APPLICATION FOR GRANTS UNDER THE

NATIONAL PROFESSIONAL DEVELOPMENT PROGRAM
CFDA # 84.365Z
PR/Award # T365Z110180
Grants.gov Tracking#: GRANT10865352

Closing Date: MAY 09, 2011
Project Abstract

Name of IHE: The Pennsylvania State University on behalf of Penn State Lehigh Valley

Title of Program: Collaborative Teaching for ELLs (CTELL) Program

Consortia of Partners: Penn State Lehigh Valley, Lehigh Valley Writing Project, Colonial Intermediate Unit, Carbon Lehigh Intermediate Unit

Project Description:

Penn State Lehigh Valley has designed the Collaborative Teaching for ELLs (CTELL) Program to address the concern of the lack of preparation among content-area teachers, particularly in math and science, to work with English Language Learners (ELL) and prepare them for academic learning and success.

CTELL is a comprehensive year-long professional development program that includes a highly collaborative teaching component in which content teachers partner with ESL teachers in mentoring relationships to gain a better understanding of ELLs’ needs. These partnerships will allow educators to conduct collaborative action research within the classroom setting and to simultaneously evaluate the effectiveness of instructional strategies. After completing a five-course, fifteen-credit series offered in a hybridized format over two semesters, the math and science teachers will obtain their ESL certification and will have developed a variety of strategies for working with ESL teachers to support the academic development of ELLs in these important areas of math and science.

The CTELL program has been designed utilizing recent demographics from the Pennsylvania State Data Center and cites a wide range of recent research literature around the topic of mainstream teacher preparation, particularly of those educators within STEM subject areas. This background information provides critical evidence that the educator training to be offered through CTELL is much needed with the Lehigh Valley region and beyond.

The CTELL program addresses two key priorities of the National Professional Development Program:

Competitive Priority 2 (Enabling More Data-Based Decision-Making): CTELL employs a substantial evaluation plan that includes assessment coursework and a systematic data-gathering process through which information will be collected on program participant outcomes including pre- and post-measures of impact on instructional practices and measurement of ESL student progress in both math and science based on student portfolios of pre- and post-course work. The evaluation plan includes both GPRA measures and specific program measures.

Competitive Priority 3 (Promoting Science, Technology, Engineering, and Math [STEM] Education): CTELL works directly with STEM subject teachers through a collaborative curriculum with ESL (English as a Second Language) to support teachers. This year-long program will prepare science and math teachers for working with ELLs and provide the opportunity for them to work in partnership with ESL teachers on collaborative teaching strategies and assessment. At the end of the program, the math and science teachers will obtain their ESL certification and will have developed a variety of strategies for working with ESL teachers to support the academic development of ELLs in these important areas of math and science.
INTRODUCTION/PROGRAM DESCRIPTION

Preparing teachers to work with English Language Learners (ELLs) is of critical importance given their increased numbers in schools. One important concern is the lack of preparation among content-area teachers, particularly in math and science, to work with ELLs and prepare them for academic learning and success. The proposed Collaborative Teaching for ELLs (CTELL) program is designed to address a key priority for NPD by working directly with STEM subject teachers. This yearlong program will prepare science and math teachers for working with ELLs and will provide the opportunity for them to work in partnership with ESL teachers on collaborative teaching strategies and assessment. At the end of the program, these teachers will obtain their ESL certification and will have developed a variety of strategies for working with ESL teachers to support the academic development of ELLs.

PRIORITIES ADDRESSED

The Collaborative Teaching for ELLs (CTELL) program is designed to address two key NPD areas: Competitive Preference Priority 2 (Enabling More Data-Based Decision-Making) and Competitive Preference Priority 3 (Promoting Science, Technology, Engineering, and Mathematics [STEM] Education). Program participant outcomes will be collected including pre- and post-measures of instructional practices and measurement of ESL student progress in both math and science based on student portfolios of pre- and post-course work. The CTELL high-quality, credit-based professional development program prepares science and math teachers to work in collaboration with ESL teachers in order to more effectively support ELLs in these two important subject areas.
STATEMENT OF NEED

The 2011 report from the Pennsylvania State Data Center shows an 82.6 percent increase in the last ten years of the Hispanic population in this state. As one of the “fastest-growing minority groups in Pennsylvania,” Hispanics now “account for 5.7 percent of the state’s population” (p. 1). Nowhere is this increase felt more than in the schools, particularly in the Eastern half of the state, which has experienced the largest numeric increase. The Lehigh Valley, Pennsylvania’s third largest metropolitan area after Philadelphia and Pittsburgh, saw the second largest increase overall. Now, 18.8 percent of Lehigh County’s total population is of Hispanic or Latino ethnicity, which represents a 105.8 percent change since 2000. The influx of ELLs has had a tremendous impact on the area schools. The Allentown School District, the third largest in the state, has an overall ELL population of 12.5 percent, but many of the schools have populations where the majority of learners are ELLs. The same is true for the Bethlehem Area School District (8.1 percent), the Easton Area School District (4.5 percent), and Pocono Mountain School District (4.2 percent). These shifting demographics have also had an impact on some of the smaller school districts in the Lehigh Valley that have had limited exposure to working with the ELLs who are now entering their schools.

The professional development preparation for mainstream classroom teachers, and in particular STEM subject teachers, has been a topic of concern for the last decade. Recent research identifies the preparation of these professionals as a high priority (Lee et al., 2008; Short & Fitzsimmons, 2007; Silva et al., 2008). Unfortunately, very little preparation has been done, and even in cases where educators have received professional development for working with diverse student populations, there is “enormous variability in what counts as sufficient preparation to take on the challenge of teaching ELL students” (Working Group on ELL Policy,
2009, p. 13). As a result, teachers exhibit a wide range of skills and abilities for working with these learners. Teacher preparation programs also exhibit this inconsistency. Ballantyne, Sanderman and Levy (2008) point out that only twenty states require new teachers to have some kind of preparation for working with ELLs, and there is very little consistency among these offerings. Perhaps the most pressing need is to provide this kind of preparation for content area teachers, particularly in math and science.

