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Abstract

Within the last decade, the commingling of art and science has reached a critical mass. Science has long infused the arts with curiosity for natural phenomena and human behavior. New models for producing knowledge have given rise to interaction and collaboration across the globe, along with a renewed Renaissance.

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Keywords

On Cultural Polymathy, Visual Thinking, STEM, STEAM, Culture, Community, Progress

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On Cultural Polymathy:

How Visual Thinking, Culture, and Community Create a Platform for Progress

Whitney A. Dail

Within the last decade, the commingling of art and science has reached a critical mass. Science has long infused the arts with curiosity for natural phenomena and human behavior. New models for producing knowledge have given rise to interaction and collaboration across the globe, along with a renewed Renaissance. In “The Art of Innovation: Polymaths and Universality of the Creative Process,” MacArthur Fellow Robert Root-Bernstein (2003) writes:

“To invent and to create requires an understanding that incorporates all that is known sensually and abstractly, subjectively and objectively, imaginatively and concretely. And because of their wide disciplinary training in the imaginative skills, handicrafts and expressive languages, only polymaths will have the tools necessary to do so” (p. 276).

Consequently, the idea of training in multiple fields (i.e. art, design, science, technology, engineering, mathematics) is gaining traction in mainstream circles by promising versatility. According to Root-Bernstein, “multiply talented” or polymathic individuals like Leonardo da Vinci are likely great innovators because they explore a range of possibilities across several domains of knowledge. Today, we are approaching the ideal as media, visual thinking, and STEAM incubators are producing cultural polymathy.

Not everyone can be a Leonardo, but in a world of excess media and communication the STEAM movement can access and produce new polymaths across the board. Media—graphic design, advertising, photography, television, film, smartphone apps, videogames, the Internet, and digital interfaces— is instrumental in disseminating ideas and feeding culture. Blogs

especially have grown in their capacity to share information, data visualizations, and artistic glimpses traversing an open landscape of ideas. Since 2007, writer Maria Popova has operated *Brain Pickings*, a blog surveying creativity in a variety of fields through a combination of text and images. Popova declares, “*in order for us to truly create and contribute to the world, we have to be able to connect countless dots, to cross-pollinate ideas from a wealth of disciplines, to combine and recombine these ideas and build new ideas*” (Popova, n.d.). *Brain Pickings* is updated with entries three times daily and has an astounding two million monthly readership (Lichtman, 2012). In a similar vein, Balmond Studio’s *Thinking in Practice (TiP)* is a bi-monthly online publication “exploring new thinking and theory” that introduces big-picture ideas, and in every issue features nine interesting projects through images (“About,” n.d.). In and outside of their networks, *Brain Pickings* and *TiP* demonstrate that investigating multitudes can satisfy and inspire the mind’s curiosity to learn with a macro-photographic lens.

That we rely heavily on images to relate meaningful content is no surprise. However, Nicholas Mirzoeff (1999), a professor of media, culture, and communication at New York University, states, “*visual culture does not depend on pictures themselves but the modern tendency to picture or visualize experience*” (p. 5). Therefore, visualizing is the act of imagining possibilities and conveying information in creative and intuitive ways. Visual experience commands the way we understand complex ideas and, in turn, facilitates thinking in images.

In his book *Visual Thinking*, gestalt psychologist Rudolf Arnheim (1904-2007) was influential in exploring the link between thinking and perceiving. Our assumption that “intuition and intellect” are opposites is incorrect because, as Arnheim (2004) states, “*both art and science are bent on the understanding of forces that shape existence*” (p. 300). His theory is that vision and knowledge are fused in cognition, and thought takes place in the realm of the senses. For

example, the mind gathers and processes information through images, but what we see and perceive depends on personal experience and interpretation or contextualization. Arnheim (2004) says, “*to see the object means to tell its own properties from those imposed upon it by its setting and by the observer*” (p. 54). Media imbues our brain and senses with aptitude for both visual experience and visual thinking – whether we are aware of it or not. Together, art (intuition) and science (intellect) can create an experience that is more powerful than their own autonomous endeavors.

Embracing this concept, cultural institutions are largely accountable for supporting new ways of thinking and understanding. They recognize that openness to multidisciplinary practices paves way for new forms of social engagement as well as two-way dialogue between disciplines.¹ For instance, the Los Angeles-based Institute For Figuring was founded in 2003 to promote hands-on learning of science, mathematics, and engineering through visual thinking strategies and arts programming. Another example is Science Gallery at Trinity College Dublin, which opened in 2008 as an experimental center dedicated to “*igniting creativity and discovery where art and science collide*” (Science Gallery, n.d.). The same year, the Curtis R. Priem Experimental Media and Performing Arts Center debuted at Rensselaer Polytechnic Institute with the purpose of “*building bridges between our human senses*” by way of creative exchanges at the intersection of art, science, engineering, and technology (“About,” n.d.). These organizations are all cases of STEAM incubators—liminal spaces integrating art with STEM disciplines for experiential learning, critical inquiry, scientific outreach, and cultural exchange.

