

ILLINOIS Pathways

Science, Technology, Engineering & Math

ILLINOIS
STEM Learning Exchanges



Illinois STEM Learning Exchanges Fall 2015 Impact Report

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STEM Learning Exchanges



ALIGNING ILLINOIS' EDUCATION AND WORKFORCE SYSTEMS

The employment landscape is shifting. Education needs to be more relevant to the real world, and resources and investments need to be coordinated in a way that makes sense to industry partners. 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.

Illinois Pathways is a statewide, public-private education and economic development initiative designed to meet twin goals:

- 1) Increase the number of Illinoisans who attain a post-secondary credential with labor market value and are ready for employment in high-demand, high-wage occupations involving the application of STEM knowledge and skills.
- 2) Spur state and regional economic development by developing a homegrown talent pipeline for areas of workforce need.

Illinois Pathways addresses these goals through three overarching strategies:

- 1) Align State education, workforce, and economic development systems to support targeted sectors and occupations.
- 2) Launch and support statewide, public-private partnerships in high-growth industry sectors, known as STEM Learning Exchanges.
- 3) Support regional career pathway systems in targeted industry sectors and occupations that respond to local development objectives.

This impact report focuses on the second strategy-launching 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.**

Each of the STEM Learning Exchanges is focused on an industry sector and works with business, government, and non-profit partners to bring resources, planning, and investments to communities across the state.

ILLINOIS Pathways

Science, Technology, Engineering & Math



ILLINOIS
STEM Learning Exchanges

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 state 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 is led by an industry-supported nonprofit or public entity that coordinates investments, resources, and planning in industry areas that are crucial to economic development in Illinois.

Key Focus Areas for STEM Learning Exchanges

- 1) **Career Pathway Advisement:** Provide sector-specific expertise to regional partnerships for developing career pathway systems.
- 2) **Career-Oriented Instruction:** Either directly or through partnerships, deliver sector-based instructional and professional development resources for educators and training providers.
- 3) **Work-Based Learning:** Engage with employers 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 perspectives on the set of tools we apply every day.” ~Kevin Sotor, Associate, TGG Group

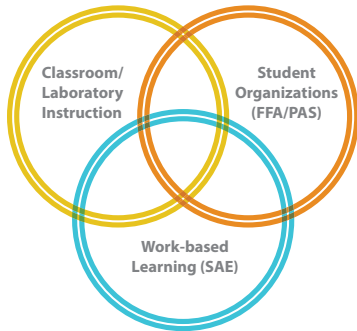
The following pages address individual Learning Exchange impact, key partners, and key initiatives.

Agriculture Food and Natural Resource Learning Exchange (AFNR)

Led by FCAE (Facilitating Coordination in Agriculture Education)

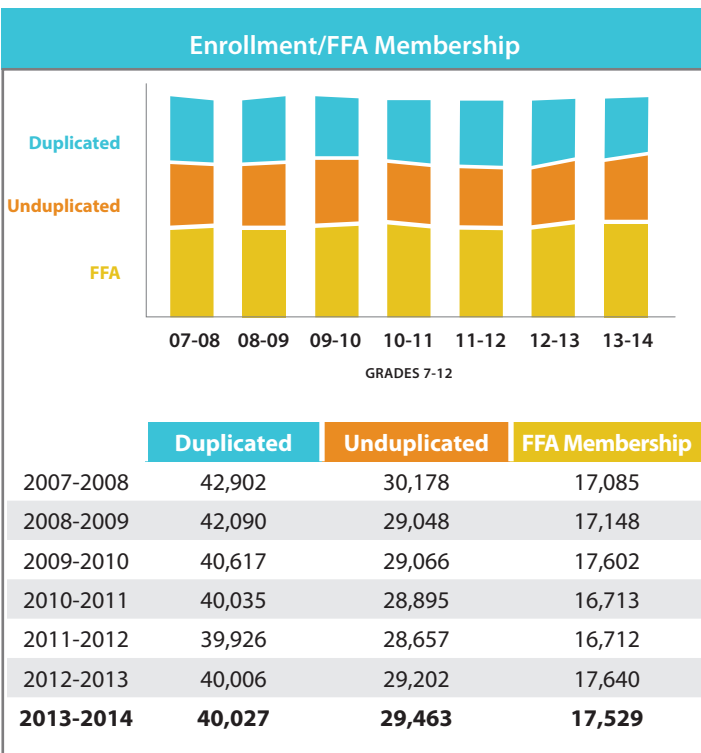


Agricultural Education programs are based on a three-circle model that develops the whole student through classroom instruction, student leadership organizations, and Supervised Agricultural Experience (SAE) projects. This model involves the instructor, parents, and the community in the development of 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 Earning 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. It is hoped that the 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 Work-Based Learning and a course for Beginning Agriculture teachers.

