



Illinois STEM Learning Exchanges Spring 2015 Impact Report

Aligning Illinois' Education and Workforce Systems

The employment landscape is shifting. Youth unemployment rates are at historic highs, while employers are unable to fill entry-level skilled positions. Education needs to be more relevant to the real world, and resources and investments need to be coordinated in a way that addresses the skills gap faced by employers. In order to achieve this, we need complimentary community and state-level approaches for this work.

Illinois Pathways was launched in 2011 to respond to these education to employment dynamics. It builds from longstanding state strengths in agricultural education, career and tech education programs of study, and pathways models for adult education.

Mission: To empower and support all Illinois learners to explore, progress through, and transition from high quality, structured career pathway systems into rewarding careers in critical growth areas for Illinois' future competitiveness.

Vision: A statewide, public-private education and development initiative designed to meet two twin goals:

1. Provide **learners in education and workforce systems with skills and experience** that will prepare them for success in college and careers
2. Spur **community economic development** by fostering a homegrown talent pipeline in critical industries

Strategies:

1. Support **local career pathway systems development** that empower learners in education and workforce systems to explore their academic and career interests in STEM fields through new and existing community and state networks
2. Creation and support of new state-wide, public-private partnerships in 8 specific sector that were identified as high-growth areas for Illinois, known as **STEM Learning Exchanges** that work to create partnerships between schools, industry, state-government, and non-profits which better coordinate investments, resources, and planning in a particular industry cluster.

This impact report focuses on the second strategy – creating and supporting the STEM Learning Exchanges.

Illinois Pathways is a key strategy that supports the state's goal to **increase the number of adults in Illinois with high-quality degrees and credentials to 60% by the year 2025.**

STEM Learning Exchanges

Since January 2013, the STEM Learning Exchanges have increased their effort to build their networks of support and reached out to educational entities, workforce development providers, and businesses across the states to create coalitions of interest and investment around sector specific “cluster” areas. These public-private partnerships have leveraged \$5 million in matching resources for the State’s \$3 million investment in Race to the Top funds from the Illinois State Board of Education and funds from the Department of Commerce and Economic Opportunity.

Each STEM Learning Exchange has developed and continues to add to a network of statewide partnerships (between schools, industry, state government, and non-profits) that better coordinate investments, resources, and planning in industry areas that are crucial to economic development in Illinois and better utilize industry and public resources.

Each of the STEM Learning Exchanges is focused on an industry sector and works with business, state, education, and not-for-profit partners to bring resources, planning, and investments to communities across the state.

Key Focus Areas for STEM Learning Exchanges:

- 1) **Sector-specific Expertise for Career Pathway Models:** Advise communities on how best to develop their local career pathway system structure in light of local labor market realities as well as best practices in a particular sector
- 2) **Instructional and Professional Development Resources:** Work across sectors to develop and/or expand access to high quality curricular and professional development resources
- 3) **Work-based Learning:** Work with industry partners to expand access to real world challenges and work-based learning.

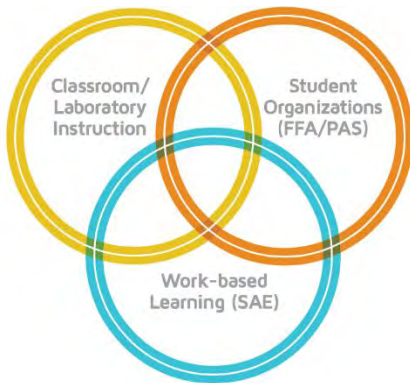
“As an industry partner in the R&D STEM Learning Exchange, we were given a unique opportunity to collaborate with students and teachers in an engaging and rewarding setting. The experience helped us see many of our ideas in action in the students’ community and gain new perspective on the set of tools we apply every day.”

~Kevin Sotor, Associate, TGG Group

The following pages address individual Learning Exchange impact, key partners, and key initiatives.



