

State of STEM² in Northeast Florida

INITIAL SURVEY REPORT

Prepared by

**Mark A. Tumeo and
Wanyonyi Kendrick**

University of North Florida

Before we start . . .

- Must have a common understanding of terms and underlying rationale:
 - **STEMM (or STEM²)**
 - **Northeast Florida**
 - **Goal of State of STEM² report**

STEMM (or STEM²)

- STEM stands for science, technology, engineering and mathematics

STEMM (or STEM²)

- There has been a growing movement to include the liberal arts in this focus, creating the acronym STEAM (Science, Technology, Engineering, Arts and Math)

STEMM (or STEM²)

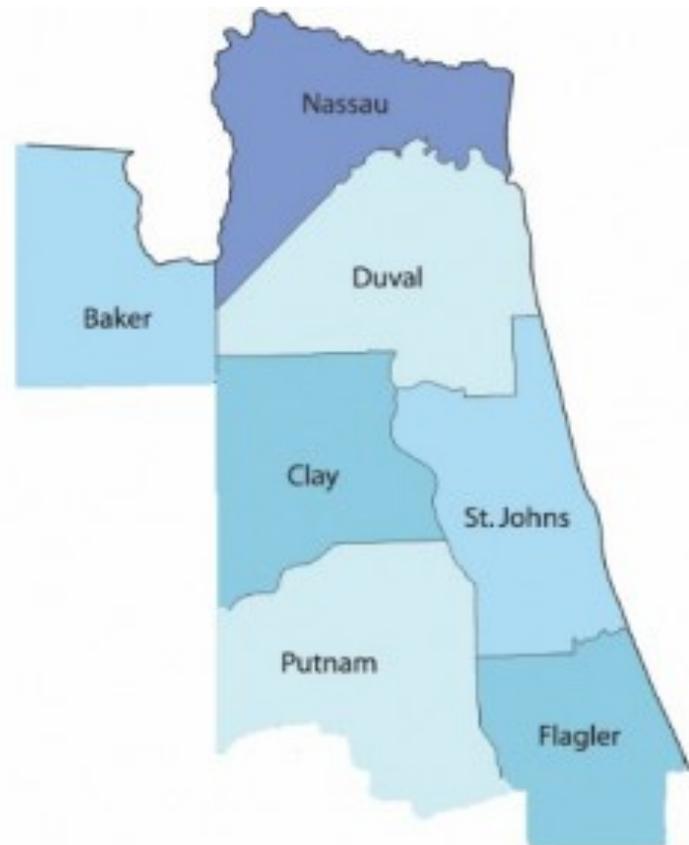
- Given the importance of the health care sector in the region, this report includes “medicine” in the grouping examined as represented of the broad spectrum of professions and disciplines in the healthcare and bioscience industry. Therefore, this report will focus on the state of STEMM (Science, Technology, Engineering, Math and Medicine) represented as STEM²

Northeast Florida

- For this report, given the focus on the connection between STEM² education and economic development, it was decided to use the same definition as the Florida Economic Development Council, the Jacksonville Chamber of Commerce, and JAXUSA Partnership.

Northeast Florida

- Throughout this report “Northeast Florida” means:
 - Baker County,
 - Clay County,
 - Duval County,
 - Flagler County,
 - Nassau County,
 - Putnam County and
 - St. Johns County.



Goal of State of STEM² report

- This initial “State of STEM² in Northeast Florida” report has four main goals:
 - Provide a national, state and regional perspective on STEM² education and employment issues.
 - Explore models of how these issues are being addressed elsewhere.
 - Gather initial information on these issues locally from existing organizations and stakeholders.
 - Make initial recommendations on how Northeast Florida might move forward.

National Perspective on STEM²

- In today's knowledge-driven economy, workforce quality and talent are a region's most important economic assets – and education in STEM² is one of the fundamental underpinnings of this asset.
- Over the past decade, jobs in STEM² fields have grown at a rate **three times faster** than non-STEM² jobs.
- This growth is expected to continue over the next decade with a **projected growth rate of 17%**.

National Perspective on STEM²

- Given that the production of skilled workers and graduates in STEM² disciplines has lagged well-behind this rate, and has fallen off in many instances, this places the nation and Northeast Florida in a position of losing in the globally competitive economy.
 - For example, by 2018 it is estimated that 1 million computer science jobs will go unfilled by US workers.

National Perspective on STEM²

- A major part of the problem is that not all the talent available is being mustered:
 - Minorities and women are significantly underrepresented in STEM² fields, leaving a staggering amount of economic potential on the table.

National Perspective on STEM²

- Underrepresented minority groups comprised 28.5 percent of the population nationally in 2006, but just only represent 9.1 percent of college-educated Americans in science and engineering occupations (academic and non-academic).

