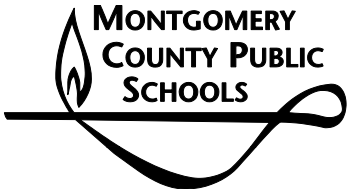

Evaluation of the Science, Technology, and Engineering Leadership Program, Year Three

Office of Shared Accountability

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Executive Summary

The Office of Shared Accountability conducted an evaluation of the implementation of the third and final year (2012–2013) of the Science, Technology, and Engineering Leadership Program (STELP) in Montgomery County Public Schools (MCPS). The study was requested by the Office of Curriculum and Instructional Programs. Funding for STELP, including the evaluation study, is provided by a grant from the Howard Hughes Medical Institute (HHMI) to MCPS. A new grant cycle, including additional projects from HHMI, began in the fall of 2013.

Background and Evaluation Questions

This evaluation report addresses the third year of STELP. The focus of this evaluation was on implementation of the program in terms of continued training of a group of teacher leaders to further develop and refine online professional development products for other MCPS science, technology, and engineering (STE) educators to view.

This study used a nonexperimental design utilizing a variety of data collection methods. Data collection methods included review of program documents and training records, surveys, and review of the online product training plans created by teacher leaders. Findings are organized by evaluation questions.

Summary of Key Findings

Question 1. What were the characteristics of the teacher leaders who participated in the year three training sessions of the Science, Technology, and Engineering Leadership Program?

A total of 35 teachers participated in year three of STELP; 14 of those 35 (40%) teachers were returning participants from year two. The participants were mostly secondary science and technology teachers as well as K–5 elementary teachers. They represented 30 different schools across the county.

Question 2. To what extent was the training of teacher leaders implemented as planned?

All of the whole-group training sessions were held as planned: a new participant training in September 2012 plus five more trainings between October 2012 and May 2013 were conducted. A range of 28–35 of the 35 teacher leaders attended the sessions.

The purpose of the training sessions was to provide teacher leader participants with a greater understanding of STE instruction and professional development as well as the technical skills needed to create online professional development products. Many of the sessions had dedicated time for working on products.

Eight teams, comprised of three to five teachers, were expected to further develop and refine an online STE professional development product on a practice that was originally created in year two. Also, each team was assigned an STE staff member (STE specialist) as a support and "go to" resource person throughout the year.

Question 3. What was the impact of the STELP training sessions on teacher leaders?

Teacher leader participant surveys were administered at the end of four of the five group training sessions. The response rate among the 35 STELP participants ranged from 74% to 97% for the four surveys; although most nonrespondents did not attend the corresponding training session. The surveys assessed teacher leaders' perceptions of the training received in the program.

Teacher Leaders' Perceptions of Training Sessions and Expectations. Across two sessions (October and December), large percentages of teacher leader participants responded with positive perceptions of the training regarding clarity of goals, meeting objectives, knowledgeable and prepared trainers, a comfortable environment, opportunities to reflect, having questions answered, and helpful information and skills gained. All or most of the participants rated the various training activities as *very helpful* or *somewhat helpful*. The top important aspects mentioned across three of the sessions were learning about expectations and goals, networking, learning about science practices, and working on the product modules. Just about everyone at the four training sessions *agreed* or *strongly agreed* that the expectations for the products and next steps were clear.

Teachers Leaders' Perceptions of Knowledge and Skills Gained and Reflection. Overall, teachers' perceptions of their skills with video style camera technology and Windows Movie Maker increased from the first session in October to the last session in May. Also, teachers' perceptions of their level of understanding and articulating the proficiencies of science and engineering increased from the first session in October to the last session in May.

At the last session in May, more than half (56%) of the 25 respondents said that they are including and focusing more on the Next Generation Science Standards (NGSS) practices in their instruction. Almost one third (8 of 25, 32%) responded that it has impacted their instruction by having them reflect on and improve their own teaching and lessons. Forty percent (10 of 25) responded that sharing the practices, standards, and information acquired is how the STELP professional development impacted their work with colleagues at their school and 9 of 25 (39%) said they have done so at team and department meetings. Almost half (11 of 24, 46%) of the respondents stated that the most important thing they gained from this STELP project was a better understanding of the practices and integrating them into teaching.

Question 4. When and how were the online products made available to MCPS teachers?

Development and Dissemination of Online Professional Development Products. In year two, eight teams of teacher leaders created eight online professional development products (also called modules) to help other MCPS educators learn about the NGSS practices. The online products were introduced to science resource teachers in September 2012.

In year three, the online products were updated, refined and relaunched in July 2013 at a science resource teacher (RT) meeting, where RTs were encouraged to introduce the online products to their school staff in the fall. The online products also were discussed during an October 2013 RT meeting. The eight online products were available to all MCPS teachers to access throughout year three and continue to be accessible.

Development of Online Professional Development Product Training Plans. Along with the online products, each year three leadership team produced a detailed training plan to coincide with their product. These training plans outlined a way for RTs or others in a training role, to incorporate the online products as a tool when training their teachers on an NGSS practice. A summary of the developed training plans may be found in Appendix E.

Question 5. What was the level of usage of the online professional development products by classroom teachers?

There was no evidence of interaction with the online products among classroom teachers based on the survey tool; however, we cannot fully and accurately answer this question because the software used for the online products was not capable of tracking participants. Additionally, the response rate for an online feedback survey, which was attached to the online product website, was zero. This may or may not indicate no or low usage of the products, since the survey was a separate link and completion was optional.

A paper survey was administered to science RTs at a November 2013 professional development meeting. Fifty-four RT's completed the survey representing over half (61%) of all secondary science RT's with an 87% response rate of those who attended the meeting.

About half of the secondary RTs reported that they had individually viewed one or more of the online professional development products outside of the RT meetings and over one third reported that they had shared one or more of the online products. More middle school RTs reported sharing the products than high school RTs. The most commonly viewed and shared product was the one for *Practice 4: Analyzing and Interpreting Data* followed by *Practice 7: Engaging in Argument from Evidence* and *Practice 1: Asking Questions and Defining Problems.*

More than two thirds reported that they definitely or probably will complete (67%) or share (70%) a product module in the future. One half indicated that they definitely or probably will use the online product's training plan.

Question 6. What was the impact of the online professional development products on teachers who accessed them?

Because there were no responses to an online feedback survey attached to the online product website, we asked secondary science RTs who attended a November 2013 RT professional development meeting how useful they thought the online products were. More than half of the 34 responding (59%) indicated they thought the products were extremely or very useful for classroom teachers and another 38% thought they were somewhat useful. Furthermore, almost three fourths (73%) thought the modules were extremely or very useful for their role as resource teachers.

Recommendations

- Continue to: a) promote and explore additional ways and formats to ensure the widespread and effective use of the online products; and b) explore additional ways in which the online products may be used by resource teachers. Include examples of how they can share with their staff and effectively use them in their staff meetings and professional development.
- Elicit user feedback on the quality and usefulness of the online products so that modifications can be made to address concerns or problems.
- Encourage user feedback on the ways that educators are using the online products so that best practices can be shared.

Evaluation of the Science, Technology, and Engineering Leadership Program, Year Three

Natalie L. Wolanin and Julie H. Wade

Background

The overarching vision for science, technology, and engineering (STE) instruction in Montgomery County Public Schools (MCPS) is that all students achieve full literacy in these areas. Students who are literate in science, technology, engineering, and mathematics (STEM) are knowledgeable, informed citizens who are able to think critically about concepts and solve problems. MCPS supports this vision by engaging all students through seamlessly integrated instruction that is project/problem and standards based (MCPS, 2012).

The Science, Technology, and Engineering Leadership Program (STELP) was introduced in MCPS in 2010. The program aims to grow instructional capacity in MCPS by training and supporting a cadre of teacher leaders to design and deliver online professional development. Building on the skills and knowledge developed through the Elementary Science Leadership Program, as well as tapping into the expertise of content specialists in secondary schools, STELP is preparing a group of teacher leaders to develop online materials to support inquiry-based instruction within effective, research-based teaching practices. With the creation of these resources, STELP aims to build a professional development network in science, technology, and engineering for wide use across MCPS.

The ultimate goal for the three years of STELP is to improve STE instruction, and in turn, help students achieve STEM literacy (MCPS, 2010). This goal supports MCPS's mission that every student will have the academic, creative problem solving, and social emotional skills to be successful in college and career (MCPS, 2013). Furthermore, it is in alignment with MCPS's core value that "we will encourage and support critical thinking, problem solving, active questioning, and risk taking to continuously improve; stimulate discovery by engaging students in relevant and rigorous academic, social, and emotional learning experiences; and challenge ourselves to analyze and reflect upon evidence to improve our practices" (MCPS, 2013).

Research reported in *Taking Science to Schools* and *Ready, Set SCIENCE: Putting Research to Work in K–8 Science Classrooms* (Michaels, Shouse, & Schweingruber, 2007; National Research Council, 2007*)* is the basis for the National Research Council's *Framework for K–12 Science Education* released July 2012. This framework, in turn, is the springboard for the development of the Next Generation of Science Standards (NGSS) managed by the nonprofit organization, Achieve, Inc. These standards were released in spring 2013. The strands of scientific proficiency represent learning goals for students and address the knowledge and reasoning skills that students must acquire to be considered fully proficient in science. They are also a means to that end—they are practices that students need to participate in and become fluent with in order to develop proficiency.

During the first two years of STELP, the program trained and supported a group of teacher leaders by providing skills and knowledge to produce online professional development products that were based on a rubric of effective online professional development in science, technology, and engineering. The online products were developed during year 2 of STELP and launched in the fall of 2012. Year three of STELP included both new and returning teacher leaders and built upon the professional development products created in year two.

The goals for the third year of STELP were:

- Build a cadre of STE teacher leaders to support the MCPS STEM vision by designing and delivering online professional development.
- Expand teacher instructional technology knowledge.
- Expand teacher knowledge on student proficiency in science and engineering.
- Continue to build collaboration between science and technology education.
- Extend the STE leadership work done at the elementary and middle school levels to high school teachers.

This evaluation report addresses the third and final year of the STELP project. Two previous reports were published on the outcomes for year 1 and year 2 of the project. The focus of this evaluation was on implementation of the program in terms of continued training of a group of teacher leaders to develop and refine the online professional development products for MCPS STE educators to view and use.

The evaluation was requested by the Office of Curriculum and Instructional Programs (OCIP) and conducted by the Office of Shared Accountability (OSA). Funding was provided by a grant from the Howard Hughes Medical Institute to MCPS.

Literature Review

In a recent nationwide study, Wei, Darling-Hammond, and Adamson (2010) reported that teachers rated professional development in their subject area as their highest priority for further training. Consistent with this finding, teachers in an earlier study reported that professional development focusing on content knowledge was one of two elements that had the greatest effect on their knowledge and skills and led to changes in instructional practice (Garet, Porter, Desimone, Birman, & Yoon, 2001).

In challenging budgetary times, it has become increasingly important to make the most efficient and effective use of limited resources in all areas of education, and professional development is no exception. Dahlberg and Philippot (2008) conducted a study to explore the perceived needs and perceptions of teachers regarding their professional development. The researchers concluded that there is no one-size-fits-all model to meet the professional development needs of teachers, arguing that professional development should be differentiated according to the varying needs and career stages of teachers. They advocate for a collaborative approach to determining professional development agendas, suggesting that, “Teachers, the ones who work most closely with the curricula and students, often know best where gaps in their own pedagogy and knowledge exist” (Dahlberg & Philippot, 2008, p. 22).