It is obvious, then, that a restructuring of teacher preparation is required to end the cycle of unpreparedness that teachers report when working with ELLs. Short and Fitzsimmons (2007), in their review of the literature, identified eight “knowledge base [areas that should] be part of the teacher development program for all teachers”: 1) first and second language acquisition theory, 2) subject-area content, 3) ESL and sheltered instruction methodologies, 4) content-area pedagogy, 5) content-area language and discourse, 6) linguistic and cross-cultural contexts, 7) curriculum development, and 8) assessment (p. 23). McGraner and Saenz (2009), reviewing “mainstream teacher education, teacher preparation for ELL teaching, and instructional practices in ELL teaching” (p. 4), identified similar areas but added an additional component: “professional engagement and collaboration” (p. 5). Grant and Wong (2003), in their study of “barriers to literacy” for ELLs, found that content-area faculty and ESL education faculty “can work together to answer critical questions regarding the nature of the relationships between language proficiency and literacy and between first- and second-language literacy, optimal literacy instruction, and the acquisition of content knowledge” (p. 393).

The recently issued U.S. Department of Education’s A Blueprint for Reform calling for a reauthorization of the Elementary and Secondary Education Act clearly states that “strengthening instruction in literacy and in science, technology, engineering, and mathematics, aligned with
improved standards that build toward college- career-readiness” (p. 25) is crucial, and it must be done by “raising standards for all students” (p. 3), including ELLs. In science education, Lee et al (2008) concur: “Closing the achievement gaps among linguistic and cultural groups, while improving the science achievement of all students, should be seen as dual goals for science education” (p. 41). And the same is true for mathematics education, as indicated in a position paper from the National Council of Supervisors of Mathematics (NCSM), which states that “in order to improve the mathematics achievement of English Language Learners (ELLs), educators must acknowledge that all ELLs can learn rigorous mathematics and that the current achievement gap can be closed” (NCSM, 2009, p. 1).

APPLICANT'S EXPERIENCE AND QUALIFICATIONS

Penn State Lehigh Valley (PSLV) was awarded a National Professional Development Grant through Office of English Language Acquisition in 2007 to design, develop and implement The Modular Design for English Language Learners (MODELL) Instruction Program, a professional development program for in-service and pre-service teachers who work with ELLs. The impact of the MODELL Instruction Program is proven through its evaluative data. The program has grown from serving two districts to six as well as a dual language charter school. To date, three cohorts of educators (52 in-service; 14 pre-service) have graduated from the program with the completion of two of the five courses for ESL Endorsement in Pennsylvania. Annual reports showcase ongoing achievement of the stated GPRA measures, including meeting targets for program graduates who have now attained NCLB Highly Qualified Teacher status and for in-service completers who now work with ELLs. One hundred percent of in-service completers have shown an increase in the presence of appropriate TESL strategies documented by pre- and post- classroom observations. Meta-analysis of the inquiry projects showed marked learning
around the pedagogy of second language acquisition and appropriate accommodations for ELLs. In addition to the creation of a regional conference for educators for MODELL participants to showcase their research, there has been the publication of an academic paper in *Teachers and Teaching: Theory and Practice* (Hutchinson & Hadjiannou, 2011). Findings have also been presented nationally at the American Educational Research Association Conference, the TESOL Conference, the National Reading Conference, and the National Council of Teachers of English Conference.

The proposed CTELL program builds upon the success of the MODELL Instruction Program by placing an emphasis on offering professional development for educators in the STEM fields of science and math. The design includes a highly collaborative teaching component creating cross-mentoring relationships to allow for collaborative action research and to simultaneously evaluate the effectiveness of instructional strategies. The findings from this research will be featured in a science/math strand in the regional conference. In addition, the new proposal includes a strong evaluation plan, which allows for an even greater collection and analysis of quantitative and qualitative data.

**CONSORTIA OF PARTNERS**

The project will bring together a consortium of IHE and LEA institutions, Penn State Lehigh Valley (PSLV), the Lehigh Valley Writing Project, Colonial Intermediate Unit 20, and Carbon Lehigh Intermediate Unit 21) that will work together to develop, deliver, monitor, and assess the program.

*Penn State University, Lehigh Valley Campus*

PSLV serves the educational and employment needs of the Lehigh Valley. The campus offers a Bachelor of Science degree in Childhood and Early Adolescent Education (PreK–4),
providing Instructional I certification. Most of the pre-service teachers are placed in urban settings working directly with ELLs as part of their one-year teaching practicum in their senior year, and have a direct need to pursue ESL certification. In addition to leveraging key faculty and staff resources as Principal Investigator, Co-Investigator, LEA Liaison, and the Program Manager, PSLV will be responsible chiefly for guiding design, management, and assessment of the proposed project components in collaboration with consortium partners.

Lehigh Valley Writing Project

The Penn State Lehigh Valley Writing Project (LVWP), a local site of the National Writing Project, provides research-based high quality professional development for teachers and has been catalogued as a Comprehensive School Reform provider under Title I. As an institutional network of teacher professional development sites, the NWP targets teacher mentoring, curriculum design, methodologies, and assessment procedures. To date, LVWP has trained over 650 K-college level teachers and administrators and is committed to offering professional development that supports and enhances the literacy lives of all stakeholders in their learning communities. The LVWP will serve as primary communicator for all partners in the consortium, identify and lead a cadre of trained Teacher Consultants (TCs) in content-area literacy (reading and writing) in math and science to develop the CTELL program.

Intermediate Units

The CTELL Program will work with two local educational agencies: the Colonial Intermediate Unit 20 (CIU20) and the Carbon Lehigh Intermediate Unit (CLIU 21), essential members of the public education system. Created in 1971, the IUs provide high-quality, cost-effective programs for educators and serve as liaisons between school districts and the Pennsylvania Department of Education.
Colonial Intermediate Unit. CIU20 provides support to 13 school districts and 3 career and technical centers in Northampton, Monroe, and Pike Counties, which are 3 of the fastest growing counties in Pennsylvania, serving 79,000 public school children; 9,000 non-public school children; and 7,000 professional staff.

Carbon-Lehigh Intermediate Unit. CLIU 21 serves 14 school districts, 2 community colleges, and 1 career and technical school providing support for approximately 69,854 students in their service area of Carbon and Lehigh counties. The CLIU uses a "regional team" approach and through cooperation and collaboration among school districts and community agencies, provides innovative, responsive, and cost-effective programs.

