

Articles

Preparing Business Students for Success in the 4th Industrial Revolution

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The fast-changing, technology-dominate Fourth Industrial Revolution is upon us. Unfortunately, our current education system is based on training compliant workers to perform repetitive tasks required for the industrial revolution of the early 1900's. Today, employers are looking for skills such as complex problem solving, critical thinking, creativity, people management, emotional intelligence, divergent thinking, and cognitive flexibility. It is our responsibility as educators to make sure our students are taught in a manner that supports their success and helps them benefit from the exponential changes occurring in our world, one that fosters complex problem solving, critical thinking, creativity, and cognitive flexibility.

We develop these skills in students by creating an environment where they are called to use their imagination, experiences, and unique perspective while applying the taught concepts. Asking open-ended questions such as “How are you going to do it?” results in unique and infinite answers that are not right or wrong, encouraging students to take risks and be creative. In this paper, the authors present several ways to activate this creative, divergent thinking process.

The Fourth Industrial Revolution (4IR), as coined by Klaus Schwab, is characterized by the growing employment of new technologies, resulting in a lack of clear boundaries between the biological, physical, and digital worlds (Schwab, 2017). The changes we are experiencing with the 4IR are occurring exponentially, setting it apart from the previous three industrial revolutions. Moreover, the changes occurring are impacting almost every industry worldwide. It follows that the 4IR is making significant changes to our labor market. Our workforce needs to adjust its skillsets to maintain relevance amongst these changes. As educators, we must develop a skillset in our business and entrepreneurship students that will enable them to compete in this changing environment.

The Future of Jobs Report (<https://www.weforum.org/reports/the-future-of-jobs>) received feedback from chief human resource and strategy officers from leading global employers regarding what skill sets would be most desirable as we move through the 4IR. The top 10 skills they highlighted for 2020 were, in order of importance, Complex Problem Solving, Critical Thinking, Creativity, People Management, Coordinating with Others, Emotional Intelligence, Judgment and Decision Making, Service Orientation, Negotiation, and Cognitive Flexibility (Gray, 2016). These skills are essential because they support an individual's and a company's ability to adapt to change.

Adaptation, requiring innovative thought and action, becomes necessary when change is accelerated, as it is now in the 4IR. Creativity, the result of innovative thought coupled with action, is developing a “novel product, idea, or

problem solution that is of value to the individual and/or the larger social group” (Götz, 1981; Halpern, 2010; Hennessey & Amabile, 2010; Oldham & Cummings, 1997; Ruscio & Amabile, 1999; Sawyer, 2006; Sternberg, 2006; Teo & Waugh, 2010). Innovation is the outcome associated with creative work; it is the successful launch and adoption of a new process or product (Barker & Baker, 2012; Oldham & Cummings, 1997; Puccio & Cabra, 2010; Sawyer, 2006). If creating value through problem-solving is a primary goal of business and entrepreneurship, we should teach our students how to innovate, create value, adapt, and thrive in a changing business environment (Patton, 2002). After all, innovation has been responsible for up to 85% of all economic growth (Rosenberg, 2004). According to McKinsey and Company, 84% of CEOs believe innovation is critical to growth.

In an article published in *Educational Leadership* in 2009, Amy M. Azzam interviewed Sir Ken Robinson, an internationally recognized leader in developing creativity, innovation, and human resources (Azzam, 2009). In this interview and his books, TED talks, and other writings, Sir Ken Robinson argues that creativity goes hand in hand with skills like critical thinking, cognitive flexibility, and complex problem-solving. The creative process used to develop a creative idea or product includes constant evaluation to ensure the idea has value. Therefore, you can only have a creative idea by incorporating critical thinking, cognitive flexibility, and complex problem-solving skills. The skills mentioned above are inherent to the creative process itself. So why isn't creativity and the creative process, as it

relates to every discipline, regularly taught in universities? McWilliam and Dawson (2008) said it well when they concluded that creativity has been “relegated to the borderlands of the visual and performing arts.” Sadly, creativity has been educated out of our students (Wagner & Dintersmith, 2015). We are taught from a young age to compartmentalize creativity within the arts, regarding it as a different subject of value only to itself. By the time they get to college, business students have little to no opportunity to learn or practice creativity, short of coming up with marketing materials for a marketing class or creating a product in a product development course. This compartmentalization does an incredible disservice to innovation.

