

**2015 Distinguished Teacher of the Year**  
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As I was preparing for my speech, I came across Dr. Walter Courtenay's Distinguished Teacher of the Year speech in 1973. In his speech, Dr. Courtenay mentioned an inscription made by someone on wet concrete on a piece of sidewalk at the north end of the Administration Building. The inscription read "And where will FAU be the day after tomorrow?" Although the intentions of the person who made the inscription were not clear, I was completely absorbed by the power of this question as this question is always appropriate; it was appropriate when it was asked 42 years ago, it is appropriate now, and it will be appropriate 42 years from now. The question challenges us to constantly improve, provide a better education to our students and advance the state of the art in our knowledge. From almost every standpoint, if we look back at our history we can state in response to that question that the FAU project has been a success; we have done great things in business, education, arts, nursing, science, mathematics, engineering and economics. For instance, in the Ocean and Mechanical Engineering Department alone, Dr. Steven Schock, Dr. Lester LeBlanc and graduates of Ocean Engineering at FAU developed a transforming technology called the CHIRP sonar system to characterize the seafloor and identify buried objects. This technology was hailed by the U.S. Navy as the best example of technology transition that is currently being used all over the world.

Our graduates, Mr. Jim Thomsen, OE Class of '71, Principal Civilian Deputy Assistant Secretary of the Navy, Research Development and Acquisition; Mr. Ralph de la Vega, ME class of '74, CEO of AT&T Mobility; Mr. James Clidas, ME class of '94, Distinguished Engineer at Google; Mrs. Catherine Barre, ME class of '88, President and Founder of Parametric Solutions; Mr. Kirk Jenne, OE class of '84, Senior Project Manager at the Naval Surface Warfare Center; Mrs. Lynn Daniels, OE class of '83, Section Chief and Program Manager for the Army Corps of Engineers, along with many others, have excelled technically and professionally and have made FAU proud of our association with them. But what does it take to produce future graduates who will do great things and bring honor to themselves and their institution? What will be our response to the question on that piece of sidewalk 42 years from now? We must answer this question knowing that the current generation of students has different qualities and strengths when compared to their teachers, mentors and parents. The educational system that was designed for us may be inadequate for our children. The current

generation of students is, by and large, more visual, needs a reason for learning, requires instantaneous feedback and solutions to problems, and learns more by doing as opposed to reading. Accordingly, our approach to education must change and we must adapt to the strength and qualities of today's students.

As educators, we have the opportunity of advancing knowledge and technology through research and education. Even more important, we have the privilege of shaping young minds, such as those named previously, to become innovators, inventors and educators of the future in their own right. And, to me, that is the most exciting profession and most noble of all causes in the world.

I believe that for today's students, because of unprecedented and easy access to information and know-how, abstract and higher-order thinking skills are less developed; the attitude is "If we can ask questions and instantly receive answers from Dr. Google or Prof. Wikipedia, why bother with re-inventing the wheel?" and "Why should we struggle to find answers to questions that have already been answered?" This attitude has resulted in "loose or disorganized thinking" and has the danger of diminishing critical thinking skills in our students.

Therefore, I have decided that, as a teacher, I have one goal and that is to guide my students to "think" beyond the obvious and avoid "loose or disorganized thinking." At the classroom level, I believe that it is important for all of us educators to avoid the conventional lectures of reciting facts and memorizing information; the available Internet resources can do a much better job of that than any professor. Instead, we should encourage and promote classes filled with "higher-order thinking" exercises or discussions that kick-start the imagination and provoke engagement. Socrates would challenge his students by asking questions such as "What is the evidence?" or "If this is true, does it not follow that certain other matters are also true?" We should all do what Socrates did, engage and challenge our students to achieve more than the minimum standards.