Each IU will contribute to the content and design of the CTELL program and will be responsible for recruiting 10 in-service math and/or science teachers toward a cohort of 20 educators each year. The broad range of school district access across the identified region, the same service areas of Penn State Lehigh Valley and the Lehigh Valley Writing Project, makes IUs 20 and 21 ideal consortium members for enhancing and contributing to the value and necessity for content area literacy and literacy support of ELLs in eastern Pennsylvania.

IHE AND LEA CONTRIBUTIONS (Design Phase)

A Course Design Team and a Workshop Design Team (comprised of LVWP TCs) and IU Liaisons, guided by the Administrative Team comprised of the CTELL Program Manager, Principal Investigator, Co-Investigator and LEA Liaison will contribute to the design as follows:

1. Revise existing ESL course content to include math and science-specific standards and classroom application specific to content and grade level of cohort participants

2. Create core assignments and related assessment tools to be used as Program Measures
3. Identify the theoretical foundations of collaborative teaching, content-based instruction, and reflective inquiry (Cochran-Smith & Lyttle, 2009), and create the Collaborative Teaching Workshops.

4. Develop and imbed curriculum and assignments specific to parallel Collaborative Teaching Workshops strand.

PROGRAM TIMELINE AND DESIGN

YEAR 1

GOAL/OBJECTIVE: 1/A. Hybridize ESL Endorsement Courses

PERSONNEL: LVWP TCs, Administrative Team

✓ Develop curriculum & online components, core assignments for Program Measures

✓ Incorporate Program Measure tools into modules

✓ Select LVWP Fellows to serve as Teacher Consultants

GOAL/OBJECTIVE: 1/B. Create Collaboration Workshops

PERSONNEL: LVWP TCs, Administrative Team

✓ Develop curriculum

✓ Develop assignments requiring participant-ESL teacher collaboration

✓ Identify district-based ESL teachers partners for program participants

GOALS/OBJECTIVES: 5/A, B & C. Create tools for Program Measures

PERSONNEL: LVWP TCs, Administrative Team

✓ Develop pre- and post- survey (self-report)

✓ Develop observation tool for pre- and post- observations of instruction

✓ Develop follow-up surveys

GOALS/OBJECTIVES: Prepare 3 Content Specialists
PERSONNEL: LEA Liaison, LVWP TCs

✓ Identify 2 exceptional content area (high school teachers)

✓ Fund their tuition for completing the ESL Endorsement course series

✓ LVWP TCs and Content Specialists collaborate in shaping the CTELL program courses

GOALS/OBJECTIVES: Design and offer workshops on Teaching ELLs in the Content Area Classroom

PERSONNEL: LVWP TCs

✓ Develop one-day workshops to be offered through the IUs, inviting teachers who teach science and mathematics. The objective is to give back to the IU and to reach potential grant participants.

✓ Offer one workshop at each IU

YEARS 1-5

GOALS/OBJECTIVES: 1/C & 3/C. Organize and host Diverse Literacies Conference for participants to present inquiry projects

PERSONNEL: Administrative Team

✓ Establish Conference Planning Committee to coordinate conference logistics (facilities planning, promotion, etc.)

✓ Develop conference program (call for proposals, evaluation of submissions)

✓ Prepare participant-presenters for creating and delivering high-quality, professional presentations

YEARS 2-5

GOALS/OBJECTIVES: Offer one complete series of program courses & Collaboration Workshops every year
PERSONNEL: LVWP TCs, Administrative Team

✓ Schedule and offer the series of courses so that each cohort can complete the requirements for the ESL Endorsement

✓ Schedule and offer 2 Collaboration Workshops (September and January)

✓ Faculty/Participant evaluation of each course

GOALS/OBJECTIVES: Offer workshops on Teaching ELLs in the Content Area Classroom

PERSONNEL: LVWP TCs

✓ Offer one recruitment workshop at each IU

YEARS 2 and forward

GOALS/OBJECTIVES: 5/4, B&C. Follow up with program graduates

PERSONNEL: Administrative Team

✓ Send follow up surveys to program graduates (1, 3 & 5 years after program completion)

YEARS 3-5

GOALS/OBJECTIVES: Evaluate each offering and revise accordingly

PERSONNEL: Administrative Team, External Evaluator, LVWP TCs

✓ Analyze data from Program Measures

✓ Analyze data from participants’ course evaluation

✓ Revise course design in response to assessments.

PROGRAM OBJECTIVES

The purpose of the proposed Collaborative Teaching for ELLs (CTELL) Program is to prepare science and math educators to (a) work effectively with English Language Learners (ELL), and (b) to work collaboratively with ESL support teachers in designing, implementing and assessing content-based instruction informed by research-based TESOL practices.
GOAL #1: Create a flexible, needs-based, grade-level/subject-specific professional development program leading to the Pennsylvania ESL Endorsement. The program will focus on (a) working with ELLs in the context of science and mathematics and (b) working collaboratively with other professionals and stakeholders in serving ELLs.

- **OBJECTIVE A:** Develop all five of the Penn State courses that lead to a Pennsylvania ESL Endorsement into a technology-enhanced, module-based, credit course model. The program will provide a foundation in second language acquisition, general and science-and-math-specific TESOL strategies, and assessment.

- **OBJECTIVE B:** Infuse the program with two non-credit workshops on collaborative teaching, focusing on collaboration with ESL professionals.

- **OBJECTIVE C:** Build capacity by developing a school-based/district-wide network of trained teachers to provide support for addressing the needs of ELLs.

GOAL #2: Recruit and retain to program completion participants who teach or are preparing to teach science and mathematics to ELL students as mainstream education teachers.

- **OBJECTIVE A:** Per funding year, recruit and retain 20 in-service teachers (elementary and secondary) who teach in districts serving increasing numbers of ELLs (GPRA 1.6).

- **OBJECTIVE B:** Per funding year, recruit and retain 5 pre-service teachers.

GOAL #3: Participants are expected to meet project requirements.

Participants are expected to:

- **OBJECTIVE A:** Complete the program-specified coursework (including an inquiry project), as outlined in the program curriculum section.
- OBJECTIVE B: Present the findings of the inquiry project in the Diverse Literacies Conference.
- OBJECTIVE C: Complete the two non-credit workshops on collaborative teaching.

GOAL #4: Participants are expected to achieve program standards.
- OBJECTIVE A: Participants should receive a passing grade in each of the program courses.
- OBJECTIVE B: Participants are expected to collaborate effectively with ESL teachers in planning and implementing instruction aimed at ELLs.
- OBJECTIVE C: The presentations of the inquiry project at the Diverse Literacies Conference are expected to be of high professional quality.

