ISFIS Iowa School Finance Information Services

School Improvement Booster

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May 2014: STEM

Everywhere we turn these days there is talk of STEM Education – in the media, at the school board table, conferences and meetings of all sorts. Iowa has established a STEM network led by the Governor's STEM Advisory Council, which works in concert with six STEM Hubs, which cover all of Iowa. The Legislature allocated $5.2 million to fund the Advisory Council and the hubs in 2014 and the same amount is in the education appropriations bill awaiting the Governor's signature. The STEM Advisory Council has established these priorities:

- Student Interest and Achievement. (This is supported by the dissemination of the STEM scale up programs like Project Lead the Way and Curriculum for Agricultural Science Education, CASE)
- Technology Enhanced Instruction for Global Learning
- STEM Teacher Recruitment and Preparation
- STEM Learner Readiness for Post-Secondary Education and Career
- STEM Education Policy (which includes competency-based learning)
- Public Awareness for the Importance of STEM Education for the Economy and Society
- Public/Private Partnerships and Mapping STEM Education to Economic Development
- STEM for All, High Potential, Under-Represented, and Nontraditional

In this issue:

Why All the Focus on STEM?

A video on the Iowa STEM website from CBS News shares a brief overview of a comprehensive report from US News and World Reports. Several compelling findings stand out. Twenty percent of all US jobs are STEM connected and the supply isn't keeping up with the demand. While 72% of STEM jobs are filled by whites, only 6% of STEM jobs are filled by African Americans and 6% by Hispanics, the fastest growing demographic group in America. Women hold 50% of all jobs, but only 25% of STEM jobs are filled by women, even though women would earn 33% more income in a STEM related job. After high school, participation in STEM fields by women plummets.

The 2012 results of the PISA are the most recent international comparisons available related to performance in reading, math, and science. While we get tired of the constant discussion about how schools can improve and what some feel as an over-emphasis on test results, this data suggests we have a ways to go. A statistical sample of 510,000 students between the ages of 15 years 3 months and 16 years 2 months representing about 28 million 15-year-olds globally participated in PISA 2012. The students took a paper-based test that lasted 2 hours, which were a mixture of open-ended and multiple-choice questions that were organized in groups based on a passage setting out a real-life situation. A total of about 390 minutes of test items were covered. Students took different combinations of different tests. They and their school principals also answered questionnaires to provide information about the students' backgrounds, schools and learning experiences and about the broader school system and learning environment.

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Among the key findings for the United States were these:

- Among the 34 OECD countries, the United States performed below average in mathematics in 2012 and is ranked 27th (this is the best estimate, although the rank could be between 23 and 29 due to sampling and measurement error).
- Performance in reading and science are both close to the OECD average. The United States ranks 17 in reading, (range of ranks: 14 to 20) and 20 in science (range of ranks: 17 to 25). There has been no significant change in these performances over time.
- Mathematics scores for the top-performer, Shanghai-China, indicate a performance that is the equivalent of over two years of formal schooling ahead of those observed in Massachusetts, itself a strong-performing U.S. state.
- Just over one in four U.S. students do not reach the PISA baseline Level 2 of mathematics proficiency – a higher-than-OECD average proportion and one that hasn't changed since 2003. At the opposite end of the proficiency scale, the U.S. has a below-average share of top performers.
- Students in the United States have particular weaknesses in performing mathematics tasks with higher cognitive demands, such as taking real-world situations, translating them into mathematical terms, and interpreting mathematical aspects in real-world problems. An alignment study between the Common Core State Standards for Mathematics and PISA suggests that a successful implementation of the Common Core Standards would yield significant performance gains also in PISA.
- Socio-economic background has a significant impact on student performance in the United States, with some 15% of the variation in student performance explained by this, similar to the OECD average. Although this impact has weakened over time, disadvantaged students show less engagement, drive, motivation and self-beliefs.
- Students in the U.S. are largely satisfied with their school and view teacher-student relations positively. But they do not report strong motivation towards learning mathematics: only 50% of students agreed that they are interested in learning mathematics, slightly below the OECD average of 53%.

The focus in our state and across the country on STEM – Science, Technology, Engineering, and Mathematics – certainly seems justified given these mediocre statistics. As with all areas of school improvement, we need to create the conditions for success:

- Use data to inform the work – identification of areas for improvement, progress monitoring, studying implementation, program effectiveness, and other areas data informs.
- Have high expectations for educators and students and provide the subsequent support for both teachers and students to be successful (i.e. time for effective professional development and collaboration for teachers, compelling and interesting teaching for students, materials like an abundance of books and computers, etc.).
- Create a collaborative environment where responsibility for learning is everyone's business. Open the doors!
- Focus on just a few things at once. Prioritize.
- Maintain positive relationships and an orientation toward success within the school and community at large.
- Lead for improvement.

