GET City: Green Energy Technologies in the City

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North Central Region

1. Abstract

Green Energy Technologies in the City (GET City), a community-school-business partnership, offers year-round programming focused on youth development in energy science, engineering and information technologies in and out of school. GET City is built on the idea that meaningful learning happens when youth engage in authentic investigations of local problems, and have scaffolded opportunities to communicate with and educate others about those investigations.

In GET City, youth engage in authentic investigations on locally relevant and globally important issues in green energy, translate their findings into powerful cyberlearning tools (e.g., digital public service announcements, wikis/webpages), and design and implement culturally relevant education lessons and workshops on green energy concerns for peers and community members through the GET City Education Network. GET City multimedia artifacts have won statewide recognition and have been featured by Detroit Public Television, Lansing's WLNS television, and Ann Arbor's Michigan Historic Theater. They have been used to provide workshops for student groups, churches and community centers, and to document the community impact of energy policy for local government. They have reached over 5,000 people in person, not including television or cyber audiences.

GET City couples afterschool programs with schools and communities to transform STEM learning for urban youth and families. The partnership, led by Michigan State University and the Boys & Girls Club of Lansing, involves community leaders, neighborhood organizations, local public schools and community colleges, government, and technology companies. Through this partnership, youth interact and build relationships with engineers and IT specialists across several green energy sectors. The collaboration helps link youth development in and out of school, and provides scaffolded pathways to "make a difference" through science and engineering in their community.

External evaluation data reveal that GET City youth demonstrate significantly increased technology skills, engineering and science knowledge gains, and educational expectations. The PIs involve undergraduate and graduate students majoring in science education and engineering in mentoring youth, program design and community-based scholarship. GET City has been funded through grants from the National Science Foundation and several local community foundations.

2. Relationship and Reciprocity Between the University and Community

In the United States, African Americans make up only 5% of the engineering workforce, and of the Africans Americans in the engineering workforce the majority hold technician rather than managerial or leadership positions (NACME, 2011). The statistic is even lower for other underrepresented groups, and has changed little in the past two decades despite efforts to reform science and mathematics in our nation's schools.

In 2007, Angela Calabrese Barton (MSU), Scott Calabrese Barton (MSU) and Carmen Turner (Boys & Girls Club of Lansing) collaborated to design and implement a technology-rich science and engineering (STEM) afterschool program in order to address this national challenge. The timing was crucial: Budget cuts had all but eliminated after school programming in area schools. Drawing upon the University's mission to "advance knowledge and transform lives" and the Club's mission to provide leadership and academic skills to lower income minority youth, the program sought to enrich the STEM knowledge base and skills of youth in the middle grades, a crucial time when STEM interests drop precipitously but when youth make critical course enrollment choices that have lifelong consequences.

The team leveraged findings from the pilot project to build a year-round program that has been in continuous operation since 2007. With funding from the National Science Foundation ($899,995) we have expanded our partnerships and engaged in sustained community-based scholarship. GET City also raised $150,000 from area foundations (Dart Foundation, Capital City Community Foundation, Auto Owners Insurance, and MSU Federal Credit Union) to support state-of-the-art computer technology, residential summer engineering program scholarships for GET City youth, and a new "green roof" for the club's facility. The PIs have published numerous peer review articles and book chapters regarding the design, enactment and impact of community-university partnerships on STEM learning and interest, have been nationally recognized for their research in this area, and are actively working with partners across mid-Michigan, and in New York, North Carolina and Hawaii to scale up the GET City model to multiple contexts and locales. We were recently awarded an additional $162,000 from the National Science Foundation to expand our program to incorporate communication technology experts (in collaboration with researchers at the University of Rochester) to investigate the impact of professional

movie making skills on youth leadership and knowledge development in STEM. The ultimate goal is to encourage youth from underrepresented background to become leaders in the STEM workforce.

