April 2014. Vol. 18, No. 2. – U.S. Workforce Policy Builds up 'STEAM' – Ann M. Galligan

Welcome to the Spring 2014 issue of *CultureWork*!

This quarter's article focuses on recent policies, initiatives, and partnerships to develop "STEM to STEAM" movements, in which the initial focus on Science, Technology, Engineering, and Mathematics (STEM) moves toward the inclusion of the Arts as part of the educational core that now becomes STEAM. In particular, comparisons are made between implementation of such efforts in the states of Rhode Island and Oregon. Ann Galligan, Associate Professor and Co-Director of the Cultural and Arts Policy Research Institute at Northeastern University in Boston, MA, examines ways in which STEAM is now building on the momentum of the successful STEM initiative.

Regards,

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U.S. Workforce Policy Builds up 'STEAM'

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Introduction

This article offers a commentary on United States (US) workforce policy as it relates to arts and cultural education through the brief examination of recent efforts to develop a "STEM to STEAM" partnership, building on the momentum of the successful STEM initiative (Science, Technology, Engineering, Mathematics to Science, Technology, Engineering, Arts, and Mathematics).

Focus of Article

This article seeks to offer a public policy take on STEAM: why and how it occurred and its possible significance for the U.S. workforce. Using the framework of what noted public policy analyst John Kingdon (1995) referred to as a "policy window" (where policy issues move onto the government agenda and towards decision and action). The article explores whether a policy window for arts and culture is opening now with the effort to add the arts (and design) to science, engineering, and math education.

Kingdon described the process of opening a policy window as involving three convergent streams: (1) the problem stream involving problem identification and recognition often based on indicators or focusing events; (2) the policy stream populated by disparate policy communities producing alternatives and proposals; and (3) the political stream incorporating shifts and in public opinion, administration changes, and interest-group dynamics in the determining of actor receptivity of policy actors to varied changes. As Kingdon stated, these three streams, all flowing independently with a life of their own and driven by different forces, are coupled by policy entrepreneurs at critical points in an effort to influence agenda setting and advocate policy alternatives. (Policy entrepreneurs, within the Kingdon model, are those who expend personal resources—time, energy, money—in pursuit of a particular policy objective). On the

merging of these streams, a policy window then opens. If however, coupling does not occur when the problem or political streams set the government agenda, there is little chance an item will make it onto the actual decision agenda. Thus, when a problem is identified and the political environment favorable, it is vital that the policy stream produce viable alternatives for change to happen. Otherwise, there is a very good chance the excitement will fade and the item be dropped from the agenda. The main question here is whether arts and culture advocates have been at all successful in making arts education a viable policy alternative with respect to the workforce?

STEM to STEAM Movement (2006-2014): Building STEAM from STEM

One of the primary reasons the arts (and design) are moving onto the national and local policy radar today is due to the movement to link the arts with the sciences as key education and workforce policy concern. This linkage is commonly referred to as "STEM to STEAM." (1) In 2010, this partnership became recognized as a formal movement and the website www.steammanifesto.com was created to share information about STEAM (often written as STE[+a]M), and to offer examples of best practices for its implementation. Leading the thinking on educational reform and the importance of creativity in learning is Sir Ken Robinson, the author and impetus (perhaps one of the main policy entrepreneurs), behind the earlier Creative Economy and Education Reform Movement in the United Kingdom and the United States.

The main premise behind the STEAM movement is integrating new approaches to instruction and feedback that research indicates support student growth academically and creatively. STEAM seeks to educate a workforce with the creativity, skills, and flexibility needed today by encouraging arts integration alignment across domains of college and career readiness, arts education, and the academic core.

With this impetus, the steammanifesto.com website morphed into the www.STEAMconnect.org and the www.STEMtoSTEAM.org sites. The second site states that STEAM is "a movement championed by Rhode Island School of Design (RISD) and widely adopted by institutions, corporations and individuals" (para. 4). The site also states that the objectives of the STEAM movement are to: (1) transform research policy and to place Art + Design at the center of STEM; (2) to encourage integration of Art + Design into K-20 education; and (3) to influence employers to hire artists and designers to drive innovation (downloaded April 8, 2014).