Don't Forget The Arts: From STEM to Steam

"The difference between science and the arts is not that they are different sides of the same coin… or even different parts of the same continuum, but rather, they are manifestations of the same thing. The arts and sciences are avatars of human creativity."
Mae Jemison, *doctor, dancer, first African American woman in space*

Various thoughtful groups have coined a phrase that reminds us we aren't producing robots, but rather citizens of the world. STEAM – Science, Technology, Engineering, the Arts, and Mathematics. These voices contend leaving the Arts out of STEM makes accomplishing what we want from STEM nearly impossible. Consider the following:

1. Comprehensive studies from around the country show that students that participate in the arts have better school outcomes, including higher GPAs, graduation rates, and eventual college attendance- effects which are especially striking because many of these studies are focused around low socio-economic status students (Catterall & Dumais, 2012)
2. The artist-scientist is not a new idea. Think Thomas Jefferson, the third President of the United States. He is considered a thinker, an inventor, an accomplished architect. Leonardo da Vinci, who painted the Mona Lisa. His Wikipedia entry describes him this way: painter, sculptor, architect, musician, mathematician, engineer, inventor, anatomist, geologist, cartographer, botanist, and writer. Think Maya Lin, the architect of the Viet Nam Veterans Memorial, a remarkable engineering and artistic accomplishment; and she's a sculptor as well. Listening to an artist recently share information about the weathering of her outdoor bronzed sculpture makes the science/art link abundantly clear.
3. Arts education supports all students' academic growth by activating a series of cognitive strategies that encourage deeper understanding of academic tasks and concepts as well as better retention of learned concepts. These two categories are in turn closely linked to success, not just in the arts but in all areas of academic understanding. Studies have shown that arts' training is correlated to raising math and reading scores, most likely because the arts, through the actions in the chart shown, lead to increased attention spans, working memory capacity, and reading fluency in many students (Rinne, et.al. 2011).

Arts actions leading to deeper understanding of topics	Arts actions leading to better retention/ memory for information
Elaboration	Enactment
Rehearsal of Meaning	Oral Production
Effort after Meaning	Emotional Arousal
Generation	Pictorial Representation

Adapted from Rinne et al., 2011, as referenced in Vega, 2012

Ensuring we maintain arts programs in this time of significant budget constraints and a focus on math and science may seem counterintuitive, but the research is clear that the arts are a viable and valuable part of the development of children and young adults, as well as grown-ups! As the counter to the old idiom goes- great minds don't think alike, they think differently. Great minds are creative and look not just outside the box, but around it, over it and through it. The arts are a key to the development of thinking and help students bring imagination and perspective to all aspects of their learning. Students in American schools will flourish if we make the Arts an integral part of their educational experience.

STEM Education in Iowa

Hoover High School STEM Academy: How One Team Is Expanding Iowa's STEM Opportunities

STEM education, or education that is focused in the fields of Science, Technology, Engineering, and Mathematics, has been a force in American education since its inception in the late 1960s at the height of the Cold War. Despite this long history, the US education system has struggled with producing excellent results in these fields in the past 20 years. While the US has continually improved, the growth rates are anemic compared to other developed countries, causing our students to fall behind. Recent statistics about STEM education in the US show a complicated picture of just how those educational outcomes stack up against other countries as well as within the United States.

The sluggish growth and our position in the world was revealed in a 2012 survey of student performance in the STEM areas. Because of this trend, there has been a surge in STEM programs and initiatives across the educational spectrum. There are, at most recent estimate, 250 STEM education programs enacted at the federal level alone, though these are just a drop in the bucket when parceled out over the thousands of school districts across the country.

Some US education programs do have high levels of effectiveness. An analysis of the 2009 PISA testing results found that some areas of the US actually perform better than other countries and significantly above the rest of the US. Knowing this, we then must wonder and ask the question, what do these schools do that less high performing schools don't do? In a 2011 analysis of available research on successful STEM programs, the Programs for K-12 STEM Education found that there are five major considerations for schools and districts to take into account when building a STEM program, three of which are pertinent here:

1. Schools and Districts should ensure that STEM curriculum is focused and rigorous.
2. There must be a commitment to the enhancement of teacher capacity.
3. Instructional leaders need the professional development that will support them in creating adequate school conditions for student achievement.

