

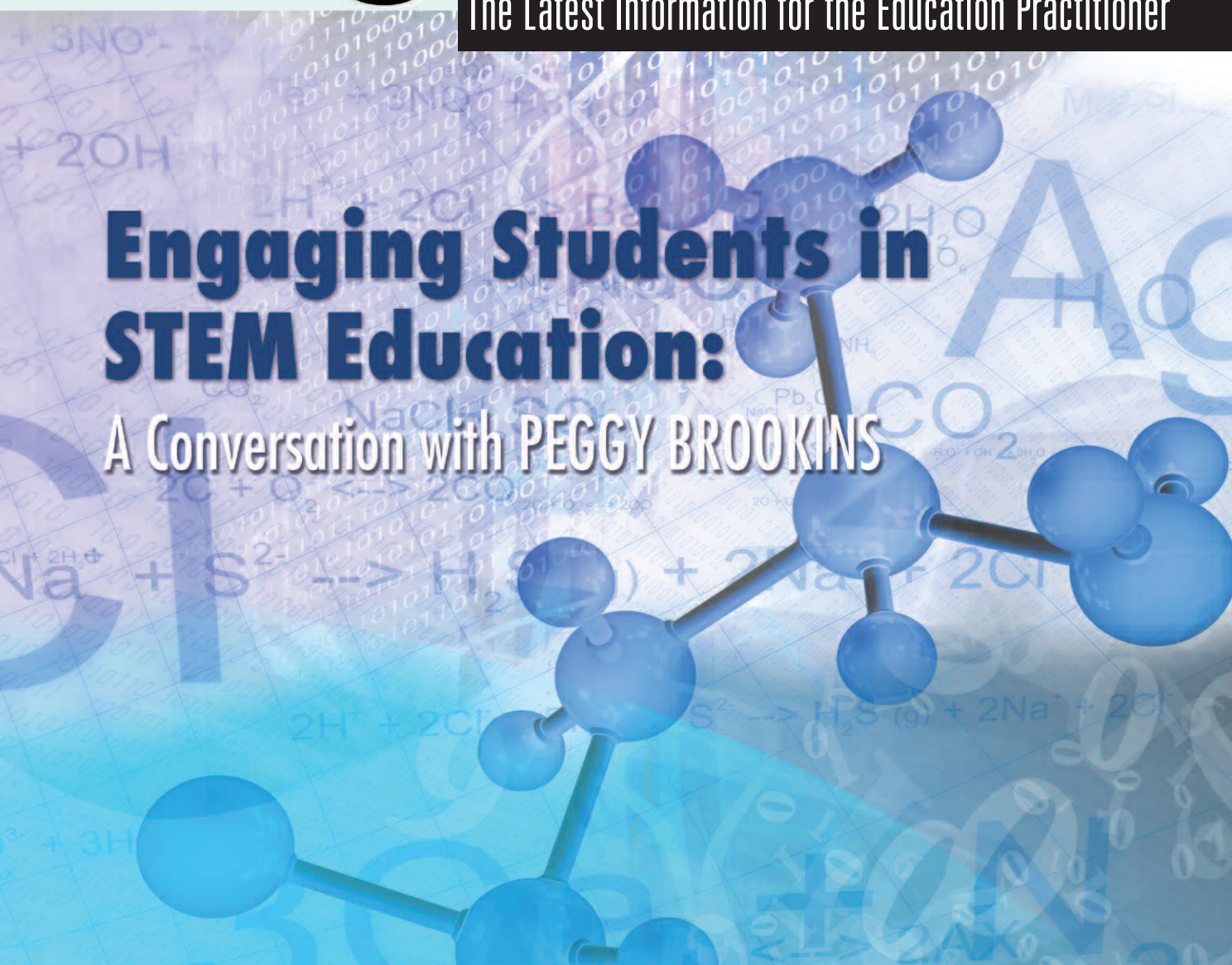
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Volume 6 • Number 3

The Latest Information for the Education Practitioner

Engaging Students in STEM Education:

A Conversation with PEGGY BROOKINS



Executive Summary

IN THIS INTERVIEW with Peggy Brookins, creator and director of the Engineering and Manufacturing Institute of Technology (E.M.I.T.) in Ocala, Florida, she talks about why the STEM subjects—science, technology, engineering, and math—are important for students to learn and how to engage them in these subjects. She suggests that these subjects have gained importance because of the new global economy and discusses ways that students are engaged in STEM subjects at E.M.I.T., which features an integrated curriculum of math, language arts, science, history, and geography. She also describes ways that any teachers can engage students in STEM subjects, including providing a path to a certification such as AutoCAD, exposing students to industry professionals through events or one-on-one meetings, and creating partnerships with local businesses to allow students to intern and gain real-world experience.