The STEAM movement grew out of the STEM movement. The United States Department of Education (ED) website (www.ed.gov/stem) highlights Science, Technology, Engineering and Math: Education for Global Leadership as one of its key themes. ED (September 16, 2010) highlights President Barak Obama as stating "leadership tomorrow depends on how we educate our students today—especially in science, technology, engineering and math" (para. 1). The rational the site gives behind this statement is that while the United States has been a global leader through hard work and innovation in these fields, this leadership is threatened because of what the president terms "an inadequate pipeline" (para. 2) of teachers skilled in these subjects to deliver the education needed to stay competitive. He set a ten-year goal of moving U.S. students forward in these fields. In the fiscal year 2015 budget, $170 million dollars was proposed in reaching this mark.

Another major vehicle created to advance these goals has been the STEM Education Coalition (www.stemedcoalition.org). As its website states, the central mission of this group has been to inform federal and state policymakers on the critical role that STEM education plays in U.S. competitiveness and future economic prosperity. Among its goals have been: a) to make STEM education a national priority; b) to expand the capacity and diversity of the STEM workforce pipeline; c) to increase the number of women in these fields; d) to inform policymakers; and, e) to develop effective policies that earn bi-partisan support.

To date, the STEM movement has grown throughout the country and the STEM curriculum has been implemented in many K-12 schools and within higher education. The political will behind this movement was greatly helped by President Obama's involvement. There has been a STEM caucus in the U.S. Congress that boasts 93 bipartisan members. In short, Kingdon's three streams came together for STEM. The problem was clearly articulated as seen in the president's remarks. Money was allocated to create the necessary infrastructure to advance possible solutions for

addressing this issue. A national coalition was formed to build the policy community behind it, and the president and congress joined with education and industry to ensure that the educational pipeline to the workforce was securely in place on a national scale.

Building on the success of the STEM movement, many arts advocates have come together to advocate for arts education and its link to the economy by advocating for the arts inclusion in STEM education. By 2010, blogs were created to advance the STEAM cause and "a thousand flowers bloomed" as to the benefits of the creativity the arts could add to what some termed "the more objective sciences." In a June 11, 2013 post, "Turn STEM to STEAM: Why Science Needs the Arts," blogger Stephen Beal wrote that,

There is a pressing need for creative people across a broad range of industries. Innovation is not the exclusive domain scientists, programmers, and engineers. Companies and organizations that have traditionally looked to large research universities for talent are now looking to artists and designers—creative people who will bring to the workplace unique problem-solving skills, entrepreneurial spirit, and a deep understanding of the user experience. (http://www.huffingtonpost.com/stephen-beal/turn-stem-to-steam_b_3424356.html, para. 14)

The STEM to STEAM Caucus and the Political Will

The political landscape behind the STEAM Caucus is vastly different from the Congressional Caucus created for STEM. The STEM Caucus was established in 2000 and now boasts almost 100 bi-partisan members. The Congressional STEAM Caucus began on February 14, 2013 and was championed by Rhode Island School of Design's (RISD) then-president, John Maeda. The bi-partisan caucus has been co-chaired by Congresswoman Suzanne Bonamici (D-OR) and Congressman Aaron Schock (R-IL). At the establishment of the STEAM Caucus, eleven representatives had signed on; now there are over 50 bi-partisan members. A major force behind the formation of the Caucus was Congressman Jim Langevin (D-RI), who had previously introduced House Resolution (H.R.) 51, calling for the creation of the Caucus and promoting STEAM. Clearly, the STEM to STEAM movement has been strongly embraced and championed by members of Congress from both Oregon and Rhode Island, but how and why this came about in both cases has been vastly different.

