Geometry Professional Development Series for Teachers – GPS for Teachers

Project Summary

The Geometry Professional Development Series for Teachers (GPS for Teachers) is a collaborative partnership between the University of Central Florida’s College of Education (CED) and College of Sciences (COS) and Orange County Public Schools (OCPS). It is widely documented the struggles teachers experience in implementing problem-based learning and higher order thinking in the classroom. Equally well documented are the achievement rates for students in mathematics, particularly Geometry. With the advent of both the Next Generation Sunshine State Standards (NGSSS) and the Common Core State Standards for Mathematics (CCSSM), many teachers and school districts are at a loss for how to teach mathematics based on these reform-based standards. Teachers and students are being held to a higher standard and there is a great need for sustained professional development to assist teachers in their classrooms and impact student learning in meaningful ways.

The purpose of GPS for Teachers is to design, test, and implement sustained professional development for high school geometry teachers. This professional development program will include addressing mathematical knowledge for teaching geometry (MKT-G) as well as tasks and activities which promote problem solving and higher order thinking which teachers can implement in their own classrooms. The specific goals of GPS for Teachers are to: (1) improve teacher content knowledge in geometry, (2) increase student achievement in geometry, and (3) develop and evaluate a professional development program for sustained and focused support for geometry teachers.
In cycle one, **GPS for Teachers** will seek to develop and pilot a sustained professional development program focused on Geometry. This will include collaboration between all partners to identify areas of need through a needs assessment, develop professional development workshops and modules to meet the areas of need, and pilot them with small groups of teacher-leaders to refine instruction and delivery prior to the summer institutes. The professional development model will include 60 hours of institute training in the summer with participating teachers followed by an additional 60 hours of follow up support throughout the school year and culminating with 30 hours of final summer institute to conclude the sustained professional development program. **GPS for Teachers** will provide OCPS and UCF, as well as other stakeholders throughout the state, with a tested and proven system for sustained professional development which impacts teacher practice and student learning in meaningful ways.

**Project Need**

The need for highly-qualified and high-quality teachers in high schools is evident. Challenges faced by teachers in high schools today are numerous including not only meeting the needs of diverse student populations, but also the need to show student achievement on standardized test measures. In Florida, teachers’ evaluations are now partly based on their students’ performance on state standardized measures including, in Geometry, the Geometry End of Course (EOCs) Assessment. EOCs are calculated into final course grades for applicable courses. Additionally, some of Florida’s EOCs are high stakes for students as awarding of course credit, and ultimately, high school graduation, are based in part by how well they perform on them. These EOCs, however, have a purpose for measuring student achievement and improving college and career readiness (http://fcat.fldoe.org/eoc/). All EOCs are aligned with state course descriptions
and NGSSS. Students and teachers alike must respond to these new demands of the NGSSS, CCSSM, and EOCs.

Teachers at all levels also often struggle with the mathematical knowledge needed for teaching their content (Ball, Thames, & Phelps, 2008; Swafford, Jones, and Thornton, 1997). Shulman (1986) described Pedagogical Content Knowledge (PCK) as this type of content-specific knowledge of teaching pedagogy which is beneficial and critical for teaching specific content, in this case mathematics. This is a different type of content knowledge than strictly mathematical knowledge or strictly pedagogical strategies, but combines the two into content-specific strategies. In mathematics, teachers need to not only know how to solve a problem for themselves. They also must be able to evaluate if a method chosen by a student is mathematically accurate, understand multiple means of representing a given problem or scenario, and respond to student misconceptions, all of which are content-specific. Ball and her colleagues (Ball, Thames, & Phelps, 2008; Hill & Ball, 2004) added to Shulman’s work in defining Mathematical Knowledge for Teaching (MKT) which encompasses not only PCK, but specialized content knowledge (SCK), knowledge of students and curriculum, and understanding the mathematical horizon, or the path on which students are following towards higher-level mathematics. Without an adequately high level of MKT, the teacher’s ability to meet the needs of diverse student populations, differentiate instruction, and respond to data-based assessments and interventions is hindered. It also becomes increasingly difficult to adapt instruction to incorporate 21st century skills (NAS, 2008) including the effective use of technology in instruction.