Brookins also talks about how to change teacher education programs and professional development to prepare educators to offer STEM education to students. Finally, she talks about the importance of algebra for all students, regardless of their postsecondary plans.

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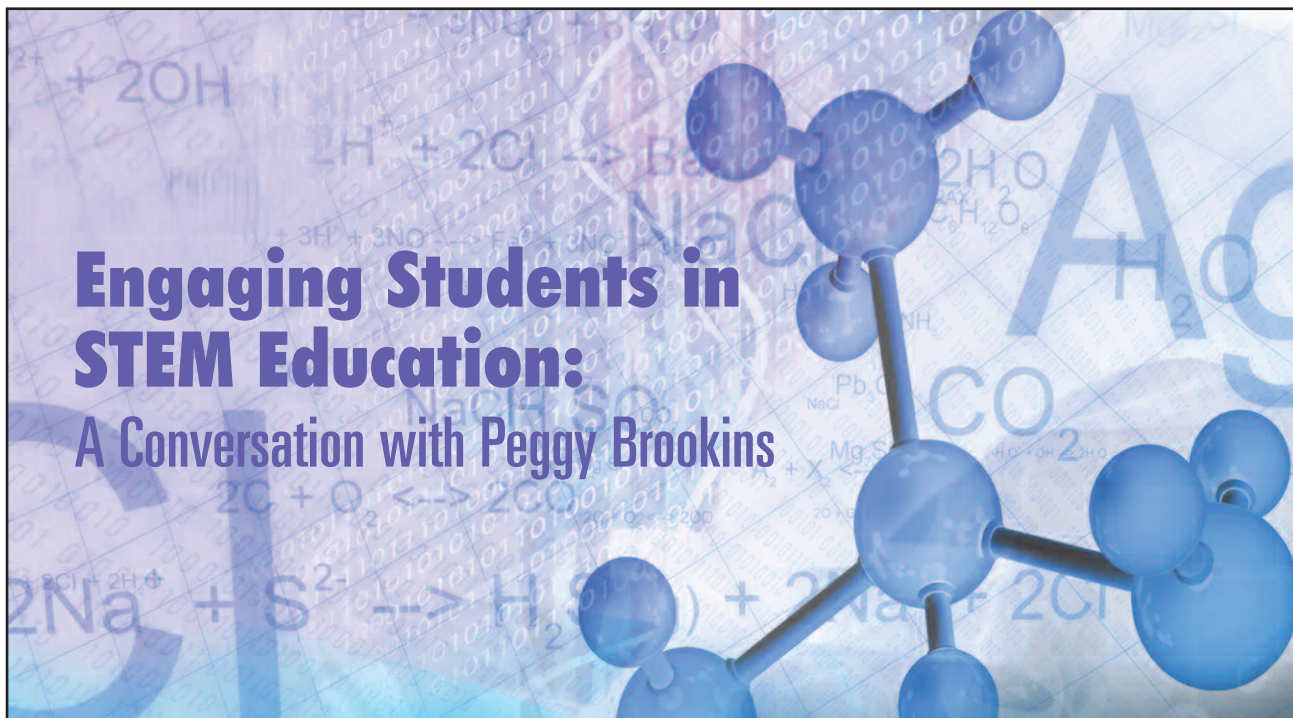
EDge™

Editor.....Erin Young
Designer.....Victoria Voelker
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Phi Delta Kappa International
ISSN 1556-6765

EDge is published bimonthly between September and May at PDK International, 408 N. Union Street, P.O. Box 7888 Bloomington, Indiana 47407-7888 USA.
Online at www.pdkintl.org.



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PDK ASKED PEGGY BROOKINS, creator and director of the Engineering and Manufacturing Institute of Technology (E.M.I.T.) in Ocala, Florida, to talk about why science, technology, engineering, and math are important for students to learn and how to engage them in these subjects. She co-wrote the \$1.2 million grant that resulted in the creation of E.M.I.T., and she's also a National Board certified math teacher in the magnet school.

PDK: Let's start off with the basics. Why are STEM subjects—science, technology, engineering, and mathematics—important for students to learn and excel in?