Instead of focusing on creative thinking practices, our education system is based on training compliant workers to perform repetitive tasks required for the industrial revolution of the early 1900s (Wagner & Dintersmith, 2015). Given that our students will be looking for work or starting a business in a world impacted by the 4IR, it does not make sense to be educating future generations in ways that undervalue skills like creativity, critical thinking, cognitive flexibility, and complex problem-solving, among others mentioned in the Future of Jobs Report. The core business classes for most business and entrepreneurship students are based on lectures and tests meant to teach students how to thrive in an environment designed to solve problems and meet the needs of consumers. Tests and lectures do not teach innovation and creativity, nor do they help students practice and hone their skills in innovation and creativity. Tests teach students there is only one correct answer to a problem, an answer they were likely told about in a lecture. Lectures often focus on showing limited views on a subject and do not allow for feedback or interaction with the students, limiting the potential for students to make meaningful real-time connections with the material and utilize skills like critical thinking, cognitive flexibility, and complex problem-solving.

Educators teaching students skillsets necessary to thrive in the 4IR should be focused on how to help individuals thrive in an ever-changing business environment. Luckily, our brains are wired for change. Neuroplasticity is the ability of the brain to form and reorganize synaptic connections, especially in response to learning or experience (Doidge, 2007). The presence of neuroplasticity implies that individuals, given their unique circumstances, can grow new synaptic connections in their brains in response to their unique life experiences. When we experience something new, we have the potential to build new connections within our brains. Those new connections applied creatively to old information are likely to result in new ideas, which will likely result in innovative businesses and business practices. With creative thought processes and action, innovation is possible. The fact that creativity is rarely focused on in an impactful way throughout our undergraduate business education is especially worrisome given the current amount of automation in the workforce. The ability to think creatively is what sets humans apart from machines. Once in the workplace, our students are expected to fix problems, create change, and innovate, so our job is to

teach students to think creatively. They are responsible for continued innovation and, ultimately, our survival. Virginia Commonwealth University put creativity front and center in their School of Business through the EPIC program, built on pillars of “experiential learning, problem-solving curricula, impactful research, and creative culture,” with great success (Grier & Kahn, 2018).

The 4IR also makes it clear that we need to train college students to be lifelong learners and develop a growth mindset which can be accomplished by focusing on creative thinking abilities (Schoeniger et al., 2021). We need to shift our student’s mindsets to value change and growth. We are failing them by locking them into one way of thinking, one specialty in which they either succeed or fail. In the book *Mindset*, by Carol Dweck, she suggests we foster a growth mindset in students, which leads to a desire to learn, a tendency to embrace change, persistence in the face of setbacks, learning from criticism, and the ability to reach ever-higher levels of achievement (Dweck, 2006). She suggests focusing on and rewarding the process, strategies, effort, and choices rather than linking it to one’s intelligence and talents. Doing so helps students recognize that they are in control of their achievement and that their intelligence level or fixed talent does not limit it. Even talented people know they must constantly practice and develop that talent.

Focusing on divergent thinking is an effective way to support a growth mindset and creativity in the classroom. According to [Merriam-Webster.com](https://www.merriam-webster.com), divergent thinking is creative thinking that may follow many lines of thought and tends to generate new and original solutions to problems. In a video about divergent thinking, Dr. Tina Seelig, Executive Director of the Stanford Technology Ventures Program, discusses the importance of divergent thinking in educating our students (Seelig, 2011). She suggests asking questions that enable more than one answer, infinite answers if possible. A good question might be, “How can you apply the principle of sustainability to your specific business/project.” Students must demonstrate sustainability knowledge and then apply it creatively to their business or project. The best part is that there is no right or wrong answer. We are encouraging students to apply the idea to their scenario. With questions such as this, there is little chance of plagiarism. We are calling them to use their imagination. The answers are based on each respondent’s perspective, experiences, and imagination. Some benefits of divergent thinking include the following:

- **Fluency** – The ability to generate a number of ideas, increasing possible solutions or related products.
- **Flexibility** – The ability to produce different categories or perceptions and different ideas about the same problem or thing.
- **Elaboration** – The ability to add to, embellish, or build off an idea or product.
- **Originality** – The ability to create fresh, unique, unusual, totally new, or highly different ideas or products
- **Complexity** – The ability to conceptualize complicated, intricate, many-layered, or multifaceted ideas or products.

- **Risk-taking** – The willingness to be courageous, adventurous, daring—trying new things or taking risks to stand apart.
- **Imagination** – The ability to dream up, invent, or see, to think, to conceptualize new ideas or products – to be ingenious.
- **Curiosity** – The trait of exhibiting probing behaviors, asking and posing questions, searching, being able to look deeper into ideas, and wanting to know more about something.