An additional factor facing students and teachers today is the implementation of high-quality standards for mathematics. In Florida, the Next Generation Sunshine State
Standards (NGSSS) have raised the level of expectation for student content performance in mathematics in the state of Florida. Florida EOCs are aligned with the NGSSS and state course descriptions. An additional demand is the need for teachers to be prepared to implement the Common Core State Standards for Mathematics (CCSSM) when they are fully implemented in 2014. The CCSSM contain two sets of standards, both of which are critical and necessary. The CCSSM are divided into the Standards of Mathematical Content (SMC) and the Standards of Mathematical Practice (SMP). Without an understanding of both the content and practice standards, teachers and students will not be prepared to teach and learn in classrooms of the future.

**GPS for Teachers** seeks to impact mathematical knowledge for teaching Geometry (MKT-G) and, ultimately, to increase student achievement in geometry through sustained and supported professional development. Through a collaborative partnership between the University of Central Florida (UCF) College of Education (CED), College of Sciences (COS) Mathematics Department, and Orange County Public Schools (OCPS), a sustained professional development program based upon research-based practices, problem solving, and student-centered learning will be undertaken which will impact geometry teachers in OCPS and their students in meaningful ways. Nationally, the National Assessment of Educational Progress (NAEP) results from 2009 indicate that overall student achievement in mathematics in Florida is lower than the national average. Additionally, white and Asian students scored, on average, higher than black and Hispanic students. This achievement gap persists when subscores for geometry are examined as well. Students are struggling in mathematics, and in geometry in particular as demonstrated by the data which showed only 69% of 8th graders could identify the side with the same length in congruent figures, a basic geometric concept.
Public schools also continue to lag behind private school counterparts for overall student achievement in mathematics. These trends have been consistent over the last 10 years, providing evidence that something must change in K-12 classrooms if student achievement is to be impacted (NCES, 2009).

Improving student achievement in mathematics can be achieved by addressing two essential components – teacher content knowledge and pedagogical activity in the classroom. GPS for Teachers will address both of these areas through sustained professional development which focuses on both the content knowledge of the teacher and the type of learning experiences provided to students aligned with NGSSS and CCSSM.

Since 2000, the National Council of Teachers of Mathematics (NCTM) has advocated that classrooms become more student-centered and less teacher-centered. This includes incorporating process standards such as communication; problem solving; reasoning and proof; representations; and connections (NCTM, 2000). In 2009, NCTM released Focus in High School Mathematics: Reasoning and Sense Making which continued to advocate for process standards in the high school classroom with a heightened focus on student-centered classrooms which foster students making sense of mathematics for themselves. This is well aligned with the Standards for Mathematical Practice (SMP) which are incorporated into the CCSSM. In order for classrooms to become more student-centered, teachers have to know and understand the mathematics they are teaching in different ways. The professional development in GPS for Teachers will focus on both of these critical aspects of teaching.

Project Design and Implementation
The goals of the proposed project are to: (1) improve teacher content knowledge in geometry; (2) increase student achievement in geometry, and (3) develop and evaluate a professional development program for sustained and focused support for geometry teachers. The objectives to meet these goals are to: (1) recruit 40 geometry teachers for each cohort from OCPS per year, with targeted recruitment in low performing schools and recruitment focused on teams of teachers; (2) create and evaluate 60-hour summer professional development training for geometry teachers (3) create and evaluate 90-hour follow up to summer professional development to be delivered as 60 hours throughout school year with 30 hour conclusion in second summer in mixed-media formats; (4) significantly increase teacher content knowledge in geometry as a result of participating in GPS for Teachers; (5) Significantly impact teacher practice through GPS for Teachers; and (6) increase student achievement scores for teachers who participate in GPS for Teachers.

