Sacramento STEM-POWER
Application for Grant Funding through the
Teacher Quality Partnership (TQP) Program
CFDA Number 84.336S

June 26, 2018

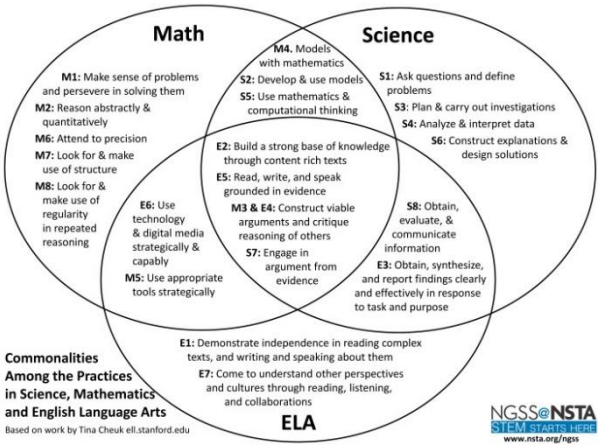
Table of Contents

Sacramento STEM-POWER
(Science, Technology, Engineering, Mathematics, and Computer Science for Powerful Teaching and Learning)

As California's capital city and at the heart of the world's 5th largest economy, we envision the Sacramento region as a place where diverse students engage in vibrant, standards-aligned STEM learning delivered by highly skilled and knowledgeable prospective and experienced teachers committed to maximizing learning opportunities for all students. To this end, Sacramento STEM-POWER will provide multi-year, intersegmental and collaborative professional learning to 20 teacher preparation program faculty and 70 mentor teachers, ensuring inclusive, high-leverage STEM practices are the norm in Sacramento. STEM-POWER will create a coherent and aligned set of teaching practices for prospective, new, and veteran teachers (including mentor teachers), from Multiple Subject teacher preparation classes to TK-8th grade classrooms. We will develop a recognizable approach for high impact urban teacher preparation, focused on STEM, with the goal of sharing our framework with other teacher preparation programs and expanding our collaborations beyond the original participating districts.

STEM-POWER is powerful teaching and learning in STEM and Computer Science (CS) subjects with strong inter-disciplinary links across STEM/CS disciplines and with content literacy, and research-based literacy and English language development practices. STEM-POWER is for all students, especially those who are diverse, are English learners and have special needs (including gifted abilities). STEM-POWER provides teachers with the tools to hone in on "core

Figure 1: **Intersections of Practice**



student outcomes" at the nexus of the California K-12 English/Language Arts, Mathematics and Science/Engineering content standards where students:1) build a strong base of knowledge through content rich texts; 2) read, write and speak grounded in evidence; 3) construct viable arguments and critique the reasoning of others; and 4) engage in argument from evidence (See Figure 1; National Science Teachers Association [NSTA], n.d.). Sacramento State's current research-based literacy methods and English language development methods courses[1] will be a thread that knits together STEM-POWER, highlighting the ways strong content literacy learning can enliven challenging subject matter. STEM-POWER encompasses **inclusive practices** and utilizes a **strong assessment framework** to inform instructional planning. Inclusive practices include Universal Design for Learning (UDL); Positive Behavior Intervention and Support (PBIS), and Multi-tier System of Supports (MTSS) Tier One and Tier Two skills and collaboration protocols needed to use MTSS-Tier Three skills. Each of these inclusive practices ensure all students have access to core content and are assessed equitably. UDL is a set of principles, based on cognitive science, that frame the design of curriculum and pedagogy that meets the learning needs of all students. PBIS focuses on positive actions teachers take to help students fully engage in classroom activities and tasks. The inclusive practices component of STEM-POWER ensures that prospective teachers will have the knowledge and skills needed to effectively differentiate instruction (for English learners and for struggling students as well as

[1] All candidates complete 6 semester units of literacy instruction focused on strategies to teach concepts about print, phonemic awareness, phonics, fluency, vocabulary, comprehension of narrative/expository texts, screening, diagnostic, and formative/summative assessment tools to identify the needs of struggling readers and implement interventions, and principles and techniques for teaching writing, especially in settings that serve students with disabilities and English learners. Literacy instruction competence is assessed by the state-mandated Reading Instruction Competency Assessment-RICA which all new teachers must pass. Candidates also complete 3 semester units of English Language Development methods, preparing them to deliver instruction aligned to the California English Language Development standards.

gifted students) and to participate on Individualized Education Program teams as defined in IDEA (Individuals with Disabilities Education Act). Our assessment framework teaches new and prospective teachers to analyze student performance data (e.g., state standardized tests) and implement strategic formative assessments (e.g., content probes, mind maps, exit tickets, etc.), especially those that conform to high leverage content practices and the UDL framework (multiple means of expression and action), so they deepen their understanding of student learning and use critical data for instructional decisions.

Sacramento STEM-POWER will be implemented by an **instructional team** of 70 veteran teachers (primarily mentor teachers working with prospective teachers during their year-long clinical experiences) from Sacramento City Unified School District and San Juan Unified School District, along with 20 teacher preparation program faculty members from Sacramento State (instructional faculty with expertise in Education, Biology, Chemistry, Physics, Earth Science, Mathematics, and Computer Science and multiple subject program clinical supervisors). This group, the instructional team, will implement STEM-POWER in their respective instructional contexts, specifically TK-classrooms and Sacramento State's teacher preparation program courses and clinical experiences. Through **innovative professional learning**, created by our professional learning team (which includes Sacramento State content faculty and district experts), the instructional team will jointly acquire expertise about STEM-POWER content and inclusive strategies (UDL, MTSS-Tier 1 and 2 strategies, high leverage literacy practices, and use of strategic summative and formative assessment cycles.) All members of the proposed project will implement STEM-POWER so that prospective and future teachers enter the profession prepared to teach, in differentiated ways, all students to high levels of achievement, regardless of ethnicity, primary language or ability.

This focus on STEM education is timely. Plans for moving the Sacramento's Powerhouse Science Center into a larger and more visible space are accelerating (Lillis, 2017). Sacramento State expects to occupy its new $91 million-dollar Science Building in 2019 and recently inaugurated its Dale and Katy Carlson Center for Innovation and Entrepreneurship (Fitzbaugh, n.d.). The Sacramento region is also emerging as an arts mecca (e.g., the expanded Crocker Art Museum, recent opening of the Shrem Art Gallery, the new SOFIA Performing Arts Center) and a culinary destination (Moon, 2018).

While the region has an ambitious development agenda, cautionary signs must not be ignored about the need to transform its educational system to provide the quality of human capital required for such economic growth. For example, none of the local school districts has identified STEM education as a formal priority. The Sacramento Metropolitan Area is slightly higher than the national average for persons over 25 with a bachelor's or higher degree (30.4% vs. 28.8%), but significantly lower than in the San Francisco or San Jose areas (44.5% and 45.7%, respectively, https://statisticalatlas.com/). According to a 2013 Brookings study (Rothwell, 2014), the Greater Sacramento region ranks 32 among metropolitan regions in terms of prevalence of STEM jobs, while San Jose ranks #1, and San Francisco #7. To remain competitive, the region must refocus its educational system on STEM. If these labor market factors are not addressed, the region's students will suffer the ill-effects. Echoing these findings, our partner school districts report struggling to provide needed STEM professional learning to their teachers (See Appendix C).

Compounding this teacher shortage is a host of challenges faced by many districts in implementing NGSS professional development (Gao et al., 2018). These challenges include: 1) teacher content knowledge gaps; 2) low teacher comfort levels with the NGSS science and

engineering practices; 3) the misalignment of NGSS and high school course offerings and district graduation requirements; and 4) chronic shortages of materials and equipment for NGSS lab activities. Our districts echo these challenges, as the needs assessment indicates a strong interest in STEM professional learning but a deployment of resources primarily to mathematics (See Appendix C). STEM-POWER has the potential to significantly and positively impact this situation by improving STEM knowledge and skills of 70 veteran teachers (30-35 in each partner district), including mentor teachers, while preparing all prospective teachers from our program to enter the profession with strong STEM instructional capacity.

To reach this potential, STEM-POWER addresses several key limitations of teacher preparation programs both nationwide and within our program. First, teacher preparation curriculum is often broad, theoretical, and focused on exposing candidates to a wide range of topics rather than providing "deep learning" (Darling-Hammond, 2015) around core content and skills essential for new teachers to master. Moreover, teacher preparation program pedagogy often relies on conventional academic strategies (lectures, discussions) to convey information and to assess prospective teachers' abilities (essays, papers, etc.). Instead, our aim is to use professional learning and coaching strategies (CDE, 2012, 2014; Gallucci et al., 2010) and provide prospective teachers completing their year-long clinical experience with recursive opportunities to demonstrate and perform competencies, thereby supporting them to develop a professional "practice" based on mastery of high leverage strategies central to teaching effectiveness, especially for diverse students (Ball & Forzani, 2009). Such an approach will stand in stark contrast to the "coverage" approach where prospective teachers are exposed to many topics but have limited opportunities to enact them or refine them and, consequently, feel confident implementing them in varied situations.

Second, a structural deficiency parallels this general curricular deficit. Lack of coordination, agreement, coherence, and theory-to-practice linkages between teacher preparation coursework and clinical experience often cause cognitive dissonance for prospective teachers. Under these conditions, candidates typically revert to teaching as they were taught or they discount the content of their courses, opting instead to mimic what they see in clinical practice, even if it is not effective. By contrast, if there is cognitive consonance, prospective teachers are more likely to experience deep learning of the program's theoretical and practical content and take risks to apply that deep learning to become as effective as possible as a beginning educator (Cochran-Smith, 1991; Darling-Hammond, 2006; Noel & Sessoms, 2009).