As administrators have sought to stretch professional development dollars while providing teachers with accessible and meaningful professional development opportunities in their subject areas, interest in online professional development has grown (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009; National Research Council, 2007; Sawchuk, 2009). The flexibility of online professional development, as well as the capacity to tailor it to meet varying needs, makes it an attractive option in many school systems. As increasing numbers of teachers have participated in online professional development activities in recent years, evaluative research has not kept up with the growing use of these online models (Dede, et al., 2009).

Dede and colleagues (2009) at the Harvard Graduate School of Education conducted a review of studies of online teacher professional development and noted that evidence of effectiveness was often lacking or anecdotal. In response to the scarcity of empirical findings, they developed a research agenda to help guide the study of online professional development toward a framework that would integrate theory and evidence-based practice. Among their recommendations are "research methodologies that do not simply replicate methods used in studying face-to-face professional development, but instead take advantage of the unique data collection possible in online programs" (Dede et al., 2009, p. 20). Their report also points out that since teachers apply what they learn over time, data should be collected over time as well. Consistent with the evaluation model constructed by Guskey (2000), Dede and his colleagues (2009) recognized the various levels of experience and learning to be addressed in an evaluation of professional development. They maintained that more and better measures implemented over time would help build understanding of what teachers learned in professional development, how they applied the new knowledge and skills to practice, and what changes resulted (Dede, et al., 2009). Consistent with the recommendations of Dede and colleagues (2009) in their "Research Agenda for Online Teacher Professional Development," this evaluation includes data collected over time so that information about teachers' use of the knowledge and skills gained from the professional development may be better understood.

An evaluation of the first year of STELP was published in February 2012 (Wolanin & Wade, 2012). The report assessed the year one implementation of the project through multiple surveys of participants, interviews with program administrators, and document reviews. Participants were positive in their perceptions of the training and reports about skills and knowledge they had learned. Feedback from the participants was used to develop recommendations for year two, including clarifying the STELP vision and understanding of STELP strands, collecting regular updates on the products' progress, and providing opportunities for teams to work on their products.

An evaluation of the second year of STELP was published in January 2013 (Wolanin & Wade, 2013). The report assessed the year two implementation of the project through multiple surveys of participants, interviews with program administrators, and document reviews. Again, perceptions were positive regarding training, and the skills and knowledge learned. Feedback from the participants was used to develop recommendations for year three, including resolving technical issues and logistical difficulties of the online products, encouraging widespread use of the modules, collecting feedback on the modules, and monitoring the progress on continued training and product modifications, as well as on ways in which the teacher leaders are sharing their learned information.

Design and Scope of the Study

The evaluation was designed using Guskey's (2000) model for evaluating professional development. Four of Guskey's sequential levels were addressed in the third year of the evaluation: participants' reactions, participants' learning, organization support and change, and participants' use of new knowledge and skills. Table 1 outlines the levels of Guskey's model along with the evaluation activities that were used to address each level.

Table 1
Evaluation Activities Using Guskey's Model for Evaluating Professional Development

Level of evaluation	Instrument/activity	Data collected
1. Participants' reactions	Surveys of participants (administered after each training)	Participants' satisfaction and reactions to professional development
2. Participants' learning	Surveys of participants (administered before and after training)	Participants' reported understanding of the proficiencies as described by the NGGS standards and their relationships to the MCPS STEM vision. The knowledge required to plan and create online professional development resources.
3. Organization support and change	Surveys of participants (administered after each training)	Organizational support and teacher leader needs in the project
4. Participants' use of new knowledge and skills	Surveys of participants (administered after each training)	Participants' reported use of new knowledge as they created professional development products

The year three evaluation has two objectives: 1) assessment of the implementation and impact of the training of teacher leaders as they continue to develop and refine online professional development products for other MCPS educators; and 2) assessment of the impact of the professional development products on the classroom teachers who access them online and resource teachers who have them in professional development. Toward this end, the evaluation will address the following questions.

1. What were the characteristics of the teacher leaders who participated in the year three training sessions of the Science, Technology, and Engineering Leadership Program?
2. To what extent was the training of teacher leaders implemented as planned?
3. What was the impact of the training sessions on teacher leaders?
4. When and how were the online products made available to MCPS teachers?
5. What was the level of usage with the online professional development products by classroom teachers?
6. What was the impact of the online professional development products on teachers who accessed them?

Methodology

Participation in STELP was comprised of a group of teacher leaders selected by program staff, so a nonexperimental design utilizing a variety of data collection methods was applied. Data collection methods included reviewing program documents and training records, surveying teacher leaders and resource teachers, and reviewing the online product training plans created by teacher leaders.

Study Sample

In the third year of the evaluation, all teacher leaders enrolled in STELP comprised the study sample. A total of 35 school-based staff members participated during year three. Thirteen were from elementary schools, nine from middle schools, twelve from high schools, and one from a special education school in MCPS. Participants consisted of elementary, science, technology, special education, and staff development teachers.

Data Collection Activities

Program Documents

Reviews of program documents and professional development session records and materials, including session agendas, session handouts, and session attendance records were made by OSA evaluators.

Review of Online Professional Product Training Plans

During year three, teacher leader teams created training plans, which accompanied each of the eight online professional development products they created. OSA evaluators reviewed these training plans and created a summary table of their contents (Appendix E).

Surveys

Based on program goals and objectives and professional development materials and curricula, evaluation survey instruments were developed by OSA evaluators, in collaboration with staff from OCIP. The following instruments were developed during the third year of the evaluation:

Surveys of Teacher Leader Participants. The teacher leader participant surveys were administered at the end of four of the five group training sessions (Appendix A). The paper and pencil surveys assessed teacher leaders' perceptions of the training received in the program. So as not to overburden participants, a survey was not conducted at the April training session since there was another training survey scheduled for the May session.

Surveys of Online Product Users. Online surveys were developed for each of the eight online professional development products; the surveys were designed for users to give feedback after viewing a product. A sample of a survey may be found in Appendix B.

Surveys of Secondary Science Resource Tachers. Resource teacher (RT) surveys were administered in November 2013 at the end of a RT professional development session. The paper

and pencil surveys assessed RTs' usage and expected usage of the online professional development products. The RTs were shown the products in July 2013 at a professional development session. The administration of the survey in November was to allow ample time for the RTs to use the products or plan how they might use them in the future for their own school staff development (Appendix C).

Summary of Data Analysis Procedures

Procedures included a descriptive statistical analysis of:

- Teacher leaders' survey responses
- Characteristics of participants
- Attendance at professional development sessions
- Characteristics of training plans developed for the online professional development products
- Resource teachers usage and plans for the online products and their corresponding training plans
- Teacher feedback about training sessions and STELP program

Strengths and Limitations of the Study

There was no participation in the online product surveys, which were meant to capture user feedback about the products. This limited the ability to answer *Question 3: What was the impact of the online professional development products on teachers who accessed them?* In addition, it was not possible to track anyone who viewed the online products. Therefore, we were not able to fully answer the evaluation *Question 5: What was the level of usage with the online professional development products by classroom teachers?* Finally, although we were able to capture some feedback from secondary RTs about their usage of the online products (see strength below), we were not able to capture similar feedback from elementary teachers.

A strength of the study was that the evaluators were able to administer four surveys at the end of four of the five training sessions. The surveys were completed by almost all of the training participants. An additional strength of the study was that evaluators were able to collect feedback from secondary RTs about their usage of the online professional development products. Almost all RTs that attended the meeting where the survey was administered completed the survey (87% response rate), which is 61% of all secondary RTs. This was especially important since it was our only means of gathering information on the products from users.

Findings

Question 1

What were the characteristics of the teacher leaders who participated in the year three training sessions of the Science, Technology, and Engineering Leadership Program?

Invitation and Enrollment of Participants

The cadre of teacher leaders who participated in year two were invited to return in year three. In addition, new teachers were recruited to expand the number of technology education and middle and high school teachers, and to replace teachers who did not return. New teacher leaders attended an introductory training session in September, prior to the regular schedule of training sessions. A total of 37 teachers started in year three, but in the end, a total of 35 teachers participated in year three of STELP; 14 of those 35 (40%) teachers were returning participants from year two.

Characteristics of the Participating Teacher Leaders

The participants represented a variety of positions in both elementary and secondary schools. As shown in Table 2, of the 35 who participated, 13 were elementary school teachers (however, one was from a special education school and one was from a K–6 school.) Twenty-two were secondary school teachers (10 middle and 12 high schools). Characteristics of the STELP participants are summarized in Table 2.

Table 2
Science, Technology, and Engineering Leadership Program:
Characteristics of Participating School Staff

	Total Teacher Leaders (N = 35)		Elementary School Teacher Leaders (N = 13)[a]		Secondary School Teacher Leaders (N = 22)[b]	
	n	%	*n*	%	*n*	%
Current position						
K–2 teacher	6	17.1	6	46.2		
3–5 teacher	4	11.4	4	30.8		
Special education teacher	1	2.9	1	7.7		
Staff development teacher	1	2.9	1	7.7		
MS science teacher	9	25.7	1	7.7	8	36.4
HS science teacher	9	25.7			9	40.9
MS technology teacher	2	5.7			2	9.1
HS technology teacher	3	8.6			3	13.6
Total years in current position						
1–4 years	10	28.6	3	23.1	7	31.8
5–10 years	14	40.0	6	46.2	8	36.4
11+ years	9	25.7	3	23.1	6	27.3
No response	2	5.7	1	7.7	1	4.5
Degree or certification in science, technology, or engineering						
No	12	34.3	12	92.3		
Yes	23	65.7	1	7.7	22	100.0

[a]A teacher from a Special Education school is included. Also, a middle school (MS) science teacher from a K–6 elementary school is included.
[b]Of the 22 secondary teachers, 10 were from middle school and 12 were from high school (HS).

One half (18 of 35, 51%) were middle or high school science teachers (one from a K–6 school); 5 of 35 (14%) were middle or high school technology teachers, 6 (17%) taught kindergarten through Grade 2, and 4 (11%) taught Grades 3–5. Two thirds (23 of 35, 66%) had more than five years teaching experience, and two thirds reported having a degree or certification in science, technology or engineering, all of them from secondary schools (Table 3).

Seven of the 13 (54%) elementary school participants were also school team leaders and three (23%) reported being a science or STEM lead at their school. Six of the 22 (27%) secondary participants were also science RTs at their school (Table 3).

Table 3
Science, Technology, and Engineering Leadership Program: Previous Training and Leadership Experience of Participating Elementary and Middle School Staff

	Total Teacher Leaders (*N* = 35)		Elementary Teacher Leaders (*N* = 13)		Secondary Teacher Leaders (*N* = 22)	
	n	%	*n*	%	*n*	%
Team leader	7	20.0	7	53.8	0	0.0
Science lead/STEM lead or Coordinator/resource teacher[a]	9	25.7	3	23.1	6	27.3

[a]Three middle school and one high school science teachers were resource teachers; two high school technology teachers were resource teachers.

Characteristics of Schools with STELP Teachers

Teachers who participated in STELP were from 30 different schools: 11 elementary schools, 10 middle schools, and 8 high schools, as well as one special education school. Characteristics of the schools represented are shown in Table 4.