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.



Information Technology Learning Exchange

Led by Creating IT Futures

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	71
Number of Schools	90	43	31	10
Est. Number of Students	9,500	4,900	6,500	2,360

IT CHALLENGE

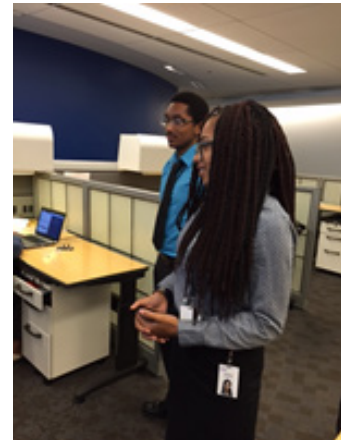
The IT Industry faces many challenges today to ensure that there is a sustainable pipeline of appropriately skilled new entrants into the workforce who can fill the more than 47,000 IT jobs that were open in the third quarter of 2015 in the greater Chicago area alone, which represents over 62% growth from the same period in 2014 - and that trend is continuing. 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

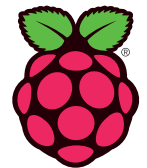
A key initiative for the IT Learning Exchange is supporting 5 Early College STEM Schools (ECSS) formed in 2012 by the Mayor's office, Chicago Public Schools and City Colleges of Chicago. In partnership with private corporate sponsors, a unique model has been designed to ensure students have the education and skills needed to successfully pursue a career in technology. Students have the opportunity to earn their high school diploma and also an Associate's Degree and IT industry-recognized certifications.

Internships are a fundamental corner stone in preparing students for careers. The IT industry lends itself to a variety of models, in addition to the traditional internship format. The IT Learning Exchange developed a "4 Ps" model that has helped create innovative and exciting internship opportunities for students. 90 ECSS students held summer internships in 2015 through employer connections facilitated by the IT Learning Exchange; and both employer and student feedback was very positive. These employers range from large industry partners to small start-up nonprofits that needed assistance with IT. The IT Learning Exchange shared lessons learned and the infrastructure to support internships and other work-based learning outreach in a two-day workshop for 6 IL communities



Professional Development: The IT Learning Exchange held a series of professional development training sessions using the Raspberry Pi from February-June, 2015; 112 teachers from 54 schools throughout Illinois attended. The goal of those sessions was to help teachers become familiar with this inexpensive 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. For the 2015-2016 school year the IT Learning Exchange will hold one more workshop, as well as two half-day follow-up workshops for teachers to learn additional applications and address any issues they may be having with Raspberry Pi technology. In addition, the Exchange will hold three half-day PD workshops to support computer support/networking teachers.

Raspberry Pi Student Challenges: Building on the exposure for IL teachers in the spring of 2015, the IT Learning Exchange is hosting a STEM Competition for Raspberry Pi on November 7 at IIT. The competition will be for the design "pitch" of an application using the Raspberry Pi and peripheral devices. Winning teams will receive a Raspberry Pi and needed peripherals to make their app design a reality. A second competition will be held in late April 2016 for students to demonstrate an application they built using their Pis.



Raspberry Pi

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, students, 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.