PB: I feel STEM is important because of the new reality Thomas Friedman lays out in his book *The World is Flat*. There is so much that is different for these students than it was for me as a student. We have a new world full of data that can be instantaneously transferred and shared around the globe. The global economy is more integrated than ever before, which presents new challenges and opportunities for both students and the work force at large within the United States. Almost without exception, new innovations critical to our own industrial base and the improvement of our standard of living involve STEM education. The creation of new products and the processes to sustain those new products depend on a solid base in mathematics, science, and engineering. I believe that without this base, we are not going to do as well as we

have done in the past.

If we look at the U.S. Department of Labor projections, they talk about the 20 fastest growing occupations for 2014, and 15 of them require mathematics or science preparation to be successful within the given field. Even requirements for occupations that have historically not required a college education or knowledge of math and science have shifted dramatically. Before, factory workers didn't need a high school degree. Now, we can see that that's changed dramatically, with almost 31 percent of jobs requiring a postsecondary education. If those trends continue, more than 40 percent of factory jobs will require postsecondary education by 2012. We know that even for jobs such as being a mechanic, the heavy integration of mechanical, electrical, and computer engineering into vehicle design has increased the requirements for STEM-related knowledge.

PDK: Do students have to like these subjects in order to excel in them?

About the Participant



PEGGY BROOKINS is the director of the Engineering and Manufacturing Institute of Technology (E.M.I.T.) in Ocala, Florida, where she is also a National Board certified mathematics instructor. E.M.I.T. is an engineering magnet

school created with a \$1.2 million Florida Department of Education grant that she co-wrote in 1994. Its mission is to prepare students to enter postsecondary colleges or universities in engineering by implementing instructional strategies that incorporate technology as a part of a hands-on, rigorous, academic integrated curriculum that uses authentic problem solving grounded in critical thinking and analysis.

She has served both as a presenter at the National High Schools That Work Conference and as a member of an external evaluation team for High Schools That Work. She sits on the Board of Directors for the National Board of Professional Teaching Standards (NBPTS) and chairs the audit committee.

PB: No, they don't have to like the subjects, but it helps. Many students have never been exposed to STEM education, so they don't realize how much fun it is to engage in these activities and feel that sense of accomplishment. Perhaps more importantly, the environment we cultivate within E.M.I.T. allows for those students, who are simply interested in solving practical, real-world problems, to be introduced to STEM subjects as tools to achieve their goals within an engineering framework. This is in contrast to learning math and science purely as an end unto itself, which may be more appropriate for someone focused on research or academics.

Another important factor to consider is that STEM fields have traditionally been dominated by men, and this has fostered a stereotype that boys are better than girls in math and science. The effect still lingers today. If we look at the performance of girls in these fields, we know that from the time they are in middle school, we need to have teachers, industry, parents, and media telling girls that they are intelligent and can compete in STEM fields. They can excel in math, science, physics, and go to college and major in STEM areas.

We still do not have enough environments where women feel comfortable. We know that research shows women are less satisfied in the academic workplace and are more likely to leave earlier than their male counterparts because they have not been exposed to some of those STEM fields. Universities could attract more female students in all STEM fields if they make modest adjustments. For example, they could add an introductory feeder course for those young women who haven't previously been involved in courses that require them to deal with spatial relationships, tool usage, project construction, or participation in hands-on projects. There are numerous other ideas and adjustments that are equally feasible, and implementing any number of them would have a profound effect on the number of women entering STEM fields.

Hooked on STEM

PDK: You mentioned that girls need to start to be exposed to these subjects in middle school. In general,

how early should students be exposed to these subjects?

PB: I think it should be in kindergarten. Expose them to inquiry at their readiness level in kindergarten; encourage them to freely explore, to create, and to interact with materials, people, and things around them. Some people say, “Oh, they’re just having fun, and they need to learn this or they need to learn that.” It is amazing what young kids can learn and develop in play. We often don’t realize what they have been exposed to and what they already know when they enter school. We should keep this development going by looking at problem solving and critical thinking and putting them in an environment where it’s okay to make a mistake and it’s okay to learn from a mistake. They should also be encouraged to clearly communicate their ideas.

Children have this natural desire to explore the world and everything around them. Given the opportunity to experience meaningful activities and have those experiences be a part of our curriculum, they will be prepared with the knowledge they need to start high school successfully. Those earlier experiences of using tools and figuring out what makes something go or turn or move will make them comfortable with those situations in an advanced context later.

PDK: You talked about how teachers could engage young children. Are there things that teachers at other levels should do to foster students’ interest and engage them in STEM subjects?

