COUNCIL OF THE CITY OF PHILADELPHIA

COMMITTEE ON EDUCATION

Room 400, City Hall
Philadelphia, Pennsylvania
Tuesday, November 19, 2013
3:15 a.m.

PRESENT:
COUNCILWOMAN JANNIE BLACKWELL, CHAIR
COUNCILMAN KENYATTA JOHNSON
COUNCILMAN DAVID OH
COUNCILMAN BRIAN J. O'NEILL
COUNCILMAN MARK SQUILLA

RESOLUTION 130781 - Resolution authorizing City Council's Committee on Education to hold hearings to investigate the benefits of integrating science, technology, engineering, and mathematics into early childhood education in Philadelphia.

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COUNCILWOMAN BLACKWELL: The City Council Committee on Education will begin its hearing with regard to Resolution No. 130781. We certainly want to commend Councilman Kenyatta Johnson, who sits to my left, with regard to this resolution and his work in this area.

We're going to ask the Clerk to read the title of the resolution.

THE CLERK: Resolution 130781, authorizing City Council's Committee on Education to hold hearings to investigate the benefits of integrating science, technology, engineering, and mathematics into early childhood education in Philadelphia schools.

COUNCILWOMAN BLACKWELL: Thank you very much.

We will begin our testimony. Is Dr. Lori Shorr here?

Thank you. Thank you again for the briefing on college education last week.

(Witness approached witness

table.)

DR. SHORR: Thank you for having me.

COUNCILWOMAN BLACKWELL: Thank you. Feel free to identify yourself for the record and begin your testimony.

DR. SHORR: Good afternoon. I'm Lori Shorr. I'm Mayor Nutter's Chief Education Officer. Thank you, City Councilmembers, for inviting me to testify today regarding Resolution 130781. Again, my name is Lori Shorr. I'm the Chief Education Officer for Mayor Michael Nutter.

Philadelphia is known for sometimes cheese steaks, Tastykakes, but because of the large number of higher education institutions and health systems, we're also known as the "eds and meds" city. There's a growing number of job opportunities in the health profession. The region has a long history and strong background in producing and employing health

professionals, with 21 percent of all degrees in the region in health-related fields and 14 percent of all new job creation in healthcare and social services.

Four of the top seven high-growth majors in the region are STEM majors: agriculture and related sciences 23 percent, natural resources and conservation 20 percent, biological/biomedical sciences 18 percent, computer technology and information 15 percent.

There's growing demand for technology, engineering, and math majors, but only 7 percent of regional degrees, or 6,362 degrees, are granted in these areas in the Greater Philadelphia region.

These are just a few statistics of why STEM is so crucial for our city to be competitive both locally and globally. Fortunately there's a lot of work happening around STEM that I wanted to highlight and also to take this

opportunity to share some exciting news on this front.

The School District of Philadelphia is currently reviewing its STEM programming and is developing a comprehensive STEM education strategy with community partners such as Drexel and Philadelphia Education Fund. They're speaking here today, so I'm going to let them really go deeply into that. I want to talk about something that a lot of people may not know about, but is about growing our awareness of how important STEM is. One of those things is the Philadelphia Science Festival. It's a ten-day community-wide celebration of science that takes place annually in April featuring lectures, debates, hands-on activities, special exhibitions, and a variety of other informal science education experiences for Philadelphians of all age.

The Philadelphia Science Festival aims to provide opportunities

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for all Philadelphians to positively engage with and build a community around science, engineering, and technology by showcasing the role that each plays in the City and region.

The inaugural Philadelphia Science Festival engaged more than a hundred thousand participants as well as over a hundred partnering agencies.

The exciting news, if you haven't heard yet, is that the City of Philadelphia was notified that it has been selected as one of 13 first-round finalists for the US2020 City Competition amongst a national field of 52 entries. It's a national competition under the Clinton Global Initiative.

As part of our US2020 application, we're bringing together a coalition of STEM partners from colleges and universities, corporations and businesses, research institutions, and the non-profit community to impact their collective knowledge and mentor

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Philadelphia students underrepresented in STEM careers.

US2020 is a new organization formed through a partnership of leading education non-profits and corporate leaders in the STEM fields. The initiative emerged from a White House call to generate big, innovative solutions to our STEM education challenge.

The US2020 City Competition is a Clinton Global Initiative project that seeks to capitalize on the role of cities as centers for innovation, supporting outstanding efforts to build science, technology, engineering, and math mentoring capacity at the local level.

The Philadelphia coalition will be led by my office, and together we are seeking to enhance and expand STEM-related opportunities for Philadelphia youth, particularly those who are low income, of color or female to provide focused, hands-on mentoring from

local STEM professionals and/or college students.

Philadelphia is a STEM city with world-class institutions, corporations, and professionals. Our goal is to build on these strengths and ensure we connect, expose, and ignite children's, particularly those of underrepresented, interests in STEM careers through mentorship.

The Philadelphia team is going to Boston to an Ideas Camp to strengthen our proposal, with a second round of applications due January 2014, with three to five winners selected in February of 2014. The winning cities will share a million dollars in resources from US2020. While the competition is strong, I feel confident we will prevail, because Philadelphia is seen as a STEM city and we have such strong institutions and collaborations in that area.

As you heard from me today, our citywide STEM initiatives have been

particularly focused on older youth, but I think the US2020 project will enable us to focus attention on interventions in the early grades starting at pre-K.

I thank City Council for bringing this to our attention, as it's definitely an area for us to explore and to excel in. My staff is here, and we're anxious to learn about STEM integration to early childhood education from the speakers testifying today, and I should say I look forward to any of your staffs being involved in the -- as we continue in this competition for the US2020 grant.

Thank you so much for having me today, and I can take any questions.

COUNCILWOMAN BLACKWELL: Thank you, Dr. Shorr.

We note that Councilman Oh is here, as well as certainly the sponsor of this legislation. And the Chair neglected to ask Councilman Johnson if he wanted to make opening remarks about this legislation.