Timeline for project development and implementation

<table>
<thead>
<tr>
<th>Dates</th>
<th>Activities</th>
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| September 2011 – April 2012 | • Observations in geometry classrooms (UCF CED and COS)  
• Focus groups with geometry teachers (UCF CED and COS)  
• Recruitment of teachers for summer training (OCPS)  
• Development of professional development series for summer and school-year follow up (UCF CED, UCF COS, and OCPS) |
<p>| May 2012            | • Piloting professional development series with instructional experts from OCPS (UCF CED and COS) |
| May 2012 – July 2012 | • Summer professional development series for cohort one – 60 hour summer institutes over four weeks. (UCF CED and COS) |
| August 2012 – May 2013 | • Follow up support for cohort one (UCF CED and OCPS) – 60 hour follow up throughout school year; average of 6 hours per month including online collaboration |</p>
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<tr>
<th>Time Frame</th>
<th>Activities</th>
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<tr>
<td>May 2013 – July 2013</td>
<td>• Teacher observations (UCF CED and COS)</td>
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<td></td>
<td>• Recruitment of teachers for cohort two (OCPS)</td>
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<td></td>
<td>• 30 hour summer conclusion of cohort one professional development (UCF CED and COS)</td>
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<td></td>
<td>• 60 hour beginning of professional development for cohort two (UCF CED and COS)</td>
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<tr>
<td>August 2013 – May 2014</td>
<td>• 60 hour follow up support for cohort two (UCF CED and OCPS)</td>
</tr>
<tr>
<td>June 2014</td>
<td>• 30 hour conclusion of professional development for cohort two (UCF CED and COS)</td>
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Year one of the proposed project will include development of the professional development program which will be piloted in the spring and implemented beginning in June, 2012. The creation of the professional development program will begin with focus groups and observations of geometry teachers in OCPS along with in depth analysis of district-based assessment results in Geometry to determine the needs of the teachers and students with regards to teaching and learning geometry. The state course description for Geometry, NGSSS, and EOCs benchmarks will also be used in identifying areas of need. The focus groups and observations will be conducted by members of the UCF team, both in CED and COS, with the assistance of PEER. Results of this analysis will then be used to identify topics and areas of need for the summer professional development training. The professional development will rely on research-based practices for teaching and learning geometry including the Van Hiele model and instruction to meet the needs of diverse student populations including English Language Learners (ELLs) and students with disabilities in the general education classroom. The professional development will include a three-fold purpose:

1. Provide sustained professional learning experiences for geometry teachers to increase their own content knowledge for teaching geometry.
2. Provide geometry teachers with research-based learning theories and methodologies for teaching and learning geometry including a focus on the SMP in the CCSSM.

3. Provide geometry teachers with activity-based, problem solving approaches for teaching geometry and assessing student learning in order to use data to drive instruction, differentiate instruction, and respond to intervention.

Research-based learning theories and methodologies could include, but would not be limited to, learning styles, visualization, proof readiness, student-centered instruction, and differentiation as well as the incorporation and proper use of technology in the geometry classroom including digital tools and resources both for the teacher and the student. The Institute for Simulation and Training (IST) will assist with project development for incorporating multi-media into the professional development series. Teachers will be provided with resources to take back to the classroom including selected readings, books, activities, and online resources including multi-media. The content included in the summer institutes will be aligned with the Next Generation Sunshine State Standards (NGSSS) and state course descriptions for geometry as well as the state Competencies and Skills Required for Teacher Certification in Florida related to geometry.

The professional development created will be piloted with instructional experts from OCPS in May 2012. This will assist the project team to refine activities and modules to improve teacher learning outcomes and provide a critical eye. Beginning in June, 2012, the first cohort of teachers will begin the professional development series created in year one. These participants will be pre-tested for mathematical knowledge for teaching related to geometry using the Diagnostic Mathematical Assessments for Middle School
Teachers (DMAMST) related to geometry. This test has been validated and tested for reliability through the University of Louisville Center for Research in Mathematics and Science Teacher Development. Participating teachers will take the assessment at three points in the program – at the beginning, after the 60 hour summer series, and at the end of the school year. Evaluation of teacher content knowledge will be examined through statistical analysis of the DMAMST test scores. See evaluation section for more information.

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<th>Professional Development Phase</th>
<th>Participant Activities</th>
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| Phase One (60 hours)          | • Attending professional development workshops held at UCF  
                                • Complete pre-assessment of MKT-G  
                                • Examine MKT-G  
                                • Participate in problem-based activities which can be taken back to the classroom  
                                • Collaborate with colleagues on lesson planning for implementation in school year  
                                • Complete mid-assessment of MKT-G |
| Phase Two (60 hours)          | • During school year  
                                • Observations of teachers in classrooms for fidelity of summer institutes  
                                • Attending one-day workshops each month held at UCF for follow up activities and debriefing of classroom activity  
                                • On-site support by project team virtually through Skype and face-to-face through site visits  
                                • Teachers provide evidence of student work samples for fidelity of implementation and discussion at workshops  
                                • Complete post-assessment of MKT-G |
| Phase Three (30 hours)        | • Final summer of professional development series  
                                • Supplement prior professional development  
                                • Incorporate issues of concern based on observations throughout school year  
                                • Teachers present posters related to lessons learned and student success stories  
                                • Posters displayed in culminating workshop in which stakeholders and new cohort are invited |
During summer 2012, teachers will participate in a 60-hour summer professional development facilitated by team members from UCF. The focus of the professional development will include both improving teacher content knowledge related to geometry based on the *Competencies and Skills for Teacher Certification* and facilitated discussions of student activities which focus on problem solving and situation-based learning of key benchmarks in the High School Geometry course as described by the state of Florida. A focus on using data to drive instruction and meeting diverse student needs will be incorporated throughout the professional development series. A lesson study approach will be taken with teams of teachers to assist them in examining their own practice. Follow up for the lesson study component will be included in the school-year based professional development. In meeting the needs of diverse student populations, topics including differentiated instruction and response to intervention will be addressed. Beginning in fall 2012, the professional development will shift to being school-based with observations of teachers in their classrooms, follow up one-day workshops each month, and online support through Skype provided collaboratively by all partners. Teachers will shift focus to implementation of lessons learned in the summer workshops into the classroom. Participating teachers will be asked to provide samples of student work and create a teacher work sample (TWS) to provide evidence of implementation of lessons learned into the classroom. In the summer 2013, cohort one teachers will participate in a final summer workshop in which they will present the ways they implemented problem solving and student-centered learning into their classrooms throughout the school year.

