

STEM AND STEAM

As Publisher of SNChronicle, I offered a statement to our digital community on this topic a few months ago that provoked a host of responses from technologists, mentors, and educators. I said;

Adding "A" to STEM under the guise of creating more job opportunities for students of color is a mis-directed initiative. The A stands for art.

(performing, dancing, singing, creating artwork, etc.)

Lots of art educators wanting to jump on the STEM bandwagon chasing \$\$\$ through in the A and getting paid.

The divergence among proponents of elemental STEM and its derivative STEAM is found in the origin of each concept. This separation is fueled on one hand by educators that are unfulfilled with the results of their efforts and by technology purists seeking to expand knowledge and discovery on the other.



In STEAM, artists, dancers, and musicians find value and gratification from inspiration of stimulants appealing to the senses of sight, sound, touch, and hearing.

Whereas in STEM, scientists, technicians, and engineers are motivated by the quest of understanding quantity, change, and structure using math, the basic language of all science and engineering.

Larry King, Publisher at STEM NEWS Chronicle

Comments Received:

I have 4 STEM degrees with my first degree from a liberal arts college, Morehouse College, where I had to take a core curriculum in humanities, even earning a Phi Beta Kappa key. I'm a collector of investment grade Black Art ... so I'm into the Arts and understand its role in the development of the whole person. As a matter of fact, my liberal arts background is my competitive advantage. When we first started talking about the A it was about computer Design and Graphics ... now it has morphed into everything, literally anything! I am in favor of all kids having exposure to the Arts ... and Arts, like STEM, are too important to be watered down by individuals, who are not competent at both or either. Therefore, STEM + Arts gives proper recognition of both.

Calvin Mackie, President and Founder at STEM NOLA

You could well be right. I'll defer to you on that. I'm more industry focused. I've been working with HBCU's over the last year and a half, pro bono and I'm still learning the education space. I enjoy your perspective(s). Thank you for sharing

Al Valentine, BA/BS/BSEE CSM

I'm reminded of a conversation I had with a Technical Director of an intelligence gathering agency. He was saying that he could find "geeks" (I say that with love, I am one), but the toughest person to find was someone who understood various cultures and could apply the technology appropriately.

Al Valentine, BA/BS/BSEE CSM

As a STEM professional, one of my biggest challenges is the conveyance of information to stakeholders and communities. Arts and design play a pivotal role. In the information age, the ability to use creative means to convey information is critical. As automation and AI looms, integration of the A is even more paramount. It's all interconnected.

Dana Clare Redden, CEO of Solar Concierge, Solar Energy Development

STEAM is a bastardization of STEM! STEM plus the Arts serves the community ... We don't have an Arts problem, we have a STEM problem!

Calvin Mackie, President and Founder at STEM NOLA

So am I wrong in my thinking that Science, Research, Problem Solving requires creativity and the Arts is the platform to release creativity? In a Digitally Transforming world shouldn't the 'A' also stand for architecture, agriculture, aerospace....all of which are interconnected and interdependent on 'S'cience, 'Engineering, 'M'ath.....AND ABOUT THAT 'T' in STEM or STEAM...if you think and teach that TECHNOLOGY is computers, tablets, broadband, smartphones, fitbits, etc. You are wrong and you are miseducating your flock...all of the aforementioned devices and connectivity mediums ARE NOT THE TECHNOLOGY...they are TOOLS! PERIOD! The technology is the human mind, yes that's right, the young minds we serve are the technology and those aforementioned tools are useless without the human mind providing an input whether physical or mental... Carry on!

William Wells Jr., Executive Director at aSTEAM Village

Design is Art. Design is part of the process cycle for engineering and technology. Adding the "A" does not change the process. I choose not to add the "A" because 'the Arts' has inevitably been defined as the "fine" arts (painting, sculpture, etc) while excluding the practical arts (cooking [aka chemistry] or sewing [aka technology/engineering]). I am a retired home economics teacher and the accepted definition of "art" has never sat well with me. For that reason, and my agreement with the observations made by Larry, I will always refer to STEM minus the "A."

