The "Why" Behind Innovation
by Ryan Botts, Industrial Engineering Senior

It doesn't take a Louisiana Tech University student very long to hear the word "innovation," whether it's in class, in conversation, or from one of the many groups using it in their name or tagline. Better yet, innovation also seems to be the buzzword in nearly every industry. The word is used to describe everything from newly designed wildfire equipment to faster muscle-building workout routines. Most people would agree that the basic idea of innovation revolves around improving daily life in some way, and that we often equate it with some level of upgrade or progress. However, there also seems to be controversy on what counts as innovation these days. This difference of opinion can be seen in how different people feel about Apple's decision to remove the headphone jack from the iPhone.

As a freshman, I heard the word innovation everywhere, from professors describing the Engineering 120 Freshman Design Series to Innovation Enterprise hosting an entrepreneurship event. Seeing and hearing that word brought out a lot of questions. What exactly does innovation mean? What value does it produce for society? Why should I care about innovation as a student? What are some ways that I can get involved with innovation on campus? Over the course of my college career, I have had many opportunities to interact with innovation at Louisiana Tech, and I've gained experience as an innovator myself. Yet, before writing this article I couldn't define innovation in a way that would fully encapsulate the term.
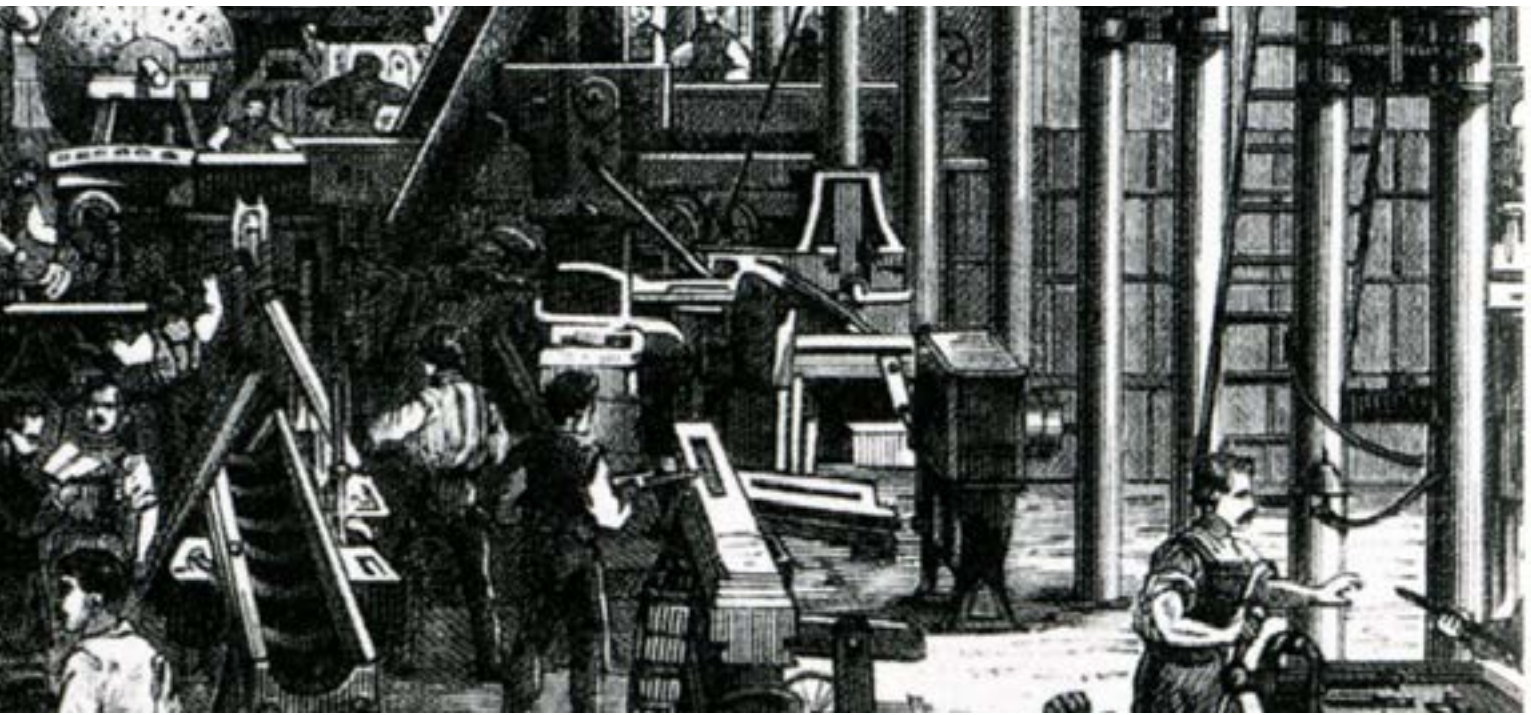
Dr. Heath Tims, associate dean of undergraduate studies for the College of Engineering and Science provided this overview, "Innovation from a broad perspective is such a critical part of making Louisiana Tech successful. Innovation plays an important role in everything from recruiting students to how the University as a whole is perceived among peer institutions." To understand why the concept is so important for Louisiana Tech, we first need to define it. There is a challenge with giving an exact definition for innovation, because its meaning has evolved over time and today the term is used in a wide variety of fields. So, let's explore the history of innovation and discover why it's critical that Louisiana Tech is an innovative community.