Each year, GET City involves a cohort of 30 youth (ages 10-14) from low-income and under-represented backgrounds in 200+ hours of programming. Additionally, each year, the GET City Education Network further reaches over 1,000 youth, parents, community members, teachers and government leaders in IT-rich environmental education outreach. GET City supports the development of STEM knowledge and skills essential to the new green economy through the following components.

1. Building STEM expertise. GET City provides authentic investigations of local relevance and global importance that foster deep engagement with green energy, using up-to-date cyberlearning strategies and tools to engage youth in STEM (i.e., Should Lansing build a new hybrid power plant?). Investigations are supported by STEM partners directly involved in these local problems.

2. A cybertoolkit for teaching others (STEM citizenship). GET City youth develop "cybertoolkits" that address the question: "What is important for others to know about my investigation?" Cybertoolkits include youth-produced digital public service announcements, podcasts, raps, etc., and contain youth-authored messages meant to educate and socially network on energy issues. Creating cybertoolkits move youth from STEM experts to STEM citizens, while providing a culturally-relevant and motivating means for enhancing multi-modal literacies.

3. Enacting the GET City Education Network. Youth put their knowledge and cybertoolkits to work to educate target audiences through youth-led community workshops providing culturally relevant education on green energy and sustainability, school classroom lessons based on GET City projects, and social media outreach through presentations on Green TV, local TV stations, and the project website, http://getcity.org. GET City Network also includes mentors and role models, career awareness, social networking, and parental involvement.

Since 2007 GET City has built a robust set of partners, including**:**

(1) Energy- and technology- related community partners who provide technical expertise, access to real-world policy and practice, and participation in education awareness programs offered throughout the year (Michigan Energy Options, Lansing Board of Water and Light, Lansing Mayor's Energy Policy

Council, Lansing's I-Tec, and TechSmith, with new partnerships extending to Duke Energy, the Children's Museum of Greensboro, and the Greensboro Sustainability Program).

(2) School and district leaders who provide spaces for youth to design plans with their teachers for classroom implementation, positioning youth as experts and teachers as partners in making green energy relevant to all (Lansing Public Schools and Waverly Public Schools, with partnerships extending into Honolulu and Greensboro Public Schools).

(3) Higher education partners who provide technical expertise, host career awareness and laboratory experiences, participate in the GET City Education Network and support research goals (Lansing Community College's Alternative Energy Center, MSU's Society of Black Engineers, the University of Rochester, the University of North Carolina at Greensboro and the University of Hawaii at Manoa).

3. Impacts

3.1 Impact on the Community

External evaluation. The GET City external evaluation, conducted by the Brown Education Alliance 2007-2010, reveals that participation in GET City significant increases technology skills, use, and value. The significant results were further verified through a linear regression analysis where effects were controlled for students' age, gender, and ethnicity. Increases in the frequency of students using technology for academic endeavors and the value they placed on IT for communication and impacting the community were also highly significant. Participation in GET City also significantly impacted the correlation between students' aspirations and expectations, reversing trends found in the literature for low-income and minority youth.

Case studies. Research on student learning in GET City reveals changes in reasoning with technology, and in youth identification as green energy and IT experts. Participation in GET City promotes the development of a "community science expert" identity, positioning youth as STEM experts *and* culturally relevant teachers (Calabrese Barton & Tan, 2010a, b). Such identity work transfers to school settings, where youth hold an "I'm an expert" attitude (Birmingham, 2012).

Community education. The GET City Education Network provides scientifically rigorous, cyber-rich and youth-centered educational tools that allow others to work toward green practices. GET City youth typically reach over 1,000 students, teachers and community members annually, not including cyber audiences. Youth have reached over 5,000 people face to face since 2007. Example events include a Community Forum on Lansing's Future Energy Needs (2009), energy efficiency workshops at local schools, community centers and churches (2010), and the Green Carnival (2011).

Energy sustainability in the low-income urban community. Youth in GET City have a significant impact on the energy sustainability practices of their community. Youth worked with club leaders in 2008-2009 to raise $65,000 for a new "green roof," an energy-efficient technology inspired by the work of GET City. Youth also collaborated with the local Board of Water and Light to distribute 1,000 energy efficient bulbs in their community.