A Profile of Two States

On both coasts, there are efforts to define, expand, and support the STEM to STEAM movement. Both Rhode Island on the East Coast and Oregon on the West Coast have been leaders, but in very different ways. In both cases, there has been a clearly defined problem and a strong and supportive legislative presence. Universities and colleges in both states have played roles. Yet, as the next few paragraphs describe, their stories are quite different.

Rhode Island

The STEM to STEAM initiative in Rhode Island has been championed by the former president of the Rhode Island School of Design (RISD), John Maeda. Maeda came to RISD from the Massachusetts Institute of Technology (MIT) Media Lab and brought much of the innovative thinking that fueled the work at the Lab. In a 2012 blog, Maeda wrote that,

The White House reminds us that "a world-class STEM workforce is essential to virtually every goal we have as a nation—whether it's broadly shared economic prosperity, international competitiveness, a strong national defense, a clean energy future, and longer, healthier lives for all Americans" (http://www.edutopia.org/blog/stem-to-steam-strengthens-economy-john-maeda, para. 2).

He added that while most people agree that the issues that face the next generation will require creative solutions, STEM alone will *not* get us there. As a self-described life-long STEM student, he has understood the need for thinking that is linear as well as divergent. Yet, what Maeda has brought to the table is a key element to STEAM—he is a scientist, artist, and designer. In short, he has occupied both worlds easily.

The other key ingredient in Maeda's success in championing STEAM has been that he takes the arts out of their traditional "comfort zone" and has added "design" to the A in STEAM. This clearly has reflected his embrace of the Creative Industries model of the arts (See Galligan, 2001). One of the main reasons that the Arts Sector grew so rapidly from 1940-2000 was the introduction of technology and the exponential growth of designers in the U.S. workforce (Galligan, 2001). Design, as a concept, is less ambiguous for many people than is "art", and the technological elements of design fit nicely within the STEM framework.

Maeda has used both RISD and the concept of design as vehicles that have appealed to arts advocates, have been less threatening to the trans-disciplinary scientific cohort than most other art forms, and have offered industry a clearer sense of how the arts fit into the picture and offer potential solutions to their well-articulated workforce woe of lack of qualified U.S. candidates for what are often global, highly-technical positions.

Maeda has also made inroads into forging relationships within local, national, and international arenas. He has become "the face" or, in Kingdon's terms, the policy entrepreneur, behind the STEM to STEAM movement. He has addressed Congress and presented STEAM at conferences and convenings globally. All this sounds like STEM to STEAM has built momentum thanks to Maeda. But has it?

This past December, Maeda stepped down as President of RISD and took a job in Silicon Valley. Questions remain: a) will RISD continue championing STEAM with the same passion Maeda did?; b) will Maeda continue to be a "policy entrepreneur" from the industry rather than the academic sphere?; c) will Maeda still have the same clout now that he is outside academia?

One of the legacies Maeda left RISD was a highly charged student body that bought into STEAM and reached out to their humanities colleagues at Brown University to create a powerful STEAM coalition. Not a week goes by that does not highlight an event or profile joint projects as part of "STEAMshow", the RISD STEAM and BROWN STEAM student coalition. In New England, STEAM has remained largely on college campuses, with K-12 moving more in step with the STEM initiative. In Rhode Island, there is a graduation requirement in place for the arts and there are a number of initiatives, such as Smart Schools (http://www.smartschoolsnetwork.org/), that foster STEM to STEAM learning. Yet, while Maeda and RISD were initial driving forces behind STEM to STEAM learning on the national and international levels, little effort was made to integrate it into learning on the local level, even with Arts and Technology as the eighth core subject approved by the Rhode Island Board of Education (See http://www.ride.ri.gov/InstructionAssessment/OtherSubjects.aspx).

Oregon

In Oregon, STEM education has become a major force on both the K-12 and university levels. For example, Oregon State University (OSU) hosts a very active Center for Research in Lifelong STEM Learning within its College of Education (www.education.oregonstate.edu/research/center-research-lifelong-stem-learning.) This Center grew from a partnership between the Colleges of Science and Education and has provided "a nexus for research on STEM learning and outreach across the campus, across communities, and across the lifespan…STEM was once marginalized within the academy, STEM learning research is rapidly emerging as a critical area of scholarship among many STEM disciplines. OSU's Center for lifelong STEM Learning is leading the way in this rapidly expanding area of inquiry."