The pre-19th century concept of innovation was a renewal or alteration of ideas that had been accepted by society. Innovation was a contested practice connected primarily with the idea of change. Innovators were seen as challengers to the status quo and innovation was viewed as a negative label. Furthermore, the idea was not within the technologically centered business world like it is today, but rather it existed mostly within the fields of literature, religion and law.

In the 1800s and early 1900s, the idea of innovation shifted in application to the world of technology and business. The term became associated with economic progress, a change which altered its connotations from that of a troublemaker to an improver of daily life. With the industrial revolution bringing about a plethora of inventions and discoveries that rapidly improved the standard of living for large populations, innovation became a title given to the solutions that had clear economic or societal impacts.

In 1939, Austrian economist Joseph Schumpeter was credited with identifying one of the most well-known

definitions. According to Schumpeter , innovation is the process of taking an invention and integrating it into society or commercializing it into the economy. At this time, innovation moved from being associated with change alone to being associated with a combination of change and creativity. The output of groundbreaking inventions and discoveries during the period spanning from the First Industrial Revolution to the 1970s created an effect in which nearly every idea had strong economic or societal applications, causing the terms innovation and invention to become nearly synonymous.

This understanding of innovation is clearly present at Louisiana Tech, most visibly through our research and curriculum efforts. Dr. Richard Kordal, director of the Office of Intellectual Property and Commercialization at Louisiana Tech defines innovations as "the process of translating an idea or invention into a marketable product or service," which closely resembles Schumpeter's definition for innovation. A prime example of taking invention to market can be found at the Trenchless Technology Center (TTC) as described by Dr. Tom Iseley, associate director of TTC International Operations. "TTC was formed at Louisiana Tech almost 30 years ago under the leadership of Dr. Guice and myself to advance the science and practice of trenchless technology through research, education and technology transfer. This is accomplished through our commitment to innovation, education and validation of technology."

For 30 years, TTC has utilized Tech's research capabilities to develop marketable solutions for addressing issues with underground infrastructure. Innovation at Louisiana Tech can also be seen through programs like the Top Dog New Venture

Championship and courses such as Entrepreneurship (ENTR) 430: Innovative Product Design. Both Top Dog and ENTR 430 challenge students to innovate by having them invent solutions for real-world problems and then identify pathways for bringing those solutions to market. There is, however, another version of innovation that is at play both on campus and globally.

"Innovation is the 'let's try it' mindset at Tech," said Kyle Prather, director of The Thingery, "that influences how we might engage with a number of resources, people and programs." The Thingery is a makerspace in University Hall that provides students resources and opportunities to develop their skills in turning ideas into tangible realities. We see here that innovation is also strongly identified with the mindset of improving or creating new solutions. The distinction between this alternate definition and the previously discussed idea of innovation is that treating the term as a mindset changes the way innovation is viewed. Now, instead of the term meaning the application of an invention to the market, it is a pattern of behavior that brings new ideas to light. A popular book on the subject by Scott D. Anthony, titled The Little Black Book on Innovation, defines innovation simply as "something different that has impact."