But what does this look like in a practical sense? One place to begin is to look to Iowa schools that are finding ways to implement STEM programs that meet these criteria, an example of which can be found in Des Moines at Hoover High School's STEM Academy. This STEM Academy invites about fifty 8th grade students per year into the program. Because of the immediate curricular and staffing needs, their program is committed to ensuring that every class in which the STEM Academy students are enrolled provides an opportunity for STEM learning, leading to students that are more engaged in STEM thinking, critical STEM application, and overall increased STEM understanding. This engagement, the leaders believe, will result in better scientific understanding for students and subsequently better opportunities as they enter STEM centered programs in their college and career paths.

A conversation with two of the leaders at Hoover High School, Maureen Griffin and Eric Hall, reveals some of the key factors on which they have focused in building a successful STEM program. In addition to curriculum and instruction, they have garnered support from within and outside the school as they build curriculum and create an excellent learning environment. They have supported the teachers involved through professional development related to pedagogy and content. There is a high level of commitment to success from the

staff - everyone involved puts in extra work every day. If those sound familiar, it's probably because they align closely to the three factors mentioned in the research above said to be integral in creating effective STEM education.

Maureen and Eric have worked diligently over the past two school years to ensure that the HHS STEM Academy is a space of excellence at work, leading their program to be recognized as one of the Governor's grant awarded STEM Scale Up schools. This award affords them the opportunity to further develop their STEM program through infrastructure development within the school building. Creating opportunities for excellence in STEM education on a budget isn't easy, but Griffin and Hall with the STEM Academy at HHS prove that it is possible.

Student Supports

Supporting students is paramount to the successful implementation of any educational change. At HHS's STEM Academy, the teachers and leaders work together to ensure that students in the academy are successful across their academic endeavors. These levels of support begin in the building and extend into the connections that the leadership has formulated with outside partners.

Within the STEM Academy team, teachers participate in an RtI process with the aim of ensuring STEM students are receiving appropriate levels of support within their school day. This is an important provision for students who are responsible for extra expectations, as these students are. They often take extra math or science classes in place of an elective, doubling up on some of the most challenging content. These students are driven and determined, but like any student can fall behind or struggle with concepts. The STEM RtI team aims to keep students on track throughout the school day, a school day jam-packed with interdisciplinary STEM classes and high expectations.

The second way that students are supported is through the inclusion of adult figures other than teachers into students' understanding of the importance of academic excellence. A regular "Speakers' Bureau" has brought a dozen STEM professionals in to speak to students, powerfully demonstrating the ways that STEM academics lead to successful careers. They also bring families of students into the school through parent nights, which further reinforce academic success by giving students the opportunity to share their learning with their families.

Finding Support

Another part of building a successful program is recognizing that the teachers within the HHS STEM Academy can't do it all on their own. Because of this, Griffin and Hall have worked hard to find partners from outside the school that can support both the students through the Speakers' Bureau, as discussed above, as well as the teachers in STEM curriculum and project planning. These partnerships have included building relationships with Iowa State, Pioneer and the World Food Prize, among others - organizations that have supported the HHS STEM Academy through teacher workshops, speakers, and an increased level of connection to the professional world of STEM for both students and teachers, so everyone more deeply understands the value of a STEM based education.

One of the newest relationships that Griffin and Hall have established is with the Governor's STEM Advisory Council, which recently awarded HHS's STEM Academy with one of four Scale Up Grants. This grant allows Griffin, Hall, and their team to begin to create a physical environment within the walls of Hoover High School that matches the intellectual environment they've been striving to build. Through this grant and the commitment of both Hoover's administration and the Des Moines Public Schools administration, the STEM Academy team has been able to redesign two classrooms to better match their classroom space to the goals of the STEM academy - no mean feat in a building originally designed in the early 1960s. The scale and scope of this redesign has been made possible by the many connections that Griffin and Hall have created and the support of the district leaders, Story Kenworthy designers, and building administrators and staff who all came to this redesign process with a spirit of, "…what can we do, rather than what can't we do?" This has allowed the team to dig into what they believe are the most important aspects of a learning environment - creating spaces that are technologically relevant and flexible so that students can both learn and enjoy the environment. Construction in these newly designed rooms will begin the day after school ends and be completed for the beginning of the 2014-15 school year.