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COUNCILMAN JOHNSON: Thank you, Madam Chair.

I just want to thank you for taking time out of your schedule to host such a hearing on what I believe is a critical issue as it relates to the development of our young people. When you talk about thinking globally and acting locally, STEM is a very vital part of our local, state, and national economy. And I remember growing up as a young man. I attended Edward Bok High School, so I didn't have a vision of going on to Mansfield University and then going on to University of Pennsylvania, but my background trade in Edward Bok High School was machine shop. So I'm a machinist by trade. I thought I was going to go work for Boeing. I thought I was going to be a tool and die maker. But also having the opportunity to attend Edward Bok High School, I also have a background in architectural drawing as well as carpentry and welding.

And so as we move forward in society, when this issue was brought forth -- and I did a little bit of work on STEM while certainly as a State Representative -- when I see the changing growth that society is taking -- the changing role that education and employment is taking in this country, it's critically important under the area of science, technology, engineering, and math that we begin developing our young people as early as possible to engage in those areas.

For instance, when we met with -- my staff and I, we did a tour of waste management. It's a waste management company, and they talk about the importance of having young people that can actually come in and do the math to operate the heavy machinery.

Another group that's going to participate today called Stemnasium, they have a very interesting program where young people are working on creating

apps. Now, these are children.

And so I thank all the panelists who will be participating at today's hearing, but my question to Ms. Lori Shorr -- and thank you for the work you're doing on behalf of the Administration and on behalf of the young people who attend the Philadelphia School District. I think the Clinton Global Initiative is great and I see we're doing some great things. In terms of our actual curriculum inside the actual School District, that pre-K -- well, the early education curriculum, is there any way that we can kind of, as we move forward, begin to intertwine the particular STEM-type model that's a District-focused curriculum?

DR. SHORR: Yeah, and I'm going to let Dave Hardy, who is here from the District, answer that. I think he has more depth on that, but I would say that pre-K, we have so many different providers in the City, and one of our

challenges I think is to have a comprehensive strategy for how that can be of high quality so that you can look at whether you're a Keystone STAR or a 3 or 4, but what does that mean about what they're teaching around STEM, are they doing some introductory lessons around patterns, which is a key part of math and engineering, can you recognize patterns, what do you do with those.

I think we have a lot of growth to do in this area in the City around having high-quality pre-K and K for all the kids. So that's a larger issue about how we get there. It has a lot to do with what the hearing that we had right before this about funding, Linda Darling-Hammond talking about -- that was the number one bullet on her slide about how do you get to good, sustainable education, was funding, and it was early pre-K and K education, and that's what we've got to work on.

In terms of how you get the

curriculum changed, I'm going to defer to my new friend from the School District.

COUNCILMAN JOHNSON: Okay. All right. Thank you. I wasn't here at the last meeting, so it will be interesting for me to connect the funding component, because I'm big on supporting funding, but I think sometimes when it comes down to curriculum or creating a culture of a certain type of achievement within the District, sometimes I don't think it comes down to money. I think it comes down to how you create that culture for high expectations in a particular area. Like the Mastery Charter Schools, they're big on college. So from the day you walk in -- and it doesn't cost a lot of money. I know some of the advocates will say, Well, Mr. Johnson, what do you mean? But it doesn't cost a whole bunch of money to come inside the school and see a sign that says Morehouse College or Harvard or Princeton to put in that young person's mind, okay, that's something that I

aspire to from day one. But I guess maybe the money part revolves around --

DR. SHORR: I think the money part was for getting pre-K and K funded.

COUNCILMAN JOHNSON: Okay. I got you.

DR. SHORR: Actually, we need more pre-K slots. We need more kindergarten slots. But I hear what you're saying. I think money is part of the equation, but there is a culture piece that has to do with do we look at our young children and think we're preparing them to be scientists, to be engineers, to be innovators, and how does that change the way we practice and interact.

COUNCILMAN JOHNSON: So I kind of think that's more program-based, but I hear you clearly in terms of the level of slots that may be needed to expand the program on scale. But okay. It seems like we're off to a good start in terms of things that we're doing in partnership

with the District, but I just want to thank you, and that's the only comment I have.

DR. SHORR: Thanks.

COUNCILWOMAN BLACKWELL: Thank you very much. Again, we thank you, Dr. Shorr.

DR. SHORR: Thank you.

COUNCILWOMAN BLACKWELL: Mr. David Hardy, Chief Academic Support Officer, School District of Philadelphia. Thank you.

Ty Holmberg is next and Darren Spielman, President and CEO of the Education Fund thereafter. So you all can feel free to come and sit inside in one of the black chairs inside the gate and you'll be here.

(Witness approached witness table.)

COUNCILWOMAN BLACKWELL: Thank you very much. Please identify yourself for the record and begin your testimony. Thank you for being here.

MR. HARDY: Thank you for having me.

Good afternoon, Chairwoman Blackwell and members of the Education Committee. My name is David Hardy. I'm the Chief Academic Support Officer for the School District of Philadelphia, and I want to thank Councilman Kenyatta Johnson for inviting me to provide testimony on this important issue of STEM education.

I am thrilled that City Council is authorizing hearings to investigate the benefits of integrating science, technology, engineering, and mathematics into early childhood education in Philadelphia schools, as we as a district have already determined that STEM education is critical to the nation's economy. The jobs of the future are STEM jobs, and having some degree of STEM proficiency is associated with higher earnings.

The United States is in the

middle of the pack in international comparisons in the quality of mathematics and science education. The World Economic Forum ranks the United States 52nd in the quality of mathematics and science education and fifth, and declining, in overall global competitiveness. The United States ranks 27th in developed nations in the proportion of college students receiving undergraduate degrees in science or engineering. In addition, progress on STEM throughout pre-kindergarten through Grade 12 is important to build a just and inclusive society, as women and minorities are substantially underrepresented in STEM fields.