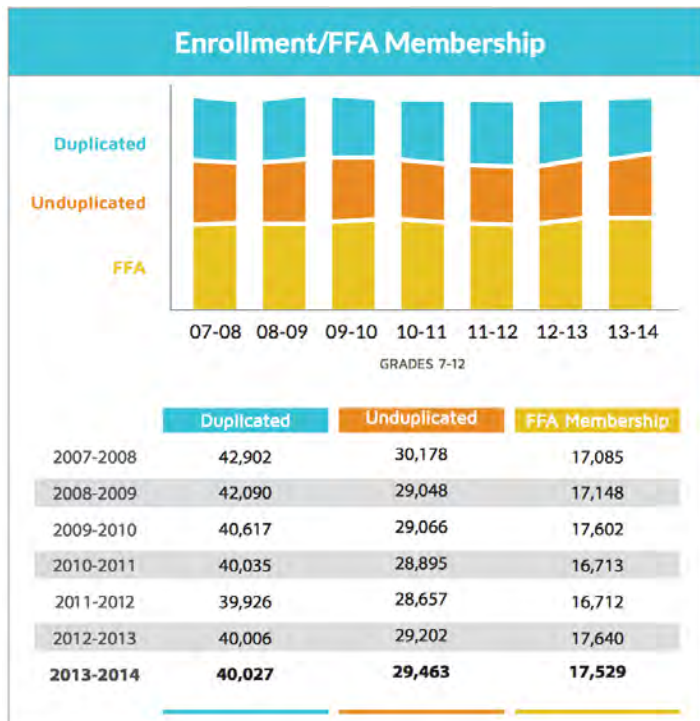
Agriculture Food and Natural Resource Learning Exchange (AFNR): Agricultural Education programs are based on a three-circle model that develops the whole student through classroom instruction, student leadership organizations, and Supervised Agricultural Experience (SAE) projects. This model involves the



instructor, parents, and the community in the development of students through personal growth experiences and the application of knowledge so they can become productive citizens. The ultimate goal and vision of the exchange is to support the development of an agricultural, food, and natural resource workforce that can be competitive and successful in tomorrow's economy.

Impact

The AFNR is by far the most developed Learning Exchange, because of the State's longstanding focus on agricultural education, and is engaged in a meaningful way in over 327 high schools across the state, engaging over 23,000 students.



Students

		Change from 2013
88%	9-12 grade students	= no change
12%	7-8 grade students	= no change
62%	Male	▼ -1%
38%	Female	▲ +1%
8%	Minority	▼ -1%
11%	Living on a family farm	▲ +2%
60%	Are FFA members	= no change
43%	Completed a Supervised Agricultural Experience (SAE)	▲ +2%
44%	Received 1+ SAE visits by their teacher	▼ -11%
\$1,050	Average SAE net income	▼ -\$45
\$11,811,317	Total Earnings of Students with an SAE	▲ +\$346,831
72%	Senior graduates went on to a postsecondary institution	▲ +7%
28%	Senior graduates entering the workforce	▼ -7%
72%	Senior graduates entering community college	= no change
28%	Senior graduates entering a university	= no change

Key Partners



Key Initiatives

Resource Development: The AFNR Learning Exchange has over 1000 lesson plans and related instructional resources available to all agriculture teachers at www.myCAERT.com. This website is an online instructional resource where teachers can access lesson plans, Power-Point presentations, e-units, and assessments libraries. The libraries currently under revision are Agricultural Mechanics and Biological Science Applications in Agricultural, the latter of which will be completely revamped and likely changes will provide great assistance to teachers as they transition their classrooms to address the New Illinois Learning Standards



Professional Development: In 2013, Illinois had a total of 57 openings in high school agricultural education departments statewide, with a total of 11 college graduates who were licensed to teach agriculture. Of those 11, only six chose to teach. Illinois developed a team of state leaders that will work collaboratively to assess the situation and create a sustainable and effective long-term agriculture teacher retention and recruitment plan. To assist with these efforts the Agriculture, Food, and Natural Resources Learning Exchange (AFNR) has offered 390 high school and 97 post-secondary agriculture teachers the opportunity to attend professional development workshops and or graduate courses which covered a range of topics from Agriculture Mechanics to Beginning Agriculture.