As a simple example, if you ask your child to recite the alphabet from A to Z, he or she will do so without any thinking or any imagination. However, if you ask the same question but require that the child recite the alphabet in reverse from Z to A, something interesting happens; you will notice, in their expressions, the signs of an intellectual struggle. If you try the exercise yourself, you realize that you use different strategies: for instance, you may try to imagine the alphabet in reverse. Alternatively, you may try to recite the alphabet in small groups in the correct order and use that recall strategy to identify their positions in the reverse order. The point is that this simple exercise totally engages the mind and, in a certain way, shows you how to think outside the box or look at problems from angles that you normally don't. It is even more important to note that

being able to successfully recite the alphabet in reverse is far less important than experiencing the struggle itself. It's the intellectual struggle that promotes higher-order thinking that leads to learning. Personally, I am concerned that a lack of focus on critical thinking skills at K through 12 levels and in our own freshman year is a problem of epidemic scale and adversely impacts our educational objectives.

Socrates's questions are examples of how our classroom discussions and exercises could engage the students at the higher levels. In the engineering profession, it is imperative that we produce engineers with critical thinking skills; otherwise how do we solve future unanticipated problems such as the Deep Water Horizon oil spill a mile below the surface of the ocean in one of the most challenging and toxic environments on Earth? Or how do we help Apollo 13 astronauts modify a carbon dioxide filter aboard the lunar module using components such as flight manual covers, suit parts and socks thousands of miles away in space? None of these tasks are simple, and accomplishing them requires engineers that think outside the box and possess exceptional analytical skills.

At the program level, our educational philosophy and approach should be one of "engaged learning." While theory should be presented to implant deep intellectual content, the application to real-life practice should be exercised with actual extracurricular activities. This means that education does not stop when the class period is over. In engineering, extracurricular activities such as the SAE Formula Race Car, Human Powered Submarines, Underwater Robotics, Rocket Design, and Drone Design and Testing engage the students and promote true learning. These activities require a healthy combination of faculty engagement, student dedication, staff participation and college and university investment, but together we create an exquisite learning experience that benefits our students and faculty alike. Not only do these experiences produce technically competent students with extraordinary critical thinking skills, they also help develop team-building and leadership capabilities, resulting in a "total education" concept.

Similar activities can and should be the cornerstone of any degree program, because if we wish to produce the best nurses, linguists, accountants, architects, healthcare specialists, teachers, engineers, and the list goes on, it is not enough that they simply know the ABCs of their profession. On the contrary, in these times when we compete for all jobs at a global scale, we must produce graduates that can outclass other graduates from other universities in our nation and outside. We may not yet be at the top with many of the "ranked universities," but we can compete by, as President Kelly states, becoming America's fastest-improving university both in research and in education. The effort to become the fastest-improving university will force us to

compete. To do this, we must think outside the box ourselves, and with tight resources develop creative ways of promoting higher-order thinking skills in our students. There is no better way to promote the brand of FAU than to produce graduates that are trained to be professionally, intellectually and technically superb.

Finally, I wish to conclude with a quote from President John F. Kennedy, who said "The only reason to give a speech is to change the world." When I read the quote, my first impression was that it conveyed an incredible level of confidence, a quality of dedication to one's beliefs and a passion to create positive change. But as university educators, we also have the opportunity to change the world by performing research that advances the state of the art and by designing and delivering lectures that inspire students to do more, learn more and be better. At FAU we are in a "race to excellence" and the best is yet to come. Our faculty and students are helping create small devices for point-of-care testing that can quickly and economically detect tiny amounts of bacteria in blood, devise medical breakthroughs to help wounded soldiers heal faster and grow new tissue to replace the damaged tissue, create prosthetic arms that will take commands directly from the brain and help disabled citizens perform complicated tasks, develop a new generation of bio-inspired flexible propulsion systems transforming the capabilities of underwater vehicles, reduce vibration, noise and damage in energy-generating turbines, communicate and image underwater, design new materials for new applications, and the list goes on. At FAU, we will do all this and much more, and if anyone doubts our resolve, we will inscribe on that wet piece of concrete these three words: "Just watch us!"

Thank you, ladies and gentlemen, and Go Owls!