R&D STEM Learning Exchange

Report for the 2013-2014 Academic Year

Prepared by

ILLINOIS SCIENCE & TECHNOLOGY INSTITUTE

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R&D STEM Learning Exchange

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R&D STEM Learning Exchange

Introduction to the R&D STEM Learning Exchange

What is the R&D STEM Learning Exchange?

The Research and Development STEM Learning Exchange (RDLE) is a coalition of 40+ 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). It is part of Illinois Pathways, a state-led and federally supported education initiative designed to support college and career readiness for all students.

Problem Statement

The dual shortage of students exploring STEM careers in post-secondary education and college graduates pursuing STEM careers will limit Illinois' ability to fill anticipated job openings and compete in a global marketplace.

Our Mission

The RDLE's mission is to spark interest in and prepare students for R&D careers to build a pipeline of professionals that become Illinois' future innovators. With this aim, RDLE partner organizations 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.

This mission is consistent with the goals of the Next Generation Science Standards (NGSS), which Illinois adopted in February 2014 and will go into effect in the 2016-17 school year. NGSS provides a new vision for K-12 science and engineering education focusing on process skills, which foster students' abilities to develop and test ideas and evaluate scientific evidence.

Our History

In 2011, the Illinois Science & Technology Institute (ISTI) was formed as a non-profit entity by a group of advocates, including the Illinois Science & Technology Coalition, who were concerned about strengthening the Illinois talent pipeline for research and development careers. Composed of major corporations, research universities, research laboratories, post-secondary education institutions and nonprofits, the ISTI first worked to develop a curriculum framework for research and development (currently available on the STEM Resource Repository).

The ISTI applied to be a part of Illinois Pathways, a public-private initiative created by the State of Illinois with Race to the Top funding to better prepare Illinois students for careers in STEM fields. Through this strategy, Illinois Pathways developed "STEM Learning Exchanges" to coordinate educational opportunities and leverage private sector resources in key sectors to better prepare

students to compete in the global economy. Through a competitive process, the ISTI was selected to manage the R&D STEM Learning Exchange, one of eight Learning Exchanges funded through the Illinois State Board of Education. The R&D STEM Learning Exchange formally launched in mid-2012 with a comprehensive strategic planning process. The 2013-2014 academic year served as the RDLE's first year of providing services to Illinois schools.

Our Partners

High Schools

Chicago Vocational Career Academy
Hinsdale Central High School
Illinois Math and Science Academy
Instituto Health Sciences Career Academy
Lane Tech College Prep
Lindblom Math and Science Academy
Muchin College Prep
Niles North High School
Oak Park River Forest High
Palatine High School
Thornton High School
Waukegan High School
Wheeling High School

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

Industry Partners

AT&T
Baxter
Comcast
Microsoft
Motorola Solutions
Northrop Grumman
Takeda Pharmaceuticals
TGG Group (Greatest Good)

State and Federal Government Organizations

Argonne National Laboratory
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
Northwest Educational Council for Student Success
NSERVE
Shedd Aquarium

R&D STEM Learning Exchange

Our Approach

During the 2013-2014 academic year, the RDLE piloted three key initiatives within 14 Illinois high schools:

- R&D STEM Challenges
- Mentor Matching Engine
- STEM Resource Repository

Students and teachers from the RDLE partner schools provided critical feedback to improve our initiatives and encourage the development of high quality, proven education solutions.

This report provides an overview of RDLE initiatives, key metrics, successes and learning from the 2013-2014 pilot year. It also outlines plans for the 2014-2015 academic year.

Our Impact during the 2013-2014 Academic Year

R&D STEM Learning Exchange	2013-2014
# Of partner high schools	14
# Of teachers attended the RDLE professional development workshop	40
% African American student participants	25%
% Hispanic student participants	25%

R&D STEM Challenges	2013-2014
# Of high schools	12
# Of student participants	400
# Of teacher participants	25

Mentor Matching Engine	2013-2014
# of teacher participants	6
# Of partner organizations contributing mentors	14
# Of mentors recruited	100
# Of students with independent research projects supported by mentors	60

STEM Resource Repository	2013-2014
# Of unique users	1,072
Avg. page views per visit	4.61
Total page views	8,731
Avg. session duration	7 min

Our Goals for the 2014-2015 Academic Year

In Year 2, RDLE will grow from 14 to 25 partner schools that commit to implement RDLE initiatives and provide feedback throughout the year. RDLE is proud of its success in engaging underrepresented students in STEM and will build on its diversity of users by also engaging rural schools downstate and by measuring the number of female students reached. Through additional metrics and evaluation, the RDLE also seeks to measure more quantitative student impacts on each of our programs.