External recognition. GET City won the 2010 Technology Program of the Year for the Midwest Council of the Boys & Girls Clubs of America, a Commendation for Outstanding Youth Programming from Michigan's Governor (2008), and a Partnership Award from the Lansing Mayor's Office (2009). GET City youth have won statewide competitions for green education videos as well as scholarships to summer residential programs at MTU, internships in the Mayor's Office and in MSU Engineering Labs, and have had their work featured in the *Lansing State Journal*, on Detroit Public Television, and on Lansing's CBS affiliate, WLNS. GET City was selected as one of only five NSF ITEST projects nationwide to be featured in a video produced by WGBH (see: http://itestlrc.edc.org/inside_itest/).

Partnership model. The GET City partnership has generated a model for how afterschool programs can foster youth development as STEM experts and citizens. This model supports youth in expanding their impact beyond the afterschool setting through lasting partnerships with schools and communities. GET City partners community organizations with schools and businesses to provide continuous and complementary learning, distributed expertise and workforce development opportunities. It also serves as a template for building partnerships in new locations. Evaluation findings indicate that the GET City partnership has created an enhanced set of opportunities for students to develop interest and motivation in STEM.

3.2 Impact on the University

Publications and academic recognition. The GET City partnership has generated a comprehensive analytic approach to documenting youth learning and participation in STEM. Research has also produced approaches for teaching engineering knowledge, skills and leadership through multi-modal literacies. Our work has led to publications in top-tier journals, book chapters, and many international conference presentations (see selected publications appendix). Additionally, GET City was awarded the MSU Outreach Scholarship Community Partnership Award in Spring 2012, and A. Calabrese Barton was awarded the 2010 American Education Research Association Informal Education's Outstanding Research award specifically for her work on GET City.

Curriculum. GET City produced four 12-week cyber-rich afterschool green energy units and two summer units on green design, to synthesize core ideas across the year, which have been made available to all school and project partners. Key energy ideas critical to careers in the new green economy (energy transformations, energy conversion, energy production and the environment) cycle through each unit, supporting students in building understanding within each unit and over time.

Undergraduate research. The GET City partnership has supported ten undergraduate students (engineering and education) as teachers and researchers in the program. Two of these students have presented their research at the University-wide Undergraduate Research Forum.

Teacher education experiences. GET City provides MSU teacher education students (#1 Teacher Education Program in the Country, according to US New & World Report) with opportunities to learn about the role of community organizations in youth development and with experience in culturally-relevant, inquiry-based learning. Several teacher-learning cases have been developed from GET City data and are used in science teaching courses in the MSU teacher education program.

Doctoral and postdoctoral research. GET City has been the site of doctoral dissertations that examine youth learning and participation in community settings and its transfer into schools. Since 2007, seven MSU doctoral students and two postdoctoral fellows in science education have conducted research within the GET City partnership, yielding conference presentations, book chapters, and published articles. Additionally, three doctoral students in chemical engineering have provided technical

support for GET City, developing experiments and design-based activities for youth in the program, arranging for campus visits to university labs, and providing career mentoring to youth in GET City.

4. Lessons Learned and Best Practices

Lessons learned from GET City relate to the design of community-based programs that support youth development in STEM, and its impact over time, in and out of the classroom. We have learned that successful community-based STEM programs are built on a set of design principles that leverage the strengths of partners to support continuous and complementary programming that is culturally relevant and scientifically rigorous.

A second lesson is the importance of supporting youth development along a broader set of learning outcomes critical to the development of leadership skills in STEM. Outcomes such as **science identity development** and **novel forms of participation** that merge cultural practices with the scientific are recognized as important forms of learning that provide crucial links to more traditional forms of success.

5. Future

GET City is a proven model for youth development in informal STEM learning, which transfers to school gains. We are working with collaborators in Michigan, New York, North Carolina and Hawaii to scale up the project to a national level. We are studying how context shapes scale-up, and refining the model to sustainably support youth pursuits in STEM. We are interested in how the GET City scale-up model, including the partnerships, practices, tools and knowledge, can generate pathways into the STEM workforce.