These places lead the way by providing a setting for social gathering; their “non-disciplinary” programs are catered to fuel visitors’ curiosities. STEAM incubators are meeting

¹ Cultural institutions are organizations, museums, libraries, archives, or historic sites that promote and preserve objects, artifacts, and traditions of society.

grounds for communities of artists, designers, scientists, makers, tinkerers, hackers, hobbyists, crafters. Debatty, Grover, Evans, & Garcia (2011) observe in *New Art/Science Affinities* that this new landscape embraces hacker, DIY/maker, citizen science, and artistic research movements. San Francisco's Exploratorium has attracted these subcultures since it opened its doors in 1969. A popular event is Open MAKE, a monthly program in partnership with *MAKE Magazine* celebrating do-it-yourself culture. Other happenings at Exploratorium include the annual Maker Faire, monthly cocktail evenings with curated discussions, and creative workshops at the



Photo by Chuck Lawton (Attribution-ShareAlike 2.0 Generic)

Tinkering Studio where projects range from plastic fusing to Rube Goldberg machines. Likewise, smaller nonprofits also support these nascent communities and hands-on activities. New

York's Genspace set up shop in 2010 as a community-based biolab for empowering the public to explore biotechnology through artistic and scientific approaches. Machine Project, a storefront space in Los Angeles, makes welding, soldering, and open-source programming accessible through introductory classes. What was once a niche hybrid practice is now a collective movement made popular by STEAM incubators. These public transactions unite passionate groups of people to work together and exchange ideas or expertise.

It is important to note that STEAM incubators take cues from the Bauhaus school

founded by Walter Gropius in Weimar, Germany—the focal point of many new ideas and practices that changed the world. But the most referenced catalyst for art-science partnership is the nonprofit arts organization Experiments in Art and Technology (EAT, n.d.). Active from 1966 to 1981, EAT played a crucial role in implementing early forms of art research and peer-to-peer collaboration. In 1967, *The New York Times* announced EAT’s plans “*to bring modern technological tools to the artist for creating new art forms and fresh insights and viewpoints to the engineer for creating ‘a people-oriented’ technology*” (Hayward, 1990, p. 27). EAT pursued these goals by forging partnerships with companies in aeronautics and space technology, which allowed artists to contribute to research (Bijvoet, 1997). EAT broke new ground and inspired further experimentation across the intersection of art, science, and technology, which we recognize today.

This nexus has undoubtedly encouraged academics, practitioners, and enthusiasts to look beyond a single discipline for greater meaning and understanding. STEAM incubators are the physical facets of this interconnectedness. Yet these organizations are valuable not only because they provide environments for crosspollination but also because they nurture transformative ideas about the future and offer active participation in making sense of the world through transdisciplinary culture. Basarab Nicolescu (2002), a quantum physicist and founder of the International Center for Transdisciplinary Research and Studies explains that transdisciplinarity seeks “*the understanding of the present world, of which one of the imperatives is the unity of knowledge*” (p. 44). Transdisciplinarity is pluralistic; it works between, across, and beyond all branches of learning, restructuring the cultural flow of knowledge. The role of STEAM incubators is three-fold: “*to transcend traditional boundaries, involve the public, and transform perceptions by focusing on social engagements and cultural activities*” (Dail, 2012, p. 3). The

byproduct becomes an increased ability to problem solve across disciplines, much like da Vinci's visual designs for flying contraptions and war machines.

What we are learning about ourselves, such as how our minds work and what practices will benefit future innovations, points to cultural polymathy. Curator Paola Antonelli (2011) observes with objects and designs in the Museum of Modern Art's *Talk to Me* exhibit that:

“Ambiguity and ambivalence – the ability to inhabit different environments and frames of mind at the same time – have become central to our cultural development. They are qualities that embody the openness and flexibility necessary for embracing diversity, and they are critical to the questioning and imagining that are preferred methods of inquiry” (p. 16).

With these new forms of knowledge – critique and reinterpretation – we can add to the human narrative. Science, technology, and society are changing so rapidly that we are entering into a critical time in history where the search for knowledge is met with even more questions. This unknown territory requires looking for deeper meaning. STEAM comes into play because it creates a platform for progress. Multi-modal learning improves education and student development, by and large encouraging the next generation of creative thinkers and innovators skilled in media, visual thinking, and polymathy. If, in 1903 on a calm North Carolina hillside, da Vinci's polymathic dreams of flight became a reality through the Wright brothers' Kitty Hawk flyer, what trajectory can STEAM set for the next 400 years of our newfound cultural polymathy?

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