These elements are activated in students when we guide them to think divergently.

Divergent thinking can be prioritized in our business classrooms by rethinking how we evaluate students' work. Grades are often assigned according to how closely students follow the rules. Students, in many cases, have been taught to repeat the work of their teachers instead of being encouraged to process information through their unique perspectives and lived experiences. By grading based on conformity, we create fear of being wrong or different in our students. It is easier to develop original ideas if people are comfortable being wrong or different (Case, 2002). We should instead assign a score based on the "outside of the box" thinking demonstrated by the student. Each person is a unique collection of ideas, desires, experiences, and perspectives that have value. This being true, our college education system should not be set up to reward conformity. We should not teach our students to "do it this way." The better question to ask our students is, "How are you going to do it?" based on your experiences, perspectives, passions, and ideas, which make you uniquely capable of serving those you are here to serve. This method of questioning taps into the process of divergent thinking, encouraging students to answer in an infinite possibility of ways.

Treffinger et al. (2002) call this divergent thinking process, Listening to One's Inner Voice. When we ask students, "How would you do it?" we guide them to find their answers. We are taking students through a process of reflection and heightening their awareness of their creative process. In Treffinger et al.'s research, students generated more creative results when instructors let the students know that one of the learning objectives is to be creative in one's answers. This suggests that students need permission to let loose and be creative.

We educate divergent thinking and, thus, creativity out of our students by asking them to memorize textbooks and regurgitate this information on tests. Rather than putting information into our students through lectures and textbooks, our purpose should be to draw out of them the wisdom from within. This can come in the form of assignments that focus on open-ended questions, encourage and reward risk-taking, and ask students to come up with multiple answers to one question. Entrepreneurship courses are usually set up to allow students to create a product or service and build a business plan around it. In this way, they are practicing entrepreneurship rather than learning concepts from a textbook. Through the structure of a business plan, each student brings forth their ideas, wisdom, and vision to create something new. Entrepreneurship courses, where

students bring forward ideas, are a step in a creative direction.

Divergent thinking can also be taught and practiced by reframing "failure" (Case, 2002). We must celebrate the creative ideas that often result in wrongness and failure but produce new ideas once tweaked and modified. We must encourage and facilitate the failure, pivot, and learning process rather than adhering to the stifling A, B, and F grading model. Giving students feedback rather than just a grade helps them understand how they can fix something by taking a different approach.

We limit students' divergent thinking capabilities by forcing them to choose one college study area instead of encouraging them to explore all their interests, building a distinctive knowledge collection. Life is inherently multidisciplinary (Eisner, 2002). All their curiosities enable them to contribute unique perspectives and solutions to a changing labor force and marketplace. If we are looking for innovative ideas, we must encourage our students to regard their talents and interests as a collaboration of knowledge within themselves as an asset, not a distraction. Encourage students to take ideas from one subject or discipline and apply them in another. Surround student with many different inputs and influences. Make multidisciplinary collaboration essential in their university education.

Fostering collaboration between students through active discussion is another way to help the students recognize that many different pathways are available to solve complex problems. When we brainstorm in a focus group, we ask our imagination to bring forth ideas of how things could be. Based on Robert Hisrich, in his book *Entrepreneurship*, while brainstorming, no criticism is allowed (Hisrich et al., 2018). Participants are assured they are safe to say whatever pops into their heads. Big things happen when we create a safe space for people to bring about the free flow of ideas. We activate each other in that scenario, generating even better ideas. One thing leads to the other, and soon, you have a great solution to the problem with multiple contributors.

Most importantly, refer to your students as creative. Many have been taught that they are not creative and thus have no faith in their ability to see their ideas as possible realities. We must train our students to be agents of change through creative processes, not information regurgitators. When giving students reading, or referencing what other experts in their field have done, ask what else can you do with this information? What is your unique perspective on this topic?

Many jobs today did not exist ten years ago. Suppose our job as educators is to prepare students for their future. In that case, we need to teach them to think past what has been done before and instead, use what they know, trust their intuition, imagine what is possible, and create pathways to make the imaginary a reality. All of that is part of the creative process, not taking the common or popular path but a path that values them as individuals with unique perspectives on the world and unique synaptic connections in their ever-changing brains. We must teach our undergraduate business students to be the creators, the innova-

tors, and the change agents. As teachers, we need to give them the tools and confidence to trust their neuroplasticity and that, with a bit of creativity, their imagination's ideas can turn into realities if they commit to them.

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