Table 4
Science, Technology, and Engineering Leadership Program: Characteristics of Elementary and Middle School Participants

		Elementary		Middle		High	
School-level characteristics		STELP (11 schools)	MCPS	STELP (10 schools)	MCPS	STELP (8 schools)	MCPS
Number of students	Mean (SD)	564 (192)	546 (147)	855 (220)	822 (215)	1747 (290)	1739 (446)
	Range	318–1009	160–1009	551–1370	351–1370	1306–2244	516–2806
% of students eligible for FARMS	Mean (SD)	25.9 (21.2)	37.1 (26.2)	22.2 (13.4)	33.3 (19.1)	32.6 (15.0)	28.3 (16.1)
	Range	1.8–75.6	1.1–94.8	1.4–43.7	1.4–64.5	7.8–52.0	2.6–7.9
% of students enrolled in ESOL	Mean (SD)	20.9 (14.1)	24.1 (16.1)	6.3 (3.8)	8.6 (5.4)	6.1 (2.5)	5.9 (4.2)
	Range	5.0–50.6	3.1–76.4	0.6–14.3	1.0–21.2	1.6–8.5	0.1–18.2

Note. Based on 2013 MCPS data. STELP includes schools represented (not number of participants). The special education school is not included in the STELP column, and a first year charter school is not included in the MCPS column. *SD* = Standard Deviation.

On average, as a group, schools with teachers participating in STELP had proportions similar to MCPS averages in terms of students receiving English for Speakers of Other Languages (ESOL) services (21% of STELP elementary schools and 24% for MCPS; 6% for STELP middle schools and 9% for MCPS; and 6% for STELP and MCPS high schools). However, STELP schools at the elementary and middle school level had a lower proportion of Free and Reduced-price Meals

System (FARMS) service recipients than all of MCPS (26% compared to 37% for elementary and 22% compared to 33% for middle schools). Just as there is a wide range of proportions of FARMS recipients in MCPS schools, there is a wide range among schools with teachers participating in STELP (2–76% for elementary schools; 1–44% for middle schools; and 8–52% for high schools). Additionally, the range of ESOL recipients with participating STELP teachers is 5–51% in elementary schools, 1–14% in middle schools and 2–9% in high schools.

Question 2
To what extent was the training of teacher leaders implemented as planned?

Training Schedule and Attendance

Participation. The program plan specified that a new participant training would be held in September 2012. Additionally, whole-group training sessions would be held in October 2012, December 2012, February 2013, April 2013, and May 2013. All of these sessions were held as planned; attendance is shown in Table 5.

Overall, attendance was fairly good across the five sessions. A range of 28–35 of the 35 teacher leaders attended the sessions from October 2012 through May 2013. More than half (20 of 35, 57%), of the participants did not miss any of the sessions and almost a third (11 of 35, 31%) only missed one session (Table 5). The lowest attendance was observed at the February 2013 and May 2013 sessions with 28 of 35 (80%) participants attending these two sessions.

Table 5
Science, Technology, and Engineering Leadership Program: Training Participation

	Participants (N = 35)	
Participation	*n*	%
Absences per Participants		
Missed 0 sessions	20	57.1
Absent 1 session	11	31.4
Absent 2 or 3 sessions	4	11.4
Attendance per Session		
October session	35	100.0
December session	32	91.4
February session	28	80.0
April session	30	85.7
May session	28	80.0

Training Session Outcomes and Agendas

The purpose of the training sessions was to provide teacher leader participants with a greater understanding of STE instruction and professional development as well as the technical skills needed to create online professional development products.

Many of the sessions had dedicated time for groups to work on their products. In all of the professional development sessions, teacher leaders reviewed the vision for STELP, determined a timeline of action steps to be completed before the next professional development day and

completed an evaluation survey at the end of the day in all but one session. A summary of the sessions follows:

- **September 2012 (New Participant Session)**: Participant leaders learned about the vision for STE in MCPS, identified proficiencies in science and engineering, learned about the goals of STELP, and learned technology skills needed to create the instructional resources for STELP, such as the use of video recording during classroom instruction and the use of Windows Movie Maker and Microsoft PowerPoint.
- **October 2012**: At the first session, teacher leaders were assigned their professional development team for the year, as well as their assigned STE content specialist, and they built relationships with their team members through team building activities. Teacher leaders also learned about the MCPS STE vision, the history and charge of STELP, as well as increased their understanding of the science and engineering proficiencies and how to utilize technological tools in the STELP program.
- **December 2012**: Teacher leaders revisited the expectations for the STELP products and viewed a sample of the proposed plan of delivery for the completed products and how the products would reach the MCPS professional community. Participants also worked with their teams to identify any parts of their practice that were not yet represented in the product and worked on developing a suggested training plan for professionals to use at a school-level team meeting.
- **February 2013**: Teacher leaders participated in a carousel with other team members to add components or elements of each practice that they felt were critical; they continued to work on a suggested training plan to deliver the professional development product and they worked on refining their product module by completing the slide show and editing videos associated with it.
- **April 2013**: Teams met with their STE specialists to revisit the training plans and any upgrades made to their products. Teams also worked on refining and editing their product modules, such as reviewing the flow of the module, checking hyperlinks, and scripting the module. Participants also reviewed and gave feedback to another team's training plan and module.
- **May 2013**: The final scheduled session was dedicated time for teams to work on refining and editing their professional development product as well as to meet with their STE content specialist to review the training and product module utilizing a STELP checklist. They also determined final steps to publish the module on Articulate. Various dates were provided in May and early June for individuals to come to the MCPS Carver Educational Service Center (CESC) facility to do voice overs for the narration of their product and to publish their product.

Formation of Teams and Selection of Topics

Eight teams, comprised of three to five teachers, were formed at the first training session in October based on participants' requests. The teams were each assigned one of the science and engineering framework practices, listed in Table 6, and were expected to develop and refine an online STE professional development product about that practice. They used the online products developed in the prior year to refine. Each practice corresponds to one of four learning strands developed by the National Research Council (NRC) Committee on Science Learning. Some repeat participants worked on the same practice as the previous year and some worked on a new practice. Also, each team was assigned an STE staff member as a support and "go to" resource

person throughout the year. Each team self-assigned roles for their members such as: coordinator, check for understanding developer, quality controller, PowerPoint expert, Movie Maker expert, and any other roles they deemed useful.

Table 6
STELP Online Professional Development Design Teams and their Assigned Topics

Science & Engineering Framework Practice #	Framework Practice Name	Target Proficiency Strand
Practice 1	Asking Questions and Defining Problems	Strand 1: Know, use, and interpret scientific explanations of the natural and design world
Practice 2	Developing and Using Models	Strand 1: Know, use, and interpret scientific explanations of the natural and design world
Practice 3	Planning and Carrying Out Investigations	Strand 2: Generating and evaluating scientific evidence or technological solutions
Practice 4	Analyzing and Interpreting Data	Strand 2: Generating and evaluating scientific evidence or technological solutions
Practice 5	Using Mathematics and Computational Thinking	Strand 2: Generating and evaluating scientific evidence or technological solutions
Practice 6	Constructing Explanations and Designing Solutions	Strand 1: Know, use, and interpret scientific explanations of the natural and design world
Practice 7	Engaging in Argument from Evidence	Strand 4: Participating productively in practices and discourse of science and engineering
Practice 8	Obtaining, Evaluating, Communicating Information	Strand 4: Participating productively in practices and discourse of science and engineering

Question 3
What was the impact of the STELP training sessions on teacher leaders?

Teacher leader participant surveys were administered at the end of four of the five group training sessions (Appendix A). The paper and pencil surveys assessed teacher leaders' perceptions of the training received in the program. So as not to overburden participants, a survey was not conducted in April since there was another training survey scheduled at the May session. Of the 35 STELP participants, those who completed surveys were: 34 respondents in October (97%), 27 in December and February (77%) and 26 in May (74%). Most of those who did not complete a survey also did not attend that session. The session feedback surveys were summarized by the evaluators and provided to program administrators after each training session. Findings helped the program staff improve and modify trainings accordingly.

Teacher Leaders' Perceptions of Training Sessions

Teacher leaders were asked to indicate their level of agreement with a series of general questions about the training session. These sets of questions (or a subset) were asked at the October and December session. Teacher leaders' perceptions of the trainings are summarized in Table 7.

Across the two sessions, large percentages of teacher leader participants responded with positive perceptions about the training, with nearly 90% of the participants agreeing with all of the

statements in October and 100% of the participants agreeing with all of the statements in December. The statements referred to aspects of the training, such as: providing clear goals, meeting objectives, providing knowledgeable and prepared trainers, a comfortable environment, opportunities to reflect, questions answered, and helpful information and skills gained.

When broken out further, two thirds or more *strongly agreed* that there was a comfortable environment in both the October (26 of 34, 77%) and December (19 of 27, 70%) trainings, reflection opportunities were given in December (17 of 26, 65%), and critiquing the existing PD modules in October were helpful for understanding expectations (23 of 34, 68%).

Table 7
Science, Technology, and Engineering Leadership Program:
Teacher Leaders' Perceptions of Training Provided in October and December Sessions

	October PD Session					December PD Session				
		Strongly Agree		Agree			Strongly Agree		Agree	
	N	*n*	*%*	*n*	*%*	*N*	*n*	*%*	*n*	*%*
The goals of today's training were clear.	34	11	32.4	19	55.9	27	16	59.3	11	40.7
The objectives of today's training were met.	33	14	42.4	17	51.5	27	13	48.1	14	51.9
The trainers were knowledgeable and well prepared.	34	14	41.2	16	47.1	27	17	63.0	10	37.0
An environment was created in which I felt comfortable taking risks.	34	26	76.5	7	20.6	27	19	70.4	8	29.6
Opportunities were provided for me to process and reflect upon the application of the knowledge and skills learned.	34	13	38.2	18	52.9	26	17	65.4	9	34.6
My questions during the training today were answered adequately.	34	20	58.8	13	38.2	27	17	63.0	10	37.0
As a result of today's training, I have gained information and skills that will help me in this role as an STE leader.	34	13	38.2	18	52.9	27	13	48.1	14	51.9
Critiquing existing PD modules was helpful in understanding the expectations for creating online PD.	34	23	67.6	8	23.5					
Working in practice groups was helpful in building my knowledge of a specific practice and preparing me to develop a training for other MCPS teachers related to the practice.	34	21	61.8	11	32.4					
The training session today helped me build my understanding of the proficiencies at different grade levels from the ones I teach.	34	9	26.5	20	58.8					
The training today helped me build my understanding of the proficiencies of Science and Engineering as described in the NGSS.[a]	30	10	33.3	18	60.0					

Note. PD = professional development. Only strongly agree and agree are shown from the 4-point scale, therefore totals may not add up to *N*. *N* reflects the number of participants who answered the question. The last four items were only asked at the October training session.

[a]*N* = 30; 4 participants responded "not applicable" at the October training session because they reported they already had a thorough understanding.

Participants were asked to rate the helpfulness of various activities performed in each of the trainings. All the activities were rated *very helpful* or *somewhat helpful* by more than 90% of the participants, with the exception of the carousel activity held in February, where 78% found it *very* or *somewhat helpful* (Table 8). When broken out further, certain activities were especially helpful with a large majority giving them the top rating of *very helpful*: the Instructional Specialist at the May training (19 of 26, 73%), the timeline in February (19 of 27, 70%), the

training plan in both February (18 of 27, 67%) and May (16 of 26, 62%), and the STELP checklist in May (17 of 26, 65%).