All RDLE partner schools are asked to appoint teachers who:

- Attend the October 10th professional development and training event hosted at Northwestern University
- Participate in ongoing professional development and trainings
- Provide regular feedback to RDLE through bi-monthly surveys and focus groups
- Shape ongoing program development by participating in focus groups and bi-monthly surveys

Additionally, one teacher in each RDLE school will be asked to pilot MME for up to 30 students who are performing independent research and seeking 1:1 mentor support.

R&D STEM Challenges

What are the R&D STEM Challenges?

R&D STEM Challenges offer high school students the opportunity to investigate and solve problems relevant to Illinois industry. The RDLE works with industry partners to customize each project to reflect a current and authentic research problem and spark student interest in R&D careers. 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.

Each R&D STEM Challenge project is interdisciplinary and developed in line with Next Generation Science Standards (NGSS), building upon the successes and learning of Illinois Innovation Talent Program (ILIT) and other problem-based learning (PBL) models.

Projects during the inaugural year of the R&D STEM Challenge addressed food safety, aerospace and defense, health, environmental sustainability and behavioral economics. Teachers representing more than 30 disciplines guided these projects with the support of STEM professionals from the sponsoring industry partner who served as mentors.

Process and Participation during the 2013-2014 Academic Year

Teachers at the RDLE partner schools received professional development through a workshop on problem-based learning and ongoing coaching on integrating industry expertise into a classroom setting and weekly coursework. Over the course of the semester, students worked in teams to investigate the problem and applied critical thinking to develop multiple solutions in response to the presented challenge or problem statement. They engaged—in-person, on the phone or using video conferencing—with industry mentors who spent up to one hour per week guiding student research by answering questions, clarifying context and applications within industry and helping to refine solutions through feedback. Mentors also hosted a student visit of their facility. Students were invited to present their research and solutions to their industry partners and representatives from the Illinois STEM community at a half-day capstone event hosted by the R&D STEM Learning Exchange at the Museum of Science and Industry. Throughout the semester, teachers shaped ongoing program development by participating in focus groups and bi-monthly surveys.

R&D STEM Challenge 2013-2014 Participation			
12	400	25	6
Schools	Students	Teachers	Projects

The RDLE originally anticipated that 200 students would engage in this initiative, but actual participation was double. Students spent on average 18 hours (equivalent to 1.125 hours per week during the semester) working on their STEM Challenge project.

Twelve partner high schools participated in the R&D STEM Challenges; however, some participated in more than one Challenge and took on multiple industry partners. Five industry partners worked with the R&D STEM Learning Exchange to develop a question or statement that reflects a real problem or challenge their organization faces.

Motorola Solutions

Participating Schools: Chicago Vocational Career Academy, Niles North High School
Challenge*: What new mobile technology applications and tools might you develop to help save lives and keep people safe in emergency and disaster situations? What types of critical information could be shared using technology*

IIT's Institute for Food Safety and Health

Participating Schools: Lindblom Math & Science Academy, Palatine High School
Challenge*: How can we help smaller, local farmers understand and address the risks posed by foodborne illness, in order to meet the upcoming requirements from FSMA?*

Northrop Grumman Corporation

Participating Schools: Lane Tech College Prep, Wheeling High School, Thornton High School, Oak Park and River Forest High School
Challenge*: Perform a trade study on a missile defense system that can detect and destroy hostile missiles before they can enter our country.*

TGG Group (Greatest Good)

Participating Schools: Wheeling High School, Waukegan High School

1. *What types of changes might "nudge" students to make healthier food choices without limiting their food options?*
2. *Design your own – Hinsdale Central designed their own TGG Challenge addressing what types of changes might "nudge" Hinsdale households to make wiser energy choices without limiting their lifestyles.*

Baxter

Participating Schools: Lindblom Math & Science Academy, Muchin College Prep, Instituto Health Sciences Career Academy

1. *Baxter is seeking innovative, effective, feasible solutions for decreasing illnesses and the spread of infections in schools.*
2. *How does the environment where you live and work impact your personal health as well as the surrounding environment?*

The iBio Institute EDUCATE Center served as a partner by co-developing the R&D STEM Challenges and providing teachers with coaching to support classroom facilitation and integration of industry expertise.