Work-based Experience: The AFNR Exchange has an established work-learning experience model (Supervised Agricultural Experience-SAE), and 41% of agricultural education students in Illinois completed such an experience last year. In 2014 over 3,000 students participated in a work-based learning project/activity related to agriculture education. These work-based learning activities engage students and encourage them to continue their agriculture education; in fact, 72 percent of senior high school graduates in Agricultural Education continued their education at a postsecondary institution.



Upcoming Events



State Envirothon a hands-on, problem-solving scholastic competition for high school-aged students focusing on conservation, natural resources and environment will be held on April 29th and 30th at Allerton Park in Monticello, IL.

IAVAT Conference: This conference offers a number of professional development sessions for agriculture educators. The conference also includes committee meetings that are centered around curriculum development. The conference will be June 15th-18th in Springfield.

The **ultimate goal and vision** of the Exchange is to support the development of an information technology workforce that can be competitive and successful in tomorrow's economy by focusing on the connections between work-based learning and successful employment outcomes for Illinois students.



IT Learning Exchange Partners



IT Impact

	Professional Development Resources for School Staff	Student Organizations/Student Challenges	IT Career Exploration: Speakers Bureau/Other Resources	Other Work Base Learning and Internships
Businesses	10	8	16	35
Number of Schools	48	42	29	9
Est. Number of Students	4130	4635	5800	2270

IT Challenge

The IT Industry faces many challenges today to ensure that there is a sustainable pipeline of appropriately skilled new entrants into the workforce who can fill the more than 88,000 IT jobs that were open in 2013 in the greater Chicago area alone.

The IL IT LEX brings together partners from education and business that can use its collective knowledge to inform and transform the career tech education programs across the state. With existing and new public/private networks, we can provide key resources & tools to Illinois school districts as well as:

- *Promote career awareness & development for students*
- *Facilitate public/private stakeholder connections to provide curriculum and other academic support resources as well as work-based learning opportunities and best practices*

- *Promote the use of industry-recognized certifications where appropriate to verify knowledge*
- *Improve access & success for underrepresented populations in IT*

Key Initiatives and Events

One of the key initiatives for the IT Learning Exchange is supporting **5 Early College STEM Schools (ECSS)** formed in 2012 by the Mayor's office, CPS and City Colleges of Chicago. In partnership with private corporate sponsors, a unique model has been designed to ensure students have the education and skills needed to successfully pursue a career in technology. Students have the opportunity to not only earn their high school diploma, but also an Associate's Degree and IT industry-recognized certifications.

Internships are one of the fundamental corner stones to engage students in learning and preparing them for future careers. The Information Technology learning exchange has secured commitments from 60 employers to host students for internship during the summer. These employers range from large industry partners to small start up nonprofits that need assistance with IT. This summer the learning exchange is piloting a program for students to provide tech support to both their high schools and other clients.



Raspberry Pi Student Challenge: The STEM Competition for Raspberry pi will take place Fall 2015. The competition will be for the design of an application using the Raspberry Pi and peripheral devices. Parameters for the challenge will be developed in conjunction with a volunteer committee of teachers attending the Raspberry Pi professional development, as well as instructors from those PD sessions, and representatives from Element14. Winning teams will receive a Raspberry Pi and needed peripherals to make their app design a reality!

Raspberry Pi Professional Development: Several professional development training sessions will be held from February-April; the target goal is 100 teacher attendees throughout Illinois. The goal of the professional development sessions is to help teachers become familiar with this type of technology and use the devices in their classrooms and/or after school clubs, thereby increasing students' interest in technology and creative problem solving.