PB: I think we have to develop an effective STEM curriculum. Ideally, it should focus on conveying to students why they should care about STEM-related subjects. How can they be applied? Where can they see examples of these subjects in action on a daily basis? Especially at a young age, success often hinges on making a subject relevant to the students and their view of the world. A curriculum that involves doing, understanding, recognizing, problem solving, critical thinking, and interdisciplinary approaches to issues and problems is likely to generate far better results and enthusiasm with students. A basic tenet that teachers can follow is to challenge students with open-ended problems that allow them to expand and explore. It is often said



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that the greatest benefit garnered at a good university is the ability to learn and teach one's self. The ability to independently pursue inquiry, synthesize information, and apply it is absolutely key to success in any field, at any level, regardless of age or education level. So, this should be in the forefront for teachers and administrators as they design and implement STEM curricula throughout students' K-12 education.

PDK: On a personal level, how did you become interested in mathematics and decide to begin your career as a math teacher?

PB: This is going to sound funny, but when I was in high school, I had a teacher whom I probably worried all the time because I asked so many questions. She told me that I should be either a lawyer or a teacher. Nothing against lawyers, but I chose to become a teacher. She said that it was because I was a leader, that I explained things well and that people listened. Math came naturally to me, as well as science. I wanted at one point to become an astronaut, but I had two strikes against me in the early 70's. I was a female, and I was a minority. According to my guidance counselor, we knew that becoming an astronaut was not going to happen. As a result, I decided I would become a teacher and in some way prepare others to achieve the goals that I couldn't. I knew that eventually times would change and opportunities would be wide open for everyone. I have been fortunate as a teacher to be a part of many academic and career successes. So, I guess my rationale back then has proved itself out.

PDK: Why did you later decide to achieve National Board certification in adolescent and young adult mathematics, and what did you learn during that process that helped you become a better teacher?

PB: Because I'm the director of an engineering magnet program, I felt a need to do something that very few people in my district had done. Actually, very few people in the country have achieved this level of certification. And to be honest, I wanted to know how I compared to such a small group of very talented educators and mathematicians. It was, and

is, important to me that I am providing the best education for my students.

National Board has five core propositions: (1) teachers are committed to their students and their learning; (2) teachers know the subjects they teach and how to teach those subjects to their students; (3) teachers are responsible for managing and monitoring student learning; (4) teachers think systematically about their practice and learn from that experience; and finally (5) teachers are members of a learning community.

I think National Board certification is one of the most rewarding things I have ever done. Though I was doing a good job before I was certified, I don't think I was realizing my full potential. My students were doing well following a curriculum that seemed to be a bit too mechanical for me. National Board helped me realize the need to change the way I constructed my lesson plans so that I could incorporate more critical thinking, more analysis, and more reflection by my students and myself. A major part of National Board is challenging you as an instructor to show your depth of knowledge, and more important, to examine and improve the way you practice. The video analysis and personal reflection are life-altering. If you've never seen yourself on video, it is informative, remarkably eye-opening, and most of all, humbling!

The process of National Board strengthened my ability to prepare more coherent, integrated, and in-depth lessons. Those lessons now involve significant synthesis, analysis, and use of prior knowledge even if the curriculum that I was given did not. I know that completing the process allowed me to reach my goal as an instructor, which is to have Socratic conversations with my students about mathematics. I can now confidently say that my students are, in fact, problem solvers.

What Is E.M.I.T.?

PDK: In 1994, you were awarded a \$1.2 million State of Florida Career Academy Grant to create the Engineering and Manufacturing Institute of Technology at Forest High School in Ocala, Florida. Why did you think it was important to create that





The integration of knowledge from multiple disciplines allows students to be successful in their endeavors and also to truly understand why they are doing what they are doing.

magnet school, and was there a specific problem or issue you were trying to address by applying for that grant?

PB: I think it was important because I saw students who were bored. I too get bored in a stifled learning environment. The solution was creating something that students would want to get up for and come to school and be excited about every day. I'm a visual and auditory learner who loves to ask questions. I always had a hard time sitting quietly and robotically in a row as a child. So when the state sent out a Request for Proposal (RFP) for Career Academies, I saw this as a chance to do something new and different. And I wanted to make sure that every demographic of the student population had a chance to be a part of this academy.