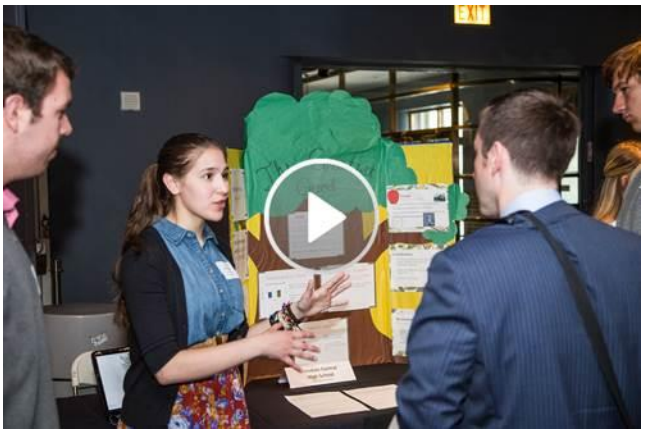
Outcomes from the 2013-2014 Academic Year

The University of Illinois' I-STEM initiative served as our metrics and evaluation partner by facilitating and analyzing bi-monthly surveys and an end-of-program focus group with R&D STEM Challenge teachers. Additional feedback was collected through an end-of-program student survey. Students indicated that this was a transformative experience and a helpful way to expose them to new learning opportunities. RDLE industry partners expressed that this was a positive experience and 80% already confirmed participation for next year.

Additional highlights include:

- 74% of teachers felt that leading Challenge projects helped bridge their teaching with real-world relevance and applications. They appreciated open houses, organized by Industry Partners to meet professionals in the field.
- Students who participated enjoyed real-world relevance of STEM learning, gained confidence in communication, and grew interested in science-related careers.
- Teachers valued that students were able to interact directly with Industry Partners who helped students see the real-world applications and significance of the Challenge projects. Teachers suggested increasing constant communication with the Industry Partner to better build relationships with them and their students.

WATCH THE VIDEO BELOW TO LEARN MORE ABOUT THE R&D STEM CHALLENGES



Student Testimonials

"It helped me learn how STEM is everywhere and we need more people in the industry. I'm interested in sciences more than I was before and learning how these challenges are applied in our daily lives."

Kathryn, Student at Oak Park and River Forest High School

"From this experience, I can now see myself doing something similar, working in research and development.

Alma, Student at Muchin College Prep

"It gave us real goals while also forcing us to assess what would be an attainable solution. It helped us realize how unfocused 'real world' problems are."

Lauren, Student at Palatine High School

Teacher Testimonials

"We saw our kids' confidence with communication really grow exponentially through the project. When we actually got to the presentation part, to see ninth graders with good posture, leaning across the table to an engineer at Northrop Grumman and tell them "this is what we want to do, and this is why we think it's going to work" without being shy and intimidated is nice to see."

Matt, Division Head at Oak Park and River Forest High School

"This project benefits students because they are able to see the real issues that our partner companies encounter. It helps students to get beyond the scope of high school to see what their futures could be like."

Don, biology teacher at Instituto Health Sciences Career Academy

Industry Partner Testimonials

"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 Soter, Associate, TGG Group

"At Motorola Solutions, our customers rely on us for the expertise, solutions and services we provide. They trust our ability to develop innovative products and our years of experience rooted in education in science, technology, engineering and math (STEM). The Motorola Solutions Foundation, the charitable and philanthropic arm of Motorola Solutions, partnered with the Illinois Science and Technology Institute's (ISTI) R&D STEM Learning Exchange (RDLE), to design an R&D STEM Challenge where students apply STEM concepts to real-world situations. As a result, dozens of student groups developed innovative solutions to help first responders better react to emergency situations. Partnerships like this give me a confidence that we will be able to develop a pipeline of Illinois-based technology leaders to support our future economy."