We are also expanding the GET City website so that it can be a repository that middle school teachers turn to for scientific and cyber-rich tools and plans for working with students on green energy issues, and in supporting youth from underrepresented background in moving into STEM trajectories. As one of our youth, Jayla, stated: "*I never knew what an engineer was. I thought engineering was for geeks. I've learned in GET City that I am a make-a-difference expert, and that I can become an engineer and help my community. That is what I am going to do.*"

The *Positive* Place For Kids

March 20, 2012

C. Peter Magrath University Community Engagement Awards Committee
APLU
1307 New York Avenue, NW
Suite 400
Washington, DC 2005

Dear Committee:

I surely did not know, back in the Fall of 2006, that a simple e-mail correspondence with Dr. Angela Calabrese-Barton would produce such an innovative award winning youth program! What ensued from our e-mail exchange is simply amazing. Dr. Angela Calabrese-Barton was looking to partner with a youth serving organization that served a lot of urban children – she had to look no further than the Boys & Girls Club of Lansing! We have been providing valuable youth development programming for over 40 years. What Angela presented, though, was something we had yet to venture into: engineering and green energy (**GET City: Green Energy Technology**)! Together we set some realistic goals and expectations. Together, with mutual respect and commitment, we have exceeded every goal and expectation *tenfold*!

We began our collaboration in Spring 2007, and collaboratively secured funding from the Dart Foundation and the Community Foundation to provide the initial $45,000 necessary to fund the **Mobile Learning Lab** so that youth in the energy program would have access to state-of-the-art wireless technology. We designed and built a program that we piloted and studied so that we could expand our offerings with a generous funding from the *National Science Foundation* ITEST Program! Their grant ensured that our initial project GET City was scalable to a much larger population of youth (and the community members "GET Citians" wanted to reach), and to allow us the time and resources necessary to develop and evaluate the curriculum and our approaches to community-based learning, how to best utilize the mobile technology lab, and identify the best recruitment and retention strategies. Since that time we have secured over $100,000 from community foundations to further expand GET City, to update our technology infrastructure in support of GET City, to install a new energy efficient "green" roof, and to support GET City graduates in further STEM opportunities as they move towards high school and beyond.

As a traditional non-profit organization, we have collaborated on many projects over the years – none as successful as this, nor with anyone so committed to the **success** and **follow-through** as Dr. Angela Calabrese-Barton. From the mobile learning lab and youth designed wiki-pages to our energy efficient roof and the technology fieldtrip to Chicago; the GET City Program has made an enormous impact on and has served the needs of underserved urban youth! The GET City Program continues to be recognized, locally and regionally, with the recent Michigan State University Outreach Scholarship – Community Partnership Award and the Midwest Region Boys & Girls Clubs of America award in 2010!

GET City is also a comprehensive and rigorous program. GET City is a unique partnership because it provides: STEM education through interesting investigations focused on issues our youth care about, advanced IT skills, leadership and community education, and career awareness in a seemless program. Youth from the Boys and Girls Club typically join GET City in the 5th or 6th grade and stay in GET City through the 8th or 9th grade. Several "GET City graduates" have gone on to become teen leaders in GET City and at the Club, have won scholarships for more advanced STEM education, and have used their GET City work in school portfolios for programs like National Junior Honor Society.

Our organization has changed through our collaboration in GET City. Not only do we have a new green roof, others in the community look to us as leaders in STEM after school education. Our collaboration opened the door for other programs to build on the successes of GET City, such as our new robotics programs that uses GET City computers and builds on GET City youths' knowledge and interests, and the new environmental leadership focus of our Torch Club. When GET City first started we had to do some extra work to recruit students to the program. A STEM program is not necessarily the first choice of after school activity of many youth. However, now students are literally knocking on the door to join. A new and vibrant culture of STEM leadership as truly emerged at our Club and in and around the community.