In writing the initial grant, we had a clear philosophy and mission that focused on the economic climate of tomorrow and specifically on the areas of engineering, architecture, and applied technology. Technology has transformed the world, and we know that the capabilities and application of technology in our lives evolves on a daily basis. As a result, we rely on the leadership of engineers within the many technology-related fields. Engineers are excellent problem solvers. They have to make critical and responsible decisions. They must simultaneously use the principles of science and mathematics to accomplish a job, while also considering the needs, wants, and expectations of the society they live in. This convergence of STEM, social factors, and application was and is at the core of our vision for the academy. A primary goal within this was to prepare students to enter colleges and universities to pursue a major in engineering. We implemented strategies that incorporated technology as part of our hands-on, rigorous, academic and integrated curriculum that included Advanced Placement and honors courses.

Our program of study is timely and relevant, and E.M.I.T. is a place where students are challenged to think and become active participants in their own learning process. The integration of knowledge from multiple disciplines allows students to be successful in their endeavors and also to truly understand why they are doing what they are doing.

PDK: You spoke about challenging students and students knowing why they're doing things. I think that's important because students sometimes can be resistant to learning things they don't think they're ever going to use. Sometimes algebra and physics and STEM subjects fall into that category. Could you talk more about how having a project-based curriculum helps address that issue?

PB: In writing the grant for the academy, it was vital that teachers taught only what was useful and had a real-world application. If I couldn't tell my students why they were learning something, then they didn't have to learn it. You can imagine that when we first started out, there was a challenge from every student. It became almost a standing joke, and finally the students would say to each other, "Oh, don't waste your time. You know there's a reason, and you're about to hear it."

I have never found the question "Why do we have to learn this?" irritating at all, and I have always viewed it as a chance to submerge deeper into the concept at hand. As I see it, we want it to be the sort of academy that is organized around problem solving, projects, and Socratic questioning, as opposed to just facts and skills about the discipline. We want them to experience STEM education. They are discovering ideas rather than covering a prescribed curriculum. The emphasis is on depth and breadth. It is amazing how well students take to learning things that once seemed difficult when they see how they're connected to the world at large. The ownership they take of the subject matter has a profound effect on their ability to internalize what they're learning, which, in my opinion, is everything.

PDK: Do you have any entrance requirements for E.M.I.T., or can any student who is interested attend?

PB: Yes, we have entrance requirements. There is an application (which includes state test results, grades, teacher recommendations, discipline, attendance), interview, and testing (math and writing) process that all interested students go through. It requires some proactive effort from the prospective students, which helps us identify the ones who are truly interested versus those who are being coerced

by parents or others to apply. Additionally, it is a wonderful opportunity to talk with them, to see their faces light up, and to discuss on a personal level why they want to come to E.M.I.T. Many of these students have interacted with academy-sponsored events and have set their minds early to attend the academy. If students are interested, we try to take them. I think I can safely say that a large percentage of the kids who apply get in because they genuinely want to be here.

PDK: It sounds like there is a lot of outreach done in your district so students are aware of the opportunity, and they don't get to the point where they need to apply and then realize they haven't worked hard enough to have the skills that they need to get in.

PB: That is true. We have what's called a magnet expo, which includes all the magnets in the district at every level. Every high school in the district has a magnet, and ours happens to be the one focused on engineering. We talk to students early. They know what E.M.I.T. is and what we are about. This includes visiting middle schools and talking to them in their school setting. They are also welcome to attend different events here at E.M.I.T., which provides opportunities to speak with graduates who have gone through the program, and they can see what it takes to become an engineer.

PDK: Speaking of graduates, what are some of the things that your alumni are doing? Is this what you envisioned when you wrote the grant?

PB: Oh yes, it is definitely what we envisioned, and then some. With that said, there are still areas in which I'd like the academy to grow and evolve. For one, I would like it if we could offer this experience to more students. As with any business or organization, expanding the number of users makes it possible to undertake certain additional fixed costs. For instance, I would like the academy to have in-house access to a well-equipped modeling facility. At this time, we have 200 students, which represents our maximum physical capacity.

On the alumni front, our former students have graduated with degrees within many fields of engi-



**Imagination is
more important than
knowledge.**

neering, including quantum physics, architecture, biomechanical engineering, mechanical engineering, bioengineering, civil engineering, computer engineering, and building construction. Some obtained a pharmacy degree or entered medical school. One is pursuing a master's degree at MIT in nuclear engineering, while still others have gone into business or education.

We envisioned our students leaving us with the confidence and the ability to succeed in their chosen vocation. We now have graduates that work as professional engineers returning as mentors to a new generation of students. They're able to say, "I sat in that seat and I learned what you're learning, and these are the reasons it will be extremely helpful to you later."