Third, pre-service teachers tend to be primarily white and women (Loewus, 2017). The demographic profile of California teachers remains stubbornly unreflective of public school students. In 2016-17, 5.6% of the state's public-school children were African American but only 3.6% of its teachers were the same. Meanwhile 54% of its students were Hispanic/Latino and served by 20% Hispanic teachers (California Department of Education [CDE], 2017). This lack of parity has been evident for decades (Harrington, 2015). In exceptional cases where the gender and ethnic diversity of the teacher workforce has increased (e.g., Oakland, California and Boston, Massachusetts), a strategic and coordinated set of interventions have been used including recruitment strategies, professional identity development, curricular alignment of coursework and clinical experiences, and strong district/university partnerships. STEM-POWER will build on existing practices at Sacramento State (e.g., EduCorps, Math/Science Teacher Initiative-MSTI, support to high school Future Teachers Clubs, and regular on-campus advising events) with new strategies aimed at improved communication, targeted recruitment, early career exploration, streamlined and seamless advising, and more attractive programmatic offerings

(e.g., MAT, new bilingual options) so that our region will be successful in recruiting diverse prospective teachers to this noble profession.

The fourth concern is that new teachers in urban settings, like our partner schools, with concentrations of high poverty and extensive student diversity (language, culture, race, ability) have the highest rates of attrition nationally. In their analysis of national survey data, Carver-Thomas and Darling-Hammond (2017) found that teacher turnover rates are 50% higher in Title I schools than in non-Title I's, and that attrition rate rises to nearly a 70% higher rate for Math and Science teachers in Title I schools. Because the most vacant positions are in Title I schools, it is imperative that teacher preparation programs prepare prospective teachers to be effective with students who are low income and have multiple diversities (racial, linguistic, ability).

Districts in the Sacramento region serve high needs pupils and face an historic shortage of effective teachers (See Table 1 below and Appendix C). The current teacher shortage negatively impacts the most vulnerable students – low income, English learner, students of color, and students with disabilities (Darling-Hammond, 2007) – who comprise most students in our partner districts. As the districts intensify recruitment, they also encourage Sacramento State's teacher preparation program to transform the way future teachers are prepared by improving recruitment, especially of diverse candidates, and by preparing prospective teachers with more innovative curriculum and pedagogy, so they exit our programs with the strong initial skill set needed to thrive and persist in the profession.

To address these issues Sacramento **STEM-POWER will provide a multi-year, intersegmental and collaborative professional learning program to ensure high-leverage, inclusive STEM practices are the norm in Sacramento - spanning the "learning to teach continuum" of teacher preparation programs through clinical experience to mandated two-**

year induction programs. Using action research, STEM-POWER immersion via successive summer institutes, and academic year professional learning (lesson study and coaching), our instructional team will transform our teacher preparation program curriculum and pedagogy, ensuring future and prospective teachers enter their first teaching position with strong skills and deep commitments to the profession. STEM-Power will improve learning for all TK-8 students especially English Language Learners (ELL), students from diverse cultural backgrounds and/or those with disabilities. To do so we will achieve four goals (see Table 2, page 23):

- Goal 1: Recruit highly qualified individuals including those from minority groups into teaching.
- Goal 2: Improve the instructional effectiveness of prospective and current teachers by improving the preparation of prospective teachers and enhancing professional development activities for new teachers.
- Goal 3: Ensure the Sacramento State multiple subject teacher preparation program is accountable for preparing teachers who meet applicable State certification and licensure requirements.
- Goal 4: Improve student achievement.

a. Quality of Project Services

i. Collaboration with appropriate partners for maximizing effectiveness.

Sacramento State's TQP includes six educational entities. (1) Sacramento State serves as the eligible Institution of Higher Education and will consist of a partnership between the (2) College of Education, (3) College of Natural Sciences and Mathematics, and (4) College of Engineering and Computer Science. (5) two Sacramento area TK-12 school districts, all high-need LEAs and (6) thirteen high-need TK-8 schools (see Appendices A, C and D).

All partners meet the definition of TQP eligibility. Sacramento State is a four-year comprehensive public university and part of the 23 campus California State University system. Our prospective teachers complete a 5th year, post-baccalaureate multiple subject (TK-8) teacher preparation program. All requirements (earning grades of B- or higher in all courses, including the year-long clinical experience; passing four state-mandated tests (California Basic Educational Skills Test-CBEST, California Subject Exams for Teachers-CSETs, the Reading Instruction Competence Assessment-RICA, and the EdTPA, a state-mandated summative performance assessment) must be met before a recommendation for a preliminary teaching credential can be submitted. The CBEST and CSET are admissions requirements while the RICA and EdTPA are summative assessments. Our program's passing scores for first-time attempts are 85% on the RICA and 95% on the EdTPA; 100% of those recommended for a preliminary credential must pass all tests (two attempts permitted on the EdTPA, unlimited attempts on the RICA).

In addition to Sacramento State's three colleges and its multiple subject teacher preparation program, there are two district partners for this project. These districts are long-time partners to Sacramento State. This continued joint work will strengthen STEM instruction for all our students and create efficiencies within our systems, particularly around teaching performance expectations and, subsequently, the districts' ability to hire new teachers from Sacramento State's program. Sacramento City Unified School District (SCUSD) is a high needs LEA for both student and teacher criteria as detailed in Table 1. San Juan Unified School District (SJUSD) meets the high needs criteria for teachers. Based on 2016 US Census Data, this district is 200 students below the 10,000 students in poverty threshold. We are including them as a second, high needs LEA because of their teacher data and because their Free/Reduce Price Meals eligibility index has risen from 50.3% in 2016 to 54.1% in 2017. The district is clearly

experiencing a shift in the income status of its residents, concomitant with significant labor force needs. Including them in our partnership will allow their teachers to proactively respond to increasing poverty among their students rather than react in an ad-hoc manner.

Table 1: LEA High Need Eligibility Data, Poverty and Teacher Need

District	Children from low income families	Teachers teaching "without full credential"
Sacramento City Unified School District	13,719	4.8%
San Juan Unified School District	9,810	2.59%

Source on Poverty: United States Census Bureau. SAIPE School District Estimates for 2016
Sources on Teacher Need: Sacramento City Unified School District and San Juan Unified School District School Accountability Report Cards, 2016-2017

Sacramento State's Teaching Credentials Department enjoys a long history of strong collaborative practices with its district partners, especially focused work on **new teacher recruitment and support**. The teacher preparation program coordinators and partner district staff jointly implement and monitor a process for identifying, training, and supporting mentor teachers. This process is initiated each spring and then regular communication continues throughout the year. Sacramento State works collaboratively to connect its district partners to prospective teachers through one-time requests and jointly hosted recruitment events. Campus representatives also participate in the Capital Region Network, an intersegmental group of LEAs and IHEs in the region that convenes to align pre-service curriculum with the curriculum of state-mandated two-year **induction programs** (operated by the districts with state funding). The College of Education, together with the Sacramento County Office of Education, recently founded the **Educator Retention Network** in which our partner districts participate to gain expertise on teacher retention. Moreover, we enjoy significant "cross-fertilization" with partner superintendents and executive staff serving on College of Education program advisory boards and our faculty serving on a range of partner district committees, taskforces and working groups.

Sacramento State's faculty work across disciplinary domains to provide professional learning to educators in our region. Faculty in the Colleges of Education, Natural Science and Mathematics and Engineering and Computer Science have a history of joint work on professional development projects for local educators and have a successful history of securing external funding for their initiatives. Beginning in 2002, faculty in these colleges have provided professional learning in inquiry-based, culturally responsive science and mathematics to over 400 elementary educators in SCUSD and SJUSD. Specialized programs focused on NGSS constitute more recent programming, with over 200 high school science teachers participating in these sessions since 2013, with intensified focus following the passage of the 2015 Every Student Succeeds Act. The Colleges of Education and Natural Sciences and Mathematics also jointly sponsor a selective high school science and math teacher leadership program, funded by the National Science Foundation. Content faculty active in these programs will comprise our interdisciplinary Professional Learning Team, ensuring that the proposed professional learning offerings contain the NGSS-aligned content, current Computer Science content, inclusive practices and summative and formative assessments for diverse learners. Sacramento STEM-POWER will continue these durable collaborations, as detailed below.

ii. Services reflect up-to-date knowledge from research and practice.

This section briefly describes the research base behind the professional learning activities STEM-POWER will use to transform the content and pedagogy of Sacramento State's teacher preparation program and ensure that prospective teachers achieve competence with STEM-POWER beginning with their coursework, continuing during their clinical field experience, and into their first teaching positions. Drawing on 20 years' experience with professional learning for educators, the STEM-POWER **Leadership Team**, comprised of the Principal Investigator, the

Project Director, content lead faculty, and district specialists, will work with the Professional Learning Team to create the professional learning curriculum for the instructional team (20 faculty members, 70 mentor teachers). This curriculum will build on the California Standards for Quality Professional Learning, published by the state Department of Education (CDE, 2014). All sessions will respond to the needs and interests of the instructional team (determined through professional knowledge scales, self-assessments, surveys, and analysis of products produced by participants) and the overall professional learning goals of STEM-POWER. Moreover, the proposed professional learning aligns with the work of Garet et al. (2010) whose multi-pronged professional development program had a significant effect on improving instructional practice of middle school mathematics teachers (see Competitive Preference Priority 1). While Garet et al. (2010) offered a 1-year program with 76 hours of professional development, our program envisions using the same activities (76 hours of professional development via action research, lesson study, coaching and summer institutes) for 5 years, giving the instructional team a sustained opportunity to progressively deepen their knowledge base and comprehensively transform instruction for their respective teaching contexts (e.g., TK-8th grades, teacher preparation program courses).instruction.

The STEM POWER professional learning will be comprised of four elements:

1. Learning from experts and the literature, accessed through "book talks" and presentations, with discussions and analysis occurring during monthly face-to-face seminars.
2. Action research conducted by all members of the instructional team on questions related to urban teacher preparation.
3. Summer institutes which provide intensive, immersive experiences with a focus on deepening content learning, especially around content at the nexus of the science and math

standards, with clear applications to computer science (e.g., understanding patterns, basic coding tenets and their relationship to math, gaming concepts); hands-on opportunities to practice inclusive practices and formative assessments; and, facilitated planning time.

4. Academic year continuous improvement sessions (using Years 2-3 lesson study, Years 4-5 coaching, and periodic seminars Years 1-5) which provide on-going support for transformation of practice in coordinated and coherent ways across stakeholder groups.

