STOCKTON UNIVERSITY

2020 Initiatives Proposal Form

Thank you for your interest in submitting a proposal to the 2020 Initiatives process.

Please complete this form, save it to your hard drive, and then email a copy to: 2020@stockton.edu. Please copy your Dean/Director on the email. You will then be contacted by the appropriate 2020 Initiative Team representative/LEGS facilitators.

Proposals will be evaluated based on general criteria including the following:

- University-wide impact
- Clearly addressing one of the four LEGS themes from the 2020 strategic plan
- Specific budget details provided
- Realistic outcomes identified
- Assessment measures specified

Please consider the following questions as helpful prompts:

University-wide Objective(s)

- Does your proposal clearly address an issue relevant to your selected "primary strategic (LEGS) theme"?
- What specifically do you wish to accomplish with your project?
- How will Stockton, as a whole, benefit?

Expected Results

- How will you know if your project is a success?
- What are your anticipated outcomes and specific measurements for success?
- Does your proposal clearly indicate the person(s) or department(s) that will assume responsibility for the various work tasks?
- What is your project's "finish line"?

General Application Information	
Your Name	Kimberly Lebak
Your Email	Kimberly.Lebak@stockton.edu
Title of Project	Establishing Laboratory Classrooms to Support Teacher Development through a School District-University Partnership
Project Leader	Kimberly Lebak
LEGS Initiative Team Coach	Heather McGovern
Project Partner(s)	Stacey Culleny, Tara Luke, Joseph Trout
Duration / Time Frame of Project	2 Years

Proposal Category (choose one: one-time or ongoing)			
One-Time Event or Activity		**Ongoing Event or Activity**	
☐	(A) $5,000 or less	☐	(C) $5,000 or less
☐	(B) More than $5,000	☑	(D) More than $5,000

Strategic Theme (choose one)	
✔	Learning
	Engagement
	Global Perspectives
	Sustainability

Strategic Objectives: choose one primary (P) in main theme and up to three secondary (S) In any themes			
Learning			
P	Deliver high value-added learning experiences and promote scholarly activity (S1)	-	Reward scholarly applications (ER2)
-	Promote liberal arts ideal to develop lifelong learners (S2)	S	Establish additional revenue sources (RS1-L)
-	Strengthen internal processes to support learning (IP1-L)	-	Reduce expenses (RS2-L)
-	Develop faculty and staff skills to support learning (ER1-L)	-	Align resources to support strategic plan (RS3-L)

Engagement			
-	Establish Stockton as an integral part of the identity of students, faculty, staff, alumni, and community members (S3)	S	Foster an interactive environment among students, faculty, staff, and community (ER3)
-	Prepare students for active citizenship role (S4)	S	Increase opportunities for interactions between internal and external communities (ER4)
-	Create mutually reinforcing intellectual and co-curricular experiences (S5)	-	Establish additional revenue sources (RS1-E)
-	Strengthen internal processes to support engagement (IP1-E)	-	Reduce expenses (RS2-E)
-	Develop faculty and staff skills to support engagement (ER1-E)	-	Align resources to support the strategic plan (RS3-E)

Global Perspectives			
-	Develop a globally diverse Stockton community (S6)	-	Strengthen opportunities for global interaction among members of the Stockton community (ER5)
-	Enhance capacity to participate globally (S7)	-	Establish additional revenue sources (RS1-G)
-	Strengthen internal processes to support global education (IP1-G)	-	Reduce expenses (RS2-G)
-	Integrate global program efforts among multiple units of the university (IP2)	-	Align resources to support the strategic plan (RS3-G)
-	Develop faculty and staff skills to support global education (ER1-G)		

Sustainability			
-	Increase sustainable infrastructure (S8)	-	Develop and implement sustainability programs (IP5)
-	Enhance sustainability education and research (S9)	-	Develop faculty and staff skills to support sustainability (ER1-S)
-	Increase recognition as a model of sustainability (S10)	-	Reward sustainable practices (ER6)
-	Partner to promote global sustainability (S11)	-	Establish additional revenue sources (RS1-S)
-	Strengthen internal process to support sustainability (IP1-S)	-	Reduce expenses (RS2-S)
-	Prioritize sustainability in plan operations and residential life (IP3)	-	Align resources to support the strategic plan (RS3-S)
-	Promote sustainability across the curriculum (IP4)	-	Seek efficiencies through sustainable practices (RS4)

The tables below allow for summaries of about 350 words. Additional information can be included as an attachment.

Narrative Summary of Project
See attached.