National Perspective on STEM²

- Despite a national push, the STEM work force is no more diverse now than in 2001.
 - The percentage of the US population employed in engineering, computing and advanced manufacturing has increased, the percentages of African Americans and Latinos employed in these sectors have stagnated.

National Perspective on STEM²

- Women have held constant as a percentage of the computing workforce but have lost slightly in both the Engineering workforce and Advanced Manufacturing workforces
- African Americans and Latinos are losing ground in the STEM disciplines.

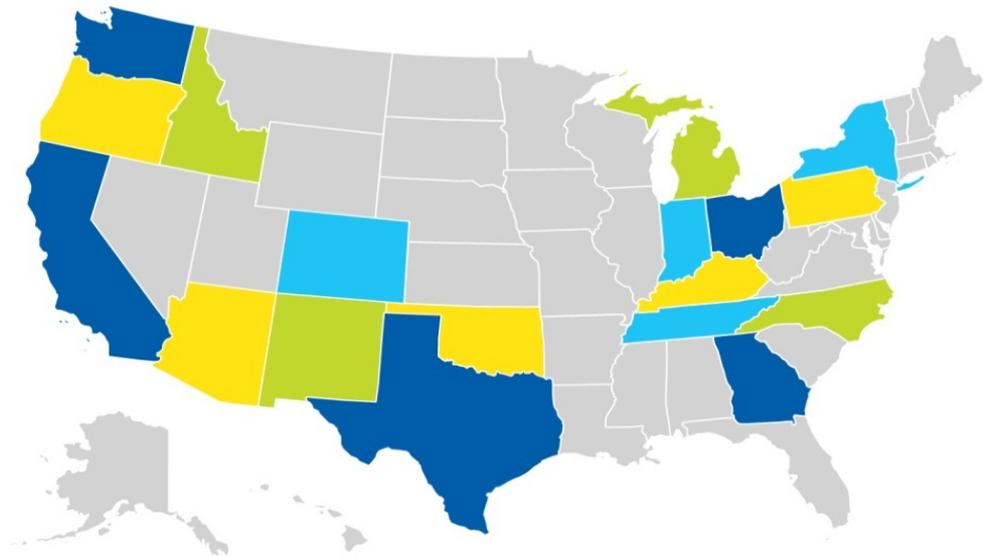
Regional Perspective on STEM²

- The trend in Florida is even worse.
 - The national average for women in Computing workforce has held steady at around 36% between 2001 and 2015, in Florida males far outnumber females and the gap has increased since 2000.
 - Similarly, while the national average for women in Engineering is around 24%, Florida has held relatively constant around 20%.

What Others are Doing

- Many States, regional and local entities have become active in addressing these issues.

In 2012, driven by the lack of progress, an initial group of 13 states formed **STEMx™**, The group now includes 18 states and the District of Columbia.



What Others are Doing

- **STEMx™** is focused on:
 - a) Sharing and disseminating information, knowledge and tool development across states;
 - b) Promoting high-quality STEM education in their classrooms, schools and programs; and
 - c) Providing mentoring and assistance to state partners to enable members to solve challenges through collective response and mutual support.

What Others are Doing

- There are also an increasing number of examples where a specific Governor and/or local school districts, civic leaders and businesses are uniting to build STEM Hubs focused on the unique needs of their regions.
 - Iowa
 - Los Angeles
 - Southeast Pennsylvania

What Others are Doing

*All of these efforts share one common element – local and state leaders have come together to develop **single or multiple STEM-Hubs** that serve to coordinate activities, share best practices, collect data and in some instances, help attract funding from the local, state and national level.*

What Others are Doing

- One of the STEM-Hub networks that might be considered a "best practice" is the Tennessee STEM Innovation Network (TSIN).
 - Recently, the Jacksonville Chamber sponsored a trip to Nashville as a sister city that has many of the same characteristics of Northeast Florida. Nashville is in the Middle Tennessee STEM Innovation Hub.

What Others are Doing

- The Network created ten STEM-focused Platform Schools designed to function like learning labs, where educators are able to try out new and innovative ways of teaching.

What Others are Doing

- Much like the "career academies" found in our region, the platform schools utilize partnerships with industry to create project-based learning units that incorporate actual situations that industry partners are striving to solve.
- In the platform schools students work to solve a common problem in all of their classes, regardless of the subject.

What Others are Doing

- The ten TSIN platform schools enroll over 4,000 students and are non-selective, making the dream of STEM careers available to all students regardless of aptitude or test scores.