Table 8
Science, Technology, and Engineering Leadership Program:
Teacher Leaders' Perceptions of Helpful Aspects of Training Provided in Three Sessions

	December PD Session					February PD Session					May PD Session				
		Very Helpful		Somewhat Helpful			Very Helpful		Somewhat Helpful			Very Helpful		Somewhat Helpful	
How helpful was….	*N*	*n*	%	*n*	%	*N*	*n*	%	*n*	%	*N*	*n*	%	*n*	%
Capture sheet	22	2	9.1	19	86.4										
Proposed plan of delivery	23	7	30.4	15	65.2										
Training plan	23	6	26.1	16	69.6	27	18	66.7	9	33.3	26	16	61.5	10	38.5
Carousel activity						27	7	25.9	14	51.9					
Timeline						27	19	70.4	8	29.6					
Instructional specialist						27	13	48.1	12	44.4	26	19	73.1	6	23.1
STELP checklist											26	17	65.4	8	30.8

Note. PD = professional developmentOnly "very helpful" and "somewhat helpful" are shown from the 4-point scale, therefore totals may not add up to *N*. *N* reflects the number of participants who answered the question. Blank cells indicate the item was not administered at that particular training session.

Teacher Leaders Responses to Open-ended Questions

At the end of the October, December, and February training sessions, teacher leader participants were asked a variety of open-ended questions on the survey about the training session. At the last session in May, the open-ended questions were reflective questions about the STELP project, which will be addressed in the next section of the evaluation. Teacher leaders' responses to the open-ended survey questions are summarized below.

Important Aspects of Training. At the end of three of the training sessions, teacher leader participants were asked, in an open-ended question, to identify the most important thing gained from the trainings. The top mentions for each training session are shown below. Percents are calculated from the number of participants who answered the question and multiple responses were allowed.

Most important aspect of professional development training provided in October (*N* = 36):

- Learning about expectations, goals, and outcomes (*n* = 16, 44%)
- Meeting their team and networking (*n* = 10, 28%)
- Learning about science practices and standards (*n* = 9, 25%)
- Viewing and critiquing the existing modules (*n* = 8, 22%)
- Thinking of ways to improve product and incorporate STEM topics (*n* = 5, 14%)

Most important aspect of professional development training provided in December (*N* = 26):

- Time to work on product; time to work with team (*n* = 8, 31%)
- Clarity on project and plans (*n* = 8, 31%)
- Understanding of practice(s) (*n* = 4, 15%)
- Gaining video and Powerpoint ideas (*n* = 4, 15%)
- Gaining technical knowledge (*n* = 3, 12%)

Most important aspect of professional development training provided in February (*N* = 26):

- Clarity on timeline and expectations (*n* = 9, 35%)
- Time to work on product (*n* = 7, 27%)
- Receiving training plan (*n* = 4, 15%)
- Learning how information will be presented to other teachers (*n* = 3, 12%)

Suggestions for Improving the Training and Additional Supports to Fulfill Teacher Leader Role. At the end of three of the training sessions, teacher leader participants were asked "Was there was anything that would have been more effective had it been done differently?" and "Are there any additional resources or supports that you think you will need to fulfill the teacher leader role as you develop your professional development product?". Few participants answered these open ended questions and even fewer had similar feedback. The top mentions for each training session are shown below. The findings from the December training are not shown because only a few participants answered the questions and they did not have similar answers.

October Professional Development Training Session. Suggestions (*N* = 15)

- Better organization: downtime, logistics, communicating objectives/agenda (*n* = 5, 33%)
- More background needed on modules (*n* = 3, 20%)
- Clearer goals and vision needed (*n* = 3, 20%)
- More time with groups needed (*n* = 3, 20%)

Additional Supports Needed (*N* = 15)

- Technology support and knowledge (*n* = 6, 40%)
- Help with videotaping – extra person or time (*n* = 3, 20%)
- More meeting time (*n* = 2, 13%)

February Professional Development Training Session. Suggestions (*N* = 8)

- More information to help create training plan (*n* = 2, 25%)
- More time for editing (*n* = 2, 25%)

Additional Supports from February training (*N* = 9)

- Technology support (*n* = 3, 33%)
- Need additional time (*n* = 3, 33%)

Other varying comments given throughout the surveys included questions about directions, expectations, and technical or detailed logistics. There were also several praises given for the project such as clarity and enjoyment working with team and on the project.

Expectations and Progress. Just about everyone at the four training sessions *agreed* or *strongly agreed* that the expectations for the products were clear and next steps were clear (Table 9). When broken down further, a higher percentage of participants in the later sessions *strongly agreed* that the expectations for the products were clearer in February (17 of 27, 63%) and May (18 of 26, 69%) compared to the earlier sessions in October (10 of 33, 30%) and December (10 of 26, 39%), and expectations for next steps were clear (63% and 73% compared to 39% and 44%). Almost all participants (96%) *agreed* or *strongly agreed*, across the three sessions asked, that expectations for the delivery of the product were clear.

The majority of participants or all participants *agreed* or *strongly agreed* that they felt good about the progress their team had made so far and the direction their product was headed in or about their product so far (93–100%).

All participants *agreed* or *strongly agreed* in December and February that expectations for what the team was to accomplish was clear and a large majority (92%) also did so in May; however, a much larger percentage (73%) gave the top rating of *strongly agreed* in the May session. The majority of participants or all participants *agreed* or *strongly agreed* (96% or 100%) that the February and May sessions helped them with their teams' progress and that the proposed deadlines and dates were realistic.

Table 9
Science, Technology, and Engineering Leadership Program:
Teacher Leaders' Perceptions of Training Provided in Four Sessions

	Session															
	October PD (*N* = 33)				December PD (*N* = 27)				February PD (*N* = 27)				May PD (*N* = 26)			
	Strongly Agree		Agree		Strongly Agree		Agree		Strongly Agree		Agree		Strongly Agree		Agree	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
The expectations for this professional development product are clear.[a]	10	30.3	21	63.6	10	38.5	15	57.7	17	63.0	10	37.0	18	69.2	8	30.8
The expectations for next steps were clearly communicated.	13	39.4	17	51.5	12	44.4	15	55.6	17	63.0	8	29.6	19	73.1	7	26.9
The expectations for the delivery of the pd products are clear.[b]					10	37.0	16	59.3	13	48.1	13	48.1	15	60.0	9	36.0
I feel good about the progress my teacher team has made so far.									14	51.9	12	44.4	19	73.1	7	26.9
I feel good about the direction my team's heading in. (Dec)/I feel good about our team's product so far. (February, May)					20	74.1	7	25.9	14	51.9	11	40.7	19	73.1	7	26.9
The expectations for what our teacher team is to accomplish for this project is clear.					12	44.4	15	55.6	14	51.9	13	48.1	19	73.1	5	19.2
I believe today's session will help/has helped with our teams' progress.[a]					19	73.1	7	26.9	17	63.0	9	33.3	22	84.6	4	15.4
The proposed deadlines and due dates are realistic. (Feb)/The proposed dates were realistic. (May)									15	55.6	11	40.7	18	69.2	8	30.8

Note. PD = professional development. Only strongly agree and agree are shown from the 4-point scale, therefore totals may not add up to *N*. *N* reflects the number of participants who answered the question. Blank cells indicate the item was not administered at that particular training session.
[a]*N* = 26 in this December item.
[b]*N* = 25 in this May item.

Responses of teacher leader participants about their perception of their team's progress are reported in Table 10. In February, the majority (20 of 27, 74%) of respondents felt they were right on schedule and about one fourth (7 of 27, 26%) felt they were behind schedule. In the last training session in May, 77% of the 26 participants felt they were ahead or right on schedule with about one fourth (6 of 26, 23%) feeling they were behind.

Table 10
Science, Technology, and Engineering Leadership Program:
Teacher Leaders' Perceptions of Training Provided in Two Sessions

How would you describe your team's progress on your PD product?	February (*N* = 27)		May (*N* = 26)	
Ahead of our planned timeline	0	0.0	4	15.4
Right on schedule	20	74.1	16	61.5
Running behind our planned timeline	7	25.9	6	23.1

Teachers Leaders' Perceptions of Knowledge and Skills Gained

Technology Skills. In surveys administered at the first and last training session, teacher leader participants were asked to indicate their level of specific technology skills. Table 11 shows that overall, teachers perceptions of their various technology skills increased from the first session in October to the last session in May. More than two thirds (23 of 33, 70%) rated themselves proficient or advanced with video style camera technology, and more than one third (15 of 34, 44%) with Windows Movie Maker at the beginning of the training sessions. By the last training session, almost all (25 of 26, 96%) rated themselves advanced or proficient in video style camera technology, and more than three fourths (20 of 26, 77%) with Windows Movie Maker. For Microsoft PowerPoint, there was little change overall in the ratings with 85% rating themselves advanced or proficient in October (29 of 34) and in May (22 of 26).

Table 12 shows the individual change in ratings from the first session to the last; only responses from those participants' who provided ratings for both sessions (*N* = 26) are shown and individual rating changes were calculated. Almost one third (8 of 25, 32%) increased their skill level rating for use of video style camera technology, and 11 of 26 (42%) increased their skill for Movie Maker. Only 4 of 26 (15%) increased their rating for using PowerPoint. There were a few participants in each of the skills who actually decreased their skill level rating.

Understanding of Science Proficiencies. In surveys administered at the first and last training sessions, teacher leader participants were asked to indicate their level of understanding and ability to articulate the proficiencies and their relationship to the MCPS STEM vision and the proficiencies of science and engineering as described by the NGSS. Table 11 shows that overall, their understanding increased from the first session in October to the last session in May. In October, 6 of 34 participants (18%) said they had a beginner understanding of the proficiencies and their relationship with the MCPS STEM vision; by May only 1 of 26 participants (4%) reported having a basic/beginner understanding. Likewise, over one third (12 of 33) said they had a beginner understanding of the proficiencies of science and engineering in October; this decreased to only 3 of 26 participants by May (12%).

Table 12 shows the individual change in ratings from the first session to the last; only responses from those participants' who rated their skill in both sessions are shown (*N* = 26) and individual

rating changes were calculated. Well over one third (10 of 26, 39%) and almost half (12 of 25, 48%) of participants increased their skill level rating for both of these proficiencies. Once again, there were a few participants in both skills who decreased in their skill level rating.

Table 11
Science, Technology, and Engineering Leadership Program:
Teacher Leaders' Perception of Technology Skills and Science Proficiencies in Two Sessions

Technology skills and science proficiencies	October PD Session (*N* = 34)						May PD Session (*N* = 26)					
	Advanced		Proficient		Basic/ Beginner		Advanced		Proficient		Basic/ Beginner	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Using video style camera technology for capturing student learning[a]	7	21.2	16	48.5	10	30.3	6	23.1	19	73.1	1	3.8
Using Windows Movie Maker software for producing videos for online PD modules	4	11.8	11	32.4	19	55.9	1	3.8	19	73.1	6	23.1
Using Microsoft Office Power Point capabilities for creating user-friendly, user-choice navigation for online professional development products	11	32.4	18	52.9	5	14.7	7	26.9	15	57.7	4	15.4
Understanding and articulating the proficiencies and their relationships to the MCPS STEM vision	7	20.6	21	61.8	6	17.6	6	23.1	19	73.1	1	3.8
Understanding and articulating the proficiencies of Science and Engineering as described by the NGS Standards[a]	5	15.2	16	48.5	12	36.4	4	15.4	19	73.1	3	11.5

Note. PD = professional development.
[a]*N* = 33 in October.