What also strikes us, as community partners, is the on-going and authentic involvement of all of the key collaborators. Drs. Angela and Scott Calabrese Barton could have easily delegated this program to graduate students, instead they wove them into the fabric of the program while maintaining a constant presence. Further, local state-wide leaders in energy policy and practices, including the Director of the Lansing Community College Alternative Energy Center, the Executive Director of Strategic Planning for the Board of Water and Light, the Mayor's Energy Policy Leader, and the Education Director for Michigan Energy Options have all played on-going and important roles. What this means is that youth in GET City have constant exposure to the people who make the real world energy decisions that affect them on a daily basis. What is more, they see and experience a wide range of career options in STEM and learn about the pathways to achieving those careers. Perhaps most importantly, however, is how the youth have been formally recognized as "players" among these leaders. George Stojic, the Executive Director of Strategic Planning for the Board of Water and Light remarked that a GET City forum had provided him an opportunity to hear community voices and concerns that he might not have heard otherwise. As he put it, it was the first time that a representative from BWL came face-to-face with a local environmental coalition firmly against coal-based energy production.

Raising the expectations of kids – who didn't think themselves capable, is the most rewarding part of the program. The lasting impact of this program will be tough to measure, as more youth explore math, science and engineering education/careers and their families become more environmentally conscience. I think the conversation I had with one of our high school seniors sums up the program for me: He said, "*I joined GET City in 2007 [as an 8th grader] and have stayed in it ever since. Last year I was a GET City Instructor. GET City actually helped me in most of my school classes, like physics and math. Most of the stuff in those classes, I already knew because of GET City. I did not have to ask that many questions in class. I got on pretty quick because of what I learned in GET City. Before I was in GET City, I did not know anything about engineering, but the program taught me a lot more. I am interested in engineering for my future. GET City helped me think more about engineering, so I know what to expect when I get to that point. I'm applying for college at MSU and at LCC to study engineering.*"

Kindest Regards,

Carmen Y. Turner
President / Chief Professional Officer

MICHIGAN STATE
U N I V E R S I T Y

March 20, 2012

Selection Committee
C. Peter Magrath/W.K. Kellogg Foundation Engagement Award
Association of Public and Land-grant Universities
1307 New York Avenue, NW, Suite 400
Washington, DC 20005

Dear Selection Committee:

Michigan State University faculty, staff, students, and alumni work to advance the common good in uncommon ways. For more than 150 years we have demonstrated a pioneering blend of the traditional classical education with practical, cutting-edge knowledge discovery. We have high standards with broad access, as well as tremendous pride in our engaged scholarship and collaborative university-community partnerships.

At MSU, engagement is defined as a form of scholarship that cuts across teaching, research, and service. It involves generating, transmitting, applying, and preserving knowledge for the direct benefit of external audiences in ways that are consistent with university and unit missions.

Recognizing the spirit and tradition of the C. Peter Magrath University Community Engagement Award and the Outreach Scholarship-W.K. Kellogg Foundation Engagement Award, it is an honor to endorse **GET City: Green Energy Technologies in the City**, a project led by Dr. Angela Calabrese Barton, Professor in the College of Education, to represent Michigan State University for the 2012 awards process.

GET City provides young people with intensive and sustained science, engineering, and technology experiences that link their out-of-school science investigations with their in-school activities. The program focuses on building capacity among youth to enter academic and career paths that utilize science, technology, engineering, and math skills. Most importantly, the youth involved in GET City are learning that they can make a difference in their communities.

Using longitudinal mixed methods research, the collaboration has provided new insights into how, and why, youth engage meaningfully in community-based science, and how youth in disadvantaged communities develop science and engineering identities.

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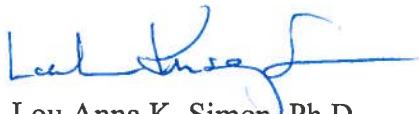
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The GET City model shows promise for wide applications in other communities. Dr. Calabrese Barton has influenced doctoral students who are piloting GET City in North Carolina and Hawaii.