What Others are Doing

- Another potential “best practice” model is the Chevron Center for STEM Education and Career Development that was established by the Carnegie Science Center in Southwest Pennsylvania.
- The Center seeks to inspire the next-generation workforce and expand the pipeline of students prepared to enter college and graduate with STEM² degrees.

What Others are Doing

- The Center's programs have a significant focus on essential support programs that complement the classroom STEM² work as well as informal (after-school) education programs.
- In May 2015 the center hosted a bi-partisan Congressional briefing in Washington DC to present their STEM-related as a national model to expand quality science, technology, engineering and math education.

What This Means for NE Florida

- Based on the experience and data from other areas and states, it seems that one of the best ways to advance STEM² education and careers is through a regional STEM² Hub.
- Such a Hub would be a new entity dedicated to accelerating the growth of STEM² initiatives and measured outcomes in the Northeast Florida region.

What This Means for NE Florida

- The goal of such a STEM²-Hub would be to provide the essential, missing elements for Northeast Florida to accelerate quickly the percent of Northeast Florida students choosing STEM² careers.
- The STEM² Hub would be the base infrastructure needed to coordinate and execute the vision of providing the essential missing elements to accelerate the growth of STEM² education and careers.

What This Means for NE Florida

- It would do this by:
 - a) Convening *all* parties and stakeholders to develop an ecosystem in Northeast Florida;
 - b) Promoting shared vision, goals and strategies;
 - c) Supporting metric development and data collection;
 - d) Supporting aligned activities to achieve shared goals;
 - e) Mobilizing funding; and
 - f) Encouraging, cultivating, and supporting STEM² businesses;

Building on Existing Strengths

- As part of the initial survey, organizations and stakeholders were asked to develop an initial analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT) with respect to the creation of a Northeast Florida STEM2-Hub.
- The Northeast Florida region is already well-positioned to take advantage of a STEM2-Hub structure.

Strengths

- Our region already has many unique stakeholders who create the foundation for our regional STEM² infrastructure.
- The region is blessed with a community spirit and desire to help that is clearly demonstrated in the numerous non-for-profit organizations that have significant activities focused on STEM² issues.

Strengths – STEM² Education

- One of the most notable strengths is the availability of significant numbers of “academies” focused on STEM².
- St. John’s County and Clay County are excellent examples of how close partnerships with industry can produce meaningful and effective STEM academies for High School students.

Strengths – STEM² Education

- The region has nationally recognized, successful robotics programs in some schools, with the potential capacity in-place that could be replicated to other schools.
- The region also has a world-class system of higher education, including numerous state colleges, several 4-year degree-granting institutions, and one highly-ranked State university.

Strengths – STEM² Business

- As can be seen in the already existing range of partnerships between educational institutions and industry, the region has an engaged and vibrant business community.
- The leaders of industry in Northeast Florida have clearly seen the need for additional STEM² workers, and have already started to develop important programs to address this need.

Opportunities

- The region has several notable opportunities that a STEM2-Hub could exploit.
- One of the most promising opportunities associated with the Hub is the coordination of organizations that should greatly increase the ability to attract grant funding for STEM² initiatives.

Opportunities

- The trend toward large STEM companies and foundations providing grant dollars for STEM has been growing and will continue to increase. There is an opportunity for the Northeast Florida Regional STEM2 Hub to capture more of these dollars for our regional educational institutes.

Opportunities

- While becoming increasingly limited, there are also opportunities in government funding of STEM2 activities. Many Federal agencies have significant resources to fund STEM2 related programs and a coordinated effort would place the region's institutions in a very strong position to attract them.

Threats

- Based on stakeholder discussions, it seems that at the regional level, two specific threats need to be recognized:
 - a) Challenges from the State Legislature
 - b) Parental Involvement and Parental Engagement

Recommendations

- *Regional stakeholders should come together to form and support a Northeast Florida STEM²-Hub.*
- *The STEM²-Hub should convene our regional all stakeholders to continue to develop nationally recognized approaches to advance STEM² education and careers.*

Recommendations

- *It should be emphasized that any education solution must provide many synergistic efforts including a clear emphasis on mathematics as the foundation for all STEM² education.*
- *That the STEM²-Hub convene a group of regional stakeholders for an outcome-focused discussion on next steps to promote entrepreneurial activity and start-ups.*

Recommendations

- *That the STEM²-Hub lead a discussion of options and alternatives for developing a sourcing pipeline for both businesses and qualified workforce alike.*

Conclusion

- The STEM²-Hub should be the base infrastructure needed to coordinate and execute the vision of providing the essential missing elements to accelerate the growth of STEM² education and careers.

Conclusion

- The journey to establishing the Northeast Regional STEM²-Hub won't be easy, but we hope all in our community will join us in the journey to a more vibrant STEM² regional economy.