Matt Blakely, Director, Motorola Solutions Foundation

Case Study: Baxter and Instituto Health Sciences Career Academy

Baxter, a global health care company headquartered in Deerfield, Illinois, partnered with the R&D STEM Learning Exchange to create an R&D STEM Challenge for Instituto Health Sciences Career Academy. Baxter piqued interest in R&D by asking a group of freshmen and sophomores: How does the environment where you live and work impact your personal health as well as the surrounding environment?

The students formed groups and got to work on developing a research question. Throughout the project, each student group was mentored by STEM professionals from Baxter who spent time—via a video conference or in person—answering questions, clarifying context and applications within industry and providing feedback on student solutions.

Monica Torres, Corporate EHS Manager for Baxter, volunteered to mentor students through the R&D STEM Challenge. "The more and more you talked with them, the more you see the interest, you see how eager they are to participate, to interview the other students—what they want to see, what they want to know—especially how they can engage them," said Monica.

Darien, a student participant, valued the whole experience. "Learning from Baxter has changed my views on recycling," she said. "It gets me more engaged to want to recycle now that I know the true outcome of not recycling. So that's something I took to heart."

At the end of the semester, students presented their research and solutions to representatives from the Illinois STEM community at a half-day capstone event hosted at the Museum of Science and Industry. Baxter mentors also invited students to present their final solutions to executives at Baxter headquarters where they received feedback.

Don Bibly, a biology teacher at Instituto Health Sciences Career Academy, was excited for his students to be mentored by STEM professionals and tour Baxter's facility. "Because Baxter is a global company, it benefits the students to be able to see the problems that a company like that deals with and what they think about," said Don. "It really lets the students get beyond the scope of high school and to see what their future might be like." Don also valued the professional development he received because of the R&D STEM Challenge. He and other teachers attended a workshop on problem-based learning and received coaching from Baxter throughout the project on integrating interdisciplinary expertise in a classroom setting.

Selene Mojica, EHS Manager at Baxter Healthcare, also served as a mentor. "I tried to show them potential career opportunities in the health sciences field," said Selene. "We are a science and technology-based company and so encouraging and promoting students to find careers in the areas of science, technology, engineering and math is important for the sustainability of companies like Baxter."

Case Study: Wheeling High School and TGG Group (The Greatest Good)

Wheeling High School in Wheeling, Illinois is a comprehensive high school with a STEM focus. Wheeling is often recognized and renowned for their "STEM for ALL" mission: STEM literate graduates are problem solvers, innovators and logical thinkers. Their STEM for ALL focus means that skills related to STEM such as problem solving, teamwork, scientific inquiry, technology and communication are purposely taught and reinforced throughout the curriculum. From the creation of the R&D STEM Learning Exchange, Wheeling High School was a natural partner because of their alignment with RDLE's mission. While it would be relatively easy to situate a Challenge project within the science department, Wheeling approached the R&D STEM Learning Exchange staff about a perceivably unconventional route: the social sciences. The RDLE recruited TGG Group (The Greatest Good), a social consulting firm with a specialization in data collection and analysis, as well as a passion for problem solving. RDLE facilitated a meeting with TGG staff and Wheeling's social science division head, Alan Wahlert. RDLE staff conducted a needs assessment on all sides and eventually came up with a Challenge to students around behavior economics and nudges – how can students change the behavior of others using data and problem solving.

After thinking through the Challenge further, Wahlert identified two teachers, one in psychology, and the other in sociology to lead students in the Challenge. They met with TGG group staff, who helped to answer questions, identify resources, and provide best practices for data collection and analysis.

A team of students from Wheeling was selected to present their findings and receive feedback from their industry partner, TGG, during the capstone event at the Museum of Science and Industry. Students also benefited from seeing the presentations of more than 100 peers who worked with TGG and the other four partner organizations.

When reflecting on his experience, Wahlert said, "This endeavor demonstrates how industry partners and students alike can benefit from integrated experiential learning." TGG strives to support and hire future researchers who know how to innovatively analyze data and implement field experiments to understand human behavior, and now as teachers we can help to cultivate these talents within our students.