The rapid increase in partners, funders, student participants, and supporters for this effort is impressive. The GET City project has led to significant personal, community, research, and financial contributions in the mid-Michigan community.

GET City: Green Energy Technologies in the City is an outstanding example of scholarship applied to community-based needs, through university-community collaboration. It is an exemplary partnership that demonstrates MSU's commitment to collaborative, participatory, empowering, systemic, and transformative work anchored in scholarship.

I invite you to consider the scope, and the impact, of the work associated with Dr. Calabrese Barton's engaged scholarship. Thank you for considering the GET City nomination for the 2012 Outreach Scholarship-W.K. Kellogg Foundation Engagement Award for the North Central Region and the national 2012 C. Peter Magrath University Community Engagement Award.

Sincerely,

Lou Anna K. Simon, Ph.D.
President

Year 3 Final Evaluation:
Green Energy Technologies in the City (GET City)

Conducted by:
Research & Evaluation Division
The Education Alliance at Brown University
4 Richmond Square, Fourth Floor
Providence, Rhode Island 02906-5117

Report Authors: Elise Arruda Laorenza, Joye Whitney and Stephanie Feger

Excerpts from the Executive Summary[1]

Michigan State University's (MSU) Colleges of Education and Engineering GET City program was awarded a National Science Foundation (NSF) Information Technology Experiences for Students and Teachers (ITEST) grant in 2007. The GET City program contracted The Education Alliance at Brown University to evaluate the implementation and impact of the program for the three years of implementation.

The purpose of The Education Alliance evaluation's design included both components to examine the impact of the program and to provide formative feedback on program develop and implementation. Implementation procedures included interviews and focus groups with program staff, participating students, and implementation partners. GET City program documents were also reviewed for descriptions of implementation, including curriculum development and parent involvement. The impact evaluation component included a pre- and post-survey instrument to access participating students' knowledge of technology use, frequency of use, and beliefs of the values of technology in their community. Student career and post-secondary educational interests were also measured within the student surveys. Additionally, evaluators extended the work scope to conduct student artifact interviews and artifact assessments to explore student learning within the context of GET City.

Alliance evaluators synthesized qualitative and quantitative data to provide meaning program findings based on evaluation questions. Data sources were examined across the three years of GET City program implementation to demonstrate the program's growth. Overall, the GET City program **consistently displayed high levels of implementation and notable student impact over three years**. In brief, these implementation and impact findings are summarized below.

GET City program implementation findings

- GET City program staff retained and adapted program goals from the initial design. The adapted program design schedule included increased student contact hours to account for student interest. Program goals were also extended to account for the evolution of students as green energy experts in their local community.
- Continuity and expansion of program partnerships created an enhanced set of

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opportunities for students to attend field trips and career-oriented experiences related to green energy and technology. Program partners have supported implementation by providing curriculum content that promotes a hands-on, real-world application of student learning.

- GET City students enjoyed their participation. Each year students consistently relayed excitement and pride in their GET City participation. Students perceived their participation in GET City to be beneficial for their future aspirations beyond high school. **GET City staff and partners were invested in continued program implementation beyond funding and all stakeholders had ideas of how sustainability could be supported**. GET City program staff expected participating students to help sustain and further develop the program by disseminating their understanding of green energy to schools as well as the local community to foster STEM expertise and STEM citizenship.

GET City Program Impacts

- **GET City implementation years were marked by significant increases in students' reported technology skills, use, and value. Students perceived themselves as mastering high level technology skills after GET City participation.** Increases in the frequency of students using technology for academic endeavors and the value they placed on technology for communication and impacting their local community were also impacted positively by GET City participation

- **Students' educational expectations increased to meet their aspirations.** That is, students reported higher educational expectations, similar to their high aspirations, after GET City participation. In year three, students entered the program with expectations that mirrored their aspiration and therefore this change was not found. This might be explained by students who repeated the program in year three who were already impacted in year two.