Supporting Teachers

The final, and some might argue most important, factor in building a successful STEM program- or any educational system that improves learning for students - is the further development of the instructional staff – the teachers. With students getting opportunities to work in the real world, a state of the art classroom, and partnerships with businesses and local governments, now it is up to the teachers, doing the daily work in their classrooms, to use all of these resources to support student learning. Changing teaching paradigms isn't easy, but Griffin and Hall affirm their belief that with these new opportunities and facilities, it is key that teachers alter their instructional skills as well. What is the point of having a Mercedes level classroom if students are going to receive old

Volkswagen instruction? The teachers are rising to the occasion. They are embracing the new curriculum and partnerships and embracing the commitment to improve instruction.

Griffin and Hall have approached this aspect of building the STEM Academy with calm determination, finding different paths to bring teachers into seeing how enhanced curriculum and pedagogy could make a difference for students. They began by taking teachers to see what science education eventually leads to – businesses and institutions of higher ed with scientists solving real world problems, integrating new ideas and scientific principles into their work. The teachers visited other, more developed STEM programs in K-12 schools and the communities in which they resided, so they could see programs in action. Seeing the world outside of Hoover helped the teachers begin to see their role in building curriculum and implementing instruction that would support students as they moved into college and careers. Building this case for change is critical as schools commit to changing curriculum and instruction.

As research related to staff development has highlighted for some time, focus is a critical element in efforts that change instruction. Maureen and Eric have taken that to heart and make sure that teachers are able to focus on improving STEM curriculum and instruction - not being pulled in a dozen directions by competing professional development systems. Griffin stated she hopes she and Eric can protect this focus, so that the STEM teachers aren't bombarded by activities that detract from the main thing. Griffin further supports the teachers of the STEM Academy by being present in their classrooms- ensuring that they, like their students, get feedback on their work, so that they can continue to grow in their teaching practice.

While creating the Hoover High School STEM Academy has not been easy- it's clearly been worth it. Building a STEM program is more than just about the building the program is housed in, or the curriculum that is developed. It requires resetting the expectations, tone, and culture of the district, parents, teachers and students.

Moving the Iowa Core in Math from Discussion to Implementation

Angie Shindelar, Green Hills Area Education Agency

"How to induce more children to grapple zestfully with academic issues may elude our most determined efforts. But I strongly suspect that observing adults honestly wrestling with intellectual problems might win more youngsters to the life of the mind than any other experience the schools could devise."

Schaefer

I was reminded of this quote while visiting the Second Grade Math Academy, supported through Green Hills AEA, at Shenandoah's May Center. This group of eight elementary teachers from five southwest Iowa school districts and two AEA consultants who work with them seemed the perfect example to capture the essence of this quote. They are working hard to ensure all of their students learn math well. While their performance on the state test received some conversation and was an issue of concern, these teachers want their students to know and be able to use math to solve problems and be successful in life. That issue surfaced over and over and over again. This has meant changes in curriculum, instruction, assessment, and even schedules to make sure students receive not only the core instruction necessary to learn math well but interventions for those that need extra support.

Angie Shindelar, a consultant at Green Hills AEA and the founder of this project, wants to change the world of math education. She struggled with math as a child – not understanding the rich concepts that underpin math and not realizing how math could help her make sense of the world. She's bound and determined that students today will have an early and deep understanding of math, one she didn't have until she was well into adulthood. This commitment drives her work and drives her life. The Iowa Core has provided the framework to move forward in this work.

Angie refers to her discipline as "mathematics." That seems to be a signal in the math education world that one is serious about the Iowa Core and making sure kids learn not only how to compute, but also to understand math concepts. Angie is committed to the elements that most impact student learning in math – curriculum, instruction, and assessment. In addition Angie knows from experience and the research related to effective teachers that in order to teach complex conceptual ideas, teachers must have a broad repertoire of instructional skills and also really understand the math content themselves.

It is an especially challenging time to be an instructional leader as Iowa schools expand math from making sure every student knows their math facts to making sure everyone knows their math facts AND has conceptual understanding of math problem solving and processes. Angie noted, "It can be overwhelming to think about how to transition to the Iowa Core – I wasn't sure where to even start;" but she analyzed the challenge and approached it in a concrete, organized way.

Angie went to work in the 2011-12 school year at Green Hills AEA after a 20 year teaching career. This was about a year after the state board adopted the Iowa Core Curriculum (July 29, 2010), which included the standards of the Common Core and some added Iowa concepts. Prior to that, she had taught both elementary and middle school and found her passion in teaching math while pursuing her MA in math education at the University of Northern Iowa. She had provided plenty of professional development in math as a teacher locally and then to a wider audience through conferences and classes in the summer and online. She knew she loved teacher development work, so when the AEA math consulting job opened up at Green Hills, it was a perfect fit.

