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2012-13 PROGRAM SUMMARY OVERVIEW and PROPOSED ETHNOGRAPHIC PROGRAM EVALUATION

Clean Energy Sustainable Industries Early College High School (ECHS)

Ballston Spa Central School District
Ballston Spa, New York

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2012-13 PROGRAM SUMMARY OVERVIEW AND PROPOSED ETHNOGRAPHIC PROGRAM EVALUATION

INTRODUCTION

This report on the Clean Energy Sustainable Industries Early College High School (ECHS) Program presents a summary of the second program year (2012-13). The pilot year evaluation of the program (2011-12) produced a multi-faceted set of issues identified by both faculty and students. Those issues were presented in the PAST Foundation report, *Ethnographic Study of the Ballston Spa Clean Technologies and Sustainable Industries Early College High School Program, 2012*. Year two (Y2) of the program plan incorporated many of the recommended actions as part of the overall planned program expansion adding the senior level coursework to the junior level program established in year one (Y1). This report provides a preliminary view of Y2 program changes as well as new elements developed by program staff to meet Y2 goals to facilitate a more robust transition for junior and senior students entering the intensive pace of the ECHS program.

The sections that follow provide an overview of the program as a whole, and in particular highlights the work of the ECHS instructional team. The PAST Foundation proposes to conduct a future research phase to produce a more detailed view of the work of the ECHS instructional team. In particular, the ECHS Program offers the opportunity to gain understanding of the ways in which the instructional team has advanced new collaborative relations among both instructors and students. In their work we can also consider important dimensions of the internal program processes that help to define new levels and types of leadership, as well as gain an understanding of the significance of leadership as an element of the collaborative framework that is the hallmark of transdisciplinary problem based learning (TPBL). The proposed ethnographic research is discussed in more detail in this report in *Section D: Areas of the ECHS Instructional Team Experience to Explore Further*.

CLEAN ENERGY SUSTAINABLE INDUSTRIES EARLY COLLEGE HIGH SCHOOL YEAR TWO SUMMARY OVERVIEW

The Summary Overview of the ECHS Program that follows presents key issues associated with three main aspects of Y2 program:

- A) Year 2 Programmatic Changes**
- B) Instructional Planning, Collaboration and Leadership**
- C) Instructor/Student Roles and Relations**

The following narrative presents a brief description on important elements of each of these three program components, and views on essential change and/or expansion of the program.

A. Year 2 Programmatic Changes

Programmatic change is defined by five sub-categories that include:

- 1) Enrollment
- 2) Program Orientation
- 3) Program Outreach
- 4) Technology and Tech Support
- 5) Regional STEM Resources

ENROLLMENT

In the 2012-13 school year the program expanded enrollment to (65) students, including (45) junior students and (20) senior students, who attend half-day sessions at the ECHS from (12) school districts (see *Table 1: 2012-13 Enrollment by School District*). Among the seniors, (14) students re-enrolled from year one of the ECHS Program. Second-year junior enrollment also included a total of seven 11th grade female students. Administrators note that female enrollment is expected to increase in the 2013-14 school year, and activities related to specific outreach to female students is presented in the section below on *Program Outreach*. Year three, (2013-14) enrollment is anticipated to increase to (44) seniors and (61) juniors as of July 2013.

2012-13 ENROLLMENT BY SCHOOL DISTRICT - TABLE 1

District	Number of Students
Burnt Hills	5 Juniors
Mechanicville	2 Juniors
Saratoga	4 juniors/5 seniors
Columbia	5 juniors/1 senior
Niskayuna	1 junior
Galway	2 juniors
South Glens Falls	2 juniors
Catskill	1 junior
Hudson Falls	2 juniors/1 senior
Stillwater	5 juniors
Schuylerville	1 junior/1 senior
Ballston Spa	14 juniors/13 seniors
TOTAL ENROLLMENT	65 Students

A complete list of the junior and senior course titles and credits offered in the Y2 ECHS Program is presented in Appendix A.