These services reflect research on "best practices" in teacher preparation and teacher professional learning. Book talks will alert the instructional team to key issues facing urban teacher educators and the extended dialogue will allow the team to generate knowledge collaboratively and to develop shared understandings and language around the goals of the project (Burbank, Kauchak, and Bates, 2010). Action research will provide the instructional team with a structured opportunity to explore theoretical issues or problems identified generally and apply them to their own distinct context. Findings generated by action research further cements the collective understanding of the group and deepens their sense of efficacy and confidence (Cammarota et al., 2016; Sagor, 2000). Specific STEM-POWER "problems of practice" will be the core focus and content of the summer institutes will emerge from the needs, dilemmas and challenges of the instructional team. This authenticity increases engagement and commitment to innovation and risk-taking. The immersive qualities of the summer institutes (Garet et al., 2010) also provide the intensity needed to shift perspectives and disrupt long-held beliefs – but in a way that is supportive and focused on growth rather than deficits. On-going, regular learning sessions during the academic year, averaging 4 hours per month via lesson study (years 2 and 3), coaching (years 4 and 5) and periodic seminars (all years), ensure that the shifts, "a-ha's," new content learning, and increased pedagogical confidence gained during the summer institutes are

extended and fortified (Park et al., 2013). The collaborative nature of lesson study (Year 2 and 3) (Lewis et al., 2006) and the highly individualized learning of instructional coaching (Years 4, 5) (Gallucci et al., 2010) provide maximum support to educators engaged in the fundamental work of transforming long-held beliefs and actions.

iii. Services are of Sufficient Quality, Intensity, and Duration for Improvements in Practice.

Sacramento State is a leader in partnership innovations (receiving the 2006 and 2008 California Council on Teacher Education Quality Partnership Award, also see publications by Wong & Glass, 2009, and Noel, 2013) and strives to set the standard for high quality urban teacher preparation. Our proposed project emerges out of this history and recent pilot programs and aims to amplify and expand them

The four-part professional learning proposed here aligns well with the literature on professional development that impacts instruction and draws from important lessons that our team has learned about what works best when making deep programmatic and pedagogical changes. The professional learning includes high quality strategies that have been documented to transform teaching. The intensity varies –from highly intense (summer institutes) to moderately intense (academic year learning) - mapping onto the level of cognitive load and change that teachers can handle while also attending to their classroom and school duties. Finally, the five-year timeline is ideal in terms of supporting educators to make deep transformations of their practice. We provide additional background on each of these three categories below.

All proposed activities are **high quality** and are included deliberately to affect specific kinds of educator learning. Initial activities (book talks, action research) in the five-year program, will provide the instructional team with an opportunity to define the issues for themselves. Educators are often seen as the source of problems and are infrequently viewed as part of the solution

(National Network of State Teachers of the Year, 2015). By engaging our instructional team in defining the issues for themselves and collecting data around them, they will become more informed about key issues in their respective practice. Consequently, our team will build capacity and assume the role of educators who direct change rather than resist it. Spending six months on establishing this collective knowledge base allows for sufficient time to explore and deepen understandings but does not mire the team in theoretical considerations with limited practical connections. The regular participation in sequential summer institutes, coupled with coordinated extension activities during the subsequent academic years, will ensure there is **intensity** when the team is most able to absorb it (summers) and continuity when the team must focus on their daily "realities" and on how to modify their teaching incrementally. Moreover, there will be an adequate balance of whole teamwork to ensure shared understanding, combined with role-specific learning (e.g., mentor teachers together, university faculty together).

In our partnership's prior professional learning experience, important shifts in educators' perspectives and willingness to take risks occurred when the following elements were in place: 1) sufficient inputs of new knowledge; 2) opportunities to collectively and individually make sense of the new knowledge; 3) immersive experiences designed to help shift perspectives; 4) low stakes and repeated opportunities to try new practices with a focus on experimentation and learning rather than performance; and 5) clear structures to guide application into practice. In Project TEAMS,[2] a project funded by the CA Department of Education, we used a combination of learning activities, including academic year seminars, lesson study, and coaching with

[2] Project TEAMS (Triangulating Educational Achievement via Mathematics and Science) was an 18 month professional development effort focused on six elementary school-based teams in SCUSD and SJUSD where general education teachers, special education teachers and the site administrator developed NGSS content knowledge, improved NGSS pedagogy, and provided professional learning activities to others at their school sites.

immersive summer institutes, to improve teachers' content and content pedagogy knowledge. The evaluation reported statistically significant findings related to gains in teacher content knowledge and confidence related to NGSS and UDL-aligned pedagogy. We are including many elements from TEAMS in STEM-POWER, which also matches well with the multi-pronged strategy used by Garet et al (2010) in their efforts to help teachers use content and pedagogical content knowledge to analyze teaching and student learning and apply it to their teaching.

The proposed 5-year **duration** of the project is ideal. In prior work, we have observed significant shifts during the third year of professional learning. For this project, we have added two additional years to truly cement the transformation of our educators' instructional practices, in TK-8 and university classrooms while developing their competency with a wide number of instructional practices. This 5-year timeframe means we will conclude with firm exemplars in place and efficacious practitioners – both in TK-8 and university classrooms – who have participated in several improvement cycles, rather than just one or two.

Finally, this project expands on Sacramento State's efforts to build a **recruitment pipeline** to attract diverse and prospective teachers interested in careers as elementary teachers with added expertise in STEM education. Specifically, through grants from the College Futures Foundation, US Department of Education, and the National Science Foundation, we are developing and strengthening our recruitment in both high schools and undergraduate programs. At the high school level, we are now developing **Future Teacher Clubs-FTCs** with the goal of inspiring and advancing diverse high school students into higher education and a future career in teaching. In reviewing best practices for over sixty-five years of FTCs, Forseille and Raptis (2016) found that the Clubs increased the number of prospective teachers entering the teaching profession, particularly among underrepresented students. With this project we aim to expand this work by

supporting our network of FTCs through by providing targeted support to teacher club sponsors and incentives for club members (high school students) to participate in Sacramento State future teacher recruitment and community building activities. A sample of these is described below.

Sacramento State is a Hispanic Serving Institution (HSI) and an Asian American, Native American and Pacific Islander Serving Institution (AANAPISI) where 36% of the student body are underrepresented minority students and more than 71% are not Caucasian. We will build our outreach to undergraduates by continuing our highly attended **EduCorps Celebration of Teaching**, a California State University system-wide initiative designed to encourage undergraduates to consider entering a teaching credential program. Sacramento State had the highest number of participants in the CSU system, as over 200 prospective teachers attended the event in each of the first two years. EduCorps utilizes effective forms of higher education marketing and recruiting to engage future teachers including celebratory events as well as face to face, online, and social media communication. Recent studies highlight the importance of events, event-related activities combined with affiliated social and online interactions as among the most effective forms of student recruitment (Ruffalo Noel Levitz, 2016; Hanover Research, 2014). Using effective web-based strategies (www.calstate.edu/educorps), EduCorps encompasses a multi-platform digital presence that augments the power of face to face interaction via events at a local site. The website offers many forms of information and communication, including videos, testimonials, and the networking potential of interacting with students and educators throughout the CSU system. Campus **outreach and recruiting** staff, along with **program advisors** for the College of Education, support EduCorps regularly participate in activities at local community colleges and high school where the teaching profession is promoted. New strategies will build on this record of success.

An important initial step will be to develop an inventory (or "map") of all potential recruiting "sites" on campus (i.e., meaning departments, programs, and clubs), by using innovative approaches such as tying our undergraduate recruiting efforts more closely to STEM majors and connecting to STEM activities/clubs with a service orientation. For example, the College of Natural Science's **Peer Assisted Learning (PAL) program** trains undergraduates to serve as peer facilitators in gateway chemistry, biology and math courses. We will actively recruit PAL's highly motivated and service-oriented undergraduates, who have deep science knowledge and are ethnically diverse, into such existing activities as the STEM Future Teachers' Club and other activities supported by the CSU Chancellor's Office Math/Science Teacher Initiative-MSTI.

Finally, in order to attract diverse prospective STEM teacher candidates into the post-baccalaureate multiple subject teacher preparation program, we will add new courses to program's **Bilingual Authorization** options (specifically Mandarin, Russian and Arabic) and augment the credential program with a **Master of Arts in Teaching option.** Additional program options should attract more diverse applicants.

b. Quality of Project Design

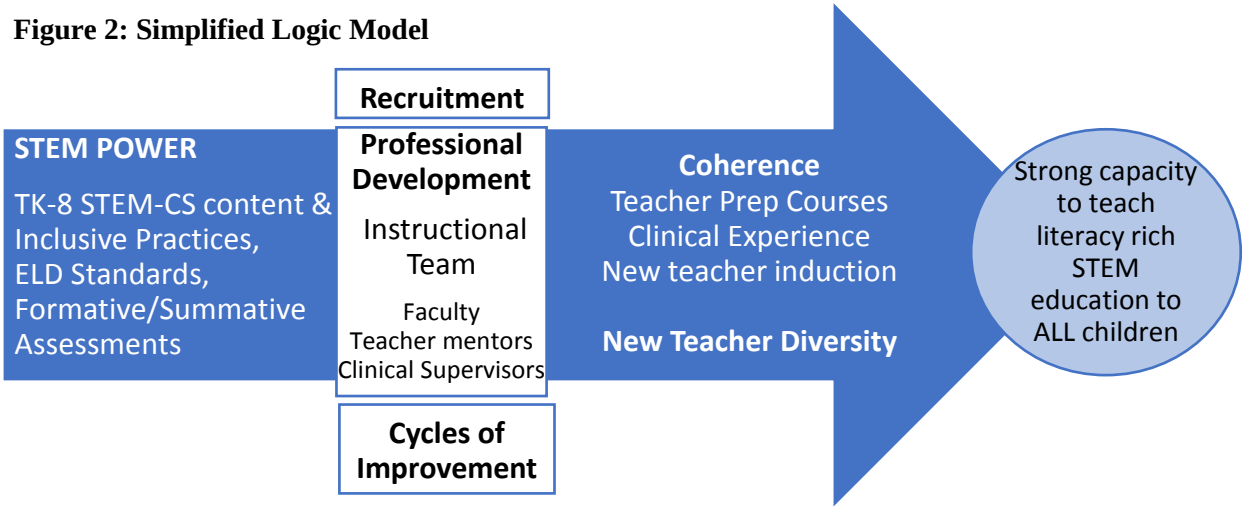
i. Rationale.