In summer, 2013, a second cohort of 40 teachers will begin the professional development program and follow the same structure as cohort one. Assessment data
will be collected throughout these activities and is detailed in the evaluation portion of the proposal.

Participating teachers will be given the option of receiving a stipend or a credit toward graduate tuition. All requirements must be met to be eligible for the stipend/tuition credit. Compensation will be distributed in 5-equal increments throughout the professional development period. Participating teachers will also receive a professional resource kit which will include manipulatives used in the summer professional development, resource books including NCTM's *Focus on High School Mathematics: Reasoning and Sense Making* and *Focus on High School Mathematics: Reasoning and Sense Making in Geometry*. Other resources will be based on identified needs and would include NCTM resources, other published materials, and web-based materials.

**Evaluation**

The evaluation of this effort will be continuous, and a joint effort involving each of the participating partners, as well as an external component conducted by Program Evaluation and Educational Research Group (PEER), at UCF. Methods will employ a range of both quantitative and qualitative methods that will be grounded in explicit advance agreements between UCF and each district. Formative evaluation, which will provide recommendations and allow for modifications to improve impact, will play an important role in validating and directing the project activities, outcomes and deliverables. Timely formative feedback to/from project stakeholders on implementation, participants’ perspectives about the success of the activities and what they may have learned, how objectives are being met, etc. will be gathered. Summative evaluation will focus on how well goals and objectives are being met, and the overall impact of the project. PEER will prepare a summative report each year, which emphasizes the
metrics used and associated results drawn from each institution, as well as a rich
description of what activities occurred. It will focus on the project’s achievement in terms
of its stated goals and objectives, the metrics for success related to the project activities;
and drawing conclusions and giving recommendations. Evaluation standards
(Yarbrough, et al. 2011) will be followed.

Bonnie Swan, PEER Director, will coordinate the evaluation process, assist with
performance measurement, and provide objective feedback. Evaluation oversight will be
provided by Conrad Katzenmeyer, Consultant who will add value and objectivity to
evaluation planning and implementation by reviewing the evaluation plan, verifying task
completion, and reviewing reports and analysis. Effectiveness data for teachers and
achievement data for teachers’ students for the treatment and comparison groups will
be organized and provided to PEER by each district partner. Other data related to
teacher performance as it relates to experiences in the professional development and
other UCF supported activities will be collected by PEER supported by the project team.
PEER will work with the project team to develop instruments from proven items;
maintain an up-to-date profile of the program, problems, and visual aids; and maintain
information on project related products, activities, and events.