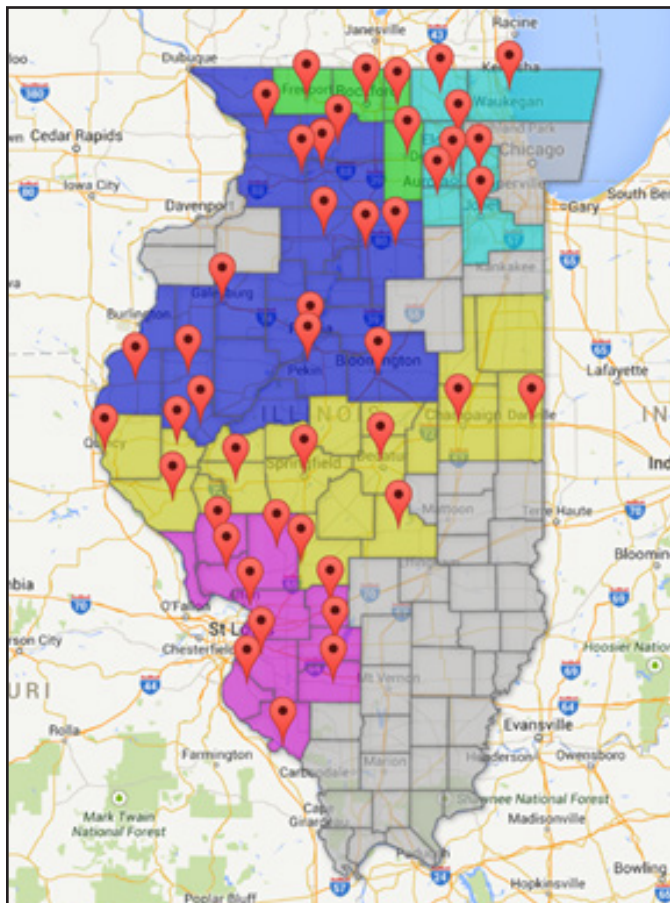
Manufacturing Learning Exchange

Led by Illinois Manufacturers' Association
Education Foundation

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 partnering with the German American Chamber of Commerce to pilot an apprenticeship program for Industrial Maintenance Technicians at Harper College and school district 211 and 214. The Exchange is leading the statewide effort for the Illinois Advanced Apprenticeship Consortium, which will create over 680 quality apprenticeship opportunities over the next 5 years.



MSSC Authorized Instructor Classes and Credentials: Since 2008, the Illinois Manufacturers' Association Education Foundation, the lead organization for the Manufacturing Learning Exchange, has expanded MSSC Certified Production Technician authorized instructors from 4 to 101, approximately 80 of which were paid for with Race to the Top funding. 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. As a result, the number of students that received the MSSC credential increased from 53 to 3,242. 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 17,000 students from all over the world. The Manufacturing Learning Exchange helped to facilitate the participation of over 2000 exhibits to promote student interest in manufacturing jobs. The show will return to Chicago in 2016.

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.

Young Manufacturer's Summer Academy: Due to the efforts of the Manufacturing Learning Exchange, several communities were able to 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 created STEM projects, with a capstone mock job fair event for students to participate in at the end of the 8 day session.



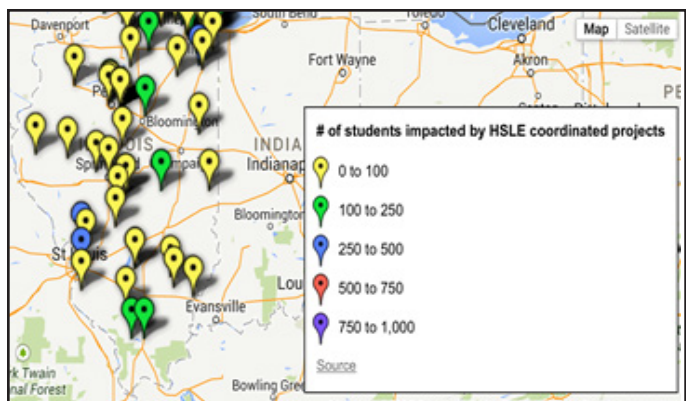
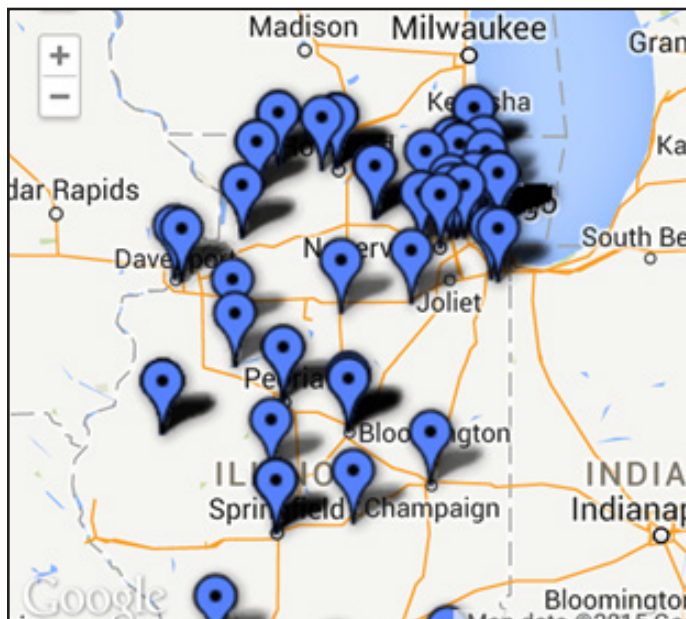
Health Science Learning Exchange

Led by University of Illinois at Chicago

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 AND STUDENT IMPACT

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



HEALTH SCIENCE

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 developed with the assistance of field professionals, held at Lincoln Land Community College 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 is 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 also partnered with AHIMA for a successful application towards developing an apprenticeship model for Health Informatics for the American Apprenticeship grant.