Assessment Plan: What are your anticipated outcomes and specific measurements for success?
See attached.

Budget Summary						
	Item	**FY2019** July 1, 2018 – June 30, 2019	**FY2020** July 1, 2019 – June 30, 2020	**FY2021** July 1, 2020 – June 30, 2021	**FY2022** July 1, 2021 – June 30, 2022	**Notes/Comments** (stipends, supplies, hospitality, etc.)
1.	Professional Development by Faculty (Lebak, Culleny, Luke, Trout)	$ 1,800.00	$ 900.00			
2.	Instructional Coaching (Lebak, Culleny, Luke, Trout)	$ 3,600.00	$ 1,350.00			
3.	Materials for Professional Development	$ 150.00	$ 150.00			
4.	Materials for Laboratory Classrooms for Model Lessons		$ 800.00			
5.	In-Kind Contribution by Somers Point District					4500.00 (Substitutes provided for professional developmen
6.						
7.						
	Total	$ 5,550.00	$ 3,200.00	$ 0.00	$ 0.00	

* Please note: a proposal can only receive 2020 funding for two fiscal years.

Funding Questions		
Are you receiving any other University funding for this project?	No	
What department or academic school will your budget for this project reside in?	SOE	
Will you need funds for <u>immediate</u> use to begin your project?	(●) **Yes**	( ) **No**
If so, how much?		
Date when funds will be needed		

Additional Support Questions		
Will your project require support from Information Technology Services?	( ) **Yes**	(●) **No**
If so, please provide details		
Will your project require support from Plant/Facilities & Operations?	( ) **Yes**	(●) **No**
If so, please provide details		

Supervisor Approval/Support	
Have you discussed your 2020 proposal with your supervisor, director, and/or dean and received their support?	Yes, I have the full support of the Dean of Education.

* Please note: proposers who answer “no” to this question may be required to submit additional documentation in support of their 2020 application form.

CC: Dean/Director/Supervisor

Introduction

The project's primary objective is to deliver high value-added learning experiences and promote scholarly activity (S1) to multiple layers of community stakeholders including Stockton faculty members from NAMS and EDUC, Stockton preservice teachers, K-8th grade community teachers, and K-8th grade community students. Initially, NAMS and EDUC faculty members will provide high value learning experiences to K-8 community science teachers through professional development on science content and pedagogical approaches and instructional coaching. As K-8th grade teachers develop a stronger capacity to offer rigorous science instruction, their own students will directly benefit through the higher quality science learning experiences delivered by their teachers. This project will further provide high value learning experiences to all Stockton University preservice teachers working towards their elementary certification. As part of this project, the Stockton University Clinical Practice II course meetings, required of all Stockton preservice teachers, will be reformatted to incorporate observations, reflections, and co-teaching opportunities in laboratory classrooms at Somers Point. The use of laboratory classrooms will further allow for a space for research by Stockton faculty members, Somers Point teachers, and Stockton preservice teachers on implementing innovative instructional practices to meet the rigorous standards. A secondary objective of this project is to establish additional revenue sources (RS1-L). Data will be collected and analyzed on K-8th grade student achievement, preservice and inservice teaching effectiveness, and change in preservice and inservice perceptions of science instruction. Data will used to apply for outside grant funding.

In addition, this project will support two secondary objectives in the theme engagement, as this project will work to bring together multiple layers of stakeholders in the immediate and greater Stockton community. Specifically, objectives of this project are to increase opportunities for interactions between internal and external communities (ER4) as Stockton University will partner with Somers Point School District and to foster an interactive environment among students, faculty, staff, and community (ER3) though the purposeful partnership of the different levels of learners.

Rationale of the Project

Nationwide, preparing high-quality elementary science teachers is an area of concern and one of the major foci of science education reforms (NGSS Lead States, 2013). Despite calls and systemic reform initiatives to improve science teaching in elementary classrooms, recent surveys of elementary teachers suggest that relatively few (33 %) feel prepared to teach science (Banilower et al., 2013; Trigstad, Smith, Banilower, & Nelson, 2013) in comparison to the majority of respondents (76%) who felt prepared to teach reading/language arts and math. Recently, the challenges of teaching science in elementary classrooms have been heightened in New Jersey classrooms. In 2016, New Jersey adopted the Next Generation Science Standards (NGSS) as the New Jersey Students Learning Standards. The NGSS increase the academic rigor for all students, requiring they apply science and engineering practices and crosscutting concepts across core disciplinary ideas. NGSS differs from traditional science standards through the integration of the three dimensions at a much higher level of complexity. For example, in middle school a Next Generation Science Standard in physical science asks students to apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer (Next Generation Science Standard MS-PS Energy). While in past science standards, middle school students were asked to define types of energy and describe energy transfer, students must now use the science practices of designing, constructing, and testing to create a device of their choosing that demonstrates the principles of energy transfer within a system. A link to the NGSS can be found at https://www.nextgenscience.org/search-standards.