Table 12
Science, Technology, and Engineering Leadership Program:
Change in Teacher Leaders' Perception of Technology Skills and Science Proficiencies

Technology skills and science proficiencies	October to May Skill Level (*N* = 26)					
	Increased		No Change		Decreased	
	n	%	*n*	%	*n*	%
Using video style camera technology for capturing student learning.[a]	8	32.0	14	56.0	3	12.0
Using Windows Movie Maker software for producing videos for online professional development modules	11	42.3	11	42.3	4	15.4
Using Microsoft Office Power Point capabilities for creating user-friendly, user-choice navigation for online professional development products.	4	15.4	18	69.2	4	15.4
Understanding and articulating the proficiencies and their relationships to the MCPS STEM vision	10	38.5	14	53.8	2	7.7
Understanding and articulating the proficiencies of Science and Engineering as described by the NGS Standards[a]	12	48.0	9	36.0	4	16.0

[a]*N* = 25.

Science Integration and Collaboration in Teacher Leaders' Schools

Elementary School. STELP participants from elementary schools were asked to rate the extent of science integration into their school schedule at the first session in October and again at the last session in May. It should be noted that only 13 elementary participants answered the question in October and 9 answered in May (Table 13). At both times, the majority reported ratings of *somewhat* or *a little* (9 out of 13, 69% and 5 out of 9, 56% respectively).

Table 14 shows the individual change in ratings from the first session to the last; only the seven participants' who rated their skill in both sessions are shown. Of these seven, six did not change their rating, and one increased their rating when their May response was compared to their October response.

Secondary School. STELP participants from secondary schools were asked at the first session in October to rate the extent of collaboration between the mathematics and science teachers in their school and also between their mathematics, science, and technology teachers; they were asked again at the last session in May. The perception level of collaboration between science and mathematics teachers varied. One half of respondents (55%) indicated that teachers at their school collaborated somewhat/a little, while a similar number reported the teachers did not collaborate at all (46%) (Table 13). When responses of the 16 participants who answered in both October and May were examined, about half (9 of 16, 56% and 8 of 16, 50% respectively) did not change their rating and 5 of the 16 (31%) increased their rating (Table 14).

Table 13
Science, Technology, and Engineering Leadership Program:
Extent of Science Integration and Collaboration in Two Sessions

Science integration and collaboration	October PD Session							May PD Session						
		A Lot		Somewhat/ A Little		Not at All			A Lot		Somewhat/ A Little		Not at All	
	N	*n*	%	*n*	%	*n*	%	*N*	*n*	%	*n*	%	*n*	%
Elementary: extent of science integration into school schedule	13	3	23.1	9	69.2	1	7.7	9	4	44.4	5	55.6	0	0.0
Secondary: extent of collaboration between math and science teachers	22	0	0.0	12	54.5	10	45.5	16	1	6.3	6	37.5	9	56.3
Secondary: extent of collaboration between math, science and technology teachers	23	0	0.0	10	43.5	13	56.5	18	1	5.6	11	61.1	6	33.3

Note. PD = professional development.

Table 14
Science, Technology, and Engineering Leadership Program:
Change in Extent of Science Integration and Collaboration

	October to May						
		Increased		No Change		Decreased	
Science integration and collaboration	*N*	*n*	%	*n*	%	*n*	%
Elementary: extent of science integration into school schedule	7	1	14.3	6	85.7	0	0.0
Secondary: extent of collaboration between math and science teachers	16	5	31.3	9	56.3	2	12.5
Secondary: extent of collaboration between math, science and technology teachers	16	5	31.3	8	50.0	3	18.8

Teacher Leaders Reflection

At the last session in May, the participant survey included open-ended reflective questions about the STELP project as a whole. Teacher leaders' responses are summarized below and shown in Table 15. Percentages are calculated from the number of participants who answered the question.

STELP Impact on Instruction. In an open-ended question that asked, "How has the STELP professional development on proficiencies and practices impacted your instruction," more than half (56%) of the 25 participants responded by saying they are including and focusing more on the practices. Almost one third (8 of 25, 32%) responded that the STELP project has impacted their instruction by having them reflect and improve their own teaching and lessons.

STELP Impact on Working with Colleagues and Sharing Information. Forty percent (10 of 25) responded that sharing the practices, standards, and information acquired is how the STELP professional development impacted their work with colleagues at their school, and 9 of 23 (39%) said they have done so at team and department meetings, followed by 5 of 23 (22%) not specifying how they shared, and 4 of 23 (17%) saying they shared informally with colleagues.

Important Gain from STELP. Almost half (11 of 24, 46%) of the respondents stated that the most important thing they gained from this STELP project was a better understanding of the science practices and learning to integrate the practices into teaching.

School Science Events. When asked, "how have you used the science and engineering practices to upgrade science events at your school," more than one third (8 of 22, 36%) said that they have not had any science event at their school; however 4 of 22 (18%) said they've used their practices to upgrade their school's STEM night or STEM conference.

Table 15
Science, Technology, and Engineering Leadership Program:
Teacher Leaders' Reflection on the STELP Program

Reported impact	Examples
Impact on instruction (*N* = 25)	
Participants include practices/focus more on practices/ (*n* = 14, 56%)	• STELP has made me rethink how to re-plan lessons to include the practices. Lessons will be more than "covering" a bunch of topics. More depth rather than breath. • I have found myself trying to incorporate the practices into my everyday teaching. • I focus on the process skills/practices much more than the content alone.
Participants reflect on own teaching/improve lesson, presentation (*n* = 8, 32%)	• The videos I created for the PowerPoint caused me to be more reflective on teaching practice • Look more carefully at how I introduce the information to my students
Impact work with colleagues at your school (*N* = 25)	
Increased sharing of practices/standards/info with colleagues (*n* = 10, 40%)	• It has influenced me to have more conversations with my colleagues about the NGSS standards and how they will impact future instruction. • I try to share what I've learned with colleagues who will listen • I have talked about the new practices with my colleagues at our department meetings - to introduce and facilitate the transition to the NGSS
Ways that practices were shared with colleagues (*N* = 23)	
At Team/Department meetings (*n* = 9, 39%)	• At team meetings • During Department meeting
Shared/Discussed - unspecified (*n* = 5, 22%)	• Have discussed what I have learned/discovered while participating in STELP training • Discussion
Informally (*n* = 4, 17%)	• Casual conversations with other staff members • Via e-mail
Most important thing gained from STELP project (*N* = 24)	
Better understanding of practices (*n* = 11, 46%)	• A better understanding of the practices and how to integrate them into my teaching • Better understanding of all the practices. How the practices, standards and strands all relate • Increased awareness of the NGSS
Integrating practices into teaching (*n* = 11, 46%)	• It has forced me to think about what I am doing in class and how well it is aligned with the NGSS • Better understanding of how to implement it in my teaching because I have had to film it in my class • New perspective on what the students should be able to do after leaving my classroom. It's not all about content and the textbook AT ALL!
Networking with colleagues (*n* = 5, 21%)	• Really enjoyed working with colleagues in county and getting their perspectives. • Collaboration with other teachers as we transition to NGSS. Our discussions really inspired me to make changes
How have you used the science and engineering practices to upgrade science events at your school? (*N* = 22)	
Have not had any (*n* = 8, 36%)	• Have not had any events
At STEM night/STEM conference (*n* = 4, 18%)	• Inviting more engineering and technology presenters at STEM night • STEM conference at our school-yearly event

Question 4
When and how were the online products made available to MCPS teachers?

Development and Dissemination of Online Professional Development Products

In year two, eight teams of teacher leaders created eight online professional development products (also called modules) to help other MCPS educators learn about the NGSS practices. The online products were introduced to resource teachers in September 2012.

In year three, the online products were updated, refined, and relaunched in July 2013 to approximately 90 secondary science RTs at an RT professional development meeting. The meeting consisted of breakout sessions where selected STELP teacher leaders (creators of the products) demonstrated a few of the online products to groups through a 55 minute presentation. The RTs were encouraged to introduce the online professional development products to their school staff in the fall. The online products also were discussed in the fall during an October 2013 RT meeting. The eight online product modules also were placed on a science SharePoint site accessible to all MCPS teachers.

Development of Online Professional Development Product Training Plans

Along with the online products, each leadership team produced a detailed training plan to coincide with their product. These training plans outlined a way for resource teachers or others in a training role to incorporate the module as a tool when training their teachers on a National Generation Science practice. A training plan template can be found in Appendix D.

A summary of the content for each of the training plans can be seen in Appendix E. Included in many of the training plans were: viewing all or parts of the product module; a hands-on activity; 3-2-1 summarizer; sharing and discussions; reviewing student work; capture sheets and reflections.

Question 5
What was the level of usage of the online professional development products by classroom teachers?

There was no evidence of use, based on the survey data, of the online products among classroom teachers; however, we cannot fully and accurately answer this question because the software used for the online products was not capable of tracking visitors. A link to an online feedback survey was attached to the products' main page so that participants could leave feedback for each product they viewed. These surveys were available throughout year three, including after the products were revised at the end of year three. Unfortunately, the response rate for the online feedback surveys was zero. This may or may not indicate no usage or low usage of the products, since the survey was a separate link and completion was optional.

Use of Online Professional Development Products Among Secondary Science Resource Teachers

The RTs were shown the products in July 2013 and were encouraged to introduce them to their school staff in the fall. RTs were exposed to the products again at a meeting in October.

A paper and pencil survey was administered in November 2013 to secondary science RTs at a professional development meeting held in six locations. They were asked whether they had used the online professional development products and if they had plans to use or share them in the future for their own school staff development. Out of 88 RTs, a total of 62 were present at the meetings and 54 surveys were completed (this does not count two participants' incomplete surveys), which is an 87% response rate of those attending and 61% of all secondary science RTs. A copy of the survey may be found in Appendix C.

As shown below in Table 16, the 54 RTs responding to the survey were evenly divided between middle school and high school levels and most were science RTs (70%). Almost half (48%) attended the summer and October RT meetings where the online products were demonstrated or discussed, and more than one third (39%) attended only the summer meeting.

Table 16
Science, Technology, and Engineering Leadership Program:
Resource Teacher Survey Participants

Characteristics	All (N = 54)	
	n	%
RT position		
Middle school	26	48.1
High school	26	48.1
Both	1	1.9
No answer	2	3.7
RT subject		
Science	38	70.4
Technology + Engineering[a]	10	18.5
Both	5	9.3
No answer	2	3.7
Prior 2013 meeting attendance		
Summer RT meeting only	21	38.9
October RT meeting only	1	1.9
Both Summer and October	26	48.1

[a]Eight of the ten are at the high school level.

About one half (52%) of the RTs reported that they had individually viewed one or more of the online professional development products outside of RT meetings (Table 17). Slightly more middle school RTs reported this compared to high school RTs (17 of 26, 65% versus 11 of 27, 41%).

Over one third of the RTs (39%) reported that they have shared one or more of the online professional development products with other staff at their school. One half of the middle school RTs reported sharing (13 of 26, 50%), and nearly one third of high school RTs reported sharing (8 of 27, 30%) with other staff at their school (Table 17).