Alumni have been hugely supportive of the thematic learning activities (TLAs) we engaged them in, and they convey how critical that was to their success in college. They also come to appreciate the head start they received in other areas, such as obtaining an official state certification in AutoCAD when they graduated from high school. Perhaps the thing they are most vocal about when talking to our new students is the importance and value of learning how to work in teams, take on leadership roles, and manage and coordinate people, time, and resources. The support and validation they provide for these aspects of our program has had a great impact on new students adopting these concepts and challenges as their own.

Interdisciplinary Learning

PDK: You talked about how students see that things are connected. Do we need to change the way we teach STEM subjects in most schools? I'm wondering how interdisciplinary courses play into this.

PB: I do think there needs to be a change in the way STEM subjects are taught. One of my favorite quotes from Einstein is "Imagination is more important than knowledge." At the academy, TLAs, which I briefly mentioned before, are at the core of our teaching methodology. It is a problem-solving process in which our students are given a specific problem to solve. It starts with a story, and contained within

that story is a problem they must solve. Students of varying grade levels work together in teams of three to four. After defining their problem, teams brainstorm and conduct research. They will narrow their solution choices, analyze what they have, and concur on the final solution choice. We use the TLA model because it requires the students to integrate technology with the subjects of mathematics, language arts, geography, and science.

A good example is a TLA called Robots Rock. Teams were given only a latitude and a longitude. The narrative stated that the students must design a robot to traverse the specified area in order to find an artificial intelligence (A.I.) chip. The robot also had to navigate its way back home, but it was required to take an alternative route because of “pirate robots” trying to steal the A.I. chip.

You can imagine what was necessary to solve this problem. First, they had to find out what the location was on a map. This was in December, so the weather and terrain were considered in the type of robot they designed. Once they designed the robot, they had to program the robot to traverse the terrain on an outbound path and then identify a different return path while staying within a designated area. Geography played an important role. Each team also determined cultural differences within their particular area and how to communicate, respect customs, and identify what commonalities may exist. After the terrain was constructed to scale, each robot was placed in the terrain to retrieve the A.I. chip from a robotic arm located at a secret latitude and longitude within their specified area. There was also a reading assignment related to the TLA. The book they read was *I, Robot*. It talked about robots and the rules that robots have to follow.

We may have 50 teams, and all 50 teams solve that same problem in a different manner. Each team uses the engineering thought process en route to a solution. My purpose in this particular TLA was to demonstrate the definition of genius advanced by Szent-Gyorgy, who discovered vitamin C, and is quoted as saying, “Genius is seeing what everyone else sees and thinking what no one else has thought.”

In addition to what I just described, there is also a presentation rubric and construction rubric involved in the TLA. When students present, they are

required to answer essential questions, as well as respond to a Q&A from outside professionals at the conclusion of the presentation. The entire TLA process shows students why they need to learn mathematics, CAD drafting, and language arts and develop the ability to present a potentially complex concept or solution in a simple manner that can be understood by a diverse audience. In other words, it not only shows the students how to use the engineering thought process, but also how to synthesize the result and share it in an effective way.

Teaching STEM

PDK: It sounds like you need to have some collaboration among teachers to make this work. Is that right?

PB: Absolutely! Collaboration among teachers is essential. We do something called Material Science Engineering (MSE) Teach. MSE Teach is a week-long summer workshop in which teachers interact with engineers to create TLAs at the University of Florida. We work with engineers, physicists, and faculty advisors who are part of the College of Engineering. Each year, the creation of these TLAs is focused on different areas of engineering. In the four years that we have our students, they will not see the same thing twice. There is a concerted effort to expose them to as many fields of engineering as possible.

I have watched my students work with professional engineers and doctoral engineering students without fear of Q&A dialogue or any other aspect of the solution creation process. I think that going through the TLA process and successfully presenting their ideas gives these students all the confidence in the world because they know that their ideas make sense and are valid. In providing proof of concept to others, they also prove it to themselves.

PDK: How do you think our teacher education programs need to change so they can prepare STEM teachers to teach in these ways?

PB: Well, to put it bluntly and in relevant terminology, many of our teacher education programs need to be re-engineered. When we talk about creating a



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richer learning experience for our students, it is important that we do so for our teachers as well. There needs to be preservice and professional development that gives them an experience that parallels what a student will likely encounter. We need to put them in a position where they, too, have to struggle as they advance through the process of learning and applying a new concept. As part of this, I think it is valuable to establish with teachers what the end goal and payoff is for their efforts, along with a clear understanding of what is required to perpetually evolve going forward. There is a massive amount of relevant and useful information that has begun to pour in that can positively affect the way we teach our children, and it is imperative that we keep up with it.