Students need to be confident in their abilities in math and science so they are prepared to implement the ambitious programs recommended by professional associations. Students with stronger performance in science and math may be more likely to major in sciences.

Life experiences before 8th grade may have an important impact on future career plans. We must expose students early to science, technology, engineering, and mathematics, as it will unlock potential and provide choices for student engagement.

With those challenges before us, over the past eight months the School District of Philadelphia, through the Office of Curriculum and Assessment, partnering with Drexel University and the Philadelphia Education Fund as the three leads in this task, convened a work group consisting of representatives from higher education, businesses, parents, teachers, administrators, and central office staff to define STEM education and to determine goals and objectives to implement a STEM initiative in the District. We have defined STEM education as the interdisciplinary way of thinking and learning about the world that enables students to integrate the skills and

knowledge from science, mathematics, engineering, and technology into their learning. Students who are STEM literate are able to apply their skills to solve everyday problems, transfer their STEM learning to other academic coursework, and are prepared for careers in the STEM workforce.

Our vision is to design and deliver vigorous STEM instruction across grade bands that is aligned with the District's definition of STEM education compatible with national, state, and professional STEM guidelines and standards, accessible and appropriate for all students and cross-curricular and in alignment with STEM pathways to post-secondary STEM education and STEM careers. This curriculum must promote student engagement in STEM concepts and practices while integrating 21st century skills. This curriculum will begin in the early grades as students must practice problem-solving throughout their

academic careers. Students will gain early exposure to science, technology, engineering, and math principles and be given opportunities to explore concepts in each of these areas. Students will learn to work collaboratively to create solutions to real-life issues and will use evidence from sources to inform or make an argument justifying their answers.

Teachers will be given professional development to learn how to use STEM resources and strategies effectively in their classroom. We will engage community stakeholders to facilitate 21st century student learning, curricular enhancements, and District-wide professional development. We will know we have reached these goals when students demonstrate understanding of STEM concepts and practices across all disciplines when students apply STEM understanding in real-world situations and when students personally value and

demonstrate relevance of STEM concepts.

I thank you for listening to my testimony.

COUNCILWOMAN BLACKWELL: Thank you very much.

Are there questions or comments?

Thank you. Thank you very much. Councilman Johnson.

COUNCILMAN JOHNSON: Thank you, Madam Chair.

Welcome to Philadelphia, Mr. Hardy.

MR. HARDY: Thank you. Thank you for having me here.

COUNCILMAN JOHNSON: I just want to -- can you just give us an update on the progress you have been partnering with -- well, the District partnership with Drexel High School, which I think is a great partnership as relates to STEM, and where we're at in that process. Just a brief update.

MR. HARDY: Absolutely. So at

this juncture, we have now moved into the direction of figuring out what that curriculum will specifically look like across all grade levels, and as a district, we're engaging in deep conversation to figure out exactly what our students need at a very early age, when we think about our kids coming into pre-kindergarten, going into kindergarten, them having the exposure that's necessary for them to understand the concepts that STEM education provides.

So we're in the early stages of establishing that and looking forward to building that going forward.

COUNCILMAN JOHNSON: And over the past eight months, so right now over the past months, it's just figuring out what it will look like. So what have you all been exploring to kind of gather that information together to take a look at what's going to be the final curriculum?

MR. HARDY: Absolutely. Great

question. So a lot of it has been digging into the research of what works and understanding where we've seen STEM education excel, understanding the products that we are shooting for so that we can create a strong vision of what STEM education will look like in Philadelphia. Once we're able to establish that and have it very clear based on this definition that I provided you, we can then move into the next phase of now that we have that clear definition, now figuring out how that will live and breathe in our district. And so that's the next critical step and juncture.

COUNCILMAN JOHNSON: Any models from any other cities across the country that y'all are looking at as prototypes to help you develop your curriculum or any other school districts?

MR. HARDY: There are a bunch of different segments of models in which I can provide you that information,

because it's a rather lengthy list of options, but I think what we've done in a very creative manner is pulling from the best. Rather than aligning ourselves just to one, we want to make sure that it's tailor made for our kids here in Philadelphia.

COUNCILMAN JOHNSON: Okay. Thank you very much.

MR. HARDY: Thank you.

COUNCILWOMAN BLACKWELL: Thank you again.

Mr. Ty Holmberg, Director of the Urban Nutrition Initiative. Thank you. Welcome.

(Witness approached witness table.)

MR. HOLMBERG: Good afternoon. Thank you so much for having me, to Councilwoman Blackwell, Councilman Johnson, for convening this hearing and the opportunity to testify here. So my name is Ty Holmberg and I'm the Executive Director of the Community Farm and Food

Resource Center at Bartram's Garden, which is in Southwest Philadelphia. I work with the Agatston Urban Nutrition Initiative, which is a part of the program of the Netter Center for Community Partnerships at the University of Pennsylvania.

So like some other folks said, many people understand the importance of STEM education for Philadelphia's students and also agree that it is critical in our nation's future.

I want us to look a little about from my experience working on a farm doing youth development programming and working with a program such as the Agatston Urban Nutrition Initiative. We work with around 9,000 school children a month and we work with around 150 students that get paid to do after-school education around gardening and farming and also teaching nutrition.

I'm looking through that lens, but I'm also looking through the lens of

a teacher. I taught out at a small democratic school in Colorado and I also taught in South Philly and West Philly. I taught science out there. So those are kind of the different lenses I'm looking at this through.

But I believe that early childhood education in general is needed and that studies show that early childhood STEM, such as critical thinking, deductive reasoning, using numbers, hearing at least ten words a day, affect all aspects of development, including literacy. So even if you're working with numbers, that hits on the literacy as well.

I think if we kind of take a step back and look at this, not just as a -- at STEM not just as creating kind of students as a commodity to provide kind of future economic security, but it's more about redefining early childhood education to be more hands-on and to experience leadership at a young age, at

this formative age is important.

We heard from the testimony from the previous hearing that one-third, one-third of the deficits we're seeing in the achievement gap happen from one to five years old, before kindergarten. So we really need to address that.