GOAL #5: The effectiveness of program graduates in working with ELLs in general and in science and mathematics contexts in particular is expected to increase.

It is expected that, by the end of the program,
- OBJECTIVE A: The participants' instruction will be characterized by increased use of research-based, context-sensitive, student-appropriate TESOL strategies.
- OBJECTIVE B: The participants' instruction in science and mathematics will involve increased use of research-based, content-sensitive, student-appropriate TESOL strategies.
- OBJECTIVE C: The participants will (a) demonstrate increased willingness to collaborate with ESL teachers, and (b) act on this willingness in substantive ways.

GOAL #6: Enhance the variety, quality and versatility of professional development at PSLV and the Lehigh Valley area.
- OBJECTIVE A: Create a program that leads to Pennsylvania ESL endorsement in a single year. No other Penn State campus offers this option.
- **OBJECTIVE B**: Collaboration among educators, identified as immensely beneficial in supporting ELL's academic success (Grant & Wong, 2003), is rarely an explicit focus of Professional Development Programs (PDPs) pertaining to TESL. CTELL will explicitly foster collaboration between math and science teachers and ESL professionals.

- **OBJECTIVE C**: Traditional face-to-face, semester-long credit courses are often impossible to fit in working teachers' schedules and conventional distance-learning configurations can be intimidating and engender a sense of detachment and intellectual loneliness for teachers who tend to thrive on personal interaction. The CTELL program accommodates the professional and personal needs of working teachers through versatile and flexible hybridity.

**PROGRAM CURRICULUM**

The CTELL program is designed around four main guidelines: (i) leading participants to the Pennsylvania ESL Endorsement utilizing a flexible hybrid design; (ii) preparing teachers of math and science to work with ELLs; (iii) promoting, supporting and facilitating collaboration among content area teachers and between content area teachers and ESL professionals; and (iv) promoting, supporting and facilitating a reflective inquiry stance. Within this framework, the CTELL program participants will engage in the following program activities (a) complete five three-credit courses, (b) attend two Collaboration Workshops, and (c) attend and present their classroom-based inquiry project at the Diverse Literacies Conference.

**Coursework**

The CTELL program will engage participants in a series of five three-credit courses on TESL education which, when completed, lead to the Pennsylvania ESL Endorsement:
1. WL ED 400, *Foundations of Language in Second Language Teaching*, designed to provide participants with a critical understanding of basic concepts and principles in second language acquisition and teaching;

2. WL ED 444, *Language, Culture and the Classroom: Issues for Practitioners*, designed to promote critical understanding of cultural linguistic diversity to facilitate the inclusion of English Language Learners in a globalized classroom;

3. WL ED 483, *Evaluating Schools Performances and Programs with English Language Learners*, designed to provide participants with a critical understanding of developing and using varieties of multiple assessments for levels of language proficiency, acquisition, and social and subject matter learning;

4. APLNG 484, *Discourse-Functional Grammar*, which is designed to help participants develop a working knowledge of the structure of English and apply such knowledge to research and/or classroom situations; and

5. APLNG 493, *Teaching English as a Second Language*, which engages participants in the study and implementation of theory, research, and pedagogy that focus on the teaching of English to speakers of other languages in varied contexts.

The courses will be offered in a series of hybrid seven-week course designs. Therefore, the participants of each cohort will be ESL-endorsed within one academic year. Most of the course activity (content delivery, readings, conversations, assignment submission) will take place electronically, using Penn State University’s ANGEL course management system. However, the program will also involve several opportunities for face-to-face interactions, including orientation sessions, program and course content based session, and Collaborative Workshops (discussed below).
Collaboration Workshops

A documented challenge in the education of ELLs is the all too common lack of collaboration among the teachers who share the same students (Lee et al., 2007). Countering this trend, and creating spaces that facilitate and support strong collaboration among content teachers and between content teachers and ESL professionals, is one of the main objectives of the CTELL program. Specifically, participants will be expected to co-attend two Collaboration Workshops with the ESL teacher who works with at least one of the ELLs in their classrooms. The workshops will be connected to course assignments requiring the documentation and reflective assessment of their collaboration with ESL professionals and other content teachers.

1. Fall Collaborative Workshop: This will be a full-day workshop during the first month of the program. Participants will receive information about the benefits of collaboratively addressing the needs of ELLs; will experience models of effective collaboration between content and ESL teachers through video clips, vignettes and testimonials; will receive training on effective collaboration strategies; and will make collaboration plans with their ESL partners regarding specific ELLs in their classrooms.

2. Spring Collaborative Workshop: This will be a full-day workshop during the fifth month of the program. The program participants and their ESL teacher/partners will share their successes and challenges with their peers; will exchange situation-specific feedback aiming to improve the effectiveness of collaboration efforts; will fine-tune their collaboration plans regarding specific ELLs in their classrooms; and will design plans for sustaining collaboration after completion of the CTELL program.
OUTCOMES

The outcomes of the CTELL Program have been organized to reflect each of the program goals and objectives:

1. Program Development

   A. By the end of the first year of funding, all five of Penn State ESL endorsement the courses will have been hybridized based on the hybridizing model developed through the MODELL Instruction Program and with a focus on science and mathematics.

   B. By the end of the first year of funding, we will have in place two workshops which will (i) focus on the benefits of collaboration and the development of appropriate instructional strategies and (ii) will bring together program participants and district-based ESOL professionals.

   C. (i) Program-required and -supported collaboration between science and mathematics teachers and ESL professionals is expected to continue after program completion in the service of ELLs. (ii) Earlier program participants will serve as mentors to subsequent groups, thus creating expanding circles of Professional Learning Communities (PLCs).

2. Participant Recruitment

   A. (i) At the beginning of each funding year, we will recruit 20 classroom teachers who teach science and mathematics in local schools with high or increasing numbers of ELLs. (ii) At the end of each funding year, the CTELL Program will produce 20 in-service graduates, all of whom will have completed the requirements of the Pennsylvania ESL Endorsement (GPRA 1.5).

