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## STEAM: The wave of the future embedded in ideals of the past

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# STEAM: The wave of the future embedded in ideals of the past

## **Abstract**

As da Vinci acknowledges, there is an inherent interconnectivity between different academic disciplines and this concept is vital in comprehending how the arts play a meaningful role in Science, Technology, Engineering, and Math (STEM) education. This piece reflects on the positive effects of integrating the arts in STEM.

## **Author/Artist Bio**

Sheena Ghanbari is currently pursuing a Doctorate in Educational Leadership through UC San Diego. She is interested in creativity and learning at the K-16 level and is more specifically drawn to the cognitive effects of the arts as well as the STEM to STEAM movement. The push and pull between logic and creativity has been ever-present in her academic and professional interests. Coming from a family of engineers, she developed an early appreciation for the ying and yang of left brain convergent thinking and right brain divergent thinking. She earned her Masters in Arts Management from the Heinz College of Public Policy at Carnegie Mellon University and completed her undergraduate studies in Visual Arts and Communications at UC San Diego. She is currently the Program Promotion Manager for the Department of Visual Arts where she manages all of the department's external marketing and communication efforts. In her spare time she enjoys traveling, swimming, running, and painting.

## **Keywords**

STEM, STEAM, art-science, motivation

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## **STEAM: The wave of the future embedded in ideals of the past**

*Sheena Ghanbari*

“Principles for the Development of a Complete Mind:

- Study the science of art
- Study the art of science
- Develop your senses, especially learn how to see
- Realize that everything connects to everything else”

*Leonardo da Vinci's notebooks (1452-1519)*

As da Vinci acknowledges, there is an inherent interconnectivity between different academic disciplines and this concept is vital in comprehending how the arts play a meaningful role in Science, Technology, Engineering, and Math (STEM) education. Researchers have documented the positive effects learning through the arts, these attributes range from heightened critical thinking skills, to risk-taking, to emphatic behavior (Burton, Horowitz, & Abeles, 2000; Catterall 2002; Lampert, 2006). Some of the loudest voices in support of the integration of arts education are from researchers in cognitive psychology and neuroscience. A common theme among a consortium of studies that focus on the neurological effects of arts training is that the arts can heighten other cognitive processes. The theoretical reasoning for these findings is that motivation in the arts translates into high interest and sustained motivation, which ultimately improves cognition (Posner, Rothbart, Sheese, & Kieras, 2008).

With the economic push to increase STEM majors at the university level it is fitting that there is a momentum to integrate the arts with STEM to make it STEAM (Burke & McNeill, 2011). Adding the “A” serves to benefit students and bring creativity and experiential learning into the STEM landscape. I have seen this first-hand in a qualitative study that I am conducting. Through a series of interviews with university students, alumni, and educational leaders, I am hearing how individuals describe their own learning in university programs that purposefully marry arts and STEM disciplines. One program in particular blends art and science by using artistic mediums to teach scientific coursework. In one class that I observed, students from different majors were tasked to work in a group and create a scientifically accurate sculptural representation of various species for their final project. Students repeatedly noted that “using their hands” to create the mold helped engrain the scientific concepts taught in the course. There are many ways that the arts can contribute towards learning and listening to these accounts

confirmed my own experiences of learning through creating. The synergy between the artistic and scientific process is not a new topic of inquiry, but the momentum of STEAM initiatives has shined a light upon the importance of a comprehensive education that fuels both sides of the brain.

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