I also want to think about as we are getting our students ready for STEM, if we're talking about jobs in industry, that we're really lacking a tangible pipeline right now. Using a farm analogy, as I am a farmer, we cannot start these seeds in a greenhouse and then broadcast them out into the farm hoping that they will find good soil to grow in. We need to not only start the seeds but plant them in healthy soil, and we need to encourage industry leaders in the area to really help to provide that pipeline program. And this comes from my experience working with a neuroscience, cardiology, and infectious disease pipeline out of the University of

Pennsylvania connecting high school students and medical students to really see how that pipeline process can work.

We also need to talk about process, and one of the other things that we learned a lot about is the process in which we are doing this STEM education. There is a really interesting study out of the Wolf Trap Institute that actually uses art initiatives to teach STEM work at a young age that really creates creativity and the type of STEM thinking that is needed but through arts education. And I've included a link within my testimony that provides that case study.

And then in a recent article put out by Education Week, a man by the name of JD Chesloff said -- he works with Massachusetts, which was one of the leaders that we also saw in doing this work. He says, To remain competitive in a global economy, investment is needed to ensure a workforce pipeline that would

rather engage in science, technology, engineering, and math than cleaning bathrooms and eating broccoli. And the best way to shore up that pipeline is starting to investing in early childhood STEM.

Now, as a farmer and someone who works with food, I say that our most pressing issue before we can talk about this global economy and talk about engineering within two-year-olds, that we really need to make sure that students are getting good, nutritious, healthy food in their bellies and that this is primary, and that as we talk about Maslow's hierarchy of needs, that that's a start and we really need to make sure our children are eating well before they can really start to be learning.

So thank you so much for having me again and for letting me testify.

COUNCILWOMAN BLACKWELL: Thank you.

Are there any questions or

comments?

(No response.)

COUNCILWOMAN BLACKWELL: The Chair also notes that Councilman Brian O'Neill is here. We're all members of the Education Committee.

Thank you very much.

MR. HOLMBERG: Thank you so much.

COUNCILWOMAN BLACKWELL: Thank you.

Mr. Darren Spielman, President and CEO of the Education Fund, Philadelphia Education Fund.

(Witnesses approached witness table.)

COUNCILWOMAN BLACKWELL: Thank you very much. Good afternoon.

DR. SPIELMAN: And let me introduce my colleague Don Kinney, who directs our Math and Science Coalition.

COUNCILWOMAN BLACKWELL: Thank you.

DR. SPIELMAN: Thank you,

Councilwoman Blackwell and Councilman Johnson, for convening this hearing and for the opportunity to testify today. Thank you, Council, for your commitment to the education of Philadelphia's children. My name is Darren Spielman. I am CEO of the Philadelphia Education Fund.

I think most folks in this room understand the importance of STEM education for Philadelphia's students. Growth in STEM jobs has been three times greater than that of non-STEM jobs over the last ten years, and throughout the next decade, STEM occupations are projected to grow by 17 percent, compared to 9.8 percent growth for other occupations. Unfortunately, many U.S. businesses frequently voice concerns over the supply of STEM workers. In Philadelphia, as demand continues to grow, we grant only 7 percent of our regional degrees in STEM fields. Even for those not pursuing STEM careers, as

the wise educator before me noted, building the ability to think and learn in this manner yields benefits across academic disciplines, across careers, and into everyday problems-solving.

For these reasons, STEM education has been an Ed Fund priority for many years. The Fund's Philadelphia Math/Science Coalition, now in its seventh year, has more than 50 institutional partners, including the School District, many of the City's colleges and universities, STEM companies such as GSK and Dow, and informal education institutions such as the Franklin Institute and the Academy of Natural Sciences at Drexel. The Coalition works to recruit, prepare, and support the long-term development of math and science teachers across the City as well as to ensure students have access to high-quality STEM opportunities. We are now gearing up the Coalition with our partners in an effort to coordinate

across sectors to ensure we as a city can deliver on these goals. We look forward to partnering with Council on this effort.

I applaud Council's interest in early STEM education. I also think we should at this moment applaud the District for the planning process in which they have engaged over the last eight months. The District, in partnership with Drexel University and the Ed Fund, has driven a process to shape a K-12 STEM education strategy. Teachers, administrators, parents, higher education, businesses, informal educators have all been at the table. The draft plan establishes a definition of STEM education and sets goals for student achievement, curriculum and instruction, professional development, and community involvement. We are excited about the progress made to date and, given some reasonable investment in public education, are hopeful about

implementation. The District deserves credit for their proactive approach to this issue.

At the Ed Fund, we are also excited about an effort you will hear from Lori Shorr about the US2020 City Competition, which under the leadership of the Mayor's Office, Philadelphia -- I don't want to blow it, but anyway, I'm going to let her do that. So at any rate, however, it's a national competition to establish a citywide STEM mentoring initiative, and we are proud to support that initiative.

As I hope Council hears, many parties share their concern for early STEM education and there are multiple initiatives afoot to move us ahead. If the right people come to the table and stay at the table and the right pressure and resources exist, I think we have a chance to make real progress for our young people.

I thank you for your commitment

to this cause.

COUNCILWOMAN BLACKWELL: Thank you very much. Thanks for coming.

Councilman Johnson, any comments, questions?

(No response.)

COUNCILWOMAN BLACKWELL: Thank you very much.

DR. SPIELMAN: Thank you. Good to see you all.

COUNCILWOMAN BLACKWELL: Certainly.

Tariq Al-Nasir, Stemnasium Learning Company. Is Sharon Easterling here?

MS. EASTERLING: Yes.

COUNCILWOMAN BLACKWELL: You can come forward and sit inside. You'll be next.

Maria Ferzola, you can come next. And then I'm told, Dr. Matthew Riggan, we're getting to you very quickly and Marguerite Anglin, and that will conclude our testimony.

(Witness approached witness table.)