Table 17
Science, Technology, and Engineering Leadership Program:
Viewed the Online Modules Outside of Resource Teacher Trainings

Method of viewing modules (i.e., products)		All RTs (N = 54)[a]		Middle School RTs (N = 26)		High School RTs (N = 27)[b]	
		n	%	*n*	%	*n*	%
Viewed PD modules individually	Yes	28	51.9	17	65.4	11	40.7
	No	26	48.1	9	34.6	16	59.3
Shared PD modules	Yes	21	38.9	13	50.0	8	29.6
	No	33	61.1	13	50.0	19	70.4

Note. Modules = products; PD = professional development.
[a]One respondent did not answer level of school; they were included with all RTs.
[b]The RT located at both levels was combined with high school RTs.

A closer look reveals that the most commonly viewed and shared product among responding resource teachers was the product for *Practice 4: Analyzing and Interpreting Data* with one fourth of RTs individually viewing it (14 of 54, 26%) and almost one fifth sharing it (10 of 54, 19%). This was followed by *Practice 7: Engaging in Argument from Evidence* (11 of 54, 20% viewing, and 10 of 54, 19% sharing) and *Practice 1: Asking Questions and Defining Problems* (10 of 54, 19% viewing, and 9 of 54, 17% sharing). Upon further examination, three of the RTs indicated that they did not view the products individually, but did share them (Table 18).

Table 18
Science, Technology, and Engineering Leadership Program:
Online Modules Viewed and Shared Outside of Resource Teacher Trainings

Modules (i.e., products)	Modules Viewed Individually		Modules Shared	
	All RTs (N = 54)		All RTs (N = 54)	
	n	%	*n*	%
P1: Asking Questions and Defining Problems.	10	18.5	9	16.7
P2: Developing and Using Models.	6	11.1	5	9.3
P3: Planning and Carrying Out Investigations.	7	13.0	4	7.4
P4: Analyzing and Interpreting Data.	14	25.9	10	18.5
P5: Using Mathematics and Computational Thinking.	4	7.4	4	7.4
P6: Constructing Explanations and Designing Solutions.	2	3.7	3	5.6
P7: Engaging in Argument from Evidence.	11	20.4	10	18.5
P8: Obtaining, Evaluating and Communicating Information.	3	5.6	5	9.3
I have, but don't remember which one(s).	3	5.6	3	5.6
No, I have not completed/shared any.	26	48.1	34	63.0

Of the 54 participants, 21 (39%) of them indicated that they shared at least one online product with staff (Table 19). Those who shared were then asked to indicate the way(s) in which they shared the online products. More than half (13 of 21, 62%) indicated that they made staff aware of the products in a staff meeting or training, and 9 of the 21 (43%) indicated that they went through a product as a group.

Table 19
Science, Technology, and Engineering Leadership Program:
Ways Online Modules Were Shared by Resource Teachers

	All RTs (N = 21)	
Methods of sharing module (i.e., product) information	*n*	%
Made staff aware of the modules in a staff meeting/training	13	61.9
Went through a module(s) as a group during a meeting/training	9	42.9
E-mailed link to staff	4	19.0
Used the module's training plan	4	19.0
Other	1	4.8

Note. N = 21 respondents shared at least one online module with staff.

A third (33%) of the participants said that they definitely will complete a module (i.e., an online professional development product) in the future, with another third (35%) saying they probably will (Table 20). Several reported that they probably will not, but no one indicated that they definitely will not. More than a third (42%) said they definitely will share a product module with their staff in the future, and more than a quarter (28%) said they probably will.

Half reported that they definitely will or probably will use the product module's training plan in the future, and another third said they might or might not (35%).

Table 20
Science, Technology, and Engineering Leadership Program:
Usefulness of Online Modules

	Resource Teachers									
	Definitely Will		Probably Will		Might or Might Not		Probably Will Not		Definitely Will Not	
How likely will you be to…	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Complete any of the modules after today? (N = 52)	17	32.7	18	34.6	9	17.3	8	15.4	0	0.0
Share any additional modules with staff at your school? (N = 50)	21	42.0	14	28.0	11	22.0	4	8.0	0	0.0
Use the module's training plan? (N = 48)	8	16.7	16	33.3	17	35.4	7	14.6	0	0.0

Finally, RTs were asked to describe how they might take back and use the online professional products. Of the 30 participants who gave a response, more than half of them (17 of 30, 57%) replied that they would share at a department meeting, department training, professional development, or professional learning community. Four of the participants replied that they would incorporate them or use them to support student learning objectives (SLO's), and three stated that they don't have the time to take them back and use.

Question 6
What was the impact of the online professional development products on teachers who accessed them?

Perception of the Online Professional Development Products

When the online products were published at the end of year two, a link to an online feedback survey was attached to the products' website main page so that participants could provide feedback on the usage, ease of navigation, and helpfulness for each product they viewed (see Appendix B for an example). The surveys continued to be available throughout year three, including after the products were revised at the end of year three. The response rate for the feedback survey was zero.

Usefulness of Online Professional Development Products among Secondary Science Resource Teachers

Secondary science RTs who attended a November 2013 RT meeting were asked how useful they thought the online products were. The majority of respondents indicated that they thought the products were extremely or very useful for classroom teachers (20 of 34, 59%), and more than one third indicated they were somewhat useful (38%) (Table 21). Almost three fourths (27 of 37, 73%) thought the products were extremely or very useful for their role as RTs.

Table 21
Science, Technology, and Engineering Leadership Program:
Usefulness of Online Product Modules

	Resource Teachers					
How useful do you find the professional development modules (i.e., products)…	Extremely/ Very Useful		Somewhat Useful		Not Very Useful/Not Useful at All	
	n	%	*n*	%	*n*	%
For classroom teachers? (*N* = 34)	20	58.8	13	38.2	1	2.9
For your role as a STE resource teachers? (*N* = 37)	27	73.0	9	24.3	1	2.7

Recommendations

- Continue to: a) promote and explore additional ways and formats to ensure the widespread and effective use of the online products; and b) explore additional ways in which the online products may be used by resource teachers. Include examples of how they can share with their staff and effectively use them in their staff meetings and professional development.
- Elicit user feedback on the quality and usefulness of the online products so that modifications can be made to address concerns or problems.
- Encourage user feedback on the ways that educators are using the online products so that best practices can be shared.

References

Dahlberg, K., & Philippot, R. (2008). The power of collaboration: A case for teachers helping to determine professional development agendas. *Planning and Changing*, *39*(1&2), 21–41.

Dede, C., Ketelhut, D., Whitehouse, P., Breit, L., & McCloskey, E. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education*, *60*(1), 8–19.

Garet, S., Porter, C., Desimone, L., Birman, F., & Yoon, S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal*, *38*(4), 915–945.

Guskey, R. (2000). *Evaluating professional development*. Thousand Oaks, CA: Corwin Press.

Michaels, S., Shouse, A., & Schweingruber, H. (2007). *Ready, Set, Science! Putting Research to Work in K–8 Science Classrooms*. Washington, DC: The National Academies Press.

Montgomery County Public Schools. (2010). Grant Plan Submission to Howard Hughes Medical Institute, June 2010.

Montgomery County Public Schools. (2012). Science and engineering. Rockville, MD: Author. http://www.montgomeryschoolsmd.org/curriculum/science/.

Montgomery County Public Schools. (2013). Building Our Future Together: The Strategic Planning Framework. Rockville, MD: Author. http://www.montgomeryschoolsmd.org/framework/.

National Research Council. (2007). *Enhancing professional development for teachers: Potential uses of information technology. Report of a Workshop.* Committee on Enhancing Professional Development for Teachers, National Academies Teacher Advisory Council. Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

Sawchuk, S. (2009). An explosion of offerings and evolving methodologies have made web-based training a viable choice for many teachers. *Education Week Teacher Professional Development Sourcebook: The Online Option.* http://www.edweek.org /tsb/articles/2009/10/01/01online.h03.html.

Wei, R., Darling-Hammond, L., and Adamson, F. (2010). *Professional development in the United States: Trends and challenges*. Dallas, TX: National Staff Development Council.

Wolanin, N. & Wade, J. (2012). *Evaluation of the science, technology, and engineering leadership program, year one*. Rockville, MD: Montgomery County Public Schools.

Wolanin, N. & Wade, J. (2013). *Evaluation of the science, technology, and engineering leadership program, year two*. Rockville, MD: Montgomery County Public Schools.

Appendix A: Training Sessions' Feedback Surveys

Feedback Survey I
Science Technology Engineering Leadership Program (STELP)
Year 3, Oct. 26, 2012

As part of your involvement in the Science, Technology, and Engineering Leadership Program (STELP), we will be asking you to provide information and feedback about the program. Your input is very important to the evaluation of the program and it will help guide administrators in planning and implementation.

This is the first in a series of surveys that will be given after each training session during year three of the program, thus our need to collect names to keep each participant's surveys together; however, your answers are strictly confidential (i.e. answers will not be linked to individual names when reporting). Completed surveys are collected by OSA staff. Summaries and non-identifiable answers are reported by OSA staff to the STE program staff and as part of the year three final evaluation report.

Name:_____

School:_____

Team: _____

1. **Please check your current position(s) (enter all that apply)**

Elementary Level: ☐

☐ Kindergarten Teacher
☐ Grade 1 Teacher
☐ Grade 2 Teacher
☐ Grade 3 Teacher
☐ Grade 4 Teacher
☐ Grade 5 Teacher
☐ ES Technology Education Teacher
☐ Staff Development Teacher
☐ Special Ed Teacher (specify grades _____)
☐ Focus Teacher (specify grades + subject_____)
☐ ES Science Teacher (specify grades_____)
☐ Other (please specify_____)

Secondary School Level: ☐

☐ Science Teacher (specify grade(s) or subject(s)_____)
☐ Technology Education Teacher
☐ Staff Development Teacher
☐ Special Ed Teacher (specify grades _____)
☐ Other (please specify_____)

2. How many years have you been in your current classroom teacher position, or SDT position, (including the current year)? _____

3. Please indicate any Leadership Roles you <u>currently</u> have:

☐ Grade Team Leader
☐ Content Specialist
☐ Secondary Science Resource Teacher
☐ Secondary Technology Education Resource Teacher
☐ Other (please specify_____)

4. Do you have a college degree or teacher certification in science, technology, and/or engineering?

☐ Yes ☐ No

5. Have you participated in the Howard Hughes STELP Teacher Leader Program before?

☐ No, this is my 1st year
-Did you participate in the September 21st new participant training? ☐ Yes ☐ No
☐ Yes, this will be my 2nd year
☐ Yes, this will be my 3rd year

<u>New STELP Participants (answer 6 thru 6b):</u>

6. Do you have any experience leading or developing professional development?
☐ Yes ☐ No

6a. If yes, did any of your experiences include leading or developing online professional development?
☐ Yes ☐ No

6b. If yes, please describe the extent of your experience leading or developing trainings.
_____

_____

7. **If you are an elementary teacher, to what extent is science integrated into the students' schedule at your school?**

☐ A lot ☐ Somewhat ☐ A little ☐ Not at all

8. **If you are a secondary school teacher, to what extent are <u>math and science teachers</u> collaborating with each other on lesson planning and looking at student work?**

☐ A lot ☐ Somewhat ☐ A little ☐ Not at all

9. **If you are a secondary school teacher, to what extent are <u>technology education, math, and science teachers</u> collaborating with each other on lesson planning and looking at student work?**

☐ A lot ☐ Somewhat ☐ A little ☐ Not at all

(turn page to continue)

Feedback on Today's Training

10. Please indicate how much you agree or disagree with the following items by checking the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The goals of today's training were clear.	☐	☐	☐	☐
b. The objectives of today's training were met.	☐	☐	☐	☐
c. The trainers were knowledgeable and well-prepared.	☐	☐	☐	☐
d. An environment was created in which I felt comfortable taking risks (i.e., asking questions, expressing my ideas, working with unfamiliar content).	☐	☐	☐	☐
e. Opportunities were provided for me to process and reflect upon the application of the knowledge and skills learned.	☐	☐	☐	☐
f. My questions during the training today were answered adequately.	☐	☐	☐	☐
g. As a result of today's training, I have gained information and skills that will help me in this role as an STE leader.	☐	☐	☐	☐
h. Critiquing existing PD modules was helpful in understanding the expectations for creating online PD	☐	☐	☐	☐
i. Working in practice groups was helpful in building my knowledge of a specific practice and preparing me to develop a training for other MCPS teachers related to the practice	☐	☐	☐	☐
j. The training session today helped me build my understanding of the proficiencies of Science and Engineering as described in the NGSS. (If you already have a thorough understanding of the proficiencies, please write "NA".)	☐	☐	☐	☐
k. The training session today helped me build my understanding of the proficiencies at different grade levels from the ones I teach.	☐	☐	☐	☐

11. Please elaborate on any of the statements above. (Indicate the corresponding letter item(s) with your comments or explanation/elaboration of your rating.

