Four years ago, when I first heard the phrase “turn STEM to STEAM” – i.e. add the arts to the federally-recognized acronym for science, technology, engineering and math — I was skeptical.

As a theater geek born to a physician and biologist, I understood that the artistic process and scientific process have a lot in common, and that participants in each arena can learn a lot from one another.

My skepticism was not rooted in whether the arts and sciences are connected. What was missing for me as the “STEM to STEAM” mantra started to pick up more and more (ahem) steam was an articulation of how they are connected. Sure, there are elements of geometry in visual art, and yes, you need to understand basic math in order to read music or follow rhythms in dance. But arranging letters on a page is one thing; bringing different disciplines together in a thoughtful and authentic way is something entirely different.

In my mind, the ability to articulate and explore the authentic relationships between the S, T, E, A and M is crucial. The arts and the STEM subjects have similar processes, but provide different means of understanding what currently exist, as well as imagining what does not yet exist. If we want the STEM to STEAM movement to have longevity, we need to get specific about what those relationships are.

Luckily some people have already tried to do that, and we have an opportunity to build on their work. Later this month, thanks to the leadership of The Boeing Company, about thirty stakeholders from across the arts and STEM communities in Los Angeles and Orange Counties will be coming together for a two-day retreat to explore the natural alignment between the arts, STEM and Common Core. In preparation for the retreat a colleague introduced me to the work of Georgette Yakman, a researcher and educator from Virginia who has been developing her own educational framework for STEAM since 2006.

The framework defines STEAM as “science and technology, interpreted through engineering and the arts, all based on mathematical elements.” That definition evolved since Yakman began her work. In an earlier version, she articulated the relationships as follows: “We now live in a world where you can’t understand science without technology, which couches most of its research and development in engineering, which you can’t create without an understanding of the Arts and Mathematics.“ (You can read Yakman’s description of how she developed and refined the framework here.)

Yakman defines “the arts” very broadly, which I know many readers of this blog may take issue with. Some elements of the framework don’t ring true to me, but it excites me as an honest and thoughtful attempt to articulate how these various disciplines represent different ways of understanding the world. It also raises a lot of intriguing questions. Is there a way to flip the relationship between science/technology and the arts, so that the arts are interpreted through
science? (Is that what conservators do?) Are there any other ways to make the arts the end goal? And if not, are we okay with that?

Our retreat between Los Angeles and Orange counties will raise even more questions and hopefully provide some answers. In the meantime, I invite you to begin pondering them within your own communities. What do you make of Georgette Yakman’s framework? How would you articulate your own understanding of how the arts, science, technology, engineering and math relate to one another?

http://blog.artsusa.org/2013/05/14/stem-to-steam-reflections-v-2/

• Brad Griffith says:
  May 16, 2013 at 12:55 am

Hi Talia
Nice post and link to Georgette Yakman site. I supported the STEM to STEAM movement by starting http://www.USASTEAM.com witch is brand new site to promote resources, news and more to the STEAM fields. We also started USASTEAM on facebook which is daily news, videos and articals as yours to get posted to spread the STEM TO STEAM theme.
Is there more information on “…our retreat between… That you can share?
“How would you articulate your own understanding of how the arts, science, technology, engineering and math relate to one another?”
We have been asking ourselves that similiar question for four years so we created http://www.CraftStickBending.com and http://www.CraftStickCrafts.com to help blend art and engineering science.
Craft Stick Bending is the new art and engineering of bending, molding and shaping craft woods of all kinds for the purpose of making crafts, gifts, art and engineering structures such as popsicle stick bridges. Please help yourself to our fun sites. Your readers will also enjoy over 140 shop tips and stricks videos on our YouTube channel “CraftStickCraftats” Thanks Brad Griffith
Sequim WA USA.

Reply
• Kristen Engebretsen says:
  May 17, 2013 at 9:05 am

The link to Georgette’s framework was very helpful, particularly because it moved the conversation beyond the usual definition of “STEM + arts = awesomeness.” I like how her pyramid has levels for integration and levels for discipline-specific study. If I was a teacher designing curriculum, this would be really useful.

However, when you take Georgette’s framework past the classroom level, does it really become a movement or a national platform? Her attempts at marketing language left me feeling like the resounding answer was no, because STEAM puns don’t get you a national movement.
But if we do truly have a movement afoot, what specifically is it that we are asking for? My sense is that teaching STEAM through Georgette’s framework is just another sound educational practice, much like many other approaches, such as integration, project-based learning, or a well-rounded education initiative. While effective for teaching and learning, I’m unsure how STEAM could become a national silver bullet because, well, no educational practice ever is.

I agree that teaching a truly integrated curriculum is awesome, but I wonder, for example, what role communities, states, national organizations, and federal law have in that awesomeness. Particularly because every district, school, and teacher could come by that awesomeness through totally different approaches.

I’d love to hear if you find answers to some of these concerns after your retreat!

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**Reply**

*Aliza Greenberg* says:

May 24, 2013 at 10:27 am

Talia, I really like the emphasis on looking for how the arts and STEM are related as a definition of STEAM. I think what always frustrated me about STEAM was that it seemed like it was a way for the arts education community to say “don’t forget about us!” And that made me think, “Well, then shouldn’t we be adding social studies, too and all the other disciplines and the specific ways they are defined?” Looking at how they are connected moves STEAM more toward an instructional approach and less as an advocacy tool (an advocacy tool that I am not sure serves anyone that well). Thanks so much for this post!

**Reply**

*Georgette Yakman* says:

June 4, 2013 at 2:59 pm

Talia,

Thank you for your article. I would be most interested in ‘what doesn’t ring true for you.’ I have strove to be as inclusive of multiple viewpoints as possible.

I would also be interested in this retreat that you are talking about. I have been brought out to CA numerous times to speak on STEAM and it is one of the leading states in the initiative.

Kristen – You are correct in that my work in and of itself does not create the foundation for a national movement. I hope that it becomes a mulch-faceted grass-roots movement that people adapt to their own educational agendas. Others are more politically connected than I and a national movement is starting. My focus is creating the best venue I can for helping educators and programs make the shift from interdisciplinary, STEAM, PBL, etc to a STEAM focus and networking those programs with the business world for better global viability in education and business. You’re correct, there is no silver bullet, but STEAM is my attempt to enable people to get as close a possible to customize their educational experiences to work best for them while substantiating global efforts.
Aliza – if you look at my framework, it very much agrees with your thought that the social, physical, ethical, musical, etc arts are included. The goal was to create a way of educating that supported the current established structure and the base ideals of NCLB, but to also formally include aspects of education that have not been well-established in many schools – especially in the US. The sentence that I used to define STEAM goes beyond ‘making STEM pretty’ it is a tool to show where all the subjects interconnect in reality and in education so that educators can help their students better understand the context and linking of subjects and content for deeper and richer and more engaging learning experiences.