The annual MSE Teach event I referenced is a good example because it puts teachers right there with the engineers. They are experiencing the curriculum as an active participant much the way their students will, but they can openly critique it on a rolling basis and in real time. By the time a teacher gets back and puts the curriculum into action with students, they are intimately familiar with it.

Some programs that offer STEM education have master teachers. These master teachers walk the attending teachers through a proposed curriculum so that it's internalized and ultimately not as scary when they return to the classroom and are working with their students in a hands-on environment. Simply going through a manual does not implicitly help a teacher deliver a better learning experience to students. I think teachers have to solve problems. They have to be put in situations where they must come up with an answer and then defend its logic and applicability.

PDK: What are some things that E.M.I.T. teachers are doing in their classrooms that teachers in other high schools that are not magnet schools and don't have this sort of curriculum might be able to implement?

PB: Not to beat it to death, but perhaps the most replicative tool we use is the TLA, which is the integrated curriculum of math, language arts, science, history, and geography. Another is providing students with a path to earn some sort of certification, such as we do with AutoCAD.

One particularly easy and effective way for al-

most any teacher or program to add value for their students is simply providing them with exposure to the world at large. There are several good examples. One is a monthly event called Breakfast for Business, where industry professionals and different types of engineers come in and talk with the students in both a classroom and one-on-one setting. They tell the students what their job is like and provide insight about what it takes to obtain such a position. It is especially useful for the students because it gives them a clear and up-to-date sense of what's going on in a given field.

In another instance, we fostered a relationship with a company called the Institute for Human and Machine Cognition (IHMC). Students got exposure to cutting-edge technology that included sensors placed on the tongue that allow the visually impaired to achieve sight.

The last example I'll give is probably my favorite. Our entire high school moved into a newly constructed facility six years ago. At the time, two of our students were interning with the same architect who designed the school. It's hard to offer something much more relevant than that.

We also put our students in leadership roles on a regular basis. Within E.M.I.T. there are a number of student leadership roles, ranging from academy and class-level leaders to project-specific leaders for something like a community service initiative. Common to all the leadership roles is the need to schedule meetings, create and share an agenda, and delegate responsibilities. For example, class leaders will organize team leaders, who in turn disseminate information to their team members.

Consistently providing students with opportunities to interact directly with professionals, university professors, and business leaders is the easiest way to create excitement and enthusiasm. It also indirectly allows them to begin building a professional résumé.

The Algebra Question

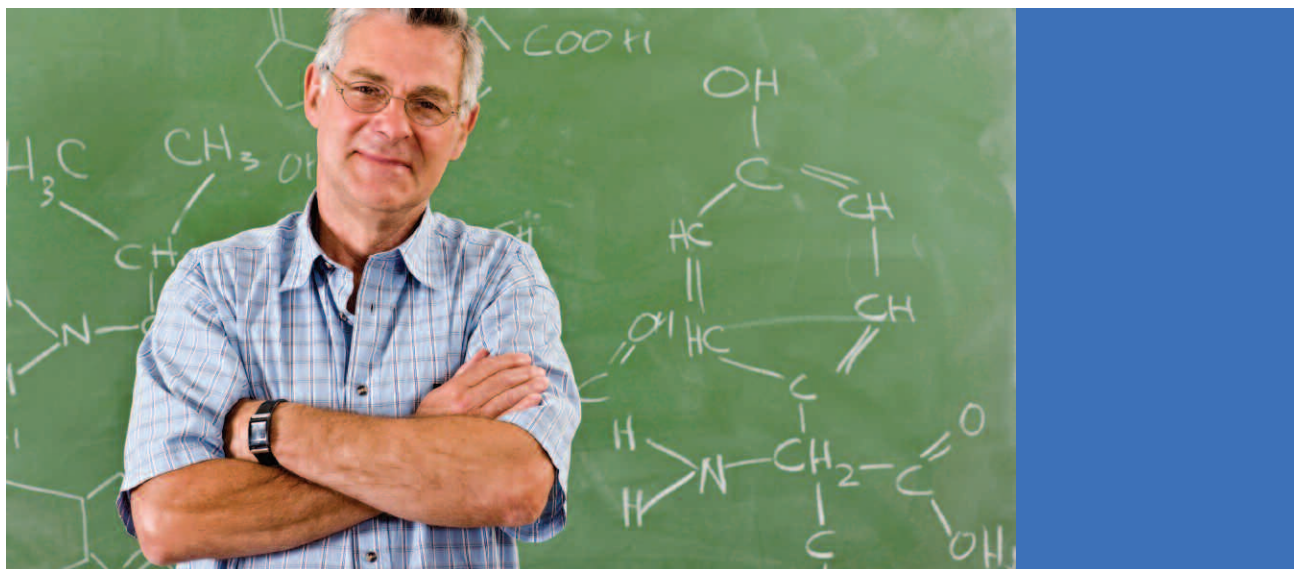
PDK: Let's talk about algebra for a few minutes. Some argue that it's critical for students to have taken algebra by the end of eighth grade so they graduate