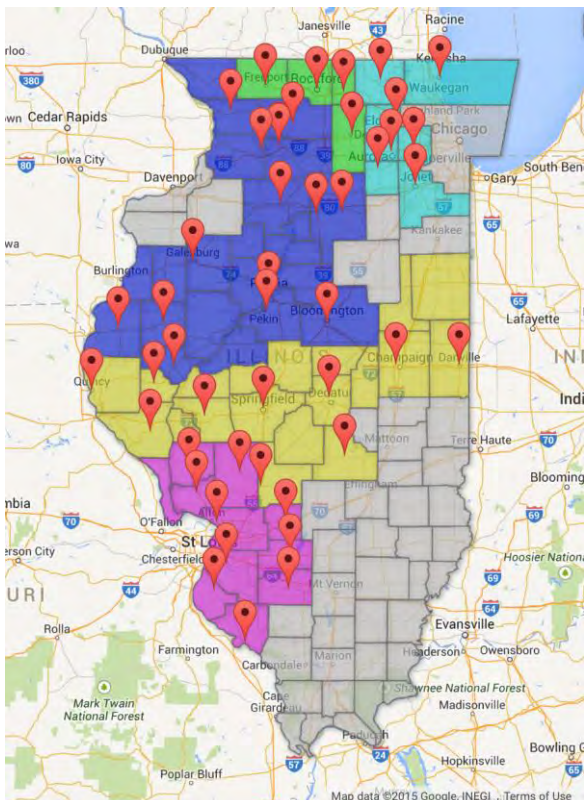
Outreach about Careers in IT & Resources on Illinois Shared Learning Environment (ISLE):

The IT Learning Exchange has developed an extensive resource library on the Open Education Resources page of the Illinois Shared Learning Environment. On this site, student, teachers, parents, and community members can find key information about internships, mentorship guides, labor market information, IT curriculum, professional development, work-based learning, women in IT, the Early College STEM School initiative, and a great deal of information on IT Careers, including resources on transitioning from high school to college and career.

The **Manufacturing Learning Exchange** is focused on supporting school districts, community colleges, universities, employers, and other stakeholders to build local career pathway systems that empower learners to explore their academic and career interests in the manufacturing field.

Impact

Illinois Manufacturers' Association, which is the lead entity for this STEM Learning Exchange, has engaged in comprehensive community outreach across the state visiting each of the state's 48 Community Colleges, their numerous feeder high schools, and local manufacturers to develop relationships that have resulted in viable internships for students, externships for faculty, and program sustainability. In the map below each mark represents a partnering manufacturing training center. At present, 30 of the 48 community colleges, and moving towards 60 high schools are developing a Manufacturing Pathway of Learning.



MANUFACTURING

Key Partners

The Manufacturing learning exchange partners with over 400 industry partners as well as other state agencies to further their efforts.



Key Initiatives

Work-based learning is a key focus for the Manufacturing Learning Exchange. The Exchange is currently in the process of piloting an apprenticeship program at Harper College and school district 211 and 214, and in the process of developing an aerospace oriented apprenticeship program at Rockford high school and Rock Valley community college. Additionally, the Exchange is leading the statewide effort for the **Illinois Advanced Apprenticeship Consortium**

MSSC Authorized Instructor Classes and Credentials: Since 2008, the Illinois Manufacturing Association, the lead organization for the Manufacturing Learning Exchange, has expanded MSSC Certified Production Technician authorized instructors from 4 to 97. The Exchange will be offering at least two MSSC (Manufacturing Skills Standards Council) Authorized Instructor classes during the summer focusing on expanding the number of high schools with instructors. In addition, the Exchange is beginning a more formal development of between-term externships for existing instructors so they can keep abreast of shop floor developments in technology and techniques. Additionally, as a result of the work of the Manufacturing Exchange and the IMA, Illinois now leads the nation in the number of NIMS credentials earned.



Robotics Competition: The Manufacturing Learning Exchange has helped to support the first Midwest regional robotics competition, held at the University of Illinois Chicago in early April, which is a competition of robots that are the result of a 6 1/2 week project between high school students and professional mentors.