Career Cruising/InSpire:

In the past year, HSLE contributed resources to begin addressing mentorship experiences in various communities across the state by partially funding the purchase of a statewide site license for Career Cruising's InSpire module.

CCInspire is a platform that provides the HSLE and regional education-industry intermediaries a prime venue for informing and connecting with the future workforce. The HSLE and regional partners all receive access to the CCInspire administrative portal, which includes functionality such as:

- Tools for adding and maintaining employer profiles
- Tools for adding and managing Career Coach mentors
- Reporting tools for understanding users' (students and career changing adults) career aspirations and for tracking system usage
- A content management system for uploading articles, featuring employers, sharing videos, etc.
- A message center for sending messages to students and career advisors

Inspire is being launched in partnership with the Energy Learning Exchange and the Manufacturing Learning Exchange.



Energy Learning Exchange

Led by Illinois State University

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

Founding Member



Companies



Workforce Boards



Workforce Related



Colleges and Universities



IMPACT

K-12 School Districts Involved	150+
Teachers Involved	275+
Students Impacted	75,000+

More



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 participated in the challenge and presented their solutions in May.

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 100 schools, 400 educators, and more than 10,000 students on Smart Grid consumer energy education and career awareness.



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. 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 12-18, 2015. 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.



Energy Educator's Summit: On September 19, 2015, more than 100 energy educators from across Illinois were invited to take part in a one-day workshop focusing on energy literacy, career awareness, and "smart grid" technologies at Illinois State University.



Finance Learning Exchange

Led by Econ Illinois

The Finance Learning Exchange (FLE) is focused on supporting students, educators and communities to empower students with the information and tools to be competent and knowledgeable citizens that will positively impact the Illinois economy in the finance industry sector. Academic

and engagement opportunities are being developed to improve educational models throughout the state. The models are implemented through partnerships with school districts, community colleges, universities, employers, and industry stakeholders to build local career pathway systems that empower learners to explore and pursue their academic and career interests in the finance-related fields.



IMPACT

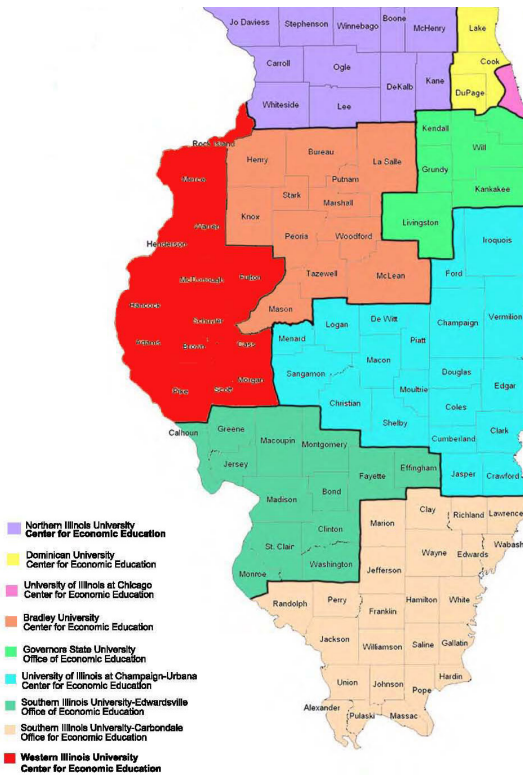
FLE 2015 FOCUS:

- Developing a framework for sustainability and outreach for multiple levels of engagement
- Building partnerships between stakeholders within regions of the state
- Building capacity for key initiatives regionally through five universities across the state
- Supporting financial literacy efforts for Illinois Money Smart Week® initiatives

Total impact - four Models of Engagement established 2014-15 school year

College Students	160
K-12 School Districts:	80
K-12 Teachers	202
K-12 Students	44,154

Models were designed to be replicable in future school years by Econ Illinois' affiliated Centers of Economic Education across the state. Center regions are listed by color in the map to the left.