Drawing on her understanding of the Iowa Professional Development Model and her knowledge of the Iowa Core, Angie knew there was much work to be done if the Iowa Core standards were to be implemented and make a difference in student learning. She knew the work had to occur with teachers and principals, and she surmised teachers could implement the Core with increasing fidelity if they developed an implementation plan; studied the theory related to math content, pedagogy and learning; saw models of lessons related to the Core; practiced what they learned in a workshop setting and in their classrooms; received support from their local administrators; and collaborated about all of it. Drawing on her experience as an elementary and middle school teacher, Angie wanted to be sure to include concrete lesson plans, materials to teach them, and assessments to learn what students know and can do that align with the Iowa Core at each grade level. In other words, she wanted to move the Core from something abstract that teachers feared to something concrete and operational that they implemented into their classroom practice with as much ease as possible.

Math Academy Development and Work

Given all this, and being especially committed to teacher learning, she designed what she calls Math Academies at grade levels K-3, teachers that meet in individual grade level groups regularly and study the Iowa Core and how to implement it. These Academies support teachers from 5 southwest Iowa school districts and their principals. Grade level teachers meet with Angie four days in the summer, quarterly in grade level teams, and monthly visits that Angie makes to the school sites. This adds up to a lot of time – 16 days in the summer and 16 days during the school year, and at least 36 visits she makes to demonstrate lessons, observe, plan, and collaborate. While often professional development work is done in grade spans, this grade level focus seems to be "just right." While the group does look carefully at the curriculum above and below where they teach to understand from where students come and where they are headed, the idea of bringing teachers together who must teach the same content is a highlight of the project. Teachers believe it utilizes the time for maximum accomplishment and allows teachers from single section buildings the opportunity to collaborate with other grade level peers. Conversations about what goes on in each school enriches the understanding of all the participants.

A whole day visit to the 2nd Grade Academy yielded evidence of work in all of these program outcomes.

- Analyze the new Iowa Core Mathematics Standards to understand the major shifts in expectations for teaching and learning;
- Analyze the progression for the new Iowa Core Mathematics Standards for a three-year grade span to deeply understand the major shifts in expectations for teaching and learning;
- Increase teacher content knowledge;
- Learn and use best practice models and strategies for developing students' conceptual understanding;
- Develop an implementation plan for the new Iowa Core Mathematics Standards (including a transition plan);
- Develop a pacing and instruction plan for the year;
- Develop an instructional plan that incorporates the RtI model;
- Use formative assessment to monitor and plan for instruction;
- Use a "backward design model" for instruction and assessment;-develop an intensive and purposeful structure for the math instructional block to include a balance of conceptual understanding, problem solving, and fluency;
- Build collaborative relationships within and across grade levels

Watching this collegial group in action was a lesson in discipline and learning. They started promptly at 8:30 AM and finished at 3. While they weren't formally in session during the lunch break, they all ate at the site and continued their conversations regarding the project in a more informal manner. At the end of the meeting, not all left immediately. Several lingered to pose questions to Angie and ask for help with specific issues.

The group engaged in various activities throughout the day. They started the meeting by sharing successes from their most recent work.

- "I'm excited about seeing the mental math that's going on in my classroom. Students tear numbers apart and do it in their heads. It's a constant, growing thing with them." - Kathleen Davidson, South Page Elementary
- "Our entire K-3 staff is on board in our building. We listen, collaborate, and analyze what the students are learning. It's very exciting to the see the growth from kindergarten up. We do a lot more planning for small groups than we ever did and the kids enjoy the interventions – don't see them as 'Gee, everybody else is doing something else.' A little bit of intensive instruction really makes a difference in student learning." - Rhonda Murphy, Hamburg Elementary, Nishnabotna Schools

• "Previously we've done reading interventions, but this is the first time we're doing math interventions. You have to be open to flexibility. I'm not one opposed to change, but I need to figure out how to make things work and I am doing that. I'm amazed at the time I have in my schedule that I didn't know I had. Two years ago if you had told me what my schedule was like today, I wouldn't have believed it. But it's necessary and I am doing it."
Maria Blake, Shenandoah Elementary

They dived into reading material by Kathy Richardson, an expert in early childhood math. The reading was very technical and detailed and explained the various progressions (stages) of learning place value and how misconceptions in student thinking would show up in their work, thus pinpointing the concept that needed instruction. The teachers appreciated this information since it's impossible to respond to assessment data with instruction (formative assessment) if you don't have a clear understanding of the progressions of learning implicit in each standard.