   B. (i) At the beginning of each funding year, we will recruit 5 pre-service teachers pursuing a Pre-K – 4 Pennsylvania certification and who are preparing to student-teach (and potentially become employed) in districts serving increasing numbers of ELLs. (ii) At the end of each funding year, the CTELL Program will produce 5 pre-service graduates who (1) will be placed in
a student-teaching assignment where they will be providing instructional services to EL students (GPRA 1.2) and (2) will have completed the requirements the Pennsylvania EL Endorsement (GPRA 1.1).

3. Participant Progress in Meeting Project Requirements
A. Approximately 90% of the participants will complete each of the program’s 7-week hybrid courses satisfactorily and with their cohort.
B. Approximately 90% of the participants will receive a satisfactory grade in the inquiry project attached to their program coursework.
C. Following coursework completion, all participants will present their inquiry projects at the Diverse Literacies Conference.
D. Approximately 90% of the participants will complete the workshops on collaborative learning and will show evidence of collaboration with district-based ESL professionals through specially designed course assignments.

4. Participant Success in Achieving Program Standards
A. Approximately 90% of the participants will receive a grade of B or higher in each of the program courses.
B. Approximately 90% of the participants will complete the collaboration workshops and will receive passing grades on course assignments.
C. Approximately 90% of the participants will receive a satisfactory grade on the presentations of their inquiry projects.
5. Graduate Effectiveness in the Instructional Setting

A. An increased use of appropriate TESOL strategies will be evident in (i) pre- and post- observations of instructional practice (ii) pre- and post- self evaluative surveys and (iii) follow-up surveys.

B. An increased use of content-appropriate TESOL strategies will be evident in (i) Pre- and post- observations of instructional practice in science and mathematics (ii) pre- and post- self evaluative surveys and (iii) follow-up surveys.

C. Participant contributions to course discussion boards, collaboration-specific course assignments, and pre- and post- surveys will (a) show an increase in participants’ willingness to collaborate with ESL teachers and (b) document specific instances of collaboration.

6. Improved Professional Development in the School or University

A. All five courses of Penn State’s ESL endorsement program will be hybridized in an intensive seven-week format. All five courses will be offered each funding year.

B. Collaboration will be the explicit objective of the Collaboration workshops, and of at least two major course assignments requiring participants to report on their collaboration with ESL teachers.

C. The CTELL Program will accommodate participants’ schedules by having most of the course-related work conducted in an online environment but will also respond to the frequently-voiced need for personal contact by including various face-to-face components such as an orientation session, the Collaboration Workshops, the Diverse Literacies Conference, and program and content-based sessions as the need arises.
MANAGEMENT PLAN

PSLV and the LVWP have had a long history in the state of Pennsylvania for providing ESL training for teachers working with ELLs. Many of the LVWP ESL and MODELL Instruction program graduates have become leaders in their school districts, where they assist in developing an ESL curriculum to meet the needs of their ELLs and have contributed to the development of the “PA ELL,” a valuable resource to all teachers across the state of Pennsylvania (www.paell.com). The CTELL Program is designed to build on this solid foundation and provide a well-designed, needs-based professional development program for teachers. The following table outlines the management plan for the program including the objectives, responsibilities, and timeline for accomplishing the project tasks:

<table>
<thead>
<tr>
<th>YEAR</th>
<th>OBJECTIVES</th>
<th>TIMELINE</th>
<th>PERSONNEL</th>
</tr>
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<tbody>
<tr>
<td>Year 1</td>
<td>Develop program</td>
<td>September—June</td>
<td>Administrative Team, LVWP TCs</td>
</tr>
</tbody>
</table>

✓ Develop online course-based components

✓ Develop face-to-face, non-credit collaborative teaching and math/science content-based ESL modules/workshops

✓ Incorporate assessment data into modules

✓ Select LVWP Fellows for Instructional Teams

| Year 1 | Build math/science content-based instructional team capacity | August - May | LEA Liaison (LL), PM, Intermediate Unit Liaisons (IUL) |

✓ Recruit and enroll one math and one science teacher to complete five courses for ESL endorsement with expectation that these individuals will serve (in years 2-5) as instructional
<table>
<thead>
<tr>
<th>Years</th>
<th>Team members (TCs)</th>
<th>Spring, each year</th>
<th>Principal Investigator (PI), LL, Co-Investigator (CI), PM, IUL, LVWP TCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>Serve and recruit up to 20 in-service math/science teachers</td>
<td></td>
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- √ Publish and distribute informational materials
- √ Conduct IU-based, pre-program workshops for math/science teacher working with ELLs
- √ Select teacher workshop participants

<table>
<thead>
<tr>
<th>Years</th>
<th>Recruiting</th>
<th>Spring, years 1-4</th>
<th>PI, LL, CI, PM, IUL</th>
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<tbody>
<tr>
<td>1-4</td>
<td>Recruit up to 20 in-service math/science teachers, 5 pre-service teachers</td>
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- √ Publish and distribute informational materials
- √ Hold information sessions
- √ Select CTELL participants

<table>
<thead>
<tr>
<th>Years</th>
<th>Retain 20 in-service math/science teachers, 5 pre-service teachers</th>
<th>Throughout program year, years 2-5</th>
<th>PI, LL, CI, PM, IUL, LVWP TCs</th>
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<tbody>
<tr>
<td>2-5</td>
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- √ Offer appropriate supports related to course work, program structure

<table>
<thead>
<tr>
<th>Years</th>
<th>Serve up to 25 ESL teachers</th>
<th>2 workshops: Fall &amp; Spring years 2-5</th>
<th>PI, LL, CI, PM, IUL, LVWP TCs</th>
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<tbody>
<tr>
<td>2-5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- √ Conduct collaborative teaching workshops linking cohort members to their ESL colleagues