Student achievement is shaped by the quality of instruction students receive (Darling-Hammond, 2000; Hanushek & Rivkin, 2010). This premise shapes the rationale for the STEM-POWER program, is illustrated in our logic model (See Figure 2, Appendix G and Competitive Preference Priority 1), and rests on three inter-related theories:

1. The teacher preparation program curriculum and pedagogy must be transformed so it focuses on a well-articulated set of high leverage practices jointly articulated by an

intersegmental team of teacher educators – namely, university teacher preparation faculty, clinical supervisors, and veteran teachers. Research consensus (e.g., Ball & Forzani, 2009; Cochran-Smith & Villegas, 2015; Darling-Hammond, 2006; NCATE, 2010) supports this position.

Figure 2: Simplified Logic Model



2. This intersegmental team of teacher educators must transform their own content knowledge, pedagogy, and coaching/mentoring skills using professional learning strategies that have proven to be effective at evoking "deep" learning among professionals. Our proposed project is grounded in prior experiences that evaluations have shown to be effective (e.g., Project TEAMS) and research conducted by Garet et al (2010) which found a significant relationship between a multipronged program consisting of (a) a summer institute, (b) academic year seminars, and (c) academic year coaching and an improvement in teachers' instructional practices that elicit student thinking. In our project. intersegmental instructional team learns collaboratively in order to guarantee coherence among the various elements of a teacher preparation program (courses, clinical practice, feedback to prospective teachers, etc.). Moreover, educators need to complete multiple cycles of improvement, where so that they learn new material, experiment with

it, receive feedback on their performance, and have opportunities to implement refinements (McLean & Mohr, 1999; Mills, 2002).

3. Changes to teaching content and delivery must be accompanied by intensified recruitment efforts so that the "face" of new teachers also changes to more accurately reflect the diverse communities that they will serve (Gershenson et al, 2016; Lindsay & Hart, 2017). Focused recruitment that achieves more gender parity and greater cultural, racial, and linguistic diversity via a strengthened teacher pipeline from our local high schools to our teacher preparation program is a hallmark of our proposed project.

With these three theoretical frames as our starting point, we posit that STEM-POWER will positively impact education in our region by:

- Improving the potential of the clinical experience to enhance student learning by better preparing prospective teachers, mentor teachers, and clinical supervisors for their respective roles (Bacharach et al, 2010). This improved preparation of all parties will render great benefits to prospective teachers during their year-long clinical experience and support their supervisors and mentor teachers to conduct effectively 12 (mandated) formal observations during that experience.
- Producing new teachers ready from day one to impact student learning, especially in STEM subjects, and their socio-emotional growth and development as learners
- Augmenting the capacity of veteran teachers to impact student learning via training and professional learning they complete to assume the role of mentor teacher.
- Intensifying coherence and standardization of expectations, assessments, and feedback across teaching preparation coursework, pre-service, induction, and in-service realms.

The STEM-POWER intersegmental professional learning program is organized around four primary professional learning activities including 1) book talks; 2) action research; 3) summer institutes; and 4) regular learning sessions during the academic year focusing on lesson study (years 2 and 3), coaching (years 4 and 5) and periodic seminars (all years) (see also Section aii) for an instructional team of university faculty, clinical supervisors, and mentor teachers to ensure they use innovative teacher education pedagogy to facilitate prospective teachers' mastery of STEM-POWER. The three elements at the core of the project rationale are: 1) teacher education pedagogy must be transformed to deliberately structure prospective teacher capacity building and skills development; 2) the teacher education curriculum must be well-understood and coherently implemented by all instructors across the "learning to teach" continuum; and 3) teacher education pedagogy and curriculum must purposefully focus prospective teachers' attention and skill set on educating all children in equitable and powerful ways.

Feeding into a transformed teacher education program will be a set of deliberately coordinated recruitment strategies (see page 23-24 below) that will: 1) link high schools to the Sacramento Campus through Future Teacher Clubs and their teacher sponsors; 2) build on existing Educorps and advising outreach activities to maximize on-campus recruitment from activities, departments and clubs where STEM interested students already gather; and 3) expand programmatic offerings, specifically new Bilingual Authorization courses and a Master's Degree in Teaching to make the Sacramento State's credential program more attractive to a broader applicant pool. These strategies will target high-achieving, service-minded, ethnically diverse students both on campus and in Sacramento's most diverse high schools and connect them to aspiring and veteran educators, engage them in structured co-curricular and extra-curricular

activities, hone an urban teacher identity, and use high quality advising and mentoring so they refine their career goals and access accelerated pathways to the teacher preparation program.

ii. Goals, Objectives, and Outcomes are Clearly Specified and Measurable

Using information in each partner district's needs assessment and data emerging from on-going intersegmental dialogues among Sacramento State and partner districts, our partnership created the goals, objectives, and outcomes described below which meet the TQP purpose of 1) enhancing professional development; 2) better preparing the quality of prospective and new teachers leading to 3) improved student achievement. Our project addresses current needs and also anticipates future policy directions, including proposed Computer Science standards for K-12 schools and potential changes to credentialing that will require general education teachers to demonstrate greater competence in working with students who have special needs.

Table 2. Goals and Measurable Objectives and Outcomes

Goal ONE: Recruit highly qualified individuals, including those from minority groups, into the teaching force.
Objective 1.1: Create a cadre of high school teachers that sponsor FTCs and participate in teacher pipeline activities
a. 100% of FTCs have teacher sponsors who participate in regional FTC events semi-annually **Outcomes:** b. 90% of FTC teacher sponsors indicate satisfaction with communication between high schools and Sac State credential programs. c. 90% of FTC teacher sponsors indicate satisfaction with FTC duties
Objective 1.2: Expand the development of high school Future Teacher Clubs (FTCs)
a. FTC membership is maintained at 20 students/club or higher for each year of the grant. **Outcomes:** b. Increase to at least 50% diversity of FTC members at each high school. c. 80% of all FTC club members engage in teacher pipeline activities at Sac State and 85% express interest in pursuing a teaching career.
Objective 1.3: Create and implement a comprehensive recruitment plan that builds on all internal Sac State resources
a. By the end of Year 1, a map will be developed of all "sites" eligible for recruiting future teachers (high referral majors, student instructors for Peer-Assisted Learning sections, service/teaching oriented student clubs, etc.). Map will be available on the College of Education website. b. By the end of Year 2, a communications strategy will be developed that engages these "sites" and provides accurate, timely information about teacher preparation program options to all appropriate advisors and recruiters.

Outcomes:

c. 90% of advisors on campus indicate the map is a useful tool for recruitment and advising
d. In Years 3-5 90% of advisors express satisfaction with communications strategy for credential program recruitment
e. In Years 3-5, the number of new credential program applicants from "sites" on the map increases each year by 5%.

Objective 1.4: Expand programmatic offerings within Sac State's teacher preparation program to make program options more attractive to diverse applicants.

a. By Year 2, finalize expansion of Bilingual Authorization program to include Mandarin, Russian and Arabic
b. By Year 2, finalize the MA in Teaching (MAT) option

Outcomes:

c. In Yrs 3-5, at least 2 new applicants for each new Bilingual Authorization options per year
d. At least 15% of teacher preparation program candidates opt for MAT option by Year 3
e. Enrollment in each new option grows by 2% each year, in years 3-5

Goal TWO: Improve the instructional effectiveness of prospective and current teachers by improving the preparation of prospective teachers and enhancing professional development activities for new teachers.

Objective 2.1: Establish a well-functioning Leadership Team to manage work plan, monitor progress on performance measures, and facilitate coordination and communication across partners.

a. At the STEM-POWER start date each partner district will finalize staff (district office leadership and professional learning/induction) to serve on Leadership Team.
b. STEM-POWER PI will finalize university faculty from the 3 partner colleges and clinical supervisors to serve on Leadership Team.

Outcomes:

c. Leadership Team uses effective and timely communication to ensure all partners are engaged in making significant decisions and challenges are addressed collectively in a timely manner.
d. Leadership Team develops methods and instruments to conduct regular cycles of improvement to ensure work plan milestones are met, including those related to professional learning and project evaluation.
e. Leadership Team communicates regularly with executive level staff for each partner to ensure alignment of STEM-POWER goals, activities, personnel, and resources with broader goals of each partner.
f. Leadership Team collaborates to facilitate STEM-POWER recruitment and ensure participant retention in STEM-POWER activities.

Objective 2.2: Professional Learning Team provides sessions so that the instructional team gains competence with content knowledge, pedagogical knowledge, and coaching/mentoring skills needed to facilitate prospective teachers' mastery of STEM-POWER.

a. 95% of instructional team will participate in at least 3 of 5 summer institutes
b. Beginning with the Yr 1 summer institute and all subsequent summer institutes, 100% of participants will commit to implementing at least one STEM-POWER strategy in their respective instructional contexts (e.g., in TK-8 classrooms, with future teachers).

Outcomes:

c. For each summer institute, at least 80% of participants will rate the experience as impactful and relevant to their practice.
d. For each summer institute, at least 80% of participants will demonstrate improved

understanding of their role in the teacher preparation program.

e. Each year, 100% of instructional team members will participate regularly in academic year professional development sessions.
f. During each year, 100% of instructional team members will improve their implementation of at least one STEM-POWER strategy learned in the summer institute(s).
g. During each year, 90% of instructional team members will rate academic year professional learning sessions as effective or highly effective.
h. All members of the instructional team will demonstrate growth on measures of STEM-POWER content each year.
i. All members of the instructional team will meet the calibration standard for: 1) assessing prospective teacher performance on STEM-POWER competencies and 2) providing actionable feedback within two attempts on calibration exercises.

