

Moving Beyond STEAM: Why America Needs to Think Differently About Design

by Lorne M. Buchman

With the recent passage of the sweeping Every Student Succeeds Act, President Obama and Congress affirmed the arts as vital to a well-rounded education. This is a significant and laudable U.S. policy change that embraces art as an important driver of innovation, visual communication and critical thinking. But the conversation around this legislation still positions “art,” a broad category that includes many different practices, as an addition to more practical and applied fields of study, especially the sciences. As many leaders in business and technology have come to understand, the creative fields, especially design, are fundamental to the new economy and to America’s role as a global leader in innovation. During the last decade or so, this understanding has been central to the discussions informing the STEM to STEAM debate.

The STEM to STEAM movement argued that the art and design disciplines are just as important to innovation as science, technology, engineering and mathematics. In our increasingly technocratic society, it was meant to correct the ascendancy of scientific thinking in business, education and government-funded research at least since the digital revolution, and more broadly following the Second World War. Proponents of STEAM mostly focused on the economic advantage and competitive edge in the global marketplace brought by the addition of creativity. The website stemtosteamm.org, for example, asserts that innovation needs art and design “to transform our economy in the 21st century just as science and technology did in the last century.”

But is the problem solved by the simple addition of these disciplines as the movement has argued? I would suggest, at this critical transition, that we ask an even more fundamental question — how does one even conceive of technology without design? Leaving aside for a moment the problematic conflation of art and design in STEAM conversations, the central question regarding the latter remains — is design not as essential to technology as mathematics itself? As the STEAM movement strives now to augment technology with design, it fails to see the mutual dependence of the two; design is *a priori* a part of technology.

STEAM sensibilities have been around for quite awhile, most prominently since John Hawkins’ *The Creative Economy* (2001) and Daniel Pink’s *A Whole New Mind* (2005), both bestsellers that envisioned a future in which the thinking and skills of creative people would be the key drivers of the 21st-century global economy. “The MFA is the new MBA,” Pink famously declared in the *Harvard Business Review* article that included it as one of the “[breakthrough ideas](#)” of 2004.

Let's be honest, during the last 15 years the report card for the movement was mixed at best. There was no discernible increase in government-funded research and its impact on innovation in the business community often relies on the very supportable anecdote of how Apple integrated technology and design to great success. Design still needs to argue its way into the innovation game in most circles.

Fifteen years. How do we explain that an idea so rich and potentially transformative sat on the sidelines of the conversations about innovation, education, and government-funded programs and research for so long? Why was the promise of Pink, Hawkins and the STEAM movement not more widely embraced? Perhaps the answer lies, at least partly, with the idea that we are working with tired distinctions that have unintentionally skewed the issue. It is worthwhile to revisit the terms of the conversation.

The coupling of art and design in the STEAM acronym, despite creating a pleasing if dated metaphor for progress, collapses important distinctions between art and design and perhaps unintentionally reinforces an older perception of design as primarily concerned with aesthetic enhancement. Although most design programs were developed at art and craft schools, design today (especially industrial design, but also environmental, interactive and media design), arguably bears more resemblance in practice and intent to engineering and science than to art. On the other hand, despite its huge and growing contemporary market, art is more likely to be generated by personal expression, is less client-driven and, at least when it functions as an instrument of cultural critique, is distant from its own commerce. Of course there are many shared skills and processes across art and design, just as there are traditionally artistic elements to the scientific process, like creative thinking, intuition and emotion, but in many fields (business and technology, for example) designers are often still perceived as fundamentally artists, which brings with it a stereotypical view of design as less pragmatic and quantifiable, and thus not at the level of science.

The STEM acronym was itself an unwieldy taxonomy, as it contains two general areas (science and technology) and two specific disciplines (engineering and mathematics), the latter components of the former. Again, we seem to have been seduced by metaphor. But more to the point, design not only exists in constant dialogue with engineering and technology, it encompasses scientific elements by definition. As is the case with structural and mechanical engineering, the material sciences and ergonomics, design is practiced today as a method of problem solving, supported by research, prototyping and the validation of hypotheses, all within a pragmatic business culture. Indeed, it is no accident that some art and design institutions offer the bachelor and master of science degrees in the industrial design fields — at ArtCenter College of Design we have done so for 50 years. Nor is it surprising that graduates of ArtCenter today occupy leadership positions in nearly every major technology company, including Apple, Google, Microsoft, and Facebook, along with recent startups like Xiaomi, Airbnb and SpaceX that top Forbes' 2016 "unicorns" list.

In our digital age, innovation is largely viewed in terms of technological breakthroughs. Certainly a large proportion of venture capital is invested in new digital-based products and services—apps, content management systems, wearable technology, the Internet of Things. But these

initiatives are possible only with design. If technology is to be useful to human beings —if it is to lead to innovation —design is not just additive but integral to the development process. It is essential to the human interface. It is critical to the identification of the human need technology seeks to answer in the first place, step one in the design process. Until a designer (or engineer functioning as a designer) translates technology for human use, technology is only code and abstract invention. We rely on the Apple story too much, but once again it needs to be noted that the great Apple products have not created new technologies so much as new user experiences, the province of design.

Let's remember that the word "technology" comes from the Greek *techne*, meaning craft or the art of making. For ArtCenter's faculty, alumni and students, and the many industry partners we work with, the productive bond between design and traditional STEM disciplines is part of our institutional DNA. For us, it is not difficult to understand design as another STEM discipline, not unlike physics or chemistry.

But advocates of STEM to STEAM have worked in categories that solidify rather than dissolve those categories, relying on acronyms to guide our thought. The danger here is we lose sight of the shared properties and inseparability of the practices that contribute to innovation.

The STEAM movement certainly deserves the support of designers, as well as those of us who educate in these fields. But we have a new challenge now, at least in educational circles —to recognize the significance of design and professional practice within STEM itself. It's not a matter of adding to the mix but of recognizing and strengthening the ingredients already there.

Lorne M. Buchman, PhD, is President of ArtCenter College of Design.