International Manufacturing Technology Show: Last fall Chicago was the host to the International Manufacturing Technology Show (IMTS), an event that hosted over 100,000 students from all over the world. The event featured over 2000 exhibits to get students interested in manufacturing jobs. In 2016 the event will return Chicago at the McCormick Place.

Project Lead the Way programs also expanded as a result of the partnership with the Manufacturing Learning Exchange. In 2014, 13,000 high school students were enrolled in 136 PLTW Engineering programs and 17 Biomedical programs, while another 17,000 middle school students were enrolled in 119 Gateway to Technology programs. This represents an increase of 74 new schools over 2013.

For the past three years, October has been declared as **Manufacturing Month** in Illinois. Illinois manufacturers hosted 106 events from Waukegan to Cairo, to open their doors to several thousand students, teachers and parent chaperones for a first-hand look at modern and advanced manufacturing plants. These events bring students and teachers directly to industry partners, where students can gain awareness about manufacturing careers.

Upcoming Events

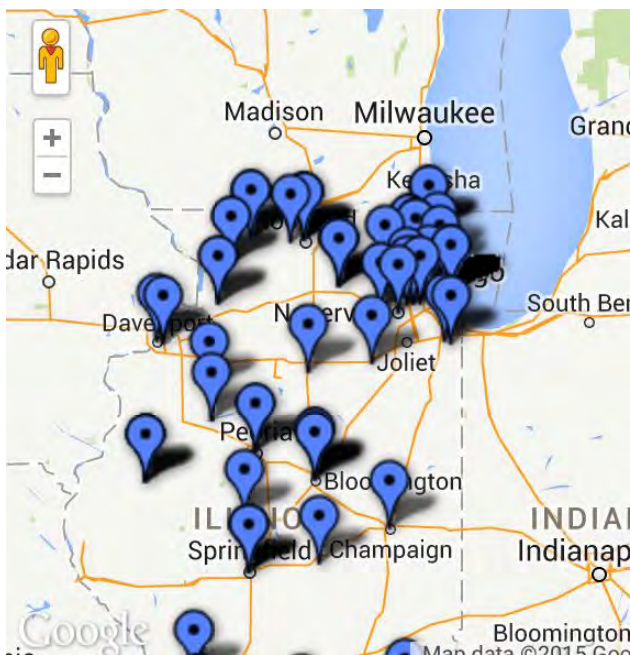
Young Manufacturer's Summer Academy: This summer a few communities will host sessions for the Young Manufacturer's Summer Academy, an outreach campaign activity that targets middle school girls and other underrepresented groups. This program is modeled after a successful Connecticut program. During the session students will create STEM projects and at the end of the 8 day session there will be a capstone mock job fair event for students to participate in.

The **Health Science Learning Exchange (HSLE)** is focused on supporting school districts, community colleges, universities, employers, and other stakeholders to build local career pathway systems that empower learners to explore their academic and career interests in the health science field. The vision of the Health Science Learning Exchange is to make it easier for students, parents, and schools to link class- time and work-based activities with active career and college exploration and preparation in the health science field.

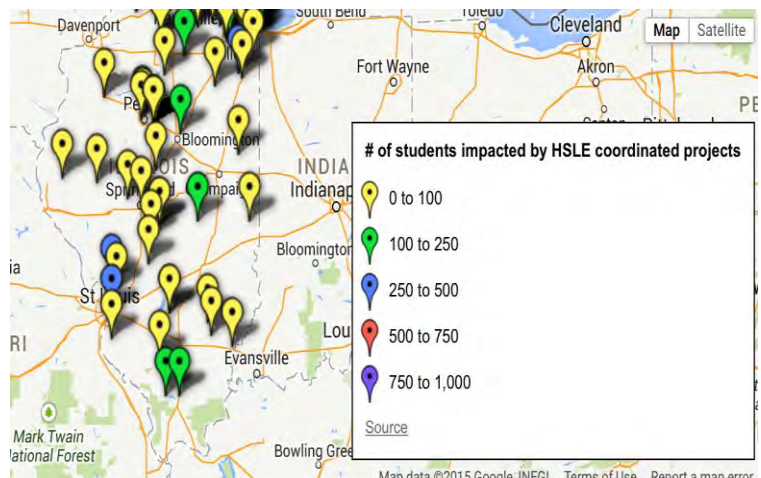


Membership Reach of HSLE

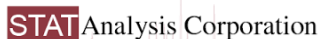
The Health Science learning exchange has actively engaged with 110 schools and reached over 12,500 students through various programs.