COUNCILWOMAN BLACKWELL: Thank you. Good afternoon.

MR. AL-NASIR: Thank you. Good afternoon, Councilwoman Blackwell, and good afternoon, City Council Education Committee members, for allowing me to speak here today and a special thank you to Councilman Johnson for inviting me to testify at today's hearing.

My name is Tariq Dionea Evans Al-Nasir and I'm the Founder and CEO of Stemnasium Learning Academy.

Integrating STEM education into early childhood education is important because it helps to establish an early identity in STEM and it creates an interest in the STEM fields. STEM education is also important in early childhood development because it encourages a child to learn and grow organically.

Children are naturally curious

and excited about almost any and everything. So by integrating a structured learning environment by which the child as early as three can begin to discover; for example, the early concepts behind fulcrums, gears, levers, pulleys, and simple machines, can almost stimulate their environment naturally. In his book, "The Seven Habits of Highly Effective People," Dr. Stephen Covey says that the best way to predict the outcome of your future is to create it. And so when we introduce STEM into early childhood education systems, we can almost guarantee an expected interest in STEM.

In 2010 to 2012, an independent study by Partners in Brainstorms, Incorporated was conducted on Stemnasium Learning Academy program participants and found that prior to introducing the students to STEM education via robotics, video game programming, science competition, and research activities,

most of the children that were in the program ages 5 through 12 were not interested in STEM or did not have any awareness to what STEM was. The study included 225 students from 2010 to 2012, which included one summer session in 2010. The control group consisted of 25 students who had attended Stemnasium and/or students who had previously been exposed to some aspect of STEM.

Since participating in the program, 96 percent of the students surveyed expressed an interest in the STEM fields. Eighty-six percent of the students expressed a desire to come back to the program the following year. Thirty-seven percent of the students surveyed were girls and 63 percent were boys. All students met the guidelines for low income and the free and reduced lunch program.

The importance of STEM education in early childhood education is to foster engineering habits, and through

early integration or involvement in STEM, we can help students develop these habits by developing their skills, increasing their desire, and improving their knowledge of STEM and the careers associated with it.

What are the measurable outcomes of STEM in early childhood education? Some measurable outcomes are increased awareness of STEM and the selection of STEM career choices via colleges that focus on STEM disciplines. From 2010 to 2012, Stemnasium Learning Academy has helped prepare more than 225 students for careers in STEM. In 2012 and 2013, several students who attended the Stemnasium Learning Academy program from grades 5 through 8 have gone on to attend top-tier high schools in Philadelphia such as George Washington Carver, Science Leadership Academy, Central High School, High School of the Future, and the Franklin Learning Center.

In 2013, four students who

attended the Stemnasium Learning Academy program have been accepted to colleges and/or universities such as Temple, University College of Engineering, Rutgers School of Engineering, and Villanova College of Engineering. One aforementioned student received a full scholarship to Temple University College of Engineering and was also the winner of the 2013 Google Hangout hackathon contest, beating out professional programmers and coders here in the City of Philadelphia.

In 2012, Stemnasium Learning Academy was able to foster an interest of two female students that previously had no interest in STEM, and those two students went on to have major accomplishments in the area of STEM by participating on a team that designed and presented a mobile app idea to the White House Council on Women and Girls.

Why invest in integrating STEM into early childhood education? Firstly,

STEM really is a language, and like most languages or new languages, it can be a challenge when you introduce a new language to children who already have a deficit such as poverty, crime, and blight in their communities. However, it has been proven and is well documented that early exposure increases the ability to learn exponentially. An example of this can be seen in the example of Zora Ball, 7-year-old, who after being taught the Cartesian math using a technique that we call bread crumbs was able to produce a mobile video game, donning her the youngest mobile app developer ever.

Secondly and lastly, the best way to predict or create your future is to create it. We are most certainly helping children who are the future to establish engineering habits of the mind when we introduce STEM into early childhood education.

Thank you for allowing me to speak here today.

COUNCILWOMAN BLACKWELL: Thank you very much.

Are there any questions or comments?

Councilman Johnson.

COUNCILMAN JOHNSON: Thank you, Tariq. In terms of your Stemnasium Learning Academy, how many young people have you worked with over the past two to three years?

MR. AL-NASIR: The past two to three years, so we'll say the range from 2012 to current would be about 225.

COUNCILMAN JOHNSON: And what does a typical day look like with your program with the children?

MR. AL-NASIR: That's a good question. So our typical day starts at 9 o'clock in the morning. And so the students come into the program and we start with identity. And so coaches on football teams you will hear say, Well, there's no "I" in team, which is correct. If you spell team, there is no "I."

However, before you can become a part of a team, you first have to declare something in yourself. And so we have the students choose who they are, because you are how you see yourself. And so the students identify with I am science, I am technology, I am engineering, and I am mathematics. And by doing that, we are able to accept them really where they are to help them continue on the path of being that scientist, technologist, engineering, and mathematician. And by focusing this way, we're not necessarily working on behavior. We're working on how they see themselves, which is the real paradigm shift. If you change how a person sees themselves, then ultimately their behaviors will line up to what it is that they're trying to aspire.

And so right around 9:45 to 10:45 or so, about an hour, we engage in a variety of different discussions and activities centered around real-life problems. And so right now, we're

working on building a robot that will be able to solve things that happen when nature doesn't quite go correct. And the students, they have to solve problems that are handed down from real engineers via different entities. So first Lego League, for example, was involved in this initiative. So the children will compete with their robot to solve real missions and present their research by way of an engineering journal and then presentation.

COUNCILMAN JOHNSON: And the last speaker talked about the importance of a pipeline, right, and creating partnerships with other agencies or entities that will support young people to go into careers in the areas of STEM. Give us an idea of what programs or corporations or non-profits that you partner with that support your program of encouraging young people to engage in STEM.