Angela DeHart, STEM Impressionist Facilitator/Mentor

One of the unique things I did (thousand years ago) when I led a team of designers that won an R&D100 award ("Nobel prize" of industrial design) was to hire a bunch of students from the local arts & fashion college. They would operate the product and provide feedback on form/fit/function. It was CX/UX

before that became a Thing. We actually incorporated many of their suggestions.

Al Valentine, BA/BS/BSEE CSM

I think there's a definite problem when people...SPECIFICALLY NON-STEM PEOPLE...decide that the way to get more Black (cause that's who he's talkin about, let's be honest) into STEM is only via adding arts. The message he conveys is misleading and makes the assumption that again Black students can't succeed in STEM without finding an "alternate" route. I also find this problematic for people...again NON-STEM people, who use STEM to try to cash in on opps for themselves instead of leaning on the experts (SPECIFICALLY BLACK STEM PROFESSIONALS AND GRADS) who could and ARE actually doing the work, have been, and understand what it takes..not just doing it cause it's "en vogue."

A. Nicki Washington, Ph.D. CS Professor, Disruptor, Author, Speaker, Advocate, and Entrepreneur

STEM is a broad term. If you're designing a water treatment plant, a bridge, or plastic extrusions for auto parts - you're STEM. If you're on the Help Desk or doing "break/fix" - you're STEM. But the Explosion in STEM jobs is in DevOps, where getting the artists, poets, singers and dancers involved in an Agile framework is THE key element to the way successful products are designed. As the expression goes: your experience may vary. ...see more

Mr. R Albanese Immersive STEM Instructor

Art is already embedded in STEM. For example engineering, 3D printing, etc.

Gladys Delancey- Bolding - CEO BioLogue Laboratorium

Thanks for sharing William. The funding landscape reminds us to build programs around STEAM. Look no further than the release of the funding from DoDEA.

Dr. Paula Love, The Funding Doctor

Al The problem with mixing STEM and the Arts is that you find a lot of people doing STEAM who are not doing STEM or the Arts ... They doing STEAM whatever the hell is that these days! STREAM was a movement created to put the Arts

people at the table when the money was being cut up ... so now big corporate donors can play with the money and words and still fund things like the Ballet and Artists under the scheme of STEAM! ...

Calvin Mackie, President and Founder at STEM NOLA

I agree there is a STEM problem that is why its in high demand. The work is making amazing strides. But equally, UX is a interconnecting advancement tool. Think of this way.....PC vs Mac or the many brands or conferences that are now employing user experience. Simply put, Mac users can accomplish in 2 steps what it takes 5 steps on a pc to do. What is the point? My different experience = more user friendly. You can extrapolate that in many variables.....from presentation to comprehension....from pitching to closing.....from delivering to retaining.....from experience to application. Science can be an Artno bastardization necessary..... And Angela that is why I said STEM plus the Arts ...

Ercel Placide, Board Chairman

STREAM this through hands-on-learning ...

- Science: Chemistry, Physics, Biology
- Technology: Computers, Coding, Biotech
- Reading: The Inventors & Their Inventions

George Antion Smith, NSBE Founder

Here is your "A" in STEaM... <https://vimeo.com/41221674>

we lowercase the 'A' because in our world we go beyond the arts as we also include architecture, aviation, agriculture and our programming is not focused on engagement, immersion and inspiration.

Instead, our programming is built upon creating pathways to three direct and distinct destinations 1) college readiness for a STEaM focused degree, 2) workforce readiness in a knowledge and information based economy and 3) entrepreneurship. Thus is why we provide year round programming that is

broken up into two segments, 1) 8-week summer camp (inspire, engage, accelerate) and 2) fall/winter/spring competitive brain sports programming Robotics, race car Engineering, computer challenges, aviation classes, Future City, MathCounts, Student Soaceflight Experiments Program to the ISS, etc.

When you consider that ALL business and professions will undergo and are currently undergoing Digital Transformation and acclaimed doctors and their staff must be retrained to learn to work with machines and business either transform digitally or face extinction like the dinosaurs the importance of the 'A' in STEaM could also mean Amplified

William Wells, Jr., Executive Director aSteam Village

Throughout my career I've been a software & product developer, mainly building digital tools for creative professionals at places like Adobe, so that's my perspective. Having a high demand skill like coding lets you walk into a lot of doors on your own. Although it's ever changing, software opportunities are plentiful. With that said, not everyone wants to code and some of the most powerful folks on a modern product team are the designers and product owners.