PROGRAM ORIENTATION

In shifting forward to the second year of the program, administrators took on the challenge of expanding enrollment from two school districts participating in the first year of the program (2011-12), to incorporate participation of (12) school districts in year two (2012-13). A major component of program expansion was directed at providing clear and consistent information for students and parents, communicated through multiple channels including written materials, program meetings offering parents and students opportunities to interact directly with program staff, and ongoing communication structured to occur throughout the school year. Maintaining good communication with students and parents is an essential feature of coordinating student enrollment in courses offered under three different programs: first, the home high school; second, the Clean Energy Sustainable Industries ECHS; and third, the Hudson Valley Community College (HVCC). ECHS faculty support for students who must coordinate their daily schedules and actively prepare for required course completion deadlines within the framework of the three programs is also an essential component of year two of the ECHS.

Initial orientation conducted prior to the official start of the 2012-13 school year brought junior and senior students together at the TEC-SMART campus to join in a daylong summer orientation designed to inform both students and their parents about the ECHS Program, including ECHS opportunities and expectations for Y2 students. This event, held in August 2012, involved members of the ECHS administrative staff as well as others, including a Ballston Spa Central School District student counselor and representatives from the Hudson Valley Community College, who collectively presented information about early college courses and expectations for ECHS students. Parents also received a complete packet of registration and program materials providing all necessary forms and information for the 2012-13 school year, detailing specific course assignments and planned timeline for student project work. These different avenues of communication were intended to be responsive to different perspectives and needs for information, engaging families and their children in a process to clarify expectations and create an environment of successful outcomes for ECHS students.

Emphasis on early actions to help begin the important process of building a “sense of community” for ECHS students coming from (12) different school districts was also essential to creating an environment of successful outcomes for ECHS students. The Y2 program was launched with a week-long experience in team building, providing students with the opportunity to get to know each other, learn about the diversity of fellow student interests, and share their ideas about future plans and career interests.

Students were also given a tour of the Hudson Valley Community College main campus where they met with community college admissions staff. A major focus of this official visit to HVCC involved completing the process for receiving their HVCC identification cards, and learning to access the HVCC website with important information about community college resources and course enrollment information. The ECHS student orientation at HVCC main campus provided similar information to that given to other new community college students to help prepare ECHS students for their first HVCC year, and to generate recognition of their new status as community college students.

PROGRAM OUTREACH

ECHS students play an integral part in communicating information about the ECHS Program. Students help inform potential new students, visiting academics and teachers in training, school administrators, as well as STEM business partners and potential new program partners. ECHS meetings held at the TEC-SMART campus during the 2012-13 school year to recruit new students gave currently enrolled students the opportunity to speak about the ECHS program with other regional high school students and their parents, offering a student’s perspective on the benefits of the ECHS Program. This included

speaking to students who have committed to enrollment in the 2013-14 school year, as well as undecided students. Additionally, a number of ECHS parents have joined student and faculty speakers during recruitment meetings, sharing their views about the important transformation process for their son or daughter in making the transition to becoming a college student and developing awareness of STEM careers and college programs.

Specific outreach to female high school students was conducted over the 2012-13 year and involved different organizations including the New York State Energy Research and Development Authority (NYSERDA), a major program partner of the ECHS. Participation of NYSERDA entailed a special event to highlight “girls in STEM.” The event was held at the TEC-SMART campus in May 2013, and focused on STEM careers and opportunities for female students to explore STEM disciplines and interests. Additional outreach activities involved work with Girls, Inc., Girl Scouts, and the Society for Women Engineers. These events provided both recruitment opportunities and a way to build regional interest in scholarship programs supporting ECHS college enrollment costs. Developing potential interest from women’s business groups in the region is a direction that may be explored further to build scholarship funds directed to sponsoring future ECHS female students.

TECHNOLOGY AND TECH SUPPORT

Each ECHS student was provided with a laptop for use both in school and after school. Additionally, students had short-term access to more powerful laptops during the “SIM CITY” student project work, giving them access to CAD and other critical resources essential for completion of that particular segment of their project work during the school year. Additional work conducted by ECHS tech support staff involved trouble-shooting various issues with online access. In year two, tech issues were addressed in a real-time and effective way, responding to ECHS student needs in an efficient process. Setting a priority for tech support to meet a range of ECHS program needs emerged from challenges arising in year one of the program.