Objective 2.3: Instructional team collaboratively transforms teacher preparation program curriculum, so it aligns with STEM-POWER content and teaching practices.

a. Instructional team develops impactful STEM-POWER tasks and assignments and integrates them into each teacher preparation course.
b. Instructional team integrates STEM-POWER tasks and assignments in courses with activities and tasks in the clinical experience.
c. Instructional team sequences tasks and assignments in coursework and clinical experience in a developmentally appropriate manner for prospective teachers.
d. Instructional team develops assessment criteria for STEM-POWER tasks, activities, and assignments and uses these criteria in a consistent manner.
e. Assessment criteria for STEM-POWER tasks and assignments are jointly developed and implemented
f. Instructional team produces at least three exemplars of STEM -POWER lessons and learning tasks for TK-8 classrooms per content area (Science, Math, Computer Science, Literacy) as well as for teacher preparation methods courses in Mathematics (with Computer Science modules), Science, and Literacy.

Objective 2.4: Instructional team collaboratively transforms teacher preparation program pedagogy so that innovative practices, aligned to STEM-POWER, permeate instruction, supervision, and mentoring for prospective teachers.

a. Instructional team identifies a consistent set of instructional videos/clips that exemplify STEM-POWER and integrates these videos into the teacher preparation curriculum.
b. Instructional team revises teacher preparation course sessions to increase prospective teachers' focus on deconstructing teaching prac tices, rehearsing teaching practices, engaging feedback on rehearsals and preparing for actual teaching tasks during clinical practice.
c. Instructional team revises clinical experience tasks, activities, and schedule to align and complement changes in #2 above.

Objective 2.5: The instructional team uses STEM-POWER cycles of improvement to refine teacher preparation program effectiveness.

a. 90% of instructional team members participate in cycles of improvement
b. Instructional team reviews all aspects of teacher preparation program and makes changes and improvements as needed.
c. Instructional team uses prospective teacher performance tools consistently and in a standardized manner.
d. Instructional team uses existing protocols to guide prospective teacher improvement or counsel them out of the program.

Objective 2.6: The instructional team maps STEM-POWER onto the induction programs'

curriculum.

a. The instructional team defines STEM-POWER competency for new teachers.
b. The instructional team revises teacher preparation program assessment tools for application with new teachers.
c. The instructional team adopts and adapts STEM-POWER tasks, assignments, and activities from the teacher preparation program for use in the induction programs.
d. The instructional team engages in improvement cycles that examine performance data on STEM-POWER assessment tools for prospective teachers that become new teachers in the partner districts.

Objective 2.7: New teachers enter the profession with strong competence in STEMPOWER

Outcomes:

a. 80% of prospective teachers indicate confidence teaching STEM-POWER on mandatory exit survey
b. 80% of mentor teachers indicate prospective teachers have strong understanding and implementation of STEM-POWER.
c. 80% of new teachers (from Sac State's teacher prep. program) completing the induction program indicate strong coherence between teacher preparation and the induction program.
d. 85% of mentor teachers indicate increasing levels of confidence with teaching STEM-POWER beginning in Year 2.
e. 85% of new teachers hired by the partner districts demonstrate competence in STEM-POWER instruction.
f. 95% of program completers who were employed for the first time by a partner LEA were offered a contract for a 2nd year of employment
g. 90% of program completers who were employed by a partner LEA were offered a contract for a 3rd year of employment

Goal THREE: Ensure the Sacramento State multiple subject teacher preparation program is accountable for preparing teachers who meet applicable State certification and licensure requirements.

Objective 3.1: New teachers enter the profession having met all state requirements.

Outcomes:

a. 100% of Multiple Subject (TK-8) program completers, have attained initial CA certification by passing all licensure/certification assessments within one year of program completion.
b. For Years 2-5, 95% of students who did not complete in the previous year persisted to complete the program.

Goal FOUR: Improve student achievement.

Objective 4.1: Prospective teachers add value to student engagement and learning during clinical experience.

Outcomes:

a. 80% of students taught by prospective teachers during clinical experience demonstrate engagement in STEM-POWER tasks, activities, and lessons.
b. 85% of mentor teachers indicate that prospective teachers maintain or increase student interest in STEM-POWER.
c. 100% of prospective teachers provide evidence of growth for at least 50% of students completing a STEM-POWER task or assignment during the clinical experience.

Objective 4.2: New teachers in partner districts are more diverse.

Outcomes:

a. Beginning Year 2 the teacher prep program increases the diversity of its program completers by 5% and districts offer these new teachers initial contracts.

iii. Designed to build capacity and yield results beyond funding period.

The proposed project will support a partnership that has already invested effort into the difficult work of developing common terms, negotiating shared outcomes and goals, and learning about each other's roles, and is committed to continued joint work. The proposed project will provide the partnership with additional resources to focus on greater alignment and improved effectiveness with the interdisciplinary components of STEM POWER.

The program will also provide multiple opportunities for all key participants to build their capacity both in subject and pedagogical areas that are central to their effectiveness as educators, independent of STEM-POWER. Not only will it increase their instructional effectiveness in their unique instructional contexts, it will build intellectual and practical bridges between two important realms of teacher education – university faculty/supervisors and mentor teachers. As observed with other past projects, each partner has improved his/her role in preparing future teachers when understanding the work of other roles in the program (Wong & Glass, 2010).

Equally important, STEM-POWER content and pedagogy are tightly aligned to the State of California's TK-12 content standards and English Development standards central to the work of our veteran teachers. Moreover, the state standards for professional practice for prospective and mentor teachers, also orient Sacramento State's teacher preparation program, the induction program, and the evaluation processes of both. Thus, as each project participant improves their capacity with STEM-POWER, they will augment their ability to perform their primary role – as classroom teacher or university professor/supervisor. As such, the project will provide participants with tools for increasing professional effectiveness and efficacy.

Finally, grant-funded professional learning will be used to produce materials central to each partners' daily work – new course content and materials for university classes, new exemplar

STEM lessons for TK-8 classrooms, and prospective and new teacher assessment and coaching tools (including instructional videos) for use by the teacher preparation and induction programs. These products, so central to the work of each partner, will ensure that the transformed practices and materials remain in use beyond the funding period.

iv. Exceptional approach to priorities.

Sacramento STEM-POWER addresses Absolute Priority 1: Partnership Grants for the Preparation of Teachers in two ways. First, it addresses all required program requirements (see Appendix E). Second, through a comprehensive and integrated transformation of its multiple subject (elementary) teacher preparation program, detailed below, our approach is exceptional because it: 1) leverages the interdisciplinary intellectual and professional resources of an intersegmental team, working in tight coordination to minimize theory-practice gaps for prospective and future teachers; 2) uses professional learning methods that are effective in changing educators' instructional practices; and, 3) focuses on transforming our teacher preparation culture to engage an increasingly diverse prospective teacher population using innovative pedagogy, research-based content, and expanded programmatic options.

The interdisciplinary, intersegmental team. Because teacher preparation involves content learning, skills learning, and practical applications, high quality teacher preparation must seamlessly and coherently blend these elements together. At all levels of our project, key actors – from the university, from classrooms, and from district offices – participate. Our instructional team members will collectively enhance their knowledge base around STEM-POWER and work together to implement new content and activities into the teacher preparation program, first, and the induction program, second. The Professional Learning Team will engage content faculty from across three colleges on our campus and district specialists to teach STEM-POWER with

the most current standards-aligned content and in interdisciplinary ways, focusing efficiently on the nexus of instructional practices (see Figure 1, page 2). Our approach draws from several current bodies of research on effective urban teacher preparation. The focus on STEM-POWER echoes Linda Darling-Hammond's (2015) call for "deep learning" in teacher education. Using innovative teacher education pedagogy, that includes deconstruction of high leverage practices and calibration of instruction and assessment processes (feedback to candidates on their performance in teaching, on lesson plans, etc.) it draws directly from Ball and Forzani's (2009) work to ensure prospective teachers learn high leverage practices. STEM-POWER's amalgamation of content knowledge, inclusive practices, high leverage literacy practices, and strategic assessment strategies ensures prospective teachers are able to work with all students regardless of primary language, abilities, and cultural backgrounds. The members of this partnership are firmly committed to the notion that there is significant mutual benefit in doing this work together, as coherently and collaboratively as possible. Without this kind of multi-dimensional systems-change, we would be unable to truly or fully meet the goals of STEM-POWER for prospective teachers and, eventually, their TK-8 students.

Effective professional learning. Our professional learning activities are designed to effect profound and lasting transformations in the educational practices of our instructional team. During Year 1 (September – December), the instructional team will take a "deep dive" into the research on teacher preparation. Using a series of monthly "book talks" with content (articles, book chapters, webinars, etc.) selected by the Professional Learning Team, our instructional team will engage the most current research on effective urban teacher preparation. The "book talks" will invigorate the instructional team's knowledge base, connecting experience to research findings while also surfacing key dilemmas. The instructional team will then engage in action

research (January – May), focusing on dilemmas and questions connected to the high quality urban teacher preparation and development (Cammarota et al., 2016; Sagor, 2010). The action research process will further engage the instructional team in understanding the key elements needed to provide high quality urban teacher preparation and will strengthen their commitment as urban teacher educators. They will present their findings in an Action Research Showcase prior to the Year 1 Summer Institute.

Summer Institutes will be offered each year. They will have four basic strands: 1) building off the academic year sessions and addressing any questions, doubts or interests that emerge from this learning; 2) expanding and deepening the content knowledge and content pedagogy that all members of the instructional team need to be STEM-POWER models for prospective teachers, concentrating specifically on conceptual overlap among STEM and CS disciplines, emphasizing the importance of content literacy and ELD strategies throughout STEM-POWER learning and activities, highlighting inclusive practices central to providing all students with access to learning, and integrating assessment tools throughout so that data informs instruction; 3) augmenting the instructional team's capacity to model, coach, and guide prospective teachers' mastery of STEM-POWER; and, 4) facilitated planning time so that the instructional team can develop new content, tasks, and tools needed to implement summer institute learning into the teacher preparation program domains for the coming year. Summer institutes will focus heavily on putting theory into practice using simulations, video analysis, analysis of artifacts developed by prospective teachers, and the "deconstruction of practice" to build the instructional team's understanding how best to support prospective teachers in mastering STEM-POWER. Finally, each summer institute will also provide structured time for reflection, synthesis, and guided planning for the academic year. This will include mapping out the ways in which new STEM-

POWER learning will be modeled and introduced to prospective teachers in university classes and the clinical settings.