MR. AL-NASIR: Thank you for

that question. So so far to date, our partners have included, but certainly not limited to, Duke University, Carnegie Mellon University, MIT, locally Drexel University and Temple University, and probably globally we're talking about Lego Education, first Lego League most notably, and then also one of our partners would be the DOD, although they changed their -- "DOD" meaning Department of Defense. They've adjusted their model a little bit, so that program now is called Math Counts. And then lastly would be the collaborative effort that we have with 3M Young Scientists Competition, which is part of Discovery Education's initiative to bring science into the elementary.

COUNCILMAN JOHNSON: That's the only question I have. The last statement is, I know oftentimes we're advocating and surely my colleague Councilman David Oh as well as Chairwoman Blackwell are staunch advocates in making sure our

young people get a quality education, and oftentimes I know we have to get better at this, but sometimes Philadelphia can be seen as a tale of two cities. We have issues when it comes to our education system, and we're working on those issues, but also we have some of the best and greatest universities in the country down the street from a school that may be struggling. So I think it's going to be important as we move forward to create better partnerships on the university level when it comes to STEM-related programs. Like I think every university should be adopting some school along the lines of STEM that they have an engineering, science, and math program. That's just my personal opinion. But also making sure those major corporations get involved. I think GlaxoSmithKline, they're doing some things, but there are also various other corporate entities down in the Navy Yard like Aker Shipyard and so forth to participate as a pipeline

partnering with such programs. And that will be something we'll look at moving forward, but just thank you for your testimony.

MR. AL-NASIR: You're welcome. Thank you.

COUNCILWOMAN BLACKWELL: Thank you very much and thank you for the services you provide.

MR. AL-NASIR: You're welcome.

COUNCILWOMAN BLACKWELL: Sharon Easterling.

(Witness approached witness table.)

MS. EASTERLING: Good afternoon.

COUNCILWOMAN BLACKWELL: Good afternoon.

MS. EASTERLING: Thank you for asking these important questions. My name is Sharon Easterling. I'm the Executive Director of the Delaware Valley Association for the Education of Young Children, DVAEYC. DVAEYC is the local

affiliate of the National Association for the Education of Young Children, which is the largest professional association of early childhood educators in the nation. And so on behalf of our Board of Directors and 2,000 members here in Southeastern Pennsylvania, I want to speak to the issue of STEM education in early childhood education.

So students in the United States lag behind our global competitors in academic achievement and most notably in math and science. There is overwhelming evidence from neuroscientists that the skills that are foundational to the fields of science and technology, skills like curiosity and persistence and problem-solving, are all developed in the years before kids actually begin formal schooling.

So while it's important to address STEM education in K to 3 classrooms, if we only do that and we fail to understand what's happening with

children before they arrive at the school door, we are missing a significant part of the equation, no pun intended.

I thought that was supposed to be funny.

Preschoolers in Philadelphia are having a myriad of experiences. Unfortunately, most of them are not very good. Of the hundred thousand plus children under the age of five who live in the City today, two-thirds are cared for by someone other than their parents. And if we add up all of the slots that we know about in Head Start and pre-K and child -- STARS 3 and 4 child care center, which is how we would define high quality here in Philadelphia, we find that we're reaching just over 12,000 kids, or about 12 percent, of our preschoolers with early education programs that are fostering school readiness and a love of learning.

Adding insult to injury, childhood has really changed in the last

two generations. Access to the outdoor world has just about vanished for our kids. Today's child is spending about 1 percent of their time outside, and those early experiences with nature where skills of observation, investigation, curiosity, and exploration are born are mostly missing from our kid's daily experiences.

So DVAEYC is really committed to ensuring educational opportunity for all young children in our region. We are deeply concerned about the current state of early childhood education and this missed opportunity when we fail to provide what children need in those early and formative years.

So I want to tell you about a couple of things that DVAEYC is doing in partnership with others in direct service and then what we're doing on the policy front.

We worked with PNC's Grow Up Great initiative to do a whole series for

teachers and parents around math, and we went into child care programs and helped them set up math centers and brought parents in and really worked with them to understand how to build these skills with their own children. We've partnered with the Franklin Institute to develop science kits for preschoolers, and each kit has an instructor guide for teachers that covers an investigation in science and it has books and materials to support that investigation. And our latest effort is partnering with Smith Memorial Playground to develop the nation's first urban nature preschool. The idea is that we would serve the children around Smith Playground, particularly Strawberry Mansion, with a very high-quality preschool experience that's really centered and focused on giving them outdoor -- experiences with the natural world and the outdoor environment and really cultivating that love of learning in those early science skills. We would

also use it as a center for training early childhood teachers so that those practices can be replicated throughout the City.

On the policy front, we're working statewide to try to make universal access to high-quality pre-K a front-and-center issue in the 2014 election. We're working with partners like the Economy League, United Way, and PCCY to do that.

And then finally here in the City, DVAEYC is part of a group of organization and individuals called PECE, Philadelphia for Early Childhood Education, and most of you saw some members of PECE last spring during the budget negotiations as we really called for an investment from the City of Philadelphia, and through your support as well as the Mayor's, we established or reestablished the Child Care Facilities Fund, and the purpose of that is to support high-quality early childhood and

to get more children into those high-quality programs.

The bottom line is that high-quality preschools in Philadelphia are delivering good STEM education through hands-on learning experiences. Children are not just learning important math and science concepts, but they're learning how to learn, and they're becoming confident, persistent learners.

The problem is that most of our kids aren't in these programs. Quality is expensive, and the early childhood field is deeply underresourced.

So here are some very specific suggestions for what the City and the School District can do. First of all, the City of Philadelphia needs to encourage parents to choose high-quality child care through a whole menu of incentives and disincentives. I encourage you to build on the action of last year to expand funding for high-quality early childhood education.

We need to encourage businesses to make tax-deductible donations to scholarship programs to open the doors to high quality for the kids who need them most, and then to launch a marketing campaign to parents about the importance of high-quality early childhood education.

The School District of Philadelphia needs to do the math and understand that by investing in high-quality early childhood, we will save so much money down the road in things like reduced special education costs.