In May, 2018, The New Jersey Student Learning Assessment for Science (NJSLA-S) was administered for the first time to 5th grade, 8th grade, and high school students in New Jersey to measure student proficiency of the NGSS. Preliminary results indicate K-12 students were unprepared for the new expectations of the NJSLA-S reflecting a lack of high-quality science instruction designed for the increased rigors of the NGSS.

At Stockton University, faculty in the School of Education have been working to prepare our preservice teachers for teaching science to elementary and middle school students. However, due to the lack of strong elementary science teaching in K-8th grade settings, preservice teachers cannot connect college coursework on best science teaching with actual practice in classrooms. While the standards focus on students "doing" science rather than just reading about it, many elementary school science teachers have never performed laboratory research themselves or conducted more complex experiments. The result has been during preservice teachers' clinical hours in K-8th grade classrooms, preservice teachers often do not see any science lessons, let alone science lessons aligned to best practices in science instruction as articulated by NGSS.

Therefore, to address these challenges, laboratory classrooms will be created as a site for best practices to be implemented and studied. The laboratory classroom concept is modeled after surgical suites where doctors can observe operations in practice to hone their techniques. Although the idea of the laboratory classroom has roots in John Dewey's original "lab school" idea, the concept of the laboratory classroom is more often found in Finland and Australia where preservice teacher education programs and schools are linked as laboratories of pedagogy (Loukomis, Petersen, & Lavonen, 2018). Through laboratory classrooms, participants apply scientific or "evidence-based" approaches and experiment with new pedagogical approaches to improve their practice and the practice of others (Cucchiara, 2010). In other countries, laboratory classrooms are also being used as sites for research in which researchers can work with classroom teachers to study best practices for learning.

Purpose/Goals

This project's primary objective is to deliver high value added learning experiences to positively impact the learning of approximately fifty preservice teachers from Stockton University each semester, twenty community K-8th grade teachers and their students, and participating NAMS and EDUC faculty members. It is anticipated that the shifts in the elementary school teachers' science will positively impact K-8th grade Somers Point students learning of science concepts. Furthermore, the laboratory classrooms will provide opportunities for preservice teachers to observe and co-teach science lessons allowing for deep discussions and reflection on practice. Finally, the laboratory classrooms will become a space for pedagogical experimentation and research in a community of learners comprised of NAMS/EDUC faculty, Somers Point teachers, and Stockton preservice teachers. Therefore, the specific goals of the project are:

- Create a minimum of eight laboratory science and engineering classrooms in Somers Point School District where best practices are modeled for Stockton University elementary science methods students.

- Increase Somers Point K-8th grade classroom teachers' ability to implement inquiry-based lessons that integrate NGSS's disciplinary core ideas, science and engineering practices, and cross cutting concepts through professional development and coaching.
- Increase Somers Point student achievement on 5th and 8th grade on the New Jersey Student Learning Assessment for Science (NJSLA-S).
- Improve Stockton University's preservice teacher's science lessons through enhancing their experiences in Clinical Practice II through designing fieldwork experiences that include visits to the laboratory classrooms with faculty members to observe and debrief on lessons.
- Develop a community of researchers between Stockton faculty, Somers Point teachers, and Stockton preservice teachers using the laboratory classrooms as a place for experimenting and researching different pedagogical approaches.
- Seek outside funding to grow the laboratory classroom approach. One grant possibility will be Improving Undergraduate STEM education: Education and Human Resources by NSF that encourages proposals designed to prepare K-12 teachers.

Partnership

The proposal seeks to deepen the partnership between Somers Point School District and Stockton University. In the past five years, Somers Point and Stockton have been partners in two externally funded grants, the Using Formative Assessment to improve Teaching and Learning grant and the Building Teacher Leadership grant. These grants have been successful in positively impacting change with inservice teachers in Somers Point. Furthermore, the Building Teacher Leadership grant was instrumental in training inservice teachers to mentor Stockton preservice teachers. Somers Point School District was also chosen for this project as the population of the Somers Point student body closely mirrors the diversity of the students in the state of New Jersey. According to the New Jersey School Performance Reports, 70% of students in Somers Point are economically disadvantaged, 60% of students represent racial minority groups, and 24% of students have disabilities. The diversity of Somers Point provides opportunities for the preparation of future teachers for teaching in diverse settings in our state. Finally, the Somers Point administration has been supportive of all partnership activities. For this proposal they have agreed to cover costs for substitutes for Somers Point teachers to attend professional development.