No one should be giving an indication that the media creation definition of 'A' , lowers the bar for more POC. About 1/3 of the software folks i've worked with didn't have a STEM degree, including myself. We need as many roads into STEAM as possible, youth are generally inspired by them all. One of the most impactful youth programs I work with uses video game creation as a way to inspire. A game needs design, coding, audio, graphics, ops and management to create. They get a complete product introduction; we're breeding entrepreneurs more than anything.

We also don't know what the future holds, so adaptability, being autodidactic, critical thinking, will prepare our youth for whatever is to come.

Randy Riggins, Principal Give TV

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about, let's be honest) into STEM is only via adding arts. The message he conveys is misleading and makes the assumption that again Black students can't succeed in STEM without finding an "alternate" route. I also find this problematic for people...again NON-STEM people, who use STEM to try to cash in on opps for themselves instead of leaning on the experts (SPECIFICALLY BLACK STEM PROFESSIONALS AND GRADS) who could and ARE actually doing the work, have been, and understand what it takes..not just doing it cause it's "en vogue."

Nicki Washington, Ph.D.CS Professor

Well . . . the 'A' which really should be considered collaterally with STEM isn't Art — it is Anthropology. In the 21st century, value development increasingly can be described as culture backboned on a technology platform — and anthropological cues drive human cultural expression.

Case in point: LinkedIn is a technology platform, but we users consider it 'social' media. Were nascent STEM learners more exposed to the study of human societies / human development, then their utility product technologies likely could yield more effective user adoption through increased relatability.

Eric Freeman, Entrepreneurial Infrastructure Adviser

Those who “liked” the discussion included:

Brian K. Ashford, VP, Analytics Delivery Services / Wealth Management Consultant

Tondi Allen, Blockchain Expert, Software Engineer, Automated Business Diversity & Inclusion in Tech Ambassador Safe Zone Ally

William Wells Jr., Executive Director at aSTEAM Village

Mariana Silva, Connecting organizations & individuals to programs preparing the next generation of innovators

Mary (Mal) Hedrick, Graduate Teaching Assistant -General Chemistry at University of Guelph; Graduate Research Assistant -BDDC

V S Washington, Certificate Logistics & Supply Chain Management at Gwinnett Technical College

Jose Carrion, Network/ Systems Security Specialist at NASA Glenn Research Center

Rebecca Lewis, Project Director at Education Development Center

A. Nicki Washington, Ph.D. CS Professor, Disruptor, Author, Speaker, Advocate, and Entrepreneur

Angela DeHart, STEM Impressionist Facilitator/Mentor

Ena Hackaday, Founder & CEO at Brainy Bytes -

Anthony E. Ray, Community Certified Master Trainer, SiriusXM Host of HBCU Nation Radio Show, Author, Church Planter

Dr. Trina L. Coleman, STEM Thought Leader, Radio Personality, CEO, PhD Physicist, Motivational Speaker

Mr. R Albanese, First 100 yrs are the hardest!

Joe Gilbreath, Analyzer/Instrument/Electrical Technician at Motiva Enterprises

Yolanda Williams, Director @ Entergy ROBOTIC PROCESS AUTOMATION

Terrence Bocage, CCNA Computer Networking and Helpdesk Professional

Donald R. Mitchell, Co-CEO/CFO at LDM Group: Advancing Equitable College Access, LLC.

Sujoy Roy, CEO/Founder at VisitDays

Gregory Gwynn, Commissioner at large

Eric Griggs, MD State of Louisiana Health & Wellness Ambassador/APA Health
Equity Ambassador/Certified Lean Six Sigma Green Belt

Jalaal Hayes, PhD Research Chemist and STEAM Educator

What We Support

Our readers in the science and engineering workforce understand demystifying common understandings of who can do and be a scientist or engineer is essential to expanding opportunity and sustaining the economy. Those among the community of educators know that unlocking imagination in the classroom builds student's confidence and esteem to achieve success in STEM careers.

Comments from readers and others will always be used to expand understanding of the value of STEM education for all students. Subscribe to our newsletter and send your thoughts on this topic at link below.

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