Academic year professional learning sessions will be designed to extend the learning from summer institutes. In Years 2 and 3, the instructional team will implement lesson study. They will use this supportive process to strengthen the implementation of one or more practices from the summer institute, most likely involving the creation and use of STEM-POWER tasks, assignments and activities that exemplify robust content, strategic assessment tools, and integrated literacy, ELD and inclusive practices. The end goals of lesson study are increased instructional team capacity with STEM POWER, a set of STEM-POWER exemplars for TK-8 and teacher preparation classrooms, and curated instructional videos for the teacher preparation and induction programs. In Years 4 and 5 the instructional team will focus on peer coaching and expert coaching, so that each member has support to implement additional strategies from prior summer institutes and lesson study, thereby refining and mastering STEM-POWER for their respective instructional contexts. Each professional learning activity will be examined through a cycle of improvement in which output data and artifacts (e.g., lessons, tasks, student products) are analyzed by the leadership, professional learning and evaluation teams to direct future effort. The cycles of improvement and the subsequent refinement to project activities should ensure that the transformation of the teacher preparation program curriculum and pedagogy is sufficiently stable to continue, without grant funding. Moreover, because cycles of improvement will have been practiced by the intersegmental team for all 5 years of the project, this on-going focus on data-driven decision-making will also be an internalized practice.

Teacher preparation culture change. The aforementioned approaches target the content and the pedagogy of Sacramento State's teacher preparation program and the ways in which its

intersegmental partners collaborate. These transformations will be accompanied by significant changes to who completes this transformed program. With successful recruitment, our program will not only produce new teachers who will be more effective with diverse learners, but these new teachers will, themselves, be more diverse, reflective of the communities where they will teach, and more committed to the profession and their students.

c. Quality of Management Plan

i. Adequacy of plan to achieve objectives on time and within budget, including clearly defined responsibilities, timelines, and milestones.

This project will be led by a Leadership Team with the support of a Professional Learning Team (see biosketches in Section ciii below). Dr. Pia Wong, Principal Investigator, has over 20 years' experience with teacher preparation grants including a Teacher Quality Partnership grant awarded in 2000. Dr. Sue Baker, Project Director, is a literacy expert with extensive experience managing complex intersegmental grant programs. Her most significant professional development activities blend literacy with science education. Dr. Ravin Pan, Math Content Lead, and Dr. Corinne Lardy, Science Content Lead, are experienced at providing professional development in their content areas as a part of interdisciplinary teams. Dr. Pan has completed extensive work with our district partners to develop new standards-aligned mathematics curriculum. Dr. Baker and Dr. Pan are fellows with the TeachingWorks Center, a highly regarded teacher education reform initiative led by Dr. Deborah Ball, president of the American Educational Research Association. Dr. Tom Owens, Articulation Lead, has coordinated our network of professional development schools for over 15 years, has extensive experience supporting mentor teachers, and is an expert in urban student engagement strategies. Dr. Stephanie Biagetti, chair of the Teaching Credentials Department, will also serve on the Leadership Team to provide university policy context and continuity. Joining these Sacramento

State faculty on the STEM-POWER leadership team are Aaron Pecho (SCUSD) and Paula Baucom (SJUSD). (See biosketches, p. 41). Aaron Pecho is the SCUSD Science Coordinator where he leads professional learning related to NGSS implementation and oversees the work of the curriculum specialists. Paula Baucom is the SJUSD Science Program Specialist whose duties include comprehensive professional development in NGSS. She has also served as the district's Mathematics Teacher-on-Special-Assignment. Clearly, these district staff possess reflect extensive expertise with teacher professional learning, especially in STEM fields and in inclusive practices, and have significant management experience needed to monitor project milestones and performance measures. In addition to guiding the project they will be responsible for recruiting and ensuring the retention of the district level instructional team members from high need schools in the districts. (See Table 3 below) The Leadership Team will have monthly in-person meetings and additional video-assisted meetings and email contact as needed.

The Professional Learning Team will include faculty from the College of Natural Sciences and Mathematics (Dr. Jennifer Lundmark, Dr. Topaz Wiscons), College of Engineering and Computer Science (Dr. Scott Gordon) and College of Education (Dr. Kathy Gee) and will augment the expertise of the Leadership Team to create the curriculum for the academic year learning sessions and the summer institutes. All these faculty are recognized experts in their subject matter and have extensive experience working with TK-12 teachers in our region.

The selected Instructional Team will ultimately be composed of 20 instructional faculty and clinical, supervisors and 70 mentor teachers associated with the multiple subject teacher preparation program. The instructional faculty are tenured/tenure track faculty at Sacramento State and have committed to project participation. The clinical supervisors are experienced supervisors with our program and have also committed to this work. The mentor teachers will be

recruited jointly by the partnership, based on criteria mandated by the Commission on Teacher Credentialing and demonstrated commitment to STEM POWER goals. Mentor teachers have already committed generally to professional learning that supports their work in this role.

The evaluation team is led by Dr. Melissa Neuburger from the Sacramento County Office of Education (SCOE). Partnering with an important educational leader in our region ensures the program evaluation will be done in a rigorous manner with findings that can guide project work and be applied to myriad initiatives over which SCOE has purview.

Table 3 details specific activities, responsible parties and timelines representing our plan to ensure the project's objectives and goals are accomplished on time and within budget.

Table 3. Management Plan and Project Timeline

Goal ONE: Recruit highly qualified individuals, including those from minority groups, into the teaching force.			
Objective 1.1: Create a cadre of High School teachers that sponsor FTCs and participate in teacher pipeline activities			
d. **Activity**	**Task**	**Timeline**	**Responsibility**
FTC teacher sponsor recruitment	• Recruit teacher sponsors for 15 FTCs in the region	By end of year 1	Leadership Team LT
FTC teacher sponsor professional dvlp.	• Develop FTC manual, organize semi-annual FTC teacher sponsor meetings	By end of year 1	Professional Learning Team-PLT
Objective 1.2: Expand the development of high school Future Teacher Clubs (FTCs)			
FTC student member-ship is more diverse	• Support teacher sponsors with recruitment activities to attract diverse students	By end of year 2	LT
Increase student engagement in FTCs	• Incentivize FTC members to attend recruitment and community building events at Sac State (one per semester)	By end of year 2	LT
Objective 1.3: Create and implement a comprehensive recruitment plan that builds on all internal Sac State resources			
Create a recruitment map for Sac State and engage faculty and staff at key "sites"	• Identify top 5 "feeder" majors to the teacher preparation program • Identify all student clubs that have a teaching and/or service orientation • Identify teaching assistant or peer assistance programs on campus • Establish regular contact with faculty/staff advisors • Create recruiting activities and events	By end of Year 1	LT

Objective 1.4: Expand programmatic offerings within Sac State's teacher preparation program to make program options more attractive to diverse applicants.			
Expand current bilingual authorization program to include Mandarin, Russian, and Arabic	• Collaborate with World Languages department chair on courses (one per language) needed for this program • Initiate course approval process • Prepare and submit program document to the Commission on Teacher Credentialing for approval • Offer new courses	By end of Year 1	LT
Offer MA in Teaching (MAT) option	• Develop courses for MAT • Initiate campus course approval process • Market and recruit for MAT program	By end of year 1	LT
Goal TWO: Improve the instructional effectiveness of prospective and current teachers by improving the preparation of prospective teachers and enhancing professional development activities for new teachers.			
Objective 2.1: Establish a well-functioning Leadership Team to manage work plan, monitor progress on performance measures, and facilitate coordination and communication across partners.			
STEM-POWER leadership team established and functioning	• All partners identify membership, including high level executive leaders • Regular meeting schedule established • Communications protocols established • Regular agenda items identified (e.g., work plan progress updates, etc.)	By end of quarter 1, year 1	PI and PD
Objective 2.2: All members of the instructional team demonstrate competence with STEM-POWER content knowledge, STEM-POWER pedagogical knowledge, and coaching/mentoring skills needed to facilitate prospective teachers' mastery of STEM-POWER.			
Implement action research module for instructional team	• Develop schedule of meetings • Create instructional materials • Monitor learning and implementation of activities by instructional team • Organize action research showcase • Work with evaluation team on action research outcomes	By June of Year 1	LT, PLT
Implement summer institutes, each year	• Conduct needs assessment with instructional team • Create instructional materials • Identify summer institute instructors • Dvlp summer institute assessment tools • Work with evaluation team on summer institute outcomes	Begin planning and curriculum dvlp in March; Summer	LT, PLT
Implement lesson study cycle in Yr 2 and 3	• Develop schedule of meetings • Create instructional materials • Monitor learning and implementation of activities by instructional team members	Beginning in Sept Yr 2-May Yr 3	LT, PLT