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Offer sequence of WL ED 400, WL ED 483, WL ED</th>
<th>September 2011-May 2011</th>
<th>PI, LL, CI, PM, IUL, LVWP TCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td>Evaluate the first offering and make changes accordingly</td>
<td>September—May each year</td>
<td>PI, LL, CI, PM, IUL, LVWP TCs, External Evaluator (EE)</td>
</tr>
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<tr>
<td>√</td>
<td>Schedule and offer courses and non-credit modules/workshops</td>
<td></td>
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<tr>
<td>√</td>
<td>Faculty/Participant evaluation</td>
<td></td>
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<tr>
<td>√</td>
<td>Collect post-portfolio assessment data</td>
<td></td>
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<tr>
<td>√</td>
<td>Analyze data from assessments</td>
<td></td>
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<tr>
<td>√</td>
<td>Collect data from participants' course and module/workshop evaluations</td>
<td></td>
<td></td>
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<tr>
<td>√</td>
<td>Assess lesson plan unit design and teacher-inquiry projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years</td>
<td>Evaluate pre and post knowledge assessment survey and assessment of instruction</td>
<td>Survey:</td>
<td>PI, LL, CI, PM, LVWP TCs, EE</td>
</tr>
<tr>
<td>2-5</td>
<td>September &amp; April, Observation:</td>
<td>October &amp; May</td>
<td></td>
</tr>
<tr>
<td>√</td>
<td>Collect, compile, and analyze survey and observation data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years</td>
<td>Evaluate participant reflective writings</td>
<td>Ongoing, throughout each course</td>
<td>PI, LL, CI, PM, LVWP TCs</td>
</tr>
<tr>
<td>2-5</td>
<td></td>
<td></td>
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<tr>
<td>√</td>
<td>Collect, compile, and analyze participant reflective writings in the context of each course</td>
<td></td>
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</tr>
<tr>
<td>Years</td>
<td>Organize and host Diverse Literacies Conference for</td>
<td>Every year in September</td>
<td>PI, LL, CI, PM</td>
</tr>
<tr>
<td>2-5</td>
<td></td>
<td></td>
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</tbody>
</table>
KEY PERSONNEL

Dr. Mary Hutchinson will serve as the Principal Investigator (PI) for the CTELL program. She has previous experience serving in this capacity for the MODELL Instruction program. Dr. Hutchinson is Assistant Professor in ESL Education at PSLV and is the former Program Coordinator for the baccalaureate degree program in elementary education. She has a bachelor's degree in English, a master's degree in teaching ESL, and a doctorate in education; and she is certified as a National Writing Project Fellow. Dr. Hutchinson is responsible for teaching courses in ESL and applied linguistics for both the baccalaureate degree program as well as for the ESL certification program.
Dr. Xenia Hadjoannou will serve as Co-Investigator (CI) and will be responsible for identifying pre-service teachers, for contributing to the design of curriculum and inquiry research projects, for suggesting appropriate student teaching placements, and for aiding in the assessment of the impact of this program on participants. Dr. Hadjoannou is Assistant Professor of Language and Literacy Education at PSLV. She has a bachelor’s degree in elementary education, University of Cyprus; a master’s degree in education and a Ph.D. in Curriculum and Instruction with a specialization in literacy, University of Florida. Dr. Hadjoannou’s education at the University of Florida involved coursework in diversity and ESL education and significant training in infusing ESL strategies in language arts instruction.

Nancy Coco, Director of the LVWP, will serve as the LEA Liaison (LL) for the program and will be responsible for working with the consortium partners to oversee the implementation of the CTELL program, provide oversight and training of the Program Manager, and aid in the selection of LVWP Fellows for curriculum design and course instruction. Ms. Coco is a former middle and high school English teacher and has served as a Teacher Consultant providing staff development programming for over 15 years. She holds a bachelor’s degree in English and French and a master’s degree in educational development and strategies.

Dr. Marisa Hockman, will serve as the Program Manager (PM); she has experience in this role for the MODELL Instruction Program. She is responsible for overseeing the day-to-day operations for the CTELL program. Dr. Hockman is a former middle school ESL teacher. She has a bachelor’s degree in secondary education social studies, a master’s degree in teaching ESL, and a doctorate in educational leadership, and is also an NWP Fellow.

Kelly Pauling is currently the Director of Curriculum Services at Colonial Intermediate Unit 20 (CIU20) serving the needs of the school districts in this area. She will serve as an IU
Liaison (IUL). Ms. Pauling is the former Assistant Director for Curriculum Services for Special Education and has worked for over a decade as a teacher of the deaf and hard of hearing. She has a master’s degree in curriculum and instruction, and supervision certificates in both Curriculum and Special Education.

Jackie Sham is the Director of Curriculum and Instruction/Educational Technologies at CLIU 21 involved in facilitating networking groups and professional learning workshops in the school districts in the CLIU service area. She will serve as an IU Liaison (IUL). Ms. Sham is a former third grade teacher, and has been an assistant high school principal as well as the Supervisor of Curriculum and Instruction in Upper Moreland School District.

Nancy Rankie Shelton is an Associate Professor at the University of Maryland Baltimore County (UMBC) where she teaches graduate and undergraduate literacy courses. She will serve as the External Evaluator. Dr. Shelton conducts research in urban elementary school settings, focusing her work on the ways in which schools prepare literate, participatory citizens for the 21st century. She is the Professor in Residence at the Violetville Elementary/Middle School, where she works with faculty and students to provide enriching, literate classroom communities and school-based professional development opportunities.

**EVALUATION PLAN**

By the end of the grant period, three groups of educators will have been served through the Collaborative Teaching for ELLs (CTELL) program. Primarily, 100 teachers (20 pre-service and 80 in-service) will have successfully completed the CTELL program, earning 15 credits required for the ESL Program Specialist certification in Pennsylvania. Secondarily, the potential exists for serving up to 100 ESL teachers through the two collaborative teaching workshops to be held annually. By partnering in collaborative workshops, the bond between the content-based
teacher and the ESL teacher will be strengthened, thus benefiting the ELLs they jointly serve. Finally, potentially up to an additional 80 in-service math/science teachers will have the opportunity to participate in the pre-program, content-specific ESL workshops offered through the partnering Intermediate Units.

A summative evaluation report will be prepared at the end of each program year by the External Evaluator. The evaluation will reflect data on 1) the number of teachers who participate in the pre-program, content-specific ESL workshops, 2) the number of teachers who complete the fifteen-credit, cohort-based CTELL program, 3) the number of ESL teachers who complete both collaborative teaching workshops offerings, 4) the lesson plans and units developed by the cohort participants, 5) the teacher-inquiry projects implemented as part of the cohort-based course requirements and the corresponding presentations at the Penn State Lehigh Valley Annual Diverse Literacies Conference, 6) cohort-based teachers’ student writing samples at the start and at the end of the CTELL program, 7) faculty evaluations of accomplishment of course and workshop objectives, 8) pre- and post-program classroom observations of cohort participant practice, 9) participants’ evaluations of each course and workshop regarding the effectiveness of course and workshop content, and 10) cohort participants’ self-evaluation of the effects of CTELL program on their teaching effectiveness in meeting the needs of ELLs in their classroom. The External Evaluator will develop appropriate assessment instruments to analyze the data collected periodically by the consortium, will gather additional data through meetings with participants, coordinators, faculty, and Intermediate Unit liaisons, and will write the evaluation reports.