Recommendations toward Sustainability and Growth
The Education Alliance suggests program recommendations based on the data collected that are meant to support sustainability and growth. Given the high levels of implementation and impact attained by the GET City program, seeking additional funding opportunities, not only to implement, but expand the program is the next logical step. Evaluators recommend that program staff strategize around defining the intensity and duration of the program as ideas of integrating the program and curriculum into the school day are explored.

Books

Tan, E., & Calabrese Barton, A. (In press). *Empowering math and science teaching and learning in urban communities.* University of Chicago Press.

Refereed Journal Articles

Rose, S., & Calabrese Barton, A. (In press). Should Great Lakes City build a new power plant? How youth navigate complex socioscientific issues. *Journal of Research in Science Teaching.*

Calabrese Barton, A. (in press). Citizen(s') science. *Democracy and Education.* Fully accepted December 2011.

McLaughlin, D. & Calabrese Barton, A. (in press). Preservice Teachers' Uptake and Understanding of Funds of Knowledge in Elementary Science. *Journal of Science Teacher Education.* Fully accepted January 2012.

Calabrese Barton, A., & Tan, E. (2010). The new green roof: Activism, science and greening the community. *Canadian Journal of Science, Mathematics and Technology Education, 10,* 207-222.

Calabrese Barton, A., & Tan, E. (2010). We be burnin': Agency, identity and learning in a green energy program. *Journal of the Learning Sciences, 19,* 187-229.

Book Chapters

Calabrese Barton, A., & Tan, E. (2009). The evolution of da heat: Making a case for scientific and technology literacy as robust participation. In D. Hodson (Ed.), *International technology handbook* (pp. 329-346).

Tan, E., & Calabrese Barton, A. (In press). Becoming an expert: Transgressing boundaries for identities in science. In M. Varelas (Ed.), *Identities and science education.* Rotterdam: Sense Publishers.

Lim, M., Tan, E., & Calabrese Barton, A. (In press). Science learning as participation with and in a place. In *Equity and diversity issues in science education* (a publication of the NARST Committee on History and Future of Equity & Diversity Issues in Science Education). Rotterdam: Sense Publishers.

Hokayem, H., & Calabrese Barton, A. (2010). From a "hybrid discourse" towards "legitimate peripheral participation." In S. Basu et al. (Eds.), *Democratic science education.* Rotterdam: Sense Publishers.

Peer-Reviewed White Papers and Conference Proceedings

Calabrese Barton, A., Tan, E., & Calabrese Barton, S. (2011, September). *Becoming community science experts in green energy technologies.* White paper for NSF sponsored symposium on youth motivation in STEM careers.

Sato, T., & Calabrese Barton, A. (2011). *Horizontal and vertical learning dimensions of urban youth investigating energy efficiency.* Paper presented at the National Association for Research in Science Teaching, Orlando, FL.

Rose, S., & Calabrese Barton, A. (2011). *The role of economic and scientific discourses in youths' involvement in Change a Light, Change Michigan.* Paper presented at the National Association for Research in Science Teaching, Orlando, FL.

Lim, M., Tan, E., & Calabrese Barton, A. (2011). *Moving the equity agenda forward: Equity research, practice, and policy in science education.* Paper presented at the National Association for Research in Science Teaching, Orlando, FL.

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COMMUNITIES
MID-MICHIGAN

PEOPLE NEWS

'GET City' and Boys & Girls Club get community outreach award

Angela Calabrese Barton, professor at Michigan State University's College of Education, and the Boys & Girls Club of Lansing received the Outreach Scholarship Community Partnership Award during the annual MSU Awards Convocation on Feb. 14.

Calabrese Barton and **Carmen Turner**, president of the Boys and Girls Club of Lansing, were recognized for the project "GET City" (Green Energy Technologies in the City).

The collaboration engages at-risk youth in science, technology, engineering and math, and encourages them to become community science experts who can bring about change by linking green energy technology with local environmental health, responsibility and practice.

