



The Fashionable Side of STEM

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In the new millennium, the integration of science, technology, engineering, and mathematics (STEM) has gained momentum in education reform in the United States. The importance of STEM is undeniable, particularly given the fact that when compared to other nations, the rate of STEM-related higher education degree attainment is inconsistent with a nation considered the world leader in scientific innovation (Kuenzi, 2008). Some contend that STEAM, or the addition of “art” in the popular acronym (and in practice) will lead to knowledge, advancement, and pedagogy that combines aesthetics and analytical modes of thinking to the betterment of both STEM and the arts (Fitzsimmons, 2011).

The purpose of this presentation is to demonstrate how fashion, both historically and contemporarily, has been influenced by and contributed to advances in STEM. While it is not possible to mention every relevant example from history and the present day, when armed with examples, instructors can more intentionally integrate STEM into their teaching of fashion across a wide array of courses, from textiles, to design, to merchandising, to history. This knowledge can help better prepare students for present-day college and future career readiness.

Science

The Merriam Webster Dictionary defines science as knowledge about or study of the natural world based on facts learned through experiments and observation (2003). New fibers have formed an amazing alliance between three massive industries: chemicals, textiles, and fashions (Handley, 1999). From the introduction of the first manufactured fiber rayon, to nylon, to polyester, these fibers enabled both the speed of fashion and the wash and wear aspect of consumer laundering that we cherish today (Quinn, 2002). In the next wave of innovation, companies such as Biocouture seek ways to free our petrochemical dependence, and experiment with microorganisms including bacteria, fungi and algae to create smarter, more sustainable additions to our fashion system. The question remains, however, will consumers be interested in wearing garments from mushrooms?

Technology

Technology is defined as the science of the application of knowledge to practical purposes: applied science (Webster, 2003). In *Fashionable Technology* (2008), Seymour discusses the degree of technology and fashion on a spectrum from expressiveness to functionality. In this way, expressive technology exists to create interesting, beautiful designs with less emphasis on function. Dutch designer Iris Van Herpen’s amazing use of 3D printing in which the printing machine is programmed to make a particular design is one such example of expressiveness. High function garments, such as work wear in which personal expression is limited is at the far end of functionality. In the middle between expressiveness and functionality, is where garments need to both function and be stylish. The history of the zipper, a device created in the 1890s to fasten shoes, which became a tool for children’s autonomy in the 1920s,

and then a haute couture design element with the work of Charles James and Elsa Schiaparelli in the 1930s is one example that shows the middle ground between expressiveness and functionality (Friedel, 1994). Today, the collection by Tory Burch for FitBit exemplifies this position.

Engineering

Engineering is defined as 1: the work of designing and creating large structures or new products or systems by using scientific methods 2: the control or direction of something (such as behavior) (Webster, 2003). It is in the 16th century, with its wheel farthingales, bum rolls, ruffs, and conches, fashion literally reached new heights. It is also in the 16th century, that we find some of the earliest published pattern books. The 1580 work *Book of the Practice of Tailoring, Measuring and Marking Out* instructed tailors on methods of cutting out patterning pieces so as to get the most garment from the least amount of fabric. The next revolution in patternmaking would coincide with the late 19th century invention of the sewing machine, dress forms, and the availability of fashion periodicals, which meant increased ease of both home sewn and factory made clothing (Emery, 2014). In the 21st century computer aided design helps designers and retailers plan their garments, create samples, examine fit issues, and even show designs to clients for selection. Mass customization and co-creation in which consumers work hand in hand with designers and manufacturers represents the next wave of engineering innovation, in which consumers control the process of design.

Mathematics

Mathematics is defined as the science of numbers, quantities, and shapes and the relations between them (Webster, 2003). The intersection of math and fashion is most clearly evident in design inspiration and fashion retailing. In the early 1900s, innovations in glass allowed for large window displays. In tandem with advertisements, consumers desired and demanded increased fashion change. Today, we no longer need department store windows, as we can shop from anywhere in the world with our fingertips and fashion bloggers take a front seat with fashion editors. Stores, even haute couture designers, such as Chanel, communicate with consumers via social media notifications. The point remains, however, whether it is 1909, 1939, or 2015, the price must be right for consumers to purchase apparel.

Armed with information such as the examples above, and more, instructors will have opportunities to explore how fashion can be engaged to strengthen STEM skills and spark creativity, useful and necessary in teaching students who will join the 21st century workforce.

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