Running Head: Leadership Proposal Draft

Implementing NGSS and Engineering Practices in the Classroom

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STEM Leadership Seminar SCED 545

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Draft

Title and Selection

Title of STEM profession development: Implementing NGSS and engineering practices in the classroom. I selected this topic because as a member of the Science Leadership committee, I want to develop training and professional development modules to enhance teachers' understanding and implementation of NGSS science and engineering practices. Complete three 5-Minute PD newsletters and conduct NGSS practice workshops to address how to apply these concepts to Pre-K to Grade 8 courses.

Integrate NASA content

Integrating NGSS and engineering practices into the classroom is something I gained by learning the content from my Endeavor courses. I think every teacher in all subjects should understand how these concepts deepen and enhance the learning process for students, Effective science and engineering integration is achieved when the use of term words and concepts are intuitive and when technology supports curricular goals. Through my science courses with Endeavor, such as in *Physical Science in Motion: Classroom Application* and *Climate Change with NSF*, I was able to examine how my math, technology or art learning objectives can be augmented to incorporated new standards of science and engineering principals.

Throughout the two years of taking Endeavor courses, I find that when I incorporated science and engineering concepts into my core classes, some of the most meaningful learning happened in this interdisciplinary environment. I would like to share this knowledge with my coworkers and provide them to tools and strategies to have a successful integration unit.

Audience

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My proposed audience with be the 24 Instructors for Chicago Public School (CPS) Saturday Enrichment Program. CPS Enrichment Program offers challenging and enriching classes for academically talented students age 4 through grade 8. The classes include mathematics, science, engineering, technology, and the camaraderie of learning with like-minded peers.

The instructors for CPS Saturday program plans and implements challenging and engaging courses with content one to two years above grade level based on course syllabi provided to them. The syllabi are created by classroom leaders, like myself before the school year. As classroom leads, instructors supervise teaching assistants and are responsible for student course evaluations. Saturday courses run for 27 Saturdays throughout the school year and are 2.5 hours in length.

STEM Concepts

Since states began deploying NGSS standards eight years ago, Chicago Public Schools have struggled to adopt the standards in full. Since many CPS teachers are just starting to understand NGSS and the value of creating engagement in the classroom, they don't know how to implement the content and the curriculum. My goal for this professional development is to address successful implementation to achieve a multidimensional approach to teaching science and engineering practices (SEP) and crosscutting concepts (CCC) in the classroom. I will show how instructors need to think, plan lessons and provide daily instruction in a different format.

As a group, we need to discuss how to successfully implement exercises that assist students when embracing the principles of science inquiry. When addressing the engineering principals, we need to address the challenges students are facing when defining a problem and resolving it as a solution. Throughout this professional development, I will discuss the value of:

- Using the scientific method to solve a problem
- Exploring concepts with hands-on activities and models
- Develop mathematical and computational thinking skills
- Interpret data
- Evaluate Information
- Communicating results

NGSS Standards for PD

Science and Engineering Practices – Teachers will be led on how to help students build toward proficiency in elements of the practices of planning and carrying out investigations (KPS2-1); and analyzing and interpreting data (K-PS2-2, K-ESS2-1, and K-2-ETS1-3).

Crosscutting Concepts – Teachers will learn to help students build toward proficiency in elements of the crosscutting concepts of Patterns (K-ESS2-1) and Cause and Effect (K-PS2-1 and K-PS2-2).

Structure of the PD

In a survey I conducted in 2017-2018 with a wider CPS instructors, data showed that teachers wants time to address the topics with their peers to build a sense of community. To this end, I will hosting a "Coffee and Bagels" Teacher Discussion Group on three Saturdays during the fall session. I will provide a 5-Minute PD newsletter the Wednesday before the meeting that teachers can read and join a lively teacher-facilitated discussion around the topic, and develop teaching strategies with fellow teachers over coffee and bagels. The sessions will be 1.5 hours long before Saturdays classes. The teachers will have access to computers during these three sessions and there will be time for questions at the end.

Post-Pre Survey

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This survey will assess teachers' perceptions of changes in their knowledge and skills, personal attributes, or impact on their future behavior and aspirations. The pre-survey is to assess teachers understanding of the subject and how I should best address the concept. The pre-survey will be conducted through a questionnaire one week prior to the session, September 21. The post-survey will be given one week at the end of the session on November 18 to see if teachers agree or disagree with statements about the professional development. Teachers will do both surveys through surveymonkey.com and they will complete them before and after the learning experience has concluded. Based on the collected data, I should be able to see the difference between teachers' retrospective pre- and post-ratings reflects the perceived impact of their learning on each outcome. I hope to see how teachers view the overall outcome of their new teaching strategies and how well they were used in the classroom.

Follow Up for Success

Three Thursdays in the fall session I will be offering a 5-minute Professional Development that focuses on the needs of our students and the value of addressing NGSS and engineering principals in a classroom setting. I will conduct teacher observation throughout the session as well. I will spend at least 30 minutes in each teachers' classroom to see how well this PD contribute to their professional growth and development.

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