.

12. Please indicate your level of skill or understanding with the following items by checking the appropriate box.

	Basic/ Beginner	Proficient	Advanced
a. Using video style camera technology for capturing student learning.	☐	☐	☐
b. Using Windows Movie Maker software for producing videos for online PD modules	☐	☐	☐
c. Using Microsoft Office Power Point capabilities for creating user-friendly, user-choice navigation for online professional development products.	☐	☐	☐
d. Understanding and articulating the proficiencies and their relationship to the MCPS STEM vision	☐	☐	☐
e. Understanding and articulating the proficiencies of Science and Engineering as described by the Next Generation Science Standards	☐	☐	☐

13. What is the most important thing you gained from this training?

14. Was there anything about the training you think would have been more effective if it were done differently?

Overall Feedback on the STELP Project

15. Please indicate how much you agree or disagree with the following items by checking the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The expectations for the professional development products are clear.	☐	☐	☐	☐
b. The expectations for next steps are clear.	☐	☐	☐	☐

16. Please elaborate on any of the statements above. (Indicate the corresponding letter item(s) with your comments or explanation/elaboration of your rating.

17. Are there any additional resources or supports that you think you will need to fulfill the teacher leader role as you develop your professional development product?

Thank you for your help.

Feedback Survey II
Science Technology Engineering Leadership Program (STELP)
Year 3, Dec. 14, 2012

As part of your involvement in the Science, Technology, and Engineering Leadership Program (STELP), we will be asking you to provide information and feedback about the program. Your input is very important to the evaluation of the program and it will help guide administrators in planning and implementation.

This is the second in a series of surveys that will be given after each training session during year three of the program, thus our need to collect names to keep each participant's surveys together; however, your answers are strictly confidential (i.e. answers will not be linked to individual names when reporting). Completed surveys are collected by OSA staff. Summaries and non-identifiable answers are reported by OSA staff to the STE program staff and as part of the year three final evaluation report.

Name:_____ School:_____

Team (Practice Assigned): _____

Feedback on Today's Training

1. Please indicate how much you agree or disagree with the following items by checking the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The goals of today's training were clear.	☐	☐	☐	☐
b. The objectives of today's training were met.	☐	☐	☐	☐
c. The trainers were knowledgeable and well-prepared.	☐	☐	☐	☐
d. An environment was created in which I felt comfortable taking risks (i.e., asking questions, expressing my ideas, working with unfamiliar content).	☐	☐	☐	☐
e. Opportunities were provided for me to process and reflect upon the application of the knowledge and skills learned.	☐	☐	☐	☐
f. My questions during the training today were answered adequately.	☐	☐	☐	☐
g. As a result of today's training, I have gained information and skills that will help me in this role as an STE leader.	☐	☐	☐	☐

2. Please indicate how helpful you found the following items by checking the appropriate box.

	Very Helpful	Somewhat Helpful	Not Very Helpful	Not at all Helpful
a. How helpful was the capture sheet in developing your online PD?	☐	☐	☐	☐
b. How helpful was viewing the proposed plan of delivery?	☐	☐	☐	☐
c. How helpful was the development of a training plan for use of delivering your product to school level team meetings?	☐	☐	☐	☐

3. What is the most important thing you gained from this training?

4. Was there anything about the training you think would have been more effective if it were done differently?

Overall Feedback on the STELP Project

5. Please indicate how much you agree or disagree with the following items by checking the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The expectations for the professional development products are clear.	☐	☐	☐	☐
b. The expectations for the delivery of the professional development products are clear	☐	☐	☐	☐
c. The expectations for what our teacher team is to accomplish for this project is clear.	☐	☐	☐	☐
d. The expectations for next steps are clear.	☐	☐	☐	☐
e. I feel good about the direction my team's heading in	☐	☐	☐	☐
f. I believe today's session has helped with our teacher team's progress as we develop our professional development product.	☐	☐	☐	☐

6. Are there any additional resources or supports that you think you will need to fulfill the teacher leader role as you develop your professional development product?

7. Do you have any other comments about the training or product development?

Thank you for your help.

Feedback Survey III
Science Technology Engineering Leadership Program (STELP)
Year 3, Feb 8, 2013

As part of your involvement in the Science, Technology, and Engineering Leadership Program (STELP), we will be asking you to provide information and feedback about the program. Your input is very important to the evaluation of the program and it will help guide administrators in planning and implementation.

This is the third in a series of surveys that will be given after each training session during year three of the program, thus our need to collect names to keep each participant's surveys together; however, your answers are strictly confidential (i.e. answers will not be linked to individual names when reporting). Completed surveys are collected by OSA staff. Summaries and non-identifiable answers are reported by OSA staff to the STE program staff and as part of the year three final evaluation report.

Name:_____ School:_____

Team (Practice Assigned): _____

Feedback on Today's Training

1. Please indicate how helpful you found the following items by checking the appropriate box.

	Very Helpful	Somewhat Helpful	Not Very Helpful	Not at all Helpful
a. How helpful was the carousel to determine additions needed to your product module?	☐	☐	☐	☐
b. How helpful was the development of a training plan for use of delivering your product to school level team meetings?	☐	☐	☐	☐
c. How helpful was it to determine a timeline of action steps to be taken between now and April?	☐	☐	☐	☐
d. How helpful was it to work with your assigned instructional specialist?	☐	☐	☐	☐

2. What is the most important thing you gained from this training?

3. Was there anything about the training you think would have been more effective if it were done differently?

Overall Feedback on the STELP Project

4. Please indicate how much you agree or disagree with the following items by checking the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The expectations for the professional development products are clear.	☐	☐	☐	☐
b. The proposed deadlines and due dates are realistic	☐	☐	☐	☐
c. The expectations for the delivery of the professional development products are clear	☐	☐	☐	☐
d. The expectations for what our teacher team is to accomplish for this project is clear.	☐	☐	☐	☐
e. The expectations for next steps are clear.	☐	☐	☐	☐
f. I feel good about our team's product so far	☐	☐	☐	☐
g. I feel good about the progress my teacher team has made so far.	☐	☐	☐	☐
h. I believe today's session has helped with our teacher team's progress as we develop our professional development product.	☐	☐	☐	☐

5. How would you describe your team's progress on your professional development product?

☐ Not as far along as we would like; running behind
☐ Right on schedule
☐ Ahead of our planned timeline

6. Are there any additional resources or supports that you think you will need to fulfill the teacher leader role as you develop your professional development product?

7. Do you have any other comments about the training or product development?

Thank you for your help.

Feedback Survey IV
Science Technology Engineering Leadership Program (STELP)
Year 3, May 10, 2013

This is the fourth in a series of surveys that you have been asked to complete as part of your involvement in the Science, Technology, and Engineering Leadership Program (STELP) this year. Your continued input is very important to the evaluation of the program and it also will continue to guide administrators in planning and implementation.

Since surveys have been administered after several training sessions during year three of the program, we have needed to collect names in order to keep each participant's surveys together; however, your answers are strictly confidential (i.e. answers will not be linked to individual names when reporting). Completed surveys are collected by OSA staff. Summaries and non-identifiable answers are reported by OSA staff to the STE program staff and as part of the year three final evaluation report.

Name:_____ School:_____

Team (Practice Assigned): _____

Feedback on Today's Training

1. Please indicate how helpful you found the following items by checking the appropriate box.

	Very Helpful	Somewhat Helpful	Not Very Helpful	Not at all Helpful
a. How helpful was the development of a training plan for future delivery of the product to school level team meetings?	☐	☐	☐	☐
b. How helpful was the STELP checklist in finalizing your product?	☐	☐	☐	☐
c. How helpful was it to work with your assigned instructional specialist?	☐	☐	☐	☐

Overall Feedback on the STELP Project

2. Please indicate how much you agree or disagree with the following items by checking the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I believe today's session has helped with our teacher team's progress as we finalized our professional development product.	☐	☐	☐	☐
b. The expectations for the professional development products are clear.	☐	☐	☐	☐
c. The proposed due dates were realistic.	☐	☐	☐	☐
d. The expectations for the delivery of the professional development products were clear.	☐	☐	☐	☐
e. The expectations for what our teacher team was to accomplish for this project was clear.	☐	☐	☐	☐
f. The expectations for next steps are clear.	☐	☐	☐	☐
g. I feel good about our team's product so far**.**	☐	☐	☐	☐
h. I feel good about the progress my teacher team has made this year.	☐	☐	☐	☐

3. How would you describe your team's progress on your professional development product?

☐ Not as far along as we would like; running behind
☐ Right on schedule
☐ Ahead of our planned timeline

Proficiencies

4. Please indicate your level of skill or understanding with the following items by checking the appropriate box.

	Basic/ Beginner	Proficient	Advanced
a. Using video style camera technology for capturing student learning.	☐	☐	☐
b. Using Windows Movie Maker software for producing videos for online PD modules	☐	☐	☐
c. Using Microsoft Office Power Point capabilities for creating user-friendly, user-choice navigation for online professional development products.	☐	☐	☐
d. Understanding and articulating the proficiencies and their relationship to the MCPS STEM vision	☐	☐	☐
e. Understanding and articulating the proficiencies of Science and Engineering as described by the Next Generation Science Standards	☐	☐	☐

Integration

5. If you are an elementary teacher, to what extent is science integrated into the students' schedule at your school?

☐ A lot ☐ Somewhat ☐ A little ☐ Not at all

6. If you are a secondary school teacher, to what extent are <u>math and science teachers</u> collaborating with each other on lesson planning and looking at student work?

☐ A lot ☐ Somewhat ☐ A little ☐ Not at all

7. If you are a secondary school teacher, to what extent are <u>technology education, math, and science teachers</u> collaborating with each other on lesson planning and looking at student work?

☐ A lot ☐ Somewhat ☐ A little ☐ Not at all

Reflection

8. **How has the STELP professional development on science and engineering proficiencies (*Ready, Set, SCIENCE!*) and scientific and engineering practices impacted your instruction?**

9. **How has the STELP professional development on science and engineering proficiencies (*Ready, Set, SCIENCE!*) and scientific and engineering practices impacted your work with colleagues at your school?**

10. **How have you shared what you have learned about the science and engineering practices with colleagues?**

11. How have you used the science and engineering practices to upgrade science events at your school?

12. What is the most important thing you have gained from this STELP project?

13. Do you have any other comments about the training, product development or STELP project?

Thank you for your help!