from high school ready for jobs or college and citizenship. Do you think learning algebra is important for all students regardless of their future plans, and where do you stand on the eighth-grade issue?

PB: An across-the-board eighth-grade algebra requirement ignores the fact that many students arrive in middle school algebra classes lacking the skills necessary to master the content. It fails to recognize that most math teachers at this grade level spend more than half the year in the "find, fix it" mode with struggling students and are unable to introduce many of the fundamental concepts necessary for future success. Such a policy would also deny opportunity to struggling students, who would be better off taking pre-algebra in middle school and getting a strong foundation for Algebra I in high school.

Because algebra is a "watershed" course for all of higher mathematics, it is essential that students have a proficient understanding of algebra concepts if they are to excel later in higher mathematics. Sequence is critical; concepts and skills should be introduced and mastered in a logical order—one dictated by academicians in the discipline and not by regulatory fiat, which is what an eighth-grade across-the-board requirement amounts to. E.M.I.T. focuses on the academic skills that underpin engineering and technology. We use the principles of thinking mathematics and the mathematical practices to guide instruction.

If I asked my students to design a structurally sound building without support structures connecting the fifth and tenth floors, they would look at me as though I had lost my mind. Yet, this is exactly what teachers are asked to do when students are placed in Algebra I in middle school without the foundation necessary for the course. During my 33-year career, I have seen very few students who struggled with Algebra I in middle school and did not go on to struggle with math for the rest of their schooling. Our system plainly has more work to do to provide the necessary tools so that every child is ready to participate and be successful in algebra. This is where the emphasis should lie, not on some arbitrary one-size-fits-all requirement for eighth-grade algebra.



Teachers called Foundations of Effective Teaching. I always give every instructor in the class *The Teaching Gap* by Stigler and Hiebert. Basically, they contend that we don't need a wholesale replacement of the teaching force. We need to support and fully develop our professionally trained educators. We need to look at what we are doing, how we are doing it, and where we are falling short. Only then can we make corrections, because ultimately we can't continue to do what we're doing. We have a growing body of evidence that says that teachers who are rich in content knowledge have a great impact on student learning, so we need to make the necessary changes to produce educators who have rich content knowledge that is married with pedagogy.

In November 2010, The National Governors Association Center for Best Practices (NGA Center) announced that it formed a Science, Technology, Engineering and Math (STEM) Advisory Committee to inform its work in this area and help the 29 new governors, as well as incumbents, develop comprehensive STEM agendas in their states.

"The increasingly globalized economy requires workers with strong science, technology, engineering and math skills," said John Thomasian, director of the NGA Center. "This committee is intended to provide the perspectives of a variety of stakeholders to governors and states as they work to establish and grow STEM education programs that can contribute to economic competitiveness."

I think this is a start in the right direction. I very recently submitted a National Science Foundation (NSF) Discovery Grant for STEM education. It is my hope that NSF will begin to fund grants at the middle school and high school levels in order to create a strong STEM foundation. This would enable us to develop problem solvers, innovators, inventors, and logical thinkers who are able to apply calculus-based concepts and collaborate with others in a wide array of settings.

In his speech, Obama said, "Reaffirming and strengthening America's role as the world's engine of scientific discovery and technological innovation is essential to meeting the challenges of this century. That's why I am committed to making the improvement of STEM education over the next decade a national priority."

Obama's Educate to Innovate campaign is designed to lift American students to the top of the pack in science and math achievement over the next decade. The campaign involves public-private partnerships between major companies, universities, foundations, non-profit organizations, and government agencies. One of the main goals of this campaign is to increase STEM literacy so all students have the opportunity to learn deeply and think critically in science, math, engineering, and technology. If we as a nation fear that we will fall behind in STEM education, I think we should fund STEM education so that our fear does not become a reality.

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