Case Study: Palatine High School and IIT's Institute for Food Safety and Health

The Palatine High School (PHS) Engineering club was introduced by the R&D STEM Learning Exchange to a prevalent issue in society: food safety. By collaborating with the Illinois Institute of Technology's Institute for Food Safety and Health (IFSH) – PHS' engineering club was tasked with spreading awareness of FSMA –the Food Safety Modernization Act, and how easy the transition could be for small farmers to adopt regulations in order to provide safe and healthy food in the US.

Their journey began in February when their Challenge coach visited Palatine High School to introduce the problem at hand. Immediately, they started thinking about what students could do to impact small farms and food safety. With varied levels of engineering experience among the group, and little to no previous knowledge of food safety legislation, they began the project by brainstorming anything that could potentially aid in endeavors to improve food safety. The students developed a three-pronged research plan including agricultural diseases, reasons for farm shutdowns and legislation.

After conducting extensive research on their own, the students sought professional insight. They contacted local grocery stores in order to learn more about where they were purchasing their produce and whether food distributors were involved in the process. In March, they visited IFSH to learn more about food safety from a professional standpoint. They were given a tour of the facilities and got the chance to learn about different sanitation processes, specific diseases, and what really passes as "safe" food. Through their visit and conversation with IFSH, the students determined that implementing these technologies in small farms was far beyond any small farm's budget.

Upon further reflection after their visit, they rationalized that because FSMA makes it possible to aid small farms, the reason why there is a discrepancy between farmers and FSMA is because there is a lack of exposure on up-and-coming food legislation. In order to achieve a better understanding of how much or how little small farmers knew about FSMA, the students developed a survey which assessed farmers' understanding of FSMA, where they sell their products, their documentation processes, and their association with co-ops and other third party auditing groups.

To address the seeming unawareness of farmers, their project focused on launching an educational media campaign in the form of an RSA-inspired illustrative video "FSMA: Do YOUR Part" in order to motivate farmers to adapt to the new legislation and realize how much better off everyone would be if they just "did their part."

On May 19th, the team had the opportunity to present their video and campaign at the R&D STEM Challenge event.

The students reflected on the event and Challenge, "We were surprised and encouraged by the willingness of our professional audience to latch on to our light-hearted media campaign, considering that it was centered on our creation of the fictional characters. However, we appreciated that everyone was open-minded with constructive feedback as well as critical analysis of potential flaws in our project. Throughout the event and Challenge, individual team members began branching out in one-on-one discussion, a valuable asset for networking. This allowed us each to exercise our own specialization as well as share our singular thoughts on our challenge experiences. As a whole, our team left the event satisfied: while we were proud of our presentation, we were even happier to bask in the opportunities for intellectual debate and network-building with accomplished but like-minded individuals."

Strategy for the 2014-2015 Academic Year

Most teachers are interested in leading a Challenge project again in the future, as well as incorporating more students into Challenge projects. As a result, in the 2014-2015 academic year the R&D STEM Challenge will expand by an estimated 60% to reach at least 650 students with 10 Challenges projects in 20 Illinois schools. To achieve this growth, the RDLE staff will focus on these key items:

- **Growth in existing schools:** The RDLE is currently working with the 12 partner schools to determine how the program can grow within their schools to train more teachers and reach more students. For some, it will mean bringing this opportunity from an optional after school enrichment environment to a classroom setting. For others, it will mean inviting teachers who did not previously participate to teach a Challenge project. As with the pilot year, these plans will be customized to fit the capacity and needs of each school.

- **Growth in new partner schools:** The RDLE will also take on up to 8 new partner schools that commit to hosting an R&D STEM Challenge in the 2014-2015 school year. This expansion is a customized approach based on capacity, as well as existing partnerships, geographic diversity, and the ability to scale in future years.

- **Integration with Mentor Matching Engine:** In order to better facilitate engagement between teachers, students, and industry partners, the Mentor Matching Engine will undergo technical enhancements to better provide virtual engagement that can easily accommodate student groups, videoconferencing needs and other STEM Challenge use cases.

R&D STEM Challenge Timeline for the 2014-2015 Academic Year

Summer 2014
R&D STEM Learning Exchange team works with industry partners and independent education consultants to develop and refine challenge problem statements.