Additionally, Y2 ECHS students were provided Internet access as HVCC students to support project research and completion. The Ballston Spa Central School District is also planning to continue development of a new program, “Montage,” that will provide an information – and software-sharing platform to be utilized by all district students, including ECHS students, to store and access their school work files via their laptops to support coursework and project completion. It is anticipated that “Montage” will be operational during the 2013-14 school year.

REGIONAL STEM RESOURCES

Year two of the ECHS Program was organized to provide opportunities for senior students to directly experience different types of STEM related businesses associated with clean energy and sustainable industries in the region. Five different companies offered interested seniors the opportunity to visit business sites and interact with STEM professionals in the work place. This component of the program was designed as a voluntary activity and not required for all seniors, but was considered to form an important option for students who could invest the additional time to participate in field experience.

Y2 ECHS courses were also designed to engage STEM professionals and others working in related fields (e.g., marketing and media) at the TEC-SMART campus, bringing STEM professionals from the regional business community into the classroom. During the early part of the school year, STEM professionals were invited for classroom visits, selected to align their area of professional STEM expertise with particular phases of student project work. This approach was designed to provide greater benefit for ECHS students, who could engage more effectively with various business professionals early in the school year to explore student project questions, including technical challenges and overall project design. Student growth over time in their understanding of STEM professions and careers was more fully explored later in the school year after students gained experience and understanding of STEM and transdisciplinary problem based learning (TPBL). Exposure to different STEM careers offered later in the school year through invited speakers to the TEC-SMART campus was viewed to be an effective approach to continue to broaden students’ understanding of STEM industries more generally.

B. Instructional Planning, Collaboration and Leadership

The ECHS faculty in year two of the program expanded to add instructors for senior course offerings, increasing the total number to five instructors, two of whom returned to teach math and science for the second ECHS year. The three new faculty members provided instruction in English, Social Studies, and Technology. ECHS faculty, like their students, were involved in the half-day TEC-SMART campus Y2 program, returning to their home high schools in the afternoon where they concluded their day conducting two high school courses. It is anticipated that enrollment will increase in year three of the program (2013-14), and ECHS faculty are expected to transition to fulltime involvement at the TEC-SMART campus as the program continues to grow.

In the second year of the program, the math and science instructors worked collaboratively with the three new program faculty, developing a coordinated plan for curriculum design and instruction to meet goals for the transdisciplinary learning model central to the ECHS Program. Building on a range of goals for program expansion, as well as taking account of the set of Y1 issues identified by program staff and students, ECHS Y2 faculty developed a number of strategies designed to facilitate a more robust transition for students entering the intensive pace of the ECHS program. Primary among the Y2 goals was the need to provide clearly stated expectations for year two of the program, guided by a structured plan for integrating projects across courses.

New senior level ECHS coursework involved completing a required capstone project with different components of the capstone to be completed through student work across different senior ECHS courses. The design for the capstone gave students the experience of mastering key concepts as well as integrating their knowledge and developing skills to produce a single final project in the form of a "business plan," containing all the elements of a fully developed business development strategy. A new aspect of the Y2 program for junior students was also developed with the addition of the senior courses. Communication specifically targeted to juniors offered these students a pathway to senior level work, encouraging juniors to envision expectations for attaining concept mastery, new skills and knowledge essential to a successful transition to the early college program.

Pre-term academic planning involved not only fundamental work on course curriculum and student assessment strategies, but also required instructors to work collaboratively in new ways, ensuring coordinated learning experiences for students in a TPBL context. Instructors also continued coordinated planning during the school year through organizing collaborative work sessions during the school week, including grade level and/or content area planning, as determined by the five instructors. The ability to use common planning time to work collaboratively when needed gave instructors the flexibility to respond to students and address emerging challenges, accommodating these individually or through a more systematic and coordinated approach across the different courses.

As a small program of (5) instructors, ECHS faculty are working within a uniquely fluid context in which collaborative interaction and leadership skills are developing among the group that define essential attributes of TPBL instruction. This aspect of the program will continue to contribute to the success of each school year as the program expands over time. The experience of the Clean Energy Sustainable Industries Early College High School instructors offers a new model for public education that can inform training strategies for developing TPBL public school instructors. In *Section C* that follows, exploration of instructor/student interaction is presented as another dimension of the ECHS learning environment.