We can investigate the potential of social impact bonds. There are few cities around the country that are beginning to leverage the money to pay for these programs through future savings when we do this early for kids. And, finally, incorporating best practices in early education in K to 3 grades instead of overemphasizing testing and narrow academic competencies.

So sum it all up, a recent editorial in Scientific American cites a study where kindergartners, when asked to talk about science, expressed almost no positive feelings toward it. We can change the situation for Philadelphia's youngest children. When they have early childhood teachers who are excited about the physics of ramps, the biology of seeds, the math of recipes, they will be excited too. Their natural curiosity will be engaged, and they will come to kindergarten eager and ready to delve deeper into science and math and grow into adults who can work together and do the problem-solving that our world so urgently needs.

Thanks for the opportunity to speak to you today.

COUNCILWOMAN BLACKWELL: Thank you very much.

Are there any questions or comments?

(No response.)

COUNCILWOMAN BLACKWELL: Thank you again.

Councilman Johnson.

COUNCILMAN JOHNSON: Just one question. Can you just elaborate on the social impact bonds.

MS. EASTERLING: Yes. So in Philadelphia we know that kids who go to Pre-K Counts programs, their special education rate is 4 percent as opposed to 14 percent in the general population. So that's just one example of future savings. So the idea is that you find investors, and they could be public or private investors, who front the money for these programs, and then as you realize those savings when kids go into school and it doesn't cost as much, you don't have as many kids needing those high-intensive services, you're able then to pay back on those investments. Salt Lake City is actually experimenting with it now.

COUNCILMAN JOHNSON: Thank you.

COUNCILWOMAN BLACKWELL: Thank you very much.

Maria Ferzola, CEO of Teach.

(Witness approached witness table.)

MS. FERZOLA: Good afternoon.

COUNCILWOMAN BLACKWELL: Good afternoon.

MS. FERZOLA: First I'd like to thank all of the Councilmen and Councilwomen for inviting me to testify in favor of Resolution No. 130781, and thank you for your dedication to education in our city.

I am in strong agreement with the points of the resolution regarding the integration of science, technology, engineering, and mathematics into early childhood education within Philadelphia schools. In my experience, the earlier students receive exposure to STEM subjects, the more likely they are to develop critical thinking and deductive reasoning skills at an early age, to set

the foundation for greater success in these skills at the middle school and high school levels, and to pursue STEM-related careers later in life. In my opinion, proficiency in STEM is more important today than ever before in our constantly evolving and competitive technological economy.

As a female with proficiency in STEM, I know STEM can dramatically further one's career opportunities. Due to my degrees in math and chemistry, I had an opportunity to pursue multiple careers, including law, education, and business. As a former high school math teacher in Philadelphia's Mastery Charter School, it was evident that early exposure to STEM could have a dramatic impact on my student's level of proficiency once they reached my high school classroom.

Students with a strong foundation in STEM and the critical thinking and reasoning skills that STEM

provides were able to progress through my course with greater ease. Those lacking such a foundation struggled through the year. It became increasingly difficult for me to rework a foundation during those later years, because many of my students had a fear or pre-conceived notion about their mathematical abilities by the time they reached my classroom.

I am currently employed as the founder and CEO of a Philadelphia-based tutoring organization called Teach. Without a doubt, the majority of the phone calls we receive pertain to tutoring requests in math and science from high school, college, and adult learners. STEM content is ubiquitous. My organization is consistently asked to provide math and science educational services for a wide range of reasons, entrance exams for college, graduate and business school, and those pursuing careers in teaching and medicine, to name a few.

My company Teach is currently partnered with organizations such as the Franklin Institute and Philadelphia Academies Incorporated to provide a wide range of academic services in STEM-related content. Through my observations, students with greater exposure to STEM content early in their educational experience are much more likely to view the content favorably and pursue increasingly critical STEM-related careers later in life.

The City of Philadelphia must ensure that its educational system is adequately preparing our youth to compete in our increasingly technological economy. My vision for the future of STEM education is to observe STEM being introduced into every Philadelphia classroom at an early age and to continue to be reinforced throughout middle and high school. Teachers and non-traditional educators such as myself must receive training regarding the

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introduction of more educational technology into the classroom at an earlier age.

Math and science teachers must encourage and allow students to explore STEM within their classrooms through technology and hands-on activities which further their critical thinking and reasoning skills.

Proficiency of our citizenry in STEM fields should absolutely be a top priority as it affects our country's competitiveness and economic productivity.

Thank you for having me today.

COUNCILWOMAN BLACKWELL: Thank you very much.

Any questions or comments?

(No response.)

COUNCILWOMAN BLACKWELL: Dr. Matthew Riggan, Executive Director of the Workshop School. Thank you for staying. They told me you had to leave. Thank you very, very much. We appreciate

your being here today.

(Witness approached witness table.)

MR. RIGGAN: Thank you, Councilwoman Blackwell. Thank you, Councilman Johnson, for convening this hearing. And I would be remiss if I didn't give Councilwoman Blackwell a huge thank you on behalf of the Workshop School, because without you, we probably wouldn't exist, and we certainly would not exist in our current home in West Philadelphia, which we love.

COUNCILWOMAN BLACKWELL: How kind of you to say. We love it too. Thank you.

MR. RIGGAN: So we are a new high school inside the School District of Philadelphia and we are, in every sense, a STEM school. You know it the minute you walk into our building, and for lots of different reasons. All of our students have their own laptops. All of their work is done electronically and

online, and we are a project-based school. And so if you walk through our building, especially in the morning -- and I would invite all of you to come and do so -- what you'll see is kids working on projects that are interdisciplinary, that are hands-on, that are focused on problem-solving.