Research Questions

The research questions guiding this project are:

- Will the implementation of laboratory classrooms increase 5th and 8th grade students' science achievement as measured by the NJSLA-S?
- Will the implementation of laboratory classrooms increase both inservice and preservice teachers' capacity to offer science lesson aligned best practices in science as aligned to the Next Generation Science Standards?

Methodology

Data collected and analyzed during this project will include standardized test scores from elementary school students, scores from videos of preservice and inservice teacher science lessons, survey data from preservice and inservice teachers, and fieldnotes.

Specifically, to answer research question number one, the results of The New Jersey Student Learning Assessment for Science (NJSLA-S) will be used to compare progress of elementary students from the academic years 2018, 2019, and 2020. The NJSLA-S examines students' performance of scientific and engineering practices in the context of crosscutting concepts and disciplinary core ideas. The three-dimensional nature of the standards requires more complex assessment items and tasks that are reflected in the NJSLA-S. Each year, the New Jersey Department of Education provides student results on the NJSLA-S. This data will be analyzed by the research team to determine change in student progress from year to year.

To answer research question number two changes in the effectiveness of teachers' practice of science lessons will be determined and survey data from participants will be analyzed. To measure change in teacher practice, science lessons of both preservice and inservice teachers will be videoed before and after the professional development workshops and instructional coaching. The Reformed Teaching Observation Protocol (RTOP), a valid research instrument, will be used to measure change. The RTOP was developed as an observation instrument to provide a standardized means for detecting the degree to which K-20 classroom instruction in science is reformed per the national science standards. Graduate assistants will be trained on the RTOP and will score all of the videos. The pre/post scores will be compared using t-tests to determine change in science practice. A survey regarding change in both preservice and inservice teachers' experiences with the connections to science and science crosscutting concepts will be given. An example of the survey can be found in Appendix A.

The results from the data analysis will be used to apply for outside funding to grow the laboratory classroom approach. At this point, I am considering applying fo an Improving Undergraduate STEM education: Education and Human Resources by NSF that encourages proposals designed to prepare K-12 teachers.

Activity Timeline and Budget Items

Phase 1 – Initially, faculty members from NAMS and SOE will provide professional development and instructional coaching to Somers Point K-8th grade science teachers in order to strengthen their science instructional practices.

January 2019 – Professional development on Introduction to the three dimensions of the NGSS to twenty Somers Point Science Teachers. This professional development workshop will include introducing the science and engineering practices, disciplinary core ideas, and cross cutting concepts that serve as foundations to NGSS. Lessons that integrate the three dimensions will be modeled to participants. **(Professional Development Presenters Cost: 90.00 x 5 hours = 450.00; Consumable Supplies for model lessons during Professional Development: $150.00)**

January – February, 2019 – Faculty members from Stockton (Culleny, Lebak, Trout) will visit each of the participants' classrooms to provide instructional coaching on science lessons. **(Coaching Costs: 45.00 x 40 hours of visitation= 1800.00)**

March, 2019 – Faculty members from SOE (Lebak, Culleny) will provide professional development workshop on creating and implementing curriculum units that align to NGSS. Participants will use their existing curriculum materials to redesign lessons that integrate the three dimensions. **(Professional Development Presenters Cost: 90.00 x 5 hours = 450.00)**

April-May, 2019- Faculty members from SOE (Lebak, Culleny) will provide instructional coaching on creating lessons and implementing NGSS in the classrooms. **(45.00 x 40 hours of coaching= 1800.00)**

May, 2019 – Faculty from NAMS (Luke, Trout) will provide professional development workshops on specific content to strengthen teachers' understanding of disciplinary core ideas in life science and physical science**. (Presenters Costs: 90.00 x 10 hours = 900.00; 150.00 in consumable supplies)**

Phase 2 –Redesign the Clinical Practice II Course for Stockton Preservice Teachers

Summer, 2019 –School of Education faculty and Somers Point administrators and teachers will work to redesign the Clinical Practice II syllabi to incorporate the laboratory classrooms.