Student Impact



Key Partnerships



Key Initiatives

Illinois Shared Learning Environment Resources: The Health Science Learning Exchange has developed 16 distinct out-of-the-box curricular modules which are hosted on the Illinois Shared Learning Environment and has worked with industry partner AHIMA to begin developing dual credit opportunities and early certification programs in Health Informatics. The Health Science Learning Exchange has developed a complete high school curriculum that uses problem-based and project-based learning in order to develop scientific skills, health literacy, and non-cognitive skills relevant to a career in any health science field. The exchange also hosts webinars that walk through the designed curriculum and lesson plans to better prepare teachers.



Junior Academy of Science: The Health Science Learning Exchange helped lead the Illinois Junior Academy of Science Annual Science Exposition, an event where students presented research projects that they have been working on with the assistance of field professional, held at Northern Illinois University, May 3, 2014 and will continue the program in 2015. The Health Science Learning Exchange gave out over 40 awards to students who exhibited high-quality Health Science projects at the event.



The Health Science Learning Exchange is also working with AHIMA to develop dual credit opportunities and early certifications in **Health Informatics**, which listed as one of the top growing medical fields that is also under taught in high schools and colleges in Illinois by the Illinois Healthcare Task Force. The Exchange is also partnering with AHIMA to develop a specific application geared towards developing an apprenticeship model for Health Informatics for the American Apprenticeship grant.

Speakers Bureau: As part of the commitment to supporting career exploration, HSLE has begun developing a Speakers Bureau database, which allows students live, virtual access to experts in the field, both in the classroom and as part of their personal career exploration. The HSLE is working with schools to consolidate and add to the existing library on career exploration and to ensure that access to this technology is broad enough that all students are able to utilize this resource.

Upcoming Events

In the past year the Health Science Learning exchange has developed several modules with lesson plans for the health sciences. In this webinar we will walk you through each one and show you how to use this curriculum in its entirety (or some of its components in your own established curriculum). The webinar on the 15th will focus on Global Health standards and topics and on the 29th we will explain the Anatomy & Physiology lesson plans and resources. To register:

https://uic.qualtrics.com/SE/?SID=SV_3rVdpFNdX1HZeO9

The 4th Annual Biotechnology Symposium May 7th 830 AM- 330 PM: This symposium offers real-world science and hands-on lab activities that will show your students that biology in the 21st century is exciting and amazing! This year we will have expanded hands-on activity offerings led by master teachers paired with Northwestern and Baxter scientists.

The mission of the Energy learning exchange is to further Science, Technology, Engineering, and Mathematics (STEM) learning, preparing students for career pathways in energy and provide Illinois companies with a superior energy workforce.



ENERGY LEARNING EXCHANGE

Illinois State University

Energy Learning Exchanges Partners



IMPACT

K-12 School Districts Involved
150+

Teachers Involved
275+

Students Impacted
75,000+

Key Initiatives

Students Brainstorm Solutions to Modern Energy Problems: This partnership challenge with the Research & Development Learning Exchange challenges students to design a prototype or plan for an energy efficient system, or improvements to an existing system that can provide reliable power to a community to meet basic energy needs during or after a weather-related power outage. Students from Glenbrook South High School, Urbana High School, Washington Community High School, and Williamsfield High School are participating in the challenge and will present their solutions in May.

Science Bowl: ELE sponsored the Illinois State Regional Science Bowl on February 8th, part of the U.S. Department of Energy's Science Bowl academic competition. Teams faced off in a fast-paced question-and-answer competition, and were tested on a range of science disciplines including energy.