Evaluation will use components of the CIPP model (Stufflebeam, 2003). It will use a
quasi-experimental matched comparison design. Effectiveness of participating teachers
will be compared to non-participating teachers through a comparison of post-test
achievement data including EOC, district-based assessments, and final grades. Project
Development and Implementation analyses will examine the effectiveness of the
program at the beginning stages. Emphasis will help direct the project and determine
whether planned approaches and strategies are evident. It will be used to describe how
participants are identified, recruited and retained. **Context** evaluation will be used to help assess teachers’ needs, views and opinions, and their current state of practice in the early stages. For this, PEER will provide assistance for a series of focus group and observations in a representative sample of schools. Interviews with program leaders and other stakeholders will be held to review and discuss their perspective on beneficiaries’ needs, potential useful assets, and to help identify any problems the program will need to solve. **Input** evaluation, which is already underway, will identify and investigate existing programs that can serve as a model for the contemplated program and to identify potential barriers and time requirements. **Process Evaluation** will be used to monitor, document, and assess program activities. Other formative evaluation will provide recommendations and allow for design modifications to improve the program’s impact. What evidence provides documentation of assurance that the content a) is error-free; b) supports research-based instructional methods; d) utilizes student appropriate language and standards-based vocabulary; and e) meets the integrity of the standard including cognitive complexity? The training content, lesson development, and other-activities development will be evaluated using a responsive approach (Guba & Lincoln 1989; Abma & Stake 2001). Stipends for teacher leaders to provide input to review and help determine the quality and perceived utility of the content and professional development plan using a written critique within an established framework is included in the budget. Process and formative evaluation questions will be used to help coordinate and strengthen the project’s activities and products, answering important questions, including: Is the project providing high-quality experiences? What impact is the project having on participating teachers’ attitude, interest, and confidence related to teaching/learning geometry? To what extent are teachers using the content to
replace some their standard lessons? How do the teachers perceive the benefits of using the new content? Does it integrate well with other content they need to use? How do users interact with each other, do they continue form relationships that benefit the classroom? Because it is expected that the project will begin to change the way partnering districts and UCF prepare teachers those stakeholder perspectives will also be gathered. A website-content-and-utilization review will be performed at different stages. Additional research conducted by UCF faculty will also inform the project. Table 1 maps the evaluation questions and measures for the intermediate outcomes planned.

Table 1. Analytic Framework for the Process and Implementation Evaluation

<table>
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<tr>
<th>Intermediate Outcomes</th>
<th>Research Questions</th>
<th>Data Elements and Sources</th>
</tr>
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<tbody>
<tr>
<td>Goals and Objectives: Are they being met?</td>
<td><strong>Project timeline; Descriptions of project related events; Recruitment strategies; Project database; Interviews and web-based questionnaires with developers, project team, stakeholders, and reviewers; Pre and post surveys and inventories; Focus groups; Classroom observations; Follow-up surveys; Expert review; Project related correspondence; Website review</strong></td>
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<td>Are planned approaches and strategies</td>
<td>Client demographics and characteristics?</td>
<td>User profile; Project records; Instruments include items for demographics and characteristics; Attendance taken at project related events; Number of schools/classrooms/students/teachers/mentors involved; FDOE website</td>
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<td>evident?</td>
<td>Services received: What components are they using? How long and how frequently?</td>
<td>Descriptions of project related events; Description of services offered and received; Project records; Timeline and operating plans; Number an descriptions of schools and teachers at project related events; Field notes; Focus groups with teachers and with mentors; Surveys with project staff and participating teachers, mentors and other important stakeholders; Project staff and evaluator observations; Evidence of student work</td>
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<td>Service delivery: How are they coming to use the content and practices? How and when do they use it?</td>
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<td>Satisfaction: How satisfied is the target population with the services they receive?</td>
<td>User questionnaires and rubrics; User satisfaction and follow-up implementation surveys; Focus groups with teachers and mentors; Interviews with the project staff and other important stakeholders; Roundtable meetings</td>
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Summative/Outcome Evaluation at each year end will focus on outcome measures based on the stated objectives plus formative feedback for the next year. Annual reports will document the extent to which the intended and unanticipated impacts have been achieved, and draw conclusions and recommendations and answers to the questions in the following table. The project team will review these reports and develop a plan to address each recommendation.

Table 2: Analytical Framework of the Summative and Outcome Evaluation

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Final Outcomes</th>
<th>Data Elements and Sources</th>
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<tr>
<td>To what extent does the project meet the stated goals and objectives for change or impact? Which components are the most effective? Which need to be improved?</td>
<td>See Exhibit 1**: Comparison of teacher users and non-users for: a) students EOC scores, and course grades and the b) Districts’ teacher effectiveness ratings</td>
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<td>What is the perceived effect on organizational knowledge and behaviors; improved and increased linkages, etc.</td>
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<td>Is project related research of a professional quality?</td>
<td>Review of dissemination plan; Record of research publications and presentations</td>
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<tr>
<td>Cost effective?</td>
<td>Cost per teacher, student and classroom; Project records</td>
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<tr>
<td>Has the project had a broader and continuing impact? Can the product be sustained beyond the funding period?</td>
<td>Project records; Dissemination plan and established timeline; Feedback from others, outside the initial collaborative who have benefited from the project</td>
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Support for Strategic Plan

This project has goals and objectives that directly and indirectly address three of the Strategic Areas of Focus of Florida’s Next Generation PreK-20 Education Strategic Plan. The most obvious is in Improving the Quality of Teaching in the Educational System. GPS for Teachers addresses this through the development and implementation of a sustained professional development series which can be used not only within UCF and OCPS, but with other school districts and stakeholders across the state of Florida. The
program focuses on equipping geometry teachers with the knowledge and skills to teach geometry with understanding and to improve student achievement in this area. **GPS for Teachers** will also work to address *Strengthening Foundational Skills* and *Improve Career and College Readiness*, as the project seeks to not only improve teacher content knowledge in geometry, but also to impact student achievement. The professional development proposed will also integrate content-literacy and effective strategies for mathematics instruction, thus aligned with Just Read Florida and the Math/Science Initiatives.