On April 9, 2013, OSU's Center for Lifelong STEM Learning hosted the event, "The Argument for STEAM: Integrating the Arts into STEM Education," as part of its campus-wide seminar series on STEM learning. As the promotional material from their website read, "STEM, oft-used to describe the integration of Science, Technology, Engineering and Mathematics into a new trans-disciplinary subject, is a dominate goal in education these days. Are we missing something? What can the arts add to the experience of STEM learning? How can creativity enhance innovation? Enter the STEM to STEAM movement with an "A" for Arts." The panel included Dr. Kevin Patten of the OSU Music Department, OSU Alum Ryan Mann from Oregon the Office of Congresswoman Susan Bonamici, and me, at that time

a Visiting Professor at the University of Oregon (UO) in Eugene. The panel discussed the origins and motivations for STEAM, the national climate on the issue including an update on the Congressional Caucus, as well as some of the work being done locally and nationally. As the blurb for the seminar concluded, “let’s imagine together how we might transform our own work and transcend the chasm between the STEM disciplines and the Arts.”

The K-12 level in Oregon has put STEAM on the agenda, in large part, thanks to the efforts of Congresswoman Bonamici, a former educator herself. In an effort to connect education to the world of work, movement is afoot to address the “current inflexibility and siloed approach to learning” (http://www.oregon.gov/gov/docs/OEIB/1aWOW.pdf, p. 1). , , p. 1) The goal of the Oregon K-20 STEAM movement is to provide students with both a solid foundation in literacy and math as well as with the skills, knowledge, and social capital needed to connect them to the world of work. Advocates argue that those skills and competencies provided by a STEAM education could include computer skills, basic math, problem solving, critical thinking, and spatial awareness as well as personal skills such as perseverance, collaboration, and creativity. In Portland, OR, a city tax for arts education was recently passed (see http://www.portlandoregon.gov/revenue/60076) and in Eugene, Lane Culture and Education Alliance (http://lanecea.org/) for arts education networking has been formed. Schools across the state have been designated as “STEM schools” (http://www.stemschool.com/schools/oregon/). Yet, until the formula for funding schools is addressed, there is little hope for a comprehensive STEM to STEAM model to take hold across the state.

Policy Implications

In many ways, a policy window for STEM has clearly opened. The problem has been defined, resources have been allocated and goals set. Coalitions have been formed and the political will behind the movement is solid. The STEAM movement has hoped to capitalize and build on STEM’s momentum, and John Maeda became a strong voice and advocate and a leading policy entrepreneur behind this effort. Now that Maeda has left RISD, questions remain whether or not the political stream will regenerate itself and support the fledgling initiative, whether the educational community will embrace it, and whether industry will champion STEAM the way they have supported STEM education.

Conclusion

There are two possible ways of looking at the arts relationship to the workforce. One is to see the arts and cultural—o creative sector—as a growing force in the global economy that should be recognized and supported in its own right. The other is to recognize and support the STEM to STEAM initiative, seeking to expand the role of the sciences in education to include art and design. It sees fostering creativity and design as necessary ingredients in a complete, overall education along with math and the sciences, providing students K-20 with the skills and abilities needed to succeed in a competitive, technologically-focused, global world. STEAM has great potential to reinvigorate K-12 education and to provide students with the skills needed to succeed in the workforce. Whether the policy community can develop convincing arguments for the inclusion of the arts and design in a comprehensive model for education and the workforce of the future remains to be seen. STEAM advocates need to form coalitions as did those in STEM. Supporters such as Congresspersons Bonamici, Langevin, and Schock need to continue building their coalition in Congress. President Obama could include STEAM on his national agenda as he did with STEM. Finally, there is hope that the university communities will continue to address and advance policy options for the window to fully open.

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1. See http://stemtosteam.org/

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