Formative evaluations will insure that ongoing feedback is provided by all the stakeholders, including participating teachers, Intermediate Unit liaisons, program manager, and
faculty; to ensure that the CTELL program is revised and improved to provide the best possible outcomes for the people involved in this program. To this end, an Advisory Board, consisting of the Principal Investigator, In-Service and Co-Investigators, Program Manager, Intermediate Unit Liaisons, External Evaluator, and select participant teachers will be organized to oversee the assessment process. The following table provides details about the objectives, responsibilities, and timeline for accomplishing the evaluation process:

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Assessment</th>
<th>Evaluation Activities</th>
<th>Timeframe</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOAL #1: Create a flexible, needs-based, grade-level/subject-specific professional development program leading to a Pennsylvania ESL Endorsement</td>
<td>*Construct course modules</td>
<td>Summative</td>
<td>*Review modules based on course objectives, etc.</td>
<td>Throughout planning year 2011-2012</td>
</tr>
<tr>
<td></td>
<td>*Construct collaborative teaching workshops</td>
<td>Summative</td>
<td>*Review modules based on program objectives, etc.</td>
<td>Throughout planning year 2011-2012</td>
</tr>
<tr>
<td></td>
<td>*Construct standards-based rubrics for evaluation of lessons, projects and teaching</td>
<td>Formative</td>
<td>*Review the quality of standards-based rubrics</td>
<td>Throughout planning year 2011-2012</td>
</tr>
<tr>
<td></td>
<td>*Determine quality of course module deliverables</td>
<td>Formative/Summative</td>
<td>*Collect/analyze program data</td>
<td>*End of each course offering</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*Evaluate: Quality of modules, presentations</td>
<td>*Pre-Post Program</td>
</tr>
<tr>
<td>Goal</td>
<td>Activity 1</td>
<td>Activity 2</td>
<td>Activity 3</td>
<td></td>
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<tr>
<td>Review of workshops after each implementation</td>
<td>Conduct: Rubric-based assessment of teaching</td>
<td>Collect/analyze workshop evaluations</td>
<td>End of each workshop offering</td>
<td></td>
</tr>
<tr>
<td>Determine the adequacy of project information dissemination</td>
<td>Collect/analyze workshop feedback</td>
<td>Organize information sessions with participating teachers</td>
<td>Each year at the end of the program</td>
<td></td>
</tr>
</tbody>
</table>

**GOAL #2: Recruit and retain targeted population of program completion participants (GPRA 1.1, 1.5).**

<table>
<thead>
<tr>
<th>Recruit 20 inservice and 5 preservice teachers per funding year (GPRA 1.1, 1.5; Target – 100%)</th>
<th>Recruitment: Pre-program workshops, promotional materials, recruitment events, Review applicants</th>
<th>*April/May of years 1-4</th>
<th>PI, LL, CI, PM, and IU Liaisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retain 20 inservice and 5 preservice teachers per funding year (GPRA 1.1, 1.5)</td>
<td>Review of program evaluations and participant support mechanisms (face-to-</td>
<td>*Ongoing</td>
<td>PI, LL, CI, PM, IU Liaisons, and LVWP TCs</td>
</tr>
<tr>
<td>Target – 90%</td>
<td>face meetings; access to PM and LVWP TCs</td>
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<tr>
<td><strong>GOAL #3: Participants will meet project requirements.</strong></td>
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<td></td>
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<tr>
<td><em>Monitor standards-based rubrics for evaluation of lessons, projects and teaching</em></td>
<td>Formative</td>
<td><em>Review standards-based rubric results and quality</em></td>
<td><em>End of each course offering</em></td>
</tr>
<tr>
<td>√ Plan for data collection &amp; analysis:</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Meta-analysis of Participants’ Written Assignments**

Participants’ Written Assignments will be graded based on standards-based Rubrics focused on:

- a) The content of the written assignment as supported by course readings, course assignments, face-to-face meetings/lectures, etc., and
- b) The quality of the written assignments.

| *Monitor standards-based rubrics for evaluation of inquiry project* | Summative | *Evaluate Quality of inquiry project* | *End of WL ED 483 offering; During Diverse Literacies Conference* | PI, LL, CI, PM, and LVWP TCs |
| √ Plan for data collection & analysis: |  |

**Meta-analysis of Action Research Projects**

Action research projects will require participants to identify an ESL-related challenge they are facing in their classrooms/placements, make instructional and other planning to address it, implement their plan, collect data related to the implementation and its results/products, and
write a report on this process. The Action Research Project Reports will be graded based on an Assessment Rubric that will focus on a) the degree to which the instructional planning of the Action Research Project included appropriate State Standards, b) the degree to which the instructional planning of the Action Research Project demonstrate adherence to ESL principles presented, and c) the degree to which the instructional planning of the Action Research Project involved appropriate accommodations for the ESL students present in the classroom.

GOAL #4: Participants will achieve program standards (GPRA 1.6).

<table>
<thead>
<tr>
<th>Pre- and post-surveys of knowledge and understanding of SLA theory, practice</th>
<th>Formative/Summative</th>
<th>*Administer pre-assessment survey to all teacher participants</th>
<th>*Pre- and post-program</th>
<th>LL, CI, PM, IU Liaisons, and LVWP TCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Monitor participant reflective writings</td>
<td>Formative</td>
<td>*Monitor the quality of the contributions (based upon standards-based rubric)</td>
<td>*Ongoing</td>
<td>PI, CI, PM, and LVWP TCs</td>
</tr>
</tbody>
</table>

√ Plan for data collection & analysis: (Additional information)

Meta-analysis of Participants’ Reflective Writings

Participants’ Reflective Writings will be graded based on a standards-based Rubric focused on the content of the reflection as supported by course readings, course assignments, face-to-face meetings/lectures, etc., and the quality of the written assignments.

