

Fostering Entrepreneurial Thinking in Biomaterials Education

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The concept of entrepreneurial thinking is gaining attention in higher education. Originally attributed to entrepreneurs, this concept embraces a set of attitudes, skills, and behaviors that can also help students, engineers, and researchers to succeed academically, professionally, and personally. This editorial discusses the benefits of developing and adopting an entrepreneurial thinking in biomaterials science and engineering. Our society is constantly evolving, and the next generations of engineers and researchers will have to adapt fast to the needs and propose innovative solutions to the demands. A strong entrepreneurial mindset may thus be key for boosting our efforts towards innovation and sustainability.

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Introduction

As a faculty member, I continuously search for new teaching and research approaches to adapt to the increasing diversity of students that universities welcome each year. While keeping the students' education in mind, this search for new techniques and methods of teaching and research also feeds my curiosity and passion for this job.

Over the past two years, I have had the opportunity to touch upon a new way of thinking, so-called entrepreneurial thinking. I was, at first, doubtful about this approach, as I was correlating it to the sole concept of *entrepreneurship*. I have never considered myself as an entrepreneur, nor have I ever had the personality to undertake the risk of starting a new business venture. But the more I read about entrepreneurial thinking, the more I could see the overlap with my role as a faculty member when, for instance, teaching sustainable packaging design and engineering to undergraduate students, brainstorming new research ideas with graduate students, and creating value through research discoveries.

If I could see the needs for entrepreneurial thinking in my research and teaching activities, could the students understand it, too? Such a question has laid the foundation of this new interest of mine: fostering entrepreneurial thinking in students to help them innovate in biomaterials research and education.

Entrepreneurship or Entrepreneurial Thinking?

I am not an entrepreneur nor have I the degrees or the formation to discuss entrepreneurship. However, I have understood that entrepreneurship is a much broader concept than I initially had thought. Entrepreneurship is not only about creating a new business venture, but it also includes all the aspects – often hidden – behind the creation of this venture. The new start-up company, the business venture...they are all finally, and simply put, the outcomes of the activities of an entrepreneur.

What, then, does entrepreneurial thinking refer to? Here as well, there is no unique answer. However, we can all agree that pursuing an entrepreneurial mindset will not make you an entrepreneur. Instead, developing an entrepreneurial thinking will help you harness your knowledge, skills, experience, resources, and networks to innovate and take advantage of opportunities at the right time and in the right way. Curiosity, connections, and value creation are all key aspects in research and education, and these three concepts build the core of entrepreneurial thinking. (i) *Curiosity* is more than ever needed in a world that is constantly changing and evolving. The solutions developed today will be obsolete tomorrow. We are thus asked to continuously innovate, to feed a rapidly growing and demanding society. (ii) If we do not connect these new discoveries with our surrounding world, the discoveries will not suffice by themselves. *Connections* to the world and society are crucial to provide innovative solutions to real-world problems. (iii) Finally, an innovative solution will not last long if it does not *create value* for others. Anticipating the needs of a changing world is the only way to give value to innovative solutions.

Engineers and researchers spend years to develop technical and very specialized skillsets. The addition of an entrepreneurial mindset to this list of high-level skills could yet boost our efforts in innovation and help us see the bigger picture, when perhaps too often, we only focus on a very specific problem.

Fostering Entrepreneurial Thinking in Biomaterials Education

As researchers, engineers, and designers, what we create, develop, and conceive will one day impact the world we live in. This is truer today than ever before, if we are engaged in biomaterials education. Why? Because our society is now fully engaged in implementing and addressing the sustainable development goals (SDGs) for a more peaceful and prosperous future. An education in biomaterials can easily span from the science and engineering of renewables and bio-based materials to the study of their end-of-life, environmental impact, safety, and consumers' perception.

When working towards the SGDs, understanding the bigger picture is thus essential. If one wants to convert an idea into a viable product that can solve a real-world problem, communication, connections, and value creation will be needed. In other words, an entrepreneurial mindset is the key.

The question remains: how do we instill this mindset in the next generation of engineers and researchers of biomaterials? This is a gradual process. A first step for the educators may be to pursue training and collaboration with entrepreneurs, to understand their approach and find inspiration. Entities such as VentureWell, for example, which provide guidance on incorporating concepts of sustainability and entrepreneurial thinking into curricula, also exist.

While the concepts of entrepreneurial thinking may sound simple at first, bringing awareness to students of their values is important for their personal and professional growth.