Phase 3 – Create and Implement Laboratory Classrooms at Somers Point

September – November, 2019 **–**Faculty members (SOE (Lebak, Culleny) and NAMS(Luke, Trout) will work with Somers Point science teachers to create eight laboratory classrooms in which model lessons will be developed focused upon specific disciplinary core ideas. **(90.00 x 10 hours= 900.00 Professional Development – 2 days followed by 45.00 x 30 hours of coaching to set up classrooms; Consumable science supplies for 5th – 8th grade individual lessons 800.00; each grade level will be allotted 200.00 to buy supplies for 5th – 8th grade students to complete the lessons)**

November, 2019 – Pilot one elementary methods class to Somers Point and visit to laboratory classrooms. CPII faculty members will serve as facilitators to manage questions, ideas, and reflections. Elementary students will teach and video a science lesson in their own fieldwork experiences.

During Spring, 2020 – Fall, 2020 we will implement the full laboratory model partnership. Specific assignments in the Elementary CP II course will be aligned to classroom laboratory observations. Faculty members teaching Elementary CP II will meet students at Somers Point for greater integration between Somers Point and Stockton. Communities of researchers will study the impact of specific pedagogical strategies implemented in the classroom.

Resources

Banilower, E. R., Smith, P. S., Weiss, I. R., Malzahn, K. A., Campbell, K. M., & Weis, A. M. (2013). *Report of the 2012 national survey of science and mathematics education.* Chapel Hill, NC: Horizon Research, Inc.

Cucchiara, M. (2010) New goals, familiar challenges?: A brief history of university-run schools.

Loukomies, A., Petersen, N., & Lavonen, J. (2018). A Finnish model of teacher education informs a South African one. A teaching schools as a pedagogical laboratory. *South African Journal of Childhood Education*. 8(1).

NGSS Lead States. (2013). *Next generation science standards: For states, by states*. Washington, DC; National Academies Press.

Pratt, H. (2014). Implementing NGSS crosscutting concepts: Opportunities for elementary teacher contributions. *Science and Children.* 52(2) 8-11.

Smith, J. & Nadelson, L. (2017). Finding alignment: The perceptions and integration of the Next Generation Science Standards Practices by elementary teachers. *School Science and Mathematics.* 117(5). 194-203.

Trigstad, P. J., Smith, P. S., Banilower, E. R., & Nelson, M. M. (2013). *The status of elementary science education: Are we ready for the Next Generation Science Standards?*

APPENDIX A - SURVEY EXAMPLE

What grade level do you teach?

How often did you teach science last year (PULL DOWN MENU)

What domains in science did you teach last year?

- physical sciences
- life sciences
- earth and space sciences
- engineering, technology and applications of science.

Approximately what percentage of your lessons were

- Physical science lessons?
- Life science lessons?
- Earth and space science lessons?
- Engineering, technology and applications of science lessons

How often did your students last year…. (PROVIDE A NUMBER OF TIMES)

Generate questions or predictions to explore

Identify questions from observations of phenomena

Engage in inquiry activity that explores a scientific concept using a hands-on approach

Design or implement their OWN investigations

Closely observe an object, phenomenon, or their surroundings

Gather quantitative or qualitative data

Organize data into charts or graphs

Analyze relationships using charts, graphs, or calculations to draw conclusions

Write about what was observed and why it happened

Present procedures, data and conclusions to the class (either informally or in formal presentations)

Read from a science textbook or other hand-outs in class

Critically synthesize information from different sources (i.e., text or media)

Create a physical model of a scientific phenomenon (like creating a representation of the solar system)
Develop a conceptual model based on data or observations (model is not provided by textbook or teacher)

Use models to predict outcomes

Explain the reasoning behind an idea

Respectfully critique each others' reasoning

Supply evidence to support a claim or explanation

Consider alternative explanations

Make an argument that supports or refutes a claim

How often did you do each of the following in your science instruction last year?

Provide direct instruction to explain science concepts

Demonstrate an experiment and have students watch

Use activity sheets to reinforce skills or content

Go over science vocabulary

Apply science concepts to explain natural events or real-world situations

Discuss students' prior knowledge or experience related to the science topic or concept

Have students work with each other in small groups

Encourage students to explain concepts to one another

Have students provide explanations and evidence-based arguments

Have student engage in sense-making talk with one another during investigations and other activities

Ask higher order questions to encourage students' own thoughts.

Encourage students to use metacognitive strategies to evaluate their own understanding of a concept.

Use a variety of discourse strategies with students to get them to think deeply and to respond to each other's thinking

Have students use a variety of means (models, drawings, graphs, concrete materials) to represent phenomena.

Reflect upon their learning

Use formative assessments to check for understanding