	• Address logistics (e.g., substitutes, etc.) • Organize lesson study showcase • Work with evaluation team on lesson study outcomes		
Implement coaching cycles in Year 4 and 5	• Develop schedule of coaching sessions • Create coaching protocols • Monitor learning and implementation of activities by instructional team • Address logistics (e.g., substitutes, etc.) • Organize Coaching Summit to share findings and reflections • Work with evaluation team on coaching outcomes	Beginning in Sept Yr 3-May Yr 5	LT, PLT
Objective 2.3: Instructional team collaboratively transforms teacher preparation program curriculum so that it aligns with STEM-POWER content and teaching practices.			
Create a curriculum map that identifies when STEM-POWER is introduced, practiced and assessed. The map encompasses university coursework and the clinical experience.	• Develop tasks and assignments for courses and the clinical experience. • Sequence tasks and assignments in coursework and clinical experience in a developmentally appropriate manner for prospective teachers. • Develop assessment criteria for STEM-POWER tasks, activities, and assignmts • Achieve calibration on use of assessment criteria and associated feedback • Produce at least 3 exemplars of STEM-POWER for university classes and for TK-8 classrooms	By end of Years 1, 2, and 3 (add new items each year)	Instructional team-IT
Objective 2.4: Instructional team collaboratively transforms teacher preparation program pedagogy so that innovative practices, aligned to STEM-POWER, permeate instruction, supervision, and mentoring for prospective teachers.			
Incorporate innovative pedagogy into university coursework, clinical supervision and clinical mentoring	• Identify a consistent set of instructional videos/video clips to exemplify STEM-POWER and integrates these videos into the teacher preparation curriculum. • Create a uniform protocol in each course where prospective teachers observe, deconstruct, rehearse, obtain feedback, and refine specific STEM-POWER strategies • Create a similar protocol for the clinical experience	By end of Year 2	IT
Objective 2.5: The instructional team uses STEM-POWER cycles of improvement to refine teacher preparation program effectiveness.			
Reflect on the level of transformation of the teacher preparation	• Gather artifacts frm instructional team • Analyze artifacts • Collaborate with evaluation team	Annually, following summer	PI, LT, Eval Team-ET

curriculum		institute	
Analyze prospective teacher performance	• Gather performance data by individual prospective teacher • Analyze data • Identify program improvements	End of each semester & program completion	PI, LT, ET
Objective 2.6: The instructional team maps STEM-POWER onto the induction programs' curriculum.			
Develop agreements about shared curriculum content and assessment tools	• Compare program documents • Identify elements in common • Adjust elements to account for developmental differences • Align documents from all programs (teacher preparation program, partners' induction programs)	At end of Year 3	LT
Objective 2.7: New teachers enter the profession with strong competence in STEMPOWER			
Monitor metrics on new teacher recruitment and retention	• Track prospective teachers' summative performance • Track new teachers' employmt searches • Track contracts offered to new teachers • For new teachers hired in partner districts, track: 1) progress in induction program; 2) first year evaluation; 3) offers for renewed contract	Beginning in Year 2, each quarter and at year end	LT, ET
Goal THREE: Ensure the Sacramento State multiple subject teacher preparation program is accountable for preparing teachers who meet applicable State certification and licensure requirements.			
Objective 3.1: New teachers enter the profession having met all state requirements.			
Report on new teacher performance on state mandated requirements	• Develop report structure with required elements • Gather all data needed	Annually	LT, Sac State credential analyst
Goal FOUR: Improve student achievement.			
Objective 4.1: Prospective teachers add value to student engagement and learning during clinical experience.			
Report on student engagement on STEM-POWER tasks, activities, and lessons.	• Collect prospective teacher and mentor teacher reflections and artifacts • Analyze and summarize • Discuss with instructional team • Program revisions as needed	At end of each term beginning in Year 2	LT, ET
Objective 4.2: New teachers in partner districts are more diverse.			
Report on prospective diversity and diversity of new teachers hired	• Track data on teacher preparation program applicants • Identify connections between applicants and recruitment activities • Track new teacher hires by diversity • Analyze data and refine strategies	Each admission and hiring cycle beginning in Year 2	LT

ii. Potential for incorporating project purposes, activities or benefits after grant funding.

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This project situates increased learning and expanded capacity at the core of each participant's primary duties ensuring content, pedagogy and mentoring skills and practices will be sustained after grant funding. Mentor teachers will be become more effective STEM-POWER teachers and in so doing, will be better models for prospective teachers. University faculty will restructure Sacramento State's teacher preparation program content so it better aligns to the California Content Standards making it more relevant to the TK-8 classroom and will learn new, more effective methods for teaching prospective teachers. Mentor teachers, university faculty, and clinical supervisors will all learn to be more effective coaches of prospective teachers through calibration activities related to assessing prospective teachers' performance and giving them actionable feedback. Because project activities focus on core duties and make changes to instructional materials (lessons, course syllabi, assessment tools), they will be fully incorporated into the daily work of each of our participants by the time the funding concludes. Though we anticipate early program benefits in terms of improved instruction to our prospective teachers and, therefore, improved outcomes from them, we fully expect that our transformed program will continue to produce these benefits well beyond the grant funding cycle. Because STEM-POWER is fundamentally a culture change in our teacher preparation program, we are confident that, in learning new ways of delivering our program, we will accelerate the benefits it renders over time. Finally, because cycles of improvement are an integral activity in the program, we anticipate that by Year 4 we will be working assiduously on internalizing key program changes and focusing our efforts on activities for which our data demonstrate strong correlations with new teacher effectiveness. As a result, the benefits to prospective teachers, new teachers and their students have strong potential for longevity.

iii. Adequacy of support, including facilities, equipment, supplies, and other resources.

The proposed project does not require significant new facilities or supplies. The budget narrative indicates equipment purchases to facilitate the development of instructional video exemplars and the creation of recruitment and outreach materials to attract new and diverse applicants, based on new program elements and options. These inputs will allow the project to create models, which will only be updated in the future, but not developed anew.

The project activities primarily rely on time and expertise from both Sacramento State faculty and the districts which are adequately compensated in the proposed budget. With the exception of logistical and clerical support for all aspects of this grant, all partners have sophisticated administrative support capacities that are resourced otherwise. All partners have designated liaisons, and are fully equipped with equipment, meeting facilities, and other resources necessary to make the project a success.

The following biosketches outline the experience and qualifications for **key personnel** and other members of the Leadership Team and Project Learning Team.

Key Personnel will serve on the Leadership Team and Professional Learning Team.

Dr. Pia Wong, Principal Investigator is Associate Dean for Research and Engagement in the College of Education. She earned her Ph.D. from Stanford University. For 20 years, she taught the Foundations of Education courses in the teacher preparation programs. Over the last 15 years she has led and evaluated $7 million dollars of externally funded professional development and research grants including a TQP project from 2000-2005. Her research focuses on urban teacher preparation.

Dr. Sue Baker, Project Director, is a professor in the Teaching Credentials Department. She earned her Ph.D. from Stanford University. Her courses focus on theory and practice related

to literacy instruction and English Language Development. She is the Director of a grant from the S.D. Bechtel, Jr. Foundation preparing prospective teachers to deliver high quality NGSS and Common Core-math instruction delivered in partnership with other campuses in the CSU system and local school districts. With 16 years' experience as a teacher educator and 12 years' experience as a bilingual elementary teacher, she also has extensive experience leading science professional development, supporting teachers through modeling lessons and coaching.

Dr. Corinne Lardy, Science Content Lead is an assistant professor in the Teaching Credentials Department. She earned her Ph.D. from the University of California, San Diego and. She teaches courses in science education. She has led NGSS-based professional development workshops, taught science teaching methods to preservice teachers, and worked with the Lawrence Hall of Science to field test materials for prospective and veteran teachers. Her research focuses on providing high quality, community-based, and NGSS-aligned science and STEM education to K-12 students and teachers.

Dr. Ravin Pan, Math Content Lead, is an associate professor in the Undergraduate Studies in Education department. He earned his Ph.D. from University of Michigan. He is the director of the Math Learning Skills Program and Project Coordinator for a CA Department of Education grant to design a senior year mathematics class and a professional development program aligned to community college and CSU mathematics standards. He is an expert on the mathematical practices designed by the National Council of Teachers of Mathematics.

Other Members of the Leadership Team

Paula Baucom, District Liaison, also oversees NGSS implementation for SJUSD. She earned her BS from the University of California, Santa Barbara and holds multiple and single

subject (Health Science) teaching credentials, an administrative services credential, and supplementary authorizations in Computers, Mathematics, and General Science.

.**Dr. Stephanie Biagetti**, professor and Teaching Credentials Department Chair. Dr. Biagetti oversees the multiple subject teacher preparation program and serves on the College of Education Administrative Council. She earned her Ph.D. in Mathematics Education from the University of California, Los Angeles. Her primary role on the leadership team will be to ensure continuity with program, college, and university policies. She will also advise on content and curriculum matters as appropriate.

Dr. Tom Owens, Articulation Lead, is a professor in the Teaching Credentials Department where he teaches the educational foundations and social studies methods courses. He is the lead coordinator for our professional development schools network where he works extensively with mentor teacher development. He earned his Ph.D. from Florida International University.

Aaron Pecho, District Liaison, oversees NGSS implementation for SCUSD. He has a B.S. from the University of California, Davis where he also earned his secondary Science credential and his M.A.

Professional Learning Team

Dr. Kathy Gee is a professor in the Teaching Credentials Department. She earned her Ph.D. from the University of California, Berkeley and San Francisco State University. She teaches courses on assessment and evidence-based interventions and methods for children and youth with severe and multiple disabilities. She has provided professional development to teachers in many school districts across numerous states.

Dr. Scott Gordon is a professor in the Department of Computer Science in the College of Engineering. He earned his Ph.D. at Colorado State University and teachers courses on computer

game architecture, artificial intelligence and computer science ethics and professional development. He has directed an ITEST grant from the National Science Foundation and has expertise developing computer science curriculum that emphasizes computer graphics, game development and motivating student to learn scientific concepts and technical skills.

Dr. Jennifer Lundmark is a professor in the Department of Biological Sciences in the College of Natural Sciences and Mathematics. She earned her Ph.D. from the University of California, Davis. She teaches courses in the physiological sciences while serving as the Director of the Peer Assisted Learning (PAL) and Hornet Scholars programs, both funded by the National Science Foundation. She has trained over 100 PAL facilitators, presented research on peer programs at national meeting and has served as a consultant for other campuses.

Dr. Topaz Wiscons is an assistant professor in the Department of Mathematics and Statistics in the College of Natural Sciences and Mathematics where she teaches general mathematics courses as well as mathematics courses for future K-12 educators. She earned her Ph.D. from the University of Colorado, Boulder. She is a co-facilitator for the Math Project, a subject-matter professional learning program for K-12 teachers sponsored by the California Department of Education. She researches abstract algebraic structures and their connections constraint satisfaction problems in computer science.

d. Quality of Project Evaluation

i. Evaluation methods will provide valid and reliable performance data on relevant outcomes.

