentialing process we have been aware of all the brain research out there. It is interesting to know that ALL of these strategies can be applied in elementary school and how it slowly dwindles as the students’ progress, and it comes to a complete halt in college education. Students become acclimated to their learning style, and once they’re in college, it’s another way of thinking, motivating, and learning.