Winners of the regional competition won an all-expense paid trip to the National Finals in Washington, D.C., in April.

Smart Grid for Schools: A Smart Grid for Schools program offers an opportunity for students to learn about new Smart Grid technology being rolled out by utility companies in the state. The program provides workshops for teachers, curriculum for their classrooms, and engages K-12 students with Smart Grid in a fun, hands-on way that incorporates Next Generation Science Standards. The ELE has worked with over 80 schools on Smart Grid Training.



Next Generation Science Standards and Curriculum: The Energy Learning Exchange is working with various industry and education partners to define an energy career pathway model, using Next Generation Science Standards (NGSS). Teacher training workshops were held for middle and high school STEM teachers (science, technology, engineering and mathematics), focusing on energy concepts and utilizing next generation science standards. The goal of the program was to develop instruction on energy-related lessons for students. Classes and field trips were designed to help teachers comprehend major principles of energy in Illinois as well as real-world applications.



Resources on Illinois Shared Learning Environment (ISLE): New statewide applications have been integrated within the Energy Learning Exchange website to provide more resources for teachers and students. The site features a tab for Classroom Resources for Illinois teachers to utilize and share information about energy and energy careers in their classrooms. Teachers can download a variety of items to use in developing their lesson plans, categories include Bright Ideas, Careers in Energy, ELE Partners, ELE Powered Curriculum, Professional Development, and Videos. This growing resource library can be accessed from the Energy Learning Exchange website at www.energy.illinoisstate.edu/careers/materials.shtml.

Careers in Energy Week: The Energy Learning Exchange worked in partnership with the Illinois Energy Workforce Consortium to bring Careers in Energy Week, October 13-19, 2014. Students from across the state were encouraged to learn about how energy companies operate, types of careers available, and what may be expected in the future, as well as the importance of energy companies in the local economy. Energy industry representatives were invited to host tours and present on energy topics at schools that week. Through this effort, Careers in Energy school kits were sent to almost 300 teachers across Illinois and assisted the Illinois Energy Workforce Consortium to send these kits to over 1,000 school principals across the state.



Upcoming Events

April 22nd STEM Career Expo at Fermilab: Students, teachers, and parents have the opportunity to meet with scientist, engineers, and technicians and ask these experts their career questions. There will also be a panel discussion on different career areas and access to career expo resources. The event is free and no registration is required, it will be at Fermi National Accelerator laboratory April 22nd at 5:30.

The **R&D STEM Learning Exchange** offers high-quality R&D STEM education resources that promote inquiry-based learning, build critical thinking skills and provide perspective on R&D applications within Illinois industry.