October 10, 2014
All RDLE teachers attend a professional development working and meet with industry partners who are sponsoring their respective R&D STEM Challenge projects. Teachers and industry partners finalize details including roles, expectations, scheduling and logistics.

January 2015
R&D STEM Challenge projects begin in schools

January–April 2015
Industry mentors engage with students weekly through Mentor Matching Engine and classroom visits. Mentors host students for a tour of their facility. Mentors provide feedback on final student presentations in-person at their facility or in the classroom.

May 2015
Capstone event to celebrate student achievement and industry collaboration

Mentor Matching Engine

What is Mentor Matching Engine?

The Mentor Matching Engine is an online platform that connects Illinois high school students and their teachers to STEM professionals from Illinois companies and research institutions. Developed in partnership with the Illinois Mathematics and Science Academy (IMSA) and Northwestern University, this site allows STEM professionals serve as mentors to guide students through student-led research. High school students are exposed to multiple perspectives along the STEM pipeline through 1:1 mentorships with a STEM Professional. Using examples from their own organizations, mentors also provide perspective on how R&D is applied beyond the classroom.
After learning basic research concepts in a classroom setting, students explore a topic of interest 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.

Teachers ensure a productive student-mentor relationship by:

- Introducing basic research concepts in advance of students engaging with Mentor Matching Engine
- Approving research questions and mentor requests
- Monitoring interaction between students and mentors to ensure appropriate conduct
- Working with RDLE to anticipate demand for mentorship
- Providing ongoing feedback to improve the platform, process and user experiences

Teacher approved student projects include classroom-based independent research, the R&D STEM Challenge and science fair projects. The platform prioritizes student safety by completing background

checks for mentors and placing teachers at the center of the student-mentor relationship.

Process and Participation from the 2013-2014 Academic Year

All teachers at our RDLE partner schools were introduced to Mentor Matching Engine at the fall professional development workshop and were enthusiastic about its potential. By fall of 2013-2014, 14 RDLE partner organizations appointed an internal Mentor Supervisor who identified and recruited more than 100 STEM professionals from within their organizations to serve as mentors.

The Phase 1 pilot launched in spring and summer for 2014. Teachers at RDLE partner schools like Illinois Mathematics and Science Academy (IMSA) and Hinsdale Central High School and Niles North High School helped 60+ student researchers from beginner and advanced student research courses to match with mentors for 1:1 support.

The RDLE sought feedback from users and conducted focus groups with RDLE teachers, which collectively enabled RDLE staff to identify new use cases, anticipate 2014-2015 demand for mentors and perform additional technical development to support Phase 2 of the pilot during the 2014-2015 academic year.

Mentor Matching Engine 2013-2014 Participation			
14	**100**	**6**	**60**
Partner Organizations	Mentors	Teachers	Students with Independent Research Projects

Outcomes from the 2013-2014 Academic Year

Case Study: Mentor Matching Engine

16-year old Theresa Do was honored with six regional and state awards for designing a smartphone app that tracks user blood glucose levels to provide alerts at peak times when users should inject insulin. Theresa is undoubtedly an exceptional student; however, she acknowledges that her project success was made possible by the dedicated support she received from mentors, teachers and industry professionals.

During her sophomore year at Jacobs High School, Theresa signed up for RISE (Research Inquiry Skills & Experimentation), a course offered by the Illinois Mathematics & Science Academy (IMSA). As a part of the course, Theresa developed a research question around whether artificial intelligence could be leveraged to help the 300 million people currently suffering from diabetes. This issue felt personal since Theresa had supported her best friend

whose relative had his leg amputated as a result of his diabetic condition. Theresa realized how big of an impact diabetes has on the person with diabetes and those around them.

Her RISE instructor, Ms. Jacki Naughton, encouraged Theresa to find a mentor who could support her independent research. "The focus of upcoming educational standards—specifically Next Generation Science Standards (NGSS)—is to have students develop their own design or research questions and develop protocols to answer those questions. The typical science teacher can't be an expert in every discipline that interests a student; I know because I've taught science for 30 years. Mentors provide an invaluable service: they are a lifeline for teachers and students," said Ms. Naughton.