Teachers analyzed their own quarterly assessment data around the standards that had been taught identifying those that appeared to offer the most challenge for students. With that data in front of them, they began the development of intervention plans that would address the specific learning needs of individual and small groups of students, as well as the identification of standards for which instruction needed to be provided to the whole class.

Principal Support

To support the work in the classrooms, Angie also meets with the building principals from these five schools three half-days annually. The fact the principals have agreed to have staff absent from the buildings for their time in the Academies indicates a certain level of support. Angie hopes to build on that level of support by helping principals answer questions like these: What should we be looking for in these classrooms related to math instruction? What results should we expect? How do we communicate with parents and families about some of the changes? What are various pieces of evidence we can share with parents related to our transition?

Capacity to Scale Up

Angie started with supporting these 4 math academies, and while there is talk of expanding the project, supporting the transition to the Core is only one of the many jobs Angie and other AEA consultants are charged with doing. Couple these new challenges with funding cuts experienced by the AEAs and the charge seems monumental. The AEAs have been underfunded somewhere between $15 and $20 million annually since the last economic downturn in 2009. Like most educators, Angie works long hours and occasionally in the evening and on weekends. But if Iowa is going to provide support to local school districts in ways that will make a difference in what teachers do in classrooms, there will need to be a well-funded system of doing so – not dependent on the heroic efforts of a few AEA staff members.

While Angie certainly sees this as a school improvement initiative and is excited about the early results she's seeing in the quarterly data, she raises flags of caution. They've just begun their work and while it feels like good things are happening, it is too early to call the project a success. She's worried that the Iowa Assessments aren't aligned to the Iowa Core, the main assessment on which schools are judged. She wants the teachers to keep learning together – to focus on figuring out this complex work rather than worry constantly about their Iowa Assessment results. She wants to work with the teachers and principals on how they'll study fidelity of implementation.

Before the group left, they discussed topics they want to address in future meetings, the work they wanted to complete in the summer, and how much easier it would be next year. Tracy Falk, 2nd grade teacher at Shenandoah, commented, "This has been a difficult year with everything new. We've been focused on reading interventions for a long time, but this math work is new and it's been tough to find the time. As I think ahead to next year, I think it'll be so much easier." She says this because they have dug deeply into the standards, enhanced their own content knowledge, developed materials, lesson plans, pacing guides, quarterly assessments, universal screeners, and just about everything else they needed to develop to teach the Iowa Core. It appears Tracy is correct. It will be easier next year as they build on what they've done this year.

Quotes

"We will not just meet, but we will exceed the level achieved at the height of the Space Race, through policies that invest in basic and applied research, create new incentives for private innovation, promote breakthroughs in energy and medicine, and improve education in math and science…Through this commitment, American students will move… from the middle to the top of the pack in science and math over the next decade – for we know that the nation that out-educates us today will out-compete us tomorrow."

Barack Obama , 2009 State of the Union Address

"The STEM workforce is exploding and is expected to continue to grow well into the future. From 2000 to 2012, STEM jobs grew nearly 8%, from 2010 to 2018 that increase is expected to jump to nearly 17%. That is why STEM education is vital to the careers of the future and what better way to encourage student participation than by putting before them teachers who have a passion and experience within STEM fields. President Obama called for 100,000 new STEM teachers over the next ten years, now even though the President and I don't agree on many things, on this we do agree that the importance of STEM education and putting those types of teachers in the classroom is paramount."
Representative Larry Bucshon, Republican, Indiana

"In the 21st century, scientific and technological innovations have become increasingly important as we face the benefit and challenges of both globalization and a knowledge-based economy. To succeed in this new information-based and highly technical society, students need to develop their capabilities in STEM to levels much beyond what was considered acceptable in the past."

National Science Foundation

"US elementary schools donate an average of 2.3 hours per week to science, a decline of 43 minutes since 1994."

STEM Education Coalition

"Innovations and creativity in science, technology, engineering and math (STEM) will be the drivers of tomorrow's economy. If you are not a participant on that frontier, you will trail behind it and possibly get left behind entirely."
Neil deGrasse Tyson, American astrophysicist

If you have any questions about the School Improvement Booster or suggested future topics, please contact Susie Olesen at susie.olesen@isfis.net.

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