**GEPA and Private School Access**

Under Section 427 of the General Education Provisions Act the recipients of federal funds are required to describe the steps that will be taken to ensure equitable access to the **GPS for Teachers**. The University of Central Florida is in full compliance with all applicable Federal and State laws with regard to equitable access. This project will not deviate from that commitment in any fashion. Access to all of the services provided by this project will be made available to anyone regardless of gender, race, national origin, color, disability or age subject to the approval of the funding agency. To assure Equitable Services for Private School Participation in accordance with P.L. 107-110, the respondents will support OCPS in providing consultation for equitable services to students and teachers in private schools within their respective districts. The respondents will, contingent upon funding agency request and contractor acceptance, provide service directly to private students and teachers.

**Dissemination Plan**

Dissemination of results of this project will take place in a variety of ways. Results of this project will be shared with stakeholders and interested parties both locally and
across the state of Florida. University faculty will present findings and experiences at appropriate state conferences as well as within local school districts. Manuscripts will be prepared and submitted to teacher education journals to inform the education community and the public at large of the results of the professional development program. The professional development created will be available to be used by project partners after grant funding has concluded and can be infused into coursework at the university where appropriate. The final professional development series will be packaged and distributed to all interested parties within the state of Florida, both university based and school districts through the project website. A project website will be developed in year one by UCF partners and will be maintained by project staff at UCF. The website will include the project proposal, resources for participants to use in their classrooms, ongoing progress of the grant, scheduled services provided by the project, and contact information for grant personnel and for access to final professional development. The website will be updated in a timely fashion, with regular updates occurring on at least a monthly basis. The UCF CED has a technology support office which exists to support faculty and the goals of the college.

**Budget**
# BUDGET NARRATIVE

## UCF College of Education Expenditures

Janet Andreasen will serve as Principal Investigator assuming responsibility for all project activities, expenditures and oversight of cooperative agreements. Dr. Andreasen will dedicate 25% her time to the project at a first year cost of $11,390.

Selcuk Haciomeroglu will serve as Co-Principal Investigator with responsibility for development and support of professional development component, classroom observation and follow-up support. Dr. Haciomeroglu will dedicate 25% of his time at a first year cost of $13,218.

Manong Pang will be responsible for website design, development, maintenance and support at 10% for a total of $3,600 during year one.

The approved fringe rate for the UCF is 33.4% for a first year total of $9,421.

There will be three graduate assistants employed to support project activities. These students will work 20 hours/week at $12.10/hr. They will have tuition assistance for twenty-four credit hour/year for a total of $20,031 each during year one.

Instructional material and supplies will be $8,400 during the first year to which includes instruments to measure content knowledge and class-specific material and supplies.

Dissemination will be through professional conferences in years two and three. There is no first year cost.

## College of Sciences

Maria Capursi, Co-PI will be on project for 25% during year one and 15% during years 2 & 3. She will collaborate as a content expert for professional development. The first year total for her involvement is $10,440.

The evaluation of the program will be conducted by Program Evaluation and Educational Research Center. The first year cost to develop the evaluation protocol and to implement data collection procedures will be $50,000.

Each participant will provided a professional resource kit which will include textbooks and software. During the first year this will only be purchased for the first cohort at a cost of $40,000.

## Orange County Public Schools

OCPS will provide personnel to serve as project liaison at $15,000/year and to handle data collection at $10,000/year.

Stipends will be paid to participants, which may be taken as credit for graduate tuition or cash payment, is based on 40 participants per year. Students will receive stipends of $1,000 on the completion of each of the five separate professional development units. First year expenditures will be $40,000.

Work with UCF faculty and Institute for Simulation and Training to develop professional development modules. This will entail involving OCPS educators in the design, development, piloting and implementation of the modules. This is an essential component of sustainability beyond the end of the grant. The cost for this during the first year of this project is $170,000.