While this can include Schumpeter's definition of bringing to market a new invention, it can also incorporate work with social or cultural impact and the mindset of being innovative. Further clarifying his view on innovation, Anthony continues, "innovation is a process that combines discovering an opportunity, blueprinting an idea to seize that opportunity, and implementing that idea to achieve results. Remember — no impact, no innovation." Challenging students to practice innovation as a form of instruction is innovative when

compared to traditionally teaching students through lectures and examples. Innovation, by any of its definitions, requires time, effort and (usually) money; bringing us to another question, why innovate?

The question of why we should innovate also has a variety of answers. Dr. Kordal stated that "it is generally accepted that to remain competitive in the global economy, one must continue to innovate. This enables companies to develop cutting-edge products that can command premium prices. Among the benefits is that industries can pay higher wages, increasing society's wealth."

Innovation provides a means for raising standards of living, staying competitive with other regions and improving the quality of life by strengthening the economy. Louisiana Tech's Chief Research and Innovation Officer, Dr. Dave Norris, stated that "innovation at Louisiana Tech engages a diverse group of students, faculty, and external stakeholders in a way that enhances the students' unparalleled educational experience and seeks to generate meaningful impacts on economic activity and the grand challenges of the 21st century in health, energy, cyber and more. We believe this is part of the University's core mission in education, research and economic development. Innovation is how we operate." He points out that in addition to the economic impact that innovation provides, there are social and cultural impact.

Dr. Tims further explained that "innovation at Tech includes everything from curriculum innovation to research. Louisiana Tech has a long history of coming up with new programs and new curricula, and also developing new ideas." From an institutional level, Louisiana Tech works to provide an unparalleled educational experience for students, developing new courses to address evolving industry demands and instilling in students the skill sets needed to be successful. Dr. Norris also mentions the need to address the challenges the world faces today. Louisiana Tech is innovative so that it can create graduates capable of working on the front lines of our most pressing issues. In addition to the curriculum developing a student's knowledge and critical thinking capabilities, the growing ecosystem of ambitious student organizations enhances Louisiana Tech's commitment to innovation. A few examples of student-led organizations include:

Eco-Car, which develops extremely fuel-efficient competition cars each year for the Shell Eco-marathon,
the Aerospace Engineering Club, which designs, builds and launches drone, rocket and high-altitude balloon projects,
Operations Tech, which develops students' creative confidence through social innovation and rapid prototyping, and the Innovation Alliance, a coordinating body made up of representatives from the colleges and organizations directly involved in innovation, entrepreneurship and design.

Furthermore, the Innovation Alliance also works with University administration to promote and support Louisiana Tech students who are fellows of the University Innovation Fellows (UIF) program, a program of Stanford University's Hasso Plattner Institute of Design that works to develop student leaders who create new opportunities by helping their peers develop an entrepreneurial mindset, define problems and address global challenges.

Director of the TTC, Dr. John Matthews said, "Innovation is a key impact that universities such as Tech must have as it is important for the success and growth of our region. Under the leadership of Dr. Guice and Dr. Norris, Tech is focused on developing innovations that will help our University and area grow and become even more prosperous."

The reason we innovate as a community is to increase our economic impact, our cultural presence, and our ability to improve society.
Dr. Kelly Crittenden, associate professor of mechanical engineering, summarized with "we invest into innovation as a means of bettering the people connected to Louisiana Tech University. [...] Innovation drives the world forward in a mutually beneficial direction."

At Louisiana Tech, innovation is used as both a tool and a mindset. It is the process through which the incredible research and technology that takes place at Louisiana Tech reaches the rest of the world. It's how we share our knowledge so that others may benefit. We look at the characteristics of the industries we are in and take advantage of opportunities to create valuable impacts there. Dr. Norris put it right when he said "innovation is how we operate". Our ability to innovate grows when we get more students involved in research projects and student organizations. We continue to improve our course offerings and take advantage of new opportunities to produce value for both the University and the region. We benefit from the support of not only industry partners, but also our incredible network of alumni who give back to Louisiana Tech, further increasing the value of its educational offerings and reputation. Visit these sites to learn more about innovative research (http://research.latech.edu), news about Louisiana Tech's innovative spirit (https://www.latech.edu/news/), and work being done to get more students involved with innovation (http://latechinnovation.org/).

Sources:
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Email interviews with Dr. Heath Tims, Dr. Richard Kordal, Dr. Tom Iseley, Kyle Prather, Dr. Dave Norris, Dr. John Matthews, and Dr. Kelly Crittenden.