The success of the project will be determined by process measures (to measure the fidelity of the implementation) program effectiveness measures that will be assessed throughout the 5-year period and GPRA and TQP performance measures. **Process measures** will include: 1) adherence to an implementation activity checklist that assesses program implementation; 2) adherence to

timelines; 3) development of deliverables (professional development units, instructional coursework components, participant assessments, clinical experience tasks, etc.); 4) status of benchmark activities; and 5) responsivity to formative or corrective feedback. Process measures will be regularly reviewed by the Leadership Team to affirm or revise courses of action.

Program effectiveness measures will assess: 1) the growth in size and diversity of the recruitment pipeline; 2) the instructional effectiveness of prospective and current teachers; 3) the coherence within the teacher preparation program and the "learning to teach continuum;" and 5) preparedness of new teachers to improve student learning, specifically in relation to employers' expectations for student achievement. These measures will include information including: professional development feedback to assess content, delivery, contribution to STEM competencies, and appropriateness of content for supporting all students and inclusive practices (MTSS, PBIS, UDL); b) participant surveys (instructional team, new teachers, future teachers, induction program coordinators) to assess the effectiveness of the program components, STEM POWER competencies (self-reported), use of strategies, effectiveness of coaching/mentoring received or provided, and long term teaching plans; data on participant recruitment, retention, and program completion; level and quality of collaboration among participants; actual growth in STEM competencies as measured by pre-post annual assessments (exams); and instructional engagement of students in K-8 partner schools, as reported by prospective and mentor teachers.

Finally **GPRA and TQP performance measures** will be measured as required and detailed in the attached Objectives and Performance Measures document.

Responsibilities, Data Collection Timeline and Analysis. Much of the program effectiveness data will be generated by project participants, with artifacts and tools developed by the Instructional Team. These data and artifacts will be transmitted to the Evaluation Team

which will conduct the program effectiveness analyses and develop reports to be shared with the Leadership and Instructional Teams throughout the year.

Data will be collected at mid- end-of-year through surveys, assessments, document analyses, program documentation, and feedback forms. Analyses will include descriptive statistics and inferential statistics to measure growth in knowledge and use of strategies, and program effectiveness over time. Self-reported competency data will be triangulated with teacher assessment data and classroom observation data (from clinical supervisors) to ensure valid and reliable results.

ii. Methods of evaluation are thorough, feasible, and appropriate to the goals, objectives, and outcomes of project.

The following instruments and tools will be used to assess the project goals. Those in italics will be created for this project. All others exist already and will be modified to more explicitly include STEM POWER items.

Table 4. Evaluation Instruments

* Future teacher surveys	* *Teacher pipeline partner surveys*
* New teacher surveys	* Summer institute surveys
* Teacher assessments	* Professional development surveys
* Program exit survey	* Classroom observations
* *Induction program coordinator survey*	* *Project artifact analyses*

Evaluation Methodology. Evaluation of the goals will be assessed through the following sources and analyses:

Table 5. Evaluation Methodology

Goal ONE: Recruit highly qualified individuals, including those from minority groups, into the teaching force.
• Changes in counts and diversity of high school student participation in Future Teacher Clubs (FTC) as assessed annually using descriptive and inferential statistics (t-test). • Changes in FTC teacher participation in regional and Sac State sponsored FTC activities as assessed annually using descriptive and inferential statistics (t-test). • Changes in counts of programmatic offerings within Sac State's teacher preparation program as assessed annually using descriptive statistics. • Verification that a recruitment plan was developed on time and as planned (implementation

documentation).

- Increased interest by students in teaching careers as measure by qualitative and quantitative analyses of student survey and increased program application rates.
- Effectiveness of recruitment and advisor knowledge and quality of services as measured by descriptive statistics and qualitative analyses of teacher pipeline partner survey data.

Goal TWO: Improve the instructional effectiveness of prospective and current teachers by improving the preparation of prospective teachers and enhancing professional development activities for new teachers.

- Effectiveness of the summer institute professional development for instructional team members regarding quality, content, learning, and application of strategies learned as assessed by descriptive statistics and qualitative analyses of summer institute survey data and inferential statistics (t-test) to assess changes in levels of learning.
- Evidence of improved student engagement as identified by instructional team members assessed through qualitative analyses of evidence and validity and reliability analyses of evidence ratings.
- Appropriateness and utilization of STEM POWER tasks and assignments (integrated into university coursework and clinical experience) and task assessments as measured by analysis and verification of task reviews for developmental appropriateness and sequencing; analysis and verification of assessment criteria development and scope of implementation.
- Evidence that the instructional team uses STEM POWER cycles of improvement to refine teacher preparation program as measured by qualitative analyses of relevant documents.
- New teacher metrics (embedded assessments within the teacher preparation program developed by the Instructional team) provide actionable data on levels of program coherence and alignment as measured by qualitative and quantitative analyses of coursework completion rates and clinical experience and new teacher survey data. Qualitative and quantitative analyses will assess the validity and relevance of the actionable feedback, including calculation of inter-rater reliability statistics (Cohen's Kappa) to assess level of calibration on team metrics.
- Higher capture rates of future teachers by hiring partner districts, especially of diverse new teachers as measured by descriptive and inferential statistics (t-test, ANOVA) that assess changes in number and demographic makeup of teachers hired over time

Goal THREE: Ensure the Sacramento State multiple subject teacher preparation program is accountable for preparing teachers who meet applicable State certification and licensure requirements.

- As required for continued accreditation by the Commission on Teacher Credentialing annual data report submission, Sacramento State will prepare annual reports the detail the first time and repeat passing rates of all prospective teachers on required state exams. These reports will be shared with the Evaluation Team for analysis.

Goal FOUR: Improve student achievement.

- Ensure future teachers enter clinical practice with adequate STEM POWER instructional skills as measured by: qualitative analysis of tasks to ensure that tasks lead to whole class discussions and associated progress markers; quantitative analyses of teacher assessments to measure levels of readiness; and qualitative and quantitative analyses of the future teacher survey to assess instructional preparedness, and developmental appropriateness and scaffolding of tasks.
- New teachers enter the profession with strong competence in STEM POWER as measured

by: qualitative and quantitative analyses of the program exit survey and the induction program coordinator survey; inferential statistical analyses of the pre-post objective teacher assessment to measure growth in competencies while statistically controlling for the pre-test score; and analyses of classroom observations to assess productive student engagement and teacher use of STEM strategies.

The evaluation will be led by Dr. Melissa Neuburger, Program Manager in SCOE's Center for Student Assessment and Program Accountability. Dr. Neuburger earned her Ph.D. in Human Development from the University of California, Davis. She has a strong background in research, program evaluation, and accountability, as well as university admissions. She began her research career at Elk Grove Unified as a research analyst, managing testing programs and evaluations then to Stockton USD as the Director of Charter Schools, Research, and Accountability where she headed the program evaluation division. Dr. Neuburger's research experiences include evaluations of professional learning and curriculum implementation grants, prevention and intervention programs, early childhood education programs, and mental health, wellness and violence prevention initiatives.

Competitive Preference Priorities 1 and 2.

Our program addresses **Competitive Preference Priority 1**: Promoting STEM Education, with a particular focus on Computer Science. Sacramento STEM-POWER aims to increase the number of educators well-prepared to deliver rigorous instruction in STEM fields, including Computer Science, through recruitment and evidence-based professional development strategies. Specifically, the professional development program to prepare mentor teachers in high leverage, inclusive practice is detailed in the logic model (Appendix G) and is supported by "moderate evidence" as defined by the What Works Clearinghouse standards without reservation under the Review Protocol for Teacher Training, Evaluation, and Compensation, Version 3.2. In their study of the impact of a middle school mathematics professional development program, Garet et

al. (2010) show a relationship between 1) a summer institute, 2) academic year seminars, and 3) academic year coaching with an improvement in teachers' instructional practices that elicit student thinking. This multi-pronged strategy totaling 68 hours aimed to integrate content knowledge, pedagogical techniques, and follow-up professional learning over the course of a year with the goal of increasing teachers' ability to use content and pedagogical content knowledge to analyze teaching and student learning and to plan and apply it to their teaching. Using an experimental design with random assignment of schools to treatments and control conditions within each school district, this study found that the professional development program had a statistically significant effect on teachers engaging in activities that elicited student thinking (one of the outcome measures for teacher instructional practice), with an effect size of 0.48, p-value <0.01 (pp. 48-49, Figure 4-2). Our proposed project replicates these professional development strategies covering more than 70 hours annually to ensure mentor teachers are well prepared to help pre-service teachers model high leverage and inclusive practices in their classroom. WWC standards without reservation were determined by: 1) Random Assignment - the study randomly assigned 77 mid- and high-poverty schools to treatment and control conditions (p. xviii); and 2) Sample Attrition – there was no attrition during the first intervention year thus differences in the rates of attrition for the intervention and comparison groups was low per Figure III.2 (p. 13) in the WWC Handbook**.** Overall, by meeting WWC standards for "moderate evidence" the study exceeds the standard required for this solicitation.

Our project addresses **Competitive Preference Priority 2** by including targeted activities designed to recruit and retain educators who are effective and who increase diversity in the teaching labor force. Our recruitment strategies are focused on strengthening the pipeline from

Sacramento's diverse high schools to our teacher preparation program including expanding outreach to Sacramento State's equally diverse undergraduate student body. We create this diverse pipeline through specific activities designed to increase diverse high school students' interest in teaching careers (via Future Teachers Clubs), promote the development of a teacher identity (recruitment events, career exploration events, EduCorps, MSTI activities), and offering more appealing program options (additional languages for the Bilingual Authorization, new program extensions via the Master of Arts in Teaching). We will achieve improved retention through the transformation of our program, with 1) completers entering the profession with greater mastery of high leverage practices than currently, 2) through enhanced articulation and coherence between the teacher preparation program and employers' expectations of new teachers and new teacher induction programs.

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