R&D STEM Learning Exchange Partners

HIGH SCHOOLS



POST SECONDARY EDUCATION INSTITUTIONS



INDUSTRY PARTNERS



NON-PROFIT AND GOVERNMENT AGENCIES



Impact 2014-15

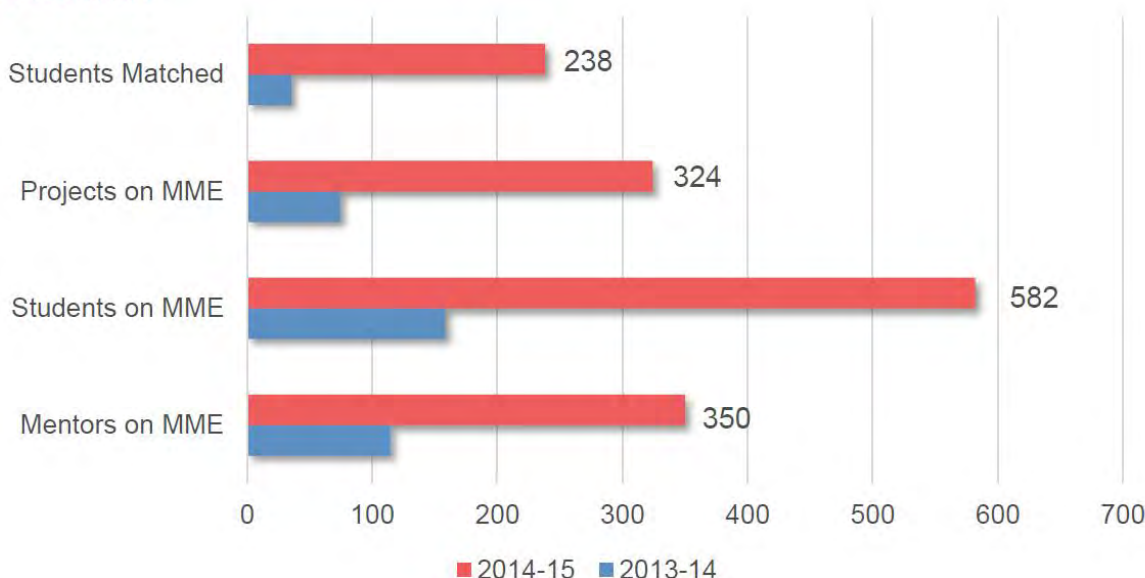
1000	Students working on STEM Challenges or matched with mentors 1:1 on the Mentor Matching Engine
350	Industry and University mentors supporting RDLE students
324	Student-led research projects.
53	Teachers leading students and participating in professional development.
26	High Schools partnering with the R&D STEM Learning Exchange

Key Initiatives



The **Mentor Matching Engine (MME)** is an online platform built by RDLE in collaboration with IMSA and Northwestern University that connects Illinois high school students and their teachers to STEM professionals to support and enhance student-led research through virtual mentoring.

MME Growth



STEM Challenges offer high school students and teachers the opportunity to investigate and solve problems relevant to Illinois industry. Through these problem-based learning Challenges, students collaborate with industry mentors to research and ultimately present their findings to the industry partners.

Challenge Examples

Motorola Solutions: What new mobile technology applications and tools might you develop to help save lives and keep people safe in emergency and disaster situations?

Chicago Vocational Career Academy

Takeda Pharmaceuticals: Address the problem of low participation in pediatric studies in one of Takeda's therapeutic areas and recommend solutions for increasing participation, which might specifically target compliance and diversity.

*Maine South High School
Hinsdale Central High School
Waukegan High School*



Illinois STEM Learning Exchanges Contact Information



http://ilpathways.com/Pages/Stem_Agriculture.aspx or contact Jess Smithers, Illinois Foundation FFA, 217-893-0091, smithers@agriculturaleducation.org



http://ilpathways.com/Pages/Stem_Energy.aspx or contact David Loomis, Illinois State University 309-438-7979, dloomis@ilstu.edu



http://ilpathways.com/Pages/Stem_ResearchAndDevelopment.aspx or contact the Illinois Science and Technology Institute, 312-239-0325, info@istcoalition.org



www.illinoistechlex.org & http://ilpathways.com/Pages/Stem_InfoTech.aspx or contact Joan Matz, CompTIA Workforce Development LLC, 630-678-8445 / jmatz@comptia.org



http://ilpathways.com/Pages/Stem_HealthScience.aspx or contact Dr. Bruce C. Neimeyer, University of Illinois at Chicago 312-996-8820, neimeyer@uic.edu



http://ilpathways.com/Pages/Stem_Manufacturing.aspx or contact Jim Nelson, Illinois Manufacturers Association (IMA) Education Foundation, 217-522-1240, ext. 4211,



jnelson@ima-net.org. The IMA is also the lead organization for the Transportation, Distribution, and Logistics Learning Exchange.



visit http://ilpathways.com/Pages/Stem_Finance.aspx or contact Beth Metzler, Econ Illinois, 815 753-6930, bmetzler@niu.edu

ILLINOIS Pathways

Science, Technology, Engineering & Math

For more information about the collective activities of the Illinois STEM Learning Exchanges, please contact:

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