Theresa was one of more than 60 students who used the Mentor Matching Engine during its inaugural year (2013-2014). Theresa was matched with an artificial intelligence expert located over 350 miles away: Ms. Nasim Eftekhari, a NETLAB+ Administrator at Southern Illinois University Carbondale.

Over the course of eight weeks, Theresa and Ms. Eftekhari connected for one to two hours per week via video conferencing and posting on a private blog. The Mentor Matching Engine gave Theresa a forum to challenge her own thoughts and ideas and ask specific questions related to Ms. Eftekhari's expertise. "It was a great honor helping an intelligent young lady like Theresa," said Ms. Eftekhari. "She is polite, passionate about science, self-motivated and a very quick learner. I really enjoyed helping her and I am very happy that she did an excellent job. Her research has great potential for future work which I hope she continues to do."

While Theresa is delighted with the awards she won, she is more excited about the confidence she developed that will aid her career pursuits. "My mentor was a huge help throughout the project. She was the most enthusiastic mentor I could ask for. She made me realize that I have the potential and the resources to pursue this project. She also taught me the ropes in the procedure and a rough background of my study, and consequently, I learned how to get from where I am to where I need to be."

Strategy for the 2014-2015 Academic Year

Mentor Matching Engine (MME) supports a wide-range of student learning. In 2014-2015, the RDLE is asking each partner high school to participate in Phase 2 of the pilot by inviting at least one classroom of students working on independent research projects to use MME. R&D STEM Challenge teachers will also be invited to leverage MME for regular, virtual engagement between mentors and student groups.

RDLE's partnership with top post-secondary institutions differentiates MME from other mentoring platforms. When and where there are appropriate teams to support mentor recruitment, RDLE will offer high school students 1:2 mentorship. This approach reflects the STEM pipeline by matching a high school student to both a post-secondary STEM student and a STEM professional. It would support new talent recruitment by allowing partner organizations to build relationships with high

schools and targeted post-secondary education institutions to both develop R&D STEM talent and attract a pool of competitive candidates. It also enables MME to support existing talent strategies including professional development, employee engagement and retention.

Over summer 2014, MME is being refined to facilitate a more sophisticated matching process that allows students and teachers to request the optimal level of mentor support based on expertise. While completing their profiles, mentors will be able to select their preferred mentoring relationship based on their expertise and mentoring abilities. This approach will allow RDLE to better match and leverage STEM expertise; set expectations for engagement; attract first-time mentors; and develop mentors to support higher levels of research.

For the 2014-2015 school year, all RDLE partner organizations are asked to appoint a Mentor Supervisor who supports multiple mentor recruitment campaigns by distributing recruitment communications, hosting recruitment events, inviting mentors onto the platform, hosting training sessions and soliciting ongoing feedback. RDLE staff will provide communication templates, user training materials, program management support and mentor support to ensure consistent, high-quality user experiences. These recruitment campaigns will begin in Fall 2014 and continue throughout the academic year.

As partners in building this platform, IMSA, Northwestern University and the ISTI will continue to manage the ongoing development of technical, user recruitment and user training resources to ensure a high-quality Phase 2 of the pilot in 2014-2015.

R&D STEM Resource Repository

What is the R&D STEM Resource Repository?

The STEM Resource Repository offers teachers, students and parents access to 100+ high-quality STEM resources created by 50+ leading Illinois-based organizations, including RDLE partner companies and research institutions invested in developing Illinois' future innovators. The STEM Resource Repository hosts curriculum based on Next Generation Science Standards (NGSS), summer programs, professional development opportunities and local events.

Process and Participation for the 2013-2014 Academic Year

STEM leaders, including RDLE partner organizations, contributed the best of their organizations' existing STEM curriculum, case studies and resources to reach more educators and students. The following organizations have contributed materials to date:

Resource Contributors

Adler Planetarium	Astellas	Chicago Zoological Society
After School Matters	Benedictine University	City Colleges of Chicago
Argonne National Laboratory	C2ST	Eastern Illinois University