VICKKI DOZIER
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Angela Calabrese Barton, 2011 Outreach Scholarship Community Partnership Award winner and Carmen Turner, President/CPO, Boys & Girls Club of Lansing. COURTESY PHOTO

GET City: Youth Exploring Energy Technologies

Engaged Scholar, May 19 2010

GET City engages students in science and information technology.

Lansing has been hit hard by the downturn in the automotive industry and continuing high levels of unemployment in Michigan. These problems were compounded by 2008's high cost of gas, leading some to explore possible solutions to these problems through biofuels. Others, including researchers like Angela Calabrese Barton, have been looking at these processes for years.

"We started our program one year before the gas crisis," Dr. Calabrese Barton said. "It's a focus that the state has been trying to take."

The program is Green Energy Technologies in the City (GET City), a collaborative effort between Angela Calabrese Barton in the College of Education, Scott Calabrese Barton in the College of Engineering, and the Boys and Girls Club of Lansing. Funded by a grant from the National Science Foundation, this year-round program serves two cohorts of 34 middle school students each and engages the students in both science issues and information technology skills.

Students have investigated potential community impacts of policies, such as the research they conducted in 2008 on a proposed (though eventually rejected) plan by Lansing Board of Water and Light for a new hybrid power plant. The students learned about biomass and discussed clean coal. "We unpacked the myths that were on TV," Calabrese Barton said. Students made 30- and 60-second public service announcements on energy conservation and presented research in public forums in Lansing.

More recently, the students conducted a survey for Lansing Mayor Virg Bernero's office on the Greater Lansing Go Green! initiative. They have also made podcasts on biomass, which is renewable but doesn't burn very cleanly, and were one of the few children's groups to present at the "Green Today, Jobs Tomorrow" conference, sponsored by Michigan's Department of Labor and Energy, in May 2009. This work helped the students construct identities as expert scientists and engineers, and Calabrese Barton has data to confirm that kids who never thought about science and engineering careers are now considering them. It helps, of course, that their research is being taken seriously by policy makers, including the Mayor's office. Calabrese Barton reported that "One of the students, an eleven-year-old girl, said, 'We're the make-a-difference experts.'"

The outcomes of this work are perhaps most obvious for the participants themselves, but Calabrese Barton's own research and teaching methodologies have been challenged as well. Teachers or volunteers with youth programs may operate from a specific curriculum, but, she said, "your work is always framed around what is happening with the students at the moment." With the critical ethnographies that Calabrese Barton conducts, and by working with a broad spectrum of partners as she does with GET City, she is constantly required to reframe her work—to ask herself what research questions, and what products and outcomes, might matter to a wide range of audiences. Students in GET City are asking, "How can we do something more?"

One answer is an upcoming item on the GET City agenda, which involves adapting the highly localized curriculum for Boys and Girls Clubs nationwide, and determining how to link the work the students do in GET City more directly with what they are learning in the classroom. For more information, visit getcity.org.

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insideITEST

Massachusetts
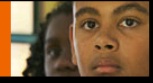Students Shape Urban Planning

New Jersey
Publishing Genome Research

Maine
Bridging Culture, Community & Science

Michigan
Becoming Green Energy Experts

Mississippi
Gaining Catfish Aquaculture Skills

California

profiles

Quick Take Aways
Leverage community stakeholders to provide training, expertise or participation in existing field investigations.

Let youth design their own investigations into issues of local concern, gather real world data, and present results to vested "clients" in the community.

playCAPTIONS

NO ▶
YES ▶

CLEANER GREENER LANSING

"Having the youth present their findings... Is a powerful experience..."

Green Energy Technologies in the City (GET City) – 5:12

GET City, a collaboration between Michigan State University and Lansing Boys and Girls Club, is a **youth-based program** designed to **empower inner-city youth to become community science experts** in energy sustainability and environmental health topics. The year round after-school program integrates hands-on, experiential learning with training in Information Technologies [IT] tools of communication, all within the context of the students' own cultural knowledge and experiences. Program participants gain IT workforce skills, research experience, science knowledge, and inquiry skills, and use these to **effectively communicate their concerns and ideas to their peers and to community leaders.**