Revised 5.1.

KEY PARTNERS



Other NIU Affiliates including:
 NIU Center for P-20 Engagement
 NIU Center for Economic Education
 NIU Department of Workforce Education and Development

KEY INITIATIVES

Teacher, Administrator and Guidance Counselor presentations: Panel presentations with industry leaders, available by request, to lead a dialog with high school and community college educators to explore ways to introduce, support and guide students interested in a finance-related careers or in taking business/entrepreneurship coursework. Approximately 90 educators, counselors and administrators from six high school districts and Triton Community College participated in dialog with the first panel presentation this past school year.

Student presentations: Presentations are available upon request to school districts for students considering or interested in finance-related careers. Information is shared about employment needs and projections regionally with industry professionals that lead an interactive dialog about their career field and experiences. School districts engaged thus far: Elmwood Park CU School District 401, Leyden Township HS District 212, Oak Park & River Forest HS District 200, Proviso Township HS District 209, Ridgewood HS District 234, Riverside Brookfield HS District 208.



Student field trips to industry sites: High school student groups are invited to visit a business firm to gain an understanding of the variety of jobs available within a particular career field and the educational background and experiences necessary for success. The visit includes: Dialog with young professionals, participation in curriculum activities, a tour of the offices and lunch. Since January 2015, two high school visits have taken place at PwC in Chicago. Three visits are being schedule for early 2016. Forty students and their teachers comprise each visit. Schools that have participated include those involved with the Student Presentations initiative and Township High School District 211. Schools participating for the first time in 2016 will be Chicago Public Schools.

Finance industry speakers in the classroom: Industry professionals are available to visit a classroom or school of their choice or to be paired with a classroom involved with Econ Illinois programming. Speakers share about their job, educational background and experiences, and may include leading a finance-related curriculum activity. Four school districts engaged 246 students and workshops at Northern Illinois University engaged 160 students during the spring of 2015.



Online curriculum resources and professional development: An online searchable library of curriculum resources is under construction. Resources were identified this past year, including: curriculum, curriculum assessments, classroom activities, projects, finance-related apps, podcasts, videos, professional development Webinars & tutorials, infographics to support the educational continuum for finance-related pathways of study. Resources continue to be populated online.

Financial literacy online resources: A robust clearinghouse of financial literacy resources has been identified and is being vetted for population into an online searchable database. A coordinated effort is underway to reach citizens along the educational continuum who most need financial literacy support, regardless of career cluster being pursued. Examples include FAFSA, credit, and loan resources.

Student Challenges: Two high school competitions engaged 835 Students from 30 schools across the state. Planning is underway to include an optional industry-based project for each competition in 2016.

Cohort of statewide teachers for mentor network: Econ Illinois is drawing from a cohort of over 75 award-winning educators that have participated in Econ Illinois programs, professional development, and used our curriculum resources to build partnerships and mentorships for educators and schools regionally across the state.



Customized Professional Development: Conference sessions and workshops are available upon request for schools and can be focused on specific subject content, the finance career cluster, learning standards or financial literacy topics.

Research and Development Learning Exchange

Led by Illinois Science and Technology Coalition

The **R&D Stem Learning Exchange** offers high-quality R&D STEM education. The Research and Development STEM Learning Exchange (RDLE) is a coalition of more than 60 cross-sector partners dedicated to educating, recruiting, and retaining the next generation of Science, Technology, Engineering, and Math (STEM) talent for Illinois industry research and development (R&D).

The mission of RDLE and its partner organizations is to collaborate to develop, test, and refine 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.

The R&D STEM Learning Exchange is led and managed by the Illinois Science & Technology Institute (ISTI). Founded in 2011, ISTI was formed as a nonprofit, affiliated entity of the Illinois Science & Technology Coalition (ISTC) to strengthen the Illinois talent pipeline for research and development careers.



R&D STEM Learning Exchange: Growth by the Numbers

	2013-14	2014-15
Students and teachers impacted	500	1,000
Partner high schools	14	26
STEM mentors supporting students	114	350
Teachers who completed professional development workshop	40	53

The third year of the R&D STEM Learning Exchange will see further growth, engaging with over 30 high schools and 1500 students, as part of our 60+ STEM coalition partners.