C. Instructor/Student Roles and Relations

Building on experience and review of Y1 program elements, Y2 ECHS instructors identified new aspects of student/teacher relations essential to meet student needs for a successful transition to college, and advancing their ability to engage in proactive career planning. ECHS instructional strategies incorporated methods to determine how students evolve and respond to coursework, giving

instructors the ability to pace classroom work to advance to new concepts as students gained new knowledge, skills and understanding. In essence, instructors found that they needed to modify and adapt their coursework plan almost daily, if not weekly, in order to work effectively to support student advancement in a framework that can be described as “multiple stages of development.”

Another new element of the Y2 program was a product of ECHS faculty goals to better convey a clear vision of how the curriculum is designed to integrate across content areas, and the structure for assessing student mastery. Presented in a PowerPoint format, instructors created this collaborative vision of the ECHS Program to communicate to students, as well as others interested in learning about the program, including current program partners and potential new partners. In this approach, instructors have significantly contributed to the overall outreach and communication process, helping inform those outside the ECHS Program through their content expertise and presentation skills, and filling a critical role in responding to growing regional interest in the ECHS Program.

Additionally, in formalizing a shared vision of the program, instructors and students are grounded by an overall structure of mutual understanding about how the program works. This also provides clarity in terms of allowing for critical flexibility for individual students to seek a creative path forward while working collaboratively within student teams.

The Y2 program has also involved instructors in program building that encompasses a broader set of overall goals including structured experiences for junior and senior students to prepare for advancement to the next level of their education and skill development. In the 2012-13 school year, instructors organized two additional program speakers to respond to particular areas of interest, and also conducted a field trip for junior students to visit a local business and introduce them to issues and ideas relevant to their senior year. Senior students and instructors gained lab experience in engineering and nanoscience at the University of Albany (UA), where both ECHS faculty and students had opportunity to work with UA graduate students as part of a field visit to the university.

With the two-year program now fully developed for both junior and senior level coursework, the technology instructor was able to create targeted communication for the junior level students in response to their interests, and helped them envision and prepare for their senior ECHS year. The English teacher provided a bridge between grade levels through coursework taught at both the junior and senior level. In this aspect of the program, instructors have taken on a mentoring role, counseling students across grade levels, and in particular, engaging with junior students to help them recognize the value of their junior level coursework and building skills that will be critical to their second and final year in the ECHS Program.

Other program breakthroughs occurred in expanding and strengthening the combined ECHS and the HVCC course offerings as Y2 ECHS students again met community college instructor expectations by performing on the same level as HVCC students. As ECHS students continue to achieve successful course completion and meet college level performance standards, it is anticipated that more HVCC courses will open up to ECHS students in coming years.

D. Areas of the ECHS Instructional Team Experience to Explore Further

The Clean Energy Sustainable Industries Early College High School Program has benefitted from the level of experience and willingness of its instructional team to take on a range of tasks, building upon a holistic integration of skills, talent and content expertise fundamental to a TPBL program. In the second year of ECHS program development, the faculty played a key role in expanding the junior level program and creating the senior level course of study. Capturing this experience as the work is underway can help others beyond the ECHS Program to gain in understanding, potentially informing other planning efforts about the possible ways in which to initiate strategies for transitioning public school education to STEM and TPBL.

The PAST Foundation seeks to contribute to understanding the essential work and qualities associated

with successful STEM education implementation. In collaborating with education programs, governmental agencies and diverse organizations in transition to STEM TPBL education we have had the opportunity to observe and document successful processes as well as critical lessons learned. The PAST Foundation proposes to conduct an evaluative research phase to produce a more detailed view of the work overall of the ECHS instructional team. In particular, considering the ways in which their experience has advanced development of new collaborative relations among the instructors and students. In their work we can also consider important dimensions of the internal program processes that help to define new levels and types of leadership, as well as gain an understanding of the significance of leadership as an element of the collaborative framework that is the hallmark of TPBL. The proposed ethnographic research would occur as a series of one-on-one interviews with each of the five Y2 faculty members. A schedule of open-ended interview questions is presented in Appendix B to this summary report on the ECHS Y2 Program.