Appendix B: Example of Online Module Survey Questions

Feedback Survey: Analyzing and Interpreting Data –
Online Professional Development Module

After you have completed all the portions of the Analyzing and Interpreting Data module that you intend to complete, please complete this anonymous survey. The Office of Shared Accountability (OSA) is conducting this survey to provide feedback for the Howard Hughes STELP Grant. Complete the survey only ONE time, even if you have exited and come back to view in other sittings. If possible, please fill out this feedback survey individually.
******Answer the survey questions only about the module "Analyzing and Interpreting Data."**

Did you view this Online Professional Development module……

- Individually
- With a Group
- Both

If you are taking the survey as a group, please indicate the type of group
***SKIP if you are taking this survey individually

- Grade Level Team
- Math Team
- Technology Team
- Other _____

What is the level of the school where you work?

- Elementary
- Middle
- High
- Two levels or all three levels

What is your current position?
(check all that apply)

- Kindergarten Teacher
- 1st Grade Teacher
- 2nd Grade Teacher
- 3rd Grade Teacher
- 4th Grade Teacher
- 5th Grade Teacher
- Secondary Science Teacher
- Secondary Math Teacher
- Secondary Technology Teacher
- Science Resource Teacher
- Staff Development Teacher
- Special Education Teacher
- Other: _____

How did you first hear about these Online Professional Development Modules?
(Check all that apply)

- ☐ Resource Teacher
- ☐ Staff Development Teacher
- ☐ Colleague from same school
- ☐ Colleague from different school
- ☐ E-mail from Science Department
- ☐ Newsletter from Science Department
- ☐ EIC link
- ☐ I am a STELP Participant
- ☐ Colleague who is a STELP Participant
- ☐ Other _____

Have you viewed…….
(answer only for the Analyzing and Interpreting Data module)

- ☐ The entire module (i.e. all portions provided)
- ☐ Most of the module (i.e. skipping 1 or 2 portions)
- ☐ Some of the module (i.e. skipping 3 or more portions/only viewing 1-2 portions)

How many sittings did you use to view THIS online module?

- ☐ Viewed it all in 1 sitting
- ☐ Viewed it in 2 sittings
- ☐ Viewed it in 3-4 sittings
- ☐ Viewed it in 5 or more sittings

If you skipped any portions of this online module, please state which parts and why you decided to skip them

Indicate how much you agree or disagree with the following statements about THIS online module: Analyzing and Interpreting Data.

	Strongly Agree	Agree	Disagree	Strongly Disagree
I had no problems accessing the online training module.	□	□	□	□
The online training module was easy to navigate.	□	□	□	□
The online module was user friendly.	□	□	□	□
The organization of this online module was good.	□	□	□	□
The production quality of the online module was professional.	□	□	□	□
The explanation(s) of the Analyzing and Interpreting Data science practice was easy to understand.	□	□	□	□
The Checks for Understanding/Post-Assessment(s) were useful.	□	□	□	□
I learned new information by viewing this module.	□	□	□	□
I have a better understanding of this science practice after viewing this module.	□	□	□	□
I have learned new ways to support students in their development of this practice.	□	□	□	□
I will use what I have learned in this module in my classroom.	□	□	□	□

Would you recommend this Analyzing and Interpreting Data training module to other teachers?

- □ Definitely would
- □ Probably would
- □ Might or Might Not
- □ Probably would not
- □ Definitely would not

Have you viewed any of the other eight online modules?

- □ Yes, all of them
- □ Yes, some of them
- □ No, but I plan to
- □ No

Please provide any comments on what you like/found helpful about this online module

Please describe any dissatisfaction you had or any problems you encountered with this online module.

How likely will you incorporate any of the strategies that you learned from this online professional development module into your classroom?

- Definitely will
- Probably will
- Might or might not
- Probably will not
- Definitely will not

Please describe how you might incorporate this practice into your classroom.

How likely is it that you will share any of the information that you learned from this online professional development module?

- Very likely
- Somewhat likely
- Might or might not
- Somewhat unlikely
- Very unlikely

Please describe your plans for sharing the information (e.g. with whom will you share it, in what format?)

Appendix C: Secondary Science Resource Teacher Survey

Survey of Online Professional Development Module Usage
Secondary Science Resource Teachers
November 6, 2013

The Office of Shared Accountability (OSA) is conducting this survey as part of a grant funded by Howard Hughes. OSA is responsible for the evaluation component of the grant; this survey is an integral part of the data collection. This survey will be anonymous; there is no need for your name.

1. Which of the following did you attend (check all that apply)

☐ The Summer 2013 STE RT training

☐ The October 2013 STE RT training

☐ Neither of these

2. Have you viewed any of the Science and Engineering Practice Online Professional Development Modules? (Do not count the RT trainings)

☐ Yes ☐ No ☐ Not sure

3. Please indicate which of the following Professional Development Modules, if any, you have completed <u>as an individual</u> (Do not count the RT trainings. Check all that apply).

☐ Asking Questions and Defining Problems (practice 1)

☐ Developing and Using Models (practice 2)

☐ Planning and Carrying Out Investigations (practice 3)

☐ Analyzing and Interpreting Data (practice 4)

☐ Using Mathematics and Computational Thinking (practice 5)

☐ Constructing Explanations and Designing Solutions (practice 6)

☐ Engaging in Argument from Evidence (practice 7)

☐ Obtaining, Evaluating and Communicating Information (practice 8)

☐ I have, but don't remember which one(s)

☐ No, I have not completed any

4. Have you shared any of the Online Professional Development Modules with other staff at your school? Please indicate which ones, if any, you have shared (check all that apply)

☐ Asking Questions and Defining Problems (practice 1)

☐ Developing and Using Models (practice 2)

☐ Planning and Carrying Out Investigations (practice 3)

☐ Analyzing and Interpreting Data (practice 4)

☐ Using Mathematics and Computational Thinking (practice 5)

☐ Constructing Explanations and Designing Solutions (practice 6)

☐ Engaging in Argument from Evidence (practice 7)

☐ Obtaining, Evaluating and Communicating Information (practice 8)

☐ I have, but don't remember which one(s)

☐ No, I have not shared any

5. If you have shared, please indicate the way(s) in which you shared the Online professional development modules. (check all that apply)

☐ E-mailed the location of the online pd modules to staff

☐ Made staff aware of the modules in a staff meeting/training

☐ Went through a module(s) as a group during a meeting/training

☐ Used the module's training plan

☐ Other (please describe) _____

_____

6. How useful do you find the professional development modules…….

	Extremely Useful	Very Useful	Somewhat Useful	Not Very Useful	Not Useful at All
For classroom teachers	☐	☐	☐	☐	☐
For your role as a STE resource teacher	☐	☐	☐	☐	☐

7. How likely will you be to…….

	Definitely will	Probably Will	Might or Might Not	Probably Will Not	Definitely Will Not
Complete any of the modules after today?	☐	☐	☐	☐	☐
Share any or additional modules with staff at your school?	☐	☐	☐	☐	☐
Use the module's training plan?	☐	☐	☐	☐	☐

8. Please describe how you might take back and use the online professional modules in the future.

_____

_____

_____

_____

9. Are you a Resource Teacher in a ☐ Middle School ☐ High School?

10. Are you a ☐ Science or ☐ Technology & Engineering Resource Teacher?

Thank you for your valuable feedback!

Appendix D: Module Training Plan Template

STELP Online PD Training Plan

MCPS STEM Vision
All students achieve full science, technology, engineering, and mathematics (STEM) literacy through seamlessly integrated instruction that is project/problem and standards-based. STEM literate students are critical thinkers who are able to solve non-routine problems in a globally competitive society.
Session Title: Practice
Outcome(s) ***By the end of today's professional development, participants will….***
Mastery of outcome(s) will be measured by….

Time (Minutes)	**Content** Including talking points	**Format Plan**	**Who**	**Resources Needed**

Appendix E: Summary of Content of STELP Online Professional Development Training Plans

Science & Engineering Framework Practice #	Outcomes:	Mastery of outcomes measured by:
Practice 1: Asking Questions and Defining Problems	• Identify the importance of questioning in instruction • Identify ways to implement strategies to refine questioning • Identify the relationship between well-defined questioning and effective and engaging instruction	Reviewing section 2 of the 3-2-1 summarizer (write two ways you could incorporate asking questions and defining problems into your instruction). Participants will modify an existing lesson to better incorporate asking questions and defining problems
Practice 1 Training Plan includes: mystery box activity; view product module; think-pair-share; explain; work on lesson plan; 3-2-1 summarizer; follow-up assignment		
Practice 2: Developing and Using Models	Develop and use models with students to • deepen understanding of concept • communicate with others • make predictions and ask questions • redesign to solve problem	Participants will complete a reflection and discuss with colleagues how models are already used in their classrooms and how incorporating models will deepen understanding.
Practice 2 Training Plan includes: view product module; discuss; reflect; choice of think-pair-share, graffiti wall, exit card or sentence completion		
Practice 3: Planning and Carrying Out Investigations	Identify ways that student-centered planning provides opportunities for students to plan and carry out investigations as reflected/described in the NGSS	Participants will record examples of how students plan and carry out investigations in classrooms as described in the NGG
Practice 3 Training Plan includes: round robin pre-assessment, side-by-side comparison; view product module examples; KWL (what know, what want to learn, what have learned)		
Practice 4: Analyzing and Interpreting Data	• Identify methods of data analysis and interpretation utilized in STE classrooms • Identify methods of data analysis and interpretation that student currently practice effectively, and methods that teachers would like to improve or expand within their classrooms • Describe examples of data analysis and interpretation related to specific content area and ways that the practice might be improved/expanded.	Participants will work in groups to discuss methods of Analyzing and Interpreting Data that are currently used in STE classrooms. Participants will discuss and share suggestions for expanding/improving implementation of the practice.
Practice 4 Training Plan includes: card sort activity pre-assessment; view product module; study and work on sample lessons; 3-2-1 summarizer		

Science & Engineering Framework Practice #	Outcomes:	Mastery of outcomes measured by:
Practice 5: Using Mathematics and Computational Thinking	• Obtain knowledge of using mathematics and computational thinking • Site an example of student engagement in the practice • Adapt a current instructional sequence with the knowledge of the practice	n/a
Practice 5 Training Plan includes: sharing student work or lesson example; text marking activity while reading about practice; view module and answer questions, reflect, share , 3-2-1summarizer		
Practice 6: Constructing Explanations and Designing Solutions	Explain the importance of including both aspects of constructing explanations and designing solutions in all Science, Technology and Engineering classrooms.	Identify strategies for incorporating both constructing explanations and designing solutions into Science, Technology and Engineering classrooms
Practice 6 Training Plan includes: pre-assessment within module, review practices, share/discuss/reflect, view module, review and discuss parts of module, post assessment within module		
Practice 7: Engaging in Argument from Evidence	• Obtain knowledge of Practice 7 Engaging in Argument from Evidence • Site an example of student engagement in the practice • Adapt a current instructional sequence with the knowledge of the practice	n/a
Practice 7 Training Plan includes: completing anticipation guide, sharing an example, view training module, share/discuss, complete capture sheet, reflect		
Practice 8: Obtaining, Evaluating, Communicating Information	Not specified	Not specified
Practice 8 Training Plan include resources: 3-2-1 Summarizer, Capture Sheet, Look-fors		