CEO	Museum of Science and Industry	STEM Summit
Fermilab	NASA	STEM Funder
GTL Resources	Niles Township District 219	RDCEP (Center for Robust
Harvard Graduate School of Education	Northern Illinois University	Decision Making on Climate and Energy Policy)
Hinsdale Township High School	Northrop Grumman	Network for Teaching
Hive Chicago	Northwestern University	Entrepreneurship
I-STEM	Oakton Community College	SEE (Science Entrepreneurship
iBio Institute EDUCATE Center	Citywide Payton Math Circle	Exchange)
Illinois Institute of Technology	PBS	SERC (Science Education
Illinois Junior Academy of Science	R&D STEM Learning Exchange	Resource Center)
Millikin University	Roosevelt University	Science Fist
Mind Research Institute	Shedd Aquarium	STEM Funder
Motorola Solutions	Southern Illinois University	University of Chicago
	Center for Workforce Development	Wheeling High School

Teachers, EFEs and guidance counselors referred students to high-quality STEM resources and learning opportunities to help them explore R&D STEM careers. Teachers, students and parents explored high-quality STEM resources and learning opportunities offered by RDLE's partner companies and research institutions. Resource repository users are "highly satisfied" with its usability and contents; however, use slowed throughout the school year.

STEM Resource Repository 2013-2014 Usage

1,072	4.61	8,731	7 min
Unique Users	Avg. Page Views	Total Page Views	Avg. Session Duration

Strategy for the 2014-2015 Academic Year

RDLE staff is focused on increasing awareness of these resources through a year-round marketing campaign beginning in September 2014. Through social media and other communications channels, RDLE staff will promote the Resource Repository and its contents to reach new users, parents, guidance counselors and other STEM influencers. RDLE partners are asked to support this campaign by retweeting and alerting RDLE staff to promotion opportunities within their organizations and communities. RDLE teachers are asked to use and review a minimum of two resources each semester. In the longer term, the Resource Repository could be built out to house Challenges available for larger consumption, additional NGSS tools and resources, as well as a place for teachers to come together as a community of practice around research & development and student inquiry.

Appendix: Key Partners

RDLE Steering Committee:

Matt Blakely, Motorola Solutions Foundation
Meridith Bruozas, Argonne National Laboratory
Kristin Brynteson, Northern Illinois University
Alice Campbell, Baxter International
Dr. Trevis Crane, Northrop Grumman
Dr. Lizanne DeStefano, University of Illinois
Gil Downey, Illinois State Board of Education
Gerald Doyle, Illinois Institute of Technology
Mark Harris, Illinois Science and Technology Coalition/Institute
Adam Hecktman, Microsoft
Dr. Willy Hunter, Illinois State University
Dr. Kemi Jona, Northwestern University – Office of STEM Partnerships
Ann Reed, iBio Institute
Judy Scheppler, Illinois Mathematics and Science Academy

RDLE partners who contributed financial support for programs and operations:

AT&T
Comcast
Motorola Solutions
Takeda Pharmaceuticals
Baxter
Illinois State Board of Education
Northrop Grumman

RDLE partners who identified and recruited STEM professionals to serve as mentors for Mentor Matching Engine:

Argonne National Laboratory
Baxter
Fermi National Laboratory
Illinois Institute of Technology
Illinois Mathematics and Science Academy
Illinois Science & Technology Coalition
Illinois State University
John G. Shedd Aquarium
Loyola University Chicago
Motorola Solutions
Northern Illinois University
Southern Illinois Unitersity
TGG Group
University of Illinois – Urbana Champaign

ISTI Board of Directors:

Doug Baker, Northern Illinois University (Board Chair 2014-15)
Linda Darragh, Northwestern University – Kellogg School of Management
John Flavin, Chicago Innovation Exchange – University of Chicago
Rob Fleming, Northrop Grumman
Laura Frerichs, University of Illinois Research Park

Chris Gladwin, Cleversafe
Eric Isaacs, University of Chicago (Board Chair 2013-14)
John Larson, AbbVie
Rob Lowe, Wellspring Worldwide
Jeffrey Mays, Illinois Business Roundtable
Azmi Nabulsi, Takeda Pharmaceuticals International, Inc.
Adam Pollet, Illinois Department of Commerce and Economic Opportunity
Warren Ribley Illinois Medical District
Gerald Roper, Chicagoland Chamber Foundation
Matt Summy, Comcast Corporation