2015-16 PARTNERS

Industry Partners

Archer Daniels Midland
 AbbVie
 Baxter International Inc.
 ComEd
 Horizon Pharma
 Microsoft
 Motorola Mobility
 Motorola Solutions Foundation
 Northrop Grumman Corporation
 Takeda Pharmaceuticals
 TGG Group

Post Secondary Education Institutions

Illinois Institute of Technology
 Illinois State University
 Loyola University Chicago
 Northern Illinois University
 Northwestern University
 Oakton Community College
 Southern Illinois University
 University of Chicago
 University of Illinois Urbana-Champaign

Non-Profit and Government Agencies

Brookfield Zoo
 Chicago Council on Science & Technology
 Fermi National Laboratory
 iBIO Institute EDUCATE Center
 Illinois Business Roundtable
 Illinois Junior Academy of Science
 Illinois Science & Technology Coalition
 Network for Teaching Entrepreneurship
 NSERVE
 Shedd Aquarium

High Schools

Amboy High School
Chicago Vocational Career Academy
Decatur-area High School
Downers Grove North High School
Downers Grove South High School
Evanston Township High School
Gwendolyn Brooks College Preparatory Academy
Illinois Math and Science Academy
Instituto Health Science Career Academy
ITW David Speer Academy

Julian High School
Lake View High School
Lindblom Math and Science Academy
Maine South High School
Muchin College Prep
Mundelein High School
New Trier High School
North Lawndale College Prep
North Chicago Community High School
Oak Park and River Forest High School
Palatine High School

Prospect High School
Rich East High School
Schurz High School
South Shore International College Prep
Taft High School
Von Steuben Metropolitan Science Center
Washington Community High School
Wheeling High School
Williamsfield High School

KEY INITIATIVES

The R&D STEM Learning Exchange aims to accomplish its mission through three key initiatives: STEM Challenges, Mentor Matching Engine, and the STEM Resource Repository.

STEM Challenges

STEM Challenges offer high school students the opportunity to investigate and solve problems relevant to Illinois industry with the support of STEM professionals.

RDLE works with industry partners such as Takeda Pharmaceuticals, Motorola Solutions, and Microsoft, to customize a project to reflect a current and authentic research problem. R&D STEM Challenge projects are designed to teach the critical skills inherent in problem solving and STEM concepts by exposing students to R&D applications beyond the classroom. They also enable students and teachers to build relationships with Illinois industry and STEM professionals. Projects during the second year of the STEM Challenges addressed topics as varied as water management, community health awareness, aerospace and defense, information technology, environmental sustainability, and behavioral economics. Students were asked to build mobile applications for emergency responders, mitigate the spread of infectious disease, and develop products to generate power in the event of a natural disaster.

Teachers representing more than 30 disciplines guided these projects with the support of STEM professionals from the sponsoring industry partner who served as mentors. At the end of the projects, students are given the opportunity to present their solutions not only to their industry partners, but to an audience of corporations, universities, government representatives and other stakeholders who make up the RDLE STEM Coalition.

In 2015-16, 11 industry partners such as Baxter International Inc., the Archer Daniels Midland Company, and Motorola Mobility will work with over 700 students across the state to address real-world problems facing these companies and industries



Mentor Matching Engine (MME)

The Mentor Matching Engine is an online platform that connects high school students and their teachers to STEM professionals who provide mentor support through student-led research.

High school students are exposed to multiple perspectives along the STEM pipeline through one-on-one mentorships with a STEM professional mentor. Using examples from their own organizations, mentors provide perspective on how R&D is applied beyond the classroom, giving students insight into the potential impact and reach of their research and applications in the real world. Students explore a topic of interest to them by developing a question that can be answered through an investigative research process. Students post teacher approved research questions on the Mentor Matching Engine and request mentors with relevant subject matter expertise to provide guidance in a chat format, as well as through document sharing and teleconferencing.

To become a mentor or to inquire about becoming a partner, contact Emily Cooper, ecooper@istcoalition.org.

STEM Resource Repository

The Repository provides connections to more than 100 high-quality STEM resources created for teachers, students, and parents, contributed by more than 50 Illinois companies and research institutions invested in STEM education.



Students present their STEM Challenge solutions at Motorola Mobility to more than 200 partners in May.



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



MANUFACTURING

**TRANSPORTATION
DISTRIBUTION
AND LOGISTICS**



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.



FINANCE

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:**

Illinois Pathways
www.ilpathways.com
Andrea Messing-Mathie
Education Systems Center
amessingmathie@niu.edu