<table>
<thead>
<tr>
<th>Track in-service assessment of</th>
<th>Summative</th>
<th>*Conduct/analyze pre-and post-classroom</th>
<th>October and May of each</th>
<th>PI, LL, CI, PM, and EE</th>
</tr>
</thead>
</table>
Instruction (GPRA 1.6; Target –100%).

<table>
<thead>
<tr>
<th>observations using standard-based rubric.</th>
<th>cohort year</th>
</tr>
</thead>
</table>

√ Plan for data collection & analysis: (Additional Information)

**Participant Practice: Pre and Post Assessment of Instruction (See Goal #4)**

The pre-assessment of instruction (October) and post-assessment (May) will be conducted by the Program Manager. The observation data will be recorded based on a specifically designed *observation rubric* focused on evidence of growth in application of concepts related to second language acquisition, ESL appropriate instructional considerations, promotion of classroom climate conducive of ELLs’ effective and efficient learning in math and science, and collaborative planning and teaching with ESL professionals and other colleagues.

<table>
<thead>
<tr>
<th><em>Monitor standards-based rubrics for evaluation of lessons, projects and teaching</em></th>
<th>Formative</th>
<th><em>Review standards-based rubric results</em></th>
<th><em>End of course offering</em></th>
<th>PI, CI, PM, and LVWP TCs</th>
</tr>
</thead>
</table>

√ Plan for data collection & analysis: (Additional information)

**Meta-analysis of Participants’ Written Assignments (See Goal #3)**

<table>
<thead>
<tr>
<th><em>Monitor standards-based rubrics for evaluation of inquiry project</em></th>
<th>Summative</th>
<th><em>Evaluate Quality of inquiry project</em></th>
<th><em>End of WL ED 483 offering; During Diverse Literacies Conference</em></th>
<th>PI, LL, CI, PM, and LVWP TCs</th>
</tr>
</thead>
</table>

√ Plan for data collection & analysis:
<table>
<thead>
<tr>
<th>Meta-analysis of Action Research Projects (See Goal #3)</th>
</tr>
</thead>
</table>

**GOAL #5: Determine the effectiveness of program graduates in working with ELLs in the fields of mathematics and science (GPRA 1.2, 1.6).**

*Track in-service assessment of Instruction*  
(GPRA 1.6; Target −100%).

| *Track in-service assessment of Instruction* | Summative | *Conduct/analyze pre-and post-classroom observations using standard-based rubric.* | October and May of each cohort year | PI, LL, CI, PM, and EE |

√ Plan for data collection & analysis:

**Participant Practice: Pre and Post Assessment of Instruction (See Goal #4)**

*Pre- and post-surveys of knowledge and understanding of SLA theory, practice*  
Formative/Summative

| *Pre- and post-surveys of knowledge and understanding of SLA theory, practice* | Formative/Summative | *Administer pre- and post-assessment surveys* | *Pre- and post-program* (September and May) | LL, CI, PM, IU Liaisons, and LVWP TCs |

√ Plan for data collection & analysis:

**Pre and Post Assessment surveys of knowledge and understanding of second language acquisition theory and practice**

Among other elements, the analysis will focus on participants’ self-assessment of knowledge and understanding of second language acquisition, ESL appropriate instructional considerations, promotion of classroom climate conducive of ELLs’ effective and efficient learning, and collaborative planning and teaching with ESL professionals and other colleagues.

<p>| <em>Annual Follow-up</em> | Summative | <em>Past program</em> | <em>For each</em> | PI, LL, CI, PM, |</p>
<table>
<thead>
<tr>
<th>Surveys</th>
<th>participants will be surveyed to determine: their current position in the field, their content assignment, their function in working with ELLs</th>
<th>cohort, one year after program completion and EE</th>
</tr>
</thead>
<tbody>
<tr>
<td>[GPRA 1.2; Target - 1 out of 6 (~17%)]</td>
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<td></td>
</tr>
<tr>
<td>[(GPRA 1.6; Target - 100%)]</td>
<td></td>
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</tr>
<tr>
<td>Analyze student pre and post writing samples</td>
<td><em>Analyze pre and post student writing samples through standards-based rubric</em></td>
<td>PI; LL, CI, PM, and Evaluator</td>
</tr>
<tr>
<td>Summative</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

√ Plan for data collection & analysis:

**Meta-analysis of Student Writing Samples**

Student Writing Samples will be graded based on standards-based Rubrics focused on a) The content of the writing sample, and b) The use of the language, including mechanics, conventions, perceived fluency level of student based on sample.

**GENERAL EDUCATION PROVISIONS ACT (GEPA) REQUIREMENTS**

The CTELL program is designed to provide pre-service and in-service STEM subject (math and science) teachers with adequate support and training to address the needs of ELLs. Additionally, this year-long program includes a highly collaborative teaching component partnering content teachers with ESL teachers in cross-mentoring relationships to allow for designing, implementing and assessing content-based instruction informed by research-based
TESOL practices. Participants in the program will enroll in a five-course, fifteen credit series which will complete the requirements for Pennsylvania endorsement in ESL. In addition to cohort participants, in-service ESL and math and science teachers will be given the opportunity to participate in collaborative teaching and/or content-based ESL workshops. All partnering institutions will work together to overcome the barriers that may limit access or participation in this program, such as physical disability or national origin. We would make provisions for participants who have visual or physical impairments by providing appropriate software and equipment that would allow them to participate in the online components of the program. We also would provide materials in alternative formats (e.g., Braille) as necessary. We do not foresee national origin as a problem because the profession of the participants required that they be proficient in English, which is the language of the offering. We also do not anticipate gender, race or color to become barriers to equitable access in this program since it is open to all pre-service and in-service math and science content-based and ESL teachers served by the IUs, none of which discriminate in hiring on the basis of gender, race, color, ancestry, national origin, or religious creed.

CONCLUSION

As President Barack Obama stated in his opening letter for *A Blueprint for Reform- The Reauthorization of the Elementary and Secondary Education Act*: “We must foster school environments where teachers have the time to collaborate, the opportunities to lead, and the respect that all professionals deserve” (p. 1). The Collaborative Teaching for ELLs (CTELL) program is designed to prepare math and science teachers for working in conjunction with ESL specialists as leaders of instructional development and change. Overall, the CTELL program is an investment in the future. Combining a technology platform, professional learning
communities, content-specific study, and preexisting capacity, the program is a template for change with exponential potential that will greatly enhance teaching and learning in the next five years and beyond.

REFERENCES


