

BIOMASS EDUCATION IN THE TWENTY-FIRST CENTURY

Lucian A. Lucia

The importance of teaching, for the development of economies, cultures, and the enrichment of people's lives cannot be overstated. These days biomass and bioenergy teaching has a pivotal role to play in influencing all of the aforementioned areas of life, since fossil fuels are becoming depleted. However, what good is teaching if it cannot be communicated in an intelligible, persuading, and egalitarian manner? A dynamic educational construct between "teacher" and "student" will be the chief mode of promoting knowledge and provoking research for engendering more knowledge. This editorial attempts to show how teaching is a living and symbiotic discipline that we typically take for granted, but once we do it right, we have the power to change the world as we know it. We will briefly explore the example of *BioSUCCEED*, a platform at NC State University, as a means of communicating knowledge related to biomass and bioenergy.

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Contact information: Department of Forest Biomaterials, North Carolina State University, Campus Box 8005, Raleigh, NC 27695-8005 USA; lucian.lucia@gmail.com

Teaching in the Twenty First Century

Recently, I attended the NACTA (North American College Teachers of Agriculture) 2011 conference in Alberta, Canada, an event that dealt specifically with good teaching in the agricultural and life sciences. I cannot begin to tell you how inspirational the conference was. I never fully appreciated the power and beauty of teaching until I met the cadre of teachers/presenters at the conference who explored it scientifically. It made such an impression on me and my psyche that I will attempt to provide a very short and simple essay on the science of teaching, especially within the specific subset of biomass.

At its highest levels, teaching is a very dynamic and co-operational interaction in which the boundaries between teacher and student become blurred and not easily defined. I sense that such a definition (my own simple interpretation) is controversial, but it nonetheless captured the spirit of the enterprises that characterized what I experienced up in NACTA. I witnessed students leading discussion with the authority and confidence of the most seasoned educational veterans. I became aware of the commitment that "teachers" invested in an activity to make it productive and worthwhile for the "students." The world population and concomitant environmental and resource issues (especially in agriculture) are reaching a level at which teachers cannot afford to simply "lecture" as representatives of an absolute knowledge base. Teachers are not privy to a reservoir of "secret" or privatized knowledge that must be communicated in just one way. As a student in parochial schools, I was a victim of such a dynamic, and it left me feeling empty. It seemed that I never really learned. It felt as if learning was akin to a spoon

feeding exercise. Teaching is in its purest form a symbiotic relationship between two or more people, where knowledge sharing and creativity are fostered to provide the maximum value to the participants. It is not a programmatic exercise, but dynamic and living, and it must be adapted (as in a micro-evolution sense) to accommodate the needs and requirements of the parties involved in the experience.

Today, more than ever, students cannot afford the dialectic of a pure “lecture” learning experience. Our world is at a critical point in its history where students must be more engaged in their own journey of self-discovery and knowledge. Students must be captains of their own ship attempting to discern the dross from the treasure and using whatever resources are available to them (including social media, on-line resources, remote experts, learning technology, virtual classrooms, etc.). If we fail to provide the students this experience, we ensure the inability of the future generation to tackle problems of cultural, technological, and national importance.

Biomass & Bioenergy Teaching

During the NACTA, I really began to ascertain that agricultural education (especially nowadays) is *vital* to our survival as a species. It was this milieu that promoted the development of a teaching technology, starting five years ago, known as BioSUCCEED (Bioproducts Sustainability, a University Cooperative Center for Excellence in Education, www.biosucceed.com). BioSUCCEED has represented a concerted cooperation among government (USDA), Universities (three in the Southeast), and affiliated corporations (ACS, SunGrant, NACTA). At its highest levels, our technology was best represented by a set of five conceptual learning modules in biomass and bioenergy that coalesced the knowledge and experience of a number of experts. It was intended to provide all interested stakeholders (students, workers, high school teachers, etc.) with a state-of-the-art snapshot and stimulate further refinements in the modules. It led to the development of curricula that encouraged partnerships with businesses and government to ensure new economic platforms based on biomass. Although the modules developed are designed to stand alone, they nevertheless require very synchronized cooperation among “teachers” and “students” to make them alive and relevant.

The Importance of Teaching Platforms & Future Directions

Although BioSUCCEED’s tenure has officially come to an end, it is a teaching platform that recognizes the value of sharing our resources in a living milieu. The potential of these programs lies not merely in the information they contain, but also in the ability of teachers to imbibe that information and engage in a living dialectic with students to promote new paradigms of problem solving. Teaching is perhaps the first and oldest discipline in human history. However, we tend to overlook its importance because we think of teaching as a commodity practice. It is anything but, when done right. This editorial has attempted to demonstrate that not only in biomass and issues of sustainability, but in many other fields of study, teaching is *the premier platform for real change*. Socrates, one of the greatest philosophers and teachers in human history, perhaps summed up teaching best when he said, “*I cannot teach anybody anything; I can only make them think.*”