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APPENDIX A:

The Clean Energy Sustainable Industries Early College High School Program
Junior and Senior Course List



Courses and Credits for Ballston Spa Central School District 2013-2014

Clean Technology Courses 11th Grade	College Credit	High School Credit
Integrated Mathematics in Clean Technologies		1.00
Environmental Science and Sustainability		1.00
English 11		1.00
2D AUTO CADD (college)	4.00	0.5
Introduction to Wind (college)	1.00	0.5
Electricity (college)	3.00	0.5
Legal & Ethical Environment of Business (college)	3.00	0.5

Clean Technology Courses 12th Grade	College Credit	High School Credit
Exploration of Nanotechnology		1.00
Green Economics & Public Policy		1.00
English 12		0.5
Public Speaking (College)	3.00	0.5
Photovoltaic Systems Theory & Design (college)	3.00	0.5
Photovoltaic Systems Installation & Maintenance (college)	3.00	0.5
Safety and Labor Relations (college)	2.00	0.5
Introduction to Entrepreneurship (college)	3.00	0.5
Entrepreneurship Process (college)	3.00	0.5
Statistics (college)	4.00	0.5
Pre-Calculus (college)	4.00	0.5
Sociology (College)	3.00	0.5
English Composition 1 (college)	3.00	0.5
Programming and Logic 1	4.00	0.5

*Courses listed in bold are possible choices for college classes. Students will select one college course for the fall and two courses for the spring based on a pathway of their choice.



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APPENDIX B:

The Clean Energy Sustainable Industries Early College High School Program
Ethnographic Research Design Year 2:
Schedule of Potential Interview Questions



Clean Energy Sustainable Industries Early College High School (ECHS) Ethnographic Research Design Year 2

Schedule of Potential Interview Questions ECHS Instructors

Teacher Profile:

1. What grade level do you teach:
 - a. At the ECHS?
 - b. At your home high school?
2. What is your current instructional content area?
 - a. At the ECHS?
 - b. At your home high school?
3. Do you hold any content area certification(s)
 - a. If so, which certifications do you hold?
4. What other content areas/courses have you taught?
 - a. Please provide course title and grade level.
5. Why did you elect to join the ECHS Program?
 - a. What are your professional development goals?
 - b. What do you hope to achieve in the next 3-5 years?
6. What are the key differences, in your view, between the ECHS and traditional high school?
7. What benefits do you expect to personally derive from your experience at the ECHS Program?

ECHS Program Experience:

1. What are your overall expectations for the ECHS Program?
2. What have you achieved in your experience so far relative to your expectations for the ECHS Program?
3. What risks, if any, do you perceive to be involved in your work with the ECHS Program?
4. What benefits, if any, do you perceive to be involved in your work with the ECHS Program?
5. Have you had prior experience with creating new curriculum or education programs?
6. Have you had prior experience working in collaborative teams with fellow teachers:
 - a. In content area teams?
 - b. In grade level teams?
7. What are the top three challenges you believe to be involved in working to grow and develop the ECHS Program?
 - a. What role do you see for yourself in meeting or addressing those challenges?

8. What is your prior experience with collaborative work with other teachers?
 - a. If you have worked in collaborative instructional teams, how would you characterize your experience?
 - b. Do you think you were able to achieve the stated goals of the team?
9. How would you describe your comfort level in:
 - a. Taking a leadership role among your peers?
 - b. Accepting leadership of others among your peers?
10. What is the role of a teacher in a STEM TPBL program?
 - a. What type of training and/or in-service professional development would best help teachers to fill that role in your view?
11. Is there a difference in roles and relations between teachers and their students in a STEM TPBL program and a traditional high school learning environment?
12. What can teachers do to help prepare students for a STEM TPBL learning environment?
13. What role do instructors play in helping students take on leadership roles in their teams?
14. What are the top (3) recommendations you believe could best help to prepare and make a difference for teachers entering a STEM TPBL program?