So, for example, in one of our classrooms this morning, we have a group of students embarking on a project where they're learning how to build generators. These are human-powered generators. And so the purpose is to understand how much electricity you can actually make on your own and what you can do with that electricity. That leads us into a conversation about, Okay, that's not sufficient to what we need to do to, say, power a classroom, let alone a building. So where does the rest of our energy come from? That leads us to how much energy are we using? How do we measure it? That leads to how do we reduce the amount

of energy we are using, both because of its effect on the environment and on the School District of Philadelphia's bottom line? And that leads to a project that we're going to be doing in the spring in which our entire school works on trying to reduce our energy usage as much as possible, reporting back on both our carbon footprint and the changes in that, as well as the amount of money we're saving the School District.

This to me -- and it's why hearing Mr. Hardy talk about the way this new initiative is defining STEM got me so excited. This to me is the essence of that work. It's real world, it's relevant, it's problem-solving, it's super rigorous because it requires that you learn new technical skills and knowledge in order to solve problems of ever-increasing complexity.

As a high school educator, seeing the interest in focusing more on STEM and early childhood I think is

tremendously important, and I also think there are some lessons that early childhood can probably learn from frankly what I think are some of the mistakes that have been made over the last 10 or 15 years in how we've approached STEM in high schools. And I think the biggest one of those mistakes is that we have focused primarily on teaching the content in the same way that content has traditionally been taught, and we haven't focused as much on the interdisciplinary nature of the work and we haven't focused as much on the problem-solving nature of the work.

So, for examples, in lots of school districts, STEM problems are really just the same science and math that they've all taught, with a few electives at that end maybe for engineering or technology. And so you have to go through the same kind of traditional school that you've always gone through before you get to actually

get to the hands-on stuff, the problem-solving stuff.

So our roots, as Councilman Kenney was so kind to point out earlier, are in the West Philly Hybrid X Team, which I think is a great example of this. This was an after-school program where kids who, in a lot of cases, were struggling in traditional classroom environments were doing extraordinarily high level and sophisticated engineering work outside the confines of the traditional school day. And a big part of what created us at the Workshop School was that impulse to say, why can't that be school, why can't we make that what we're doing during the school day.

Now, having an incoming group of 9th graders at the Workshop School, I find that we spend an awful lot of time trying to reconnect kids with their love of learning. They've been through enough years of school now that they've sort of been taught that school is not a place

where you engage your curiosity, school is not a place where you try and solve real problems, school is something you sort of have to survive. And so the work we're doing with our freshmen now is really focused on how do you rekindle that curiosity.

So when we talk about STEM for early childhood, I think the big lesson or, I guess, the one really important thing I want us to remember as this stuff gets off the policy level, which is super exciting, and into classrooms is that while young children in Philadelphia face lots and lots of disadvantages -- we're one of the poorest large cities in the country -- the one thing that all little kids have in abundance is curiosity and a love of learning. And the one thing that I would hate to see happen as we move towards STEM education with very young children is, in an effort to make sure that we're introducing this subject matter, that we forget that engaging that

curiosity and using that curiosity as the engine of learning about science and technology and mathematics is at the heart of the work that we're trying to do, and if we do that effectively, then we are not going to have to spend as much time trying to convince our 9th graders that learning is relevant and important and even fun.

Thank you for your time.

COUNCILWOMAN BLACKWELL: Thank you very much. It is obvious that if they have your enthusiasm, they're going to be successful. Thank you for all you do. It's so important.

MR. RIGGAN: You're welcome.

COUNCILWOMAN BLACKWELL: Love of learning is half the battle. Thank you very much.

Are there questions or comments?

(No response.)

COUNCILWOMAN BLACKWELL: Thank you very much.

I understand Marguerite Anglin, President of PhilaNOMA, is not here. Is there anyone else here who would like to testify?

(No response.)

COUNCILWOMAN BLACKWELL: Anyone else here?

(No response.)

COUNCILWOMAN BLACKWELL: Are there further comments by any of my colleagues who are here?

Councilman Johnson.

COUNCILMAN JOHNSON: Well, first and foremost, I want to thank all the panelists for coming out today and giving your perspective on such an important issue. In just listening to the most recent testimony, it seems like one thing we need to take out of this hearing is making sure that as we go from a policy to an implementation component, that we make sure that this is an engaging process for young people, because I understand the traditional, and

I'm not in the classroom setting, but I would think it would probably be pretty interesting to see how young people even pay attention, because I know in the technology age, everything is on the smart phone, you know, and young people like realtime information constantly 24/7.

But I want to thank everyone for coming out. This is something I will definitely follow up with Mr. Hardy on as it relates to the work that the School District is doing to move forward to see how we can continue to engage in taking STEM to the next level. But I'm definitely going to make sure I circle back with the component on how do we get some of our major corporations, some of our major institutions of higher learning on board, because, again, sometimes when I sit back and look at the big picture, Philadelphia can be a tale of two cities. We have some of the best education and medical institutions in the country, and

this cannot be tolerated, but for a school district where young people, the graduation rate may be 50 percent or less, and that's -- and I don't say that's one person's fault. I think as a society everybody has to step up and put some skin in the game to make sure our young people are successful, because at the end of the day, it's the young people that will lead this city, they will lead this state, and they will lead this country. And so when you talk about investment, we have to invest on the front end as opposed to the back end.

But I thank Madam Chairwoman Jannie Blackwell for hosting the meeting and my colleagues for being here, and thank you all for coming out today.

COUNCILWOMAN BLACKWELL: Thank you very much.

And we note that we have testimony from Marguerite Anglin, who is architect and associate with WRT Planning and Design and President of the

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Philadelphia Chapter of National Organizations of Minority Architects, PhilaNOMA. So we will submit her testimony as though she were here today for the record. It will be included in our testimony. And if all minds are well, we will conclude our hearing subject to the call of the Chair.

Thank you all very much.

Let us note that Mark Squilla was here. He is part of this committee and will be noted as being present.

Thank you.

(Committee on Education concluded at 4:15 p.m.)

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CERTIFICATE

I HEREBY CERTIFY that the proceedings, evidence and objections are contained fully and accurately in the stenographic notes taken by me upon the foregoing matter, and that this is a true and correct transcript of same.

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