

Professional Development Proposal

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Abstract

Professional Development is a critical part of the educational system. These trainings provide information, skills, collaboration, and community to teachers in their district. New policies, standards, and programs are presented in Professional Development courses to give them a fighting chance to be successful for the benefit of everyone involved in the learning experience. The following proposal is designed to address innovation in the classroom with educators. The ability to showcase innovation (new ideas) to students. Teaching them how to come up with their own way of thinking to create new designs, products, and solutions to problems yet to be solved. The Professional Development on Innovation would involve hands on learning, STEM, and research into possible innovation projects for a middle school classroom of various curriculums. The voluntary development course will be organized to be an hour long provided for 16 instructors in the Northern Cambria School District. The proposal below will address the schedule, measurement of progress, and tentative plan for the hour development session.

Building Innovators for Our Future

Professional Development Course

Northern Cambria School District

Topic

This Professional Development session will provide educators with time and resources with various content areas to explore innovation opportunities in the classroom. Innovation is a term that means to construct new ideas, methods, and solutions to problems. Innovation is necessary for our leaders of tomorrow to fix the multiple problems in the world. Our world needs new ideas, solutions, technology, programs, and more to address and act on the issues we face today. These problems may not find solutions in the middle school classroom, but students can learn this skill for their future careers. While researching innovation educators have found it comes easy in the classroom when paired with STEM (Science, Technology, Engineering, and Math). The innovation skill can be gained through project based, hands on, STEM projects. Allowing students to brainstorm collaboratively on their own. Providing them with tools and allowing them to find their own method of using them. The Professional Development course proposed in this paper would provide differentiated active learning to students ranging in ages from 10 to 14 years of age.

NASA and Endeavor assets

The Professional Development session will utilize resources in the form of Endeavor and their partnership with NASA. A mini lesson using project based, collaborative, innovative learning will be provided to teachers using a NASA resource. It would be simple to discuss bringing this development into a science or math classroom, but to really challenge teachers this development session would begin by having a lesson in English class. Using the latest resource/competition from NASA, “Naming the New Rover”. The resource can be found at the following site:

<https://www.nasa.gov/press-release/nasa-invites-students-to-name-next-mars-rover>

The Professional Development session will use this resource as an example and the instructor of the lessons will go about the middle school lesson as if the teachers were the middle schoolers. The instructors will be asked to design their own rover with labeled features that they believe would be vital to a rover going to explore Mars in 2020. The group will need to include measurements for their design. Laptops will be provided for research into existing NASA designs. This will be conducted as a group project of 3-4 in a group. Each member will have their own piece of scrap paper to brainstorm ideas to share with the group. The group will then combine their ideas on a large poster board. The group will then name their rover. In a real classroom this would then be submitted to NASA for review in the competition. English comes into play in this activity through the written explanation of the design and why they picked the

name that they did. Does it mean something to the mission, is it historical, does it relate to science? Groups will present their design, name, and reasoning at the end of the session. Instructors will be given 30 minutes using this resource and other NASA resources.

The idea for this lesson was gained through Endeavor peer discussions.

Participants

The Professional Development session will consist of 16 middle school instructors. Northern Cambria Middle School in Pennsylvania consists of four teachers per grade level and the middle school is broken down into four grade levels, 5th-8th grade. The session will also be open to any other instructor in the middle school as well. This consists of aids, gifted instructors, special teachers, and guidance counselors. The PD is voluntary and does not count for Act 48 hour credit. The 5th grade class in the 2019-2020 school year consists of 58 students with each teacher instructing 14-15 students per class. 6th grade has 65 students currently in attendance. This would give each instructor roughly 16-17 students per class. The 7th grade has 80 students, 20 per class. The 8th grade has the largest group of students at 91 at this point in the school year. The teachers in this grade level have 22-23 students per class.

STEM concepts/learning goals

- Explain the purpose of STEM and give examples of lessons in own content area.
- Support other educators in accessing resources available for conducting STEM activities with students.
- Practice intrinsic motivation in designing advanced lesson plans for students to collaborate, work with their hands, and problem solve.

Standards Addressed

NGSS

- MS-ETS1-1 Engineering Design: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-4 Engineering Design: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
- MS-PS1-3 Matter and its Interactions: Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

Common Core

- CCSS.ELA-LITERACY.WHST.6-8.1.B: Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
- CCSS.ELA-LITERACY.W.6.2.A: Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.

Location/Time/Resources

The Professional Development session will be held in my classroom (Northern Cambria Middle School, Pennsylvania) which is made to fit 26 students. The session will be one hour and will require laptops for each teacher to conduct research.

Expected Outcomes from the PD

- For educators to gain intrinsic motivation to incorporate STEM, hands on learning, or project based learning into their classrooms.
- For educators to collaborate with each other, sharing information about their content area, classroom management strategies, and experience.
- For educators to understand the value of innovation in their classrooms.

Follow Up

A month after the PD a small get-together with food and drinks will be organized. This will provide a space for educators to share their experiences in the classroom after adding in STEM, hands on learning, and any other strategy gained through the PD. This will keep communication continuing among the middle school staff.

Data collection methods

The pre-surveys and post-surveys will be compared side by side for each educator and analyzed into an excel sheet for easy scanning. One person from each grade level will also be interviewed on their thoughts on the PD and its effectiveness. Teachers will also be asked (voluntary) if I, the instructor, could sit in on one of their classes where the new skills from the PD are utilized.

Sample Measurement Tool

Pre/Post Survey

Directions: Answer the following questions to the best of your abilities.

1. What does STEM stand for?

2. How often is STEM incorporated into your classroom on a weekly basis?

3. List any hands on projects you want to try in your classroom.

Answer the following questions from a scale of strongly disagree to strongly agree by circling your choice.

I allow students to work collaboratively in groups at least once a day

Strongly disagree disagree neutral agree strongly agree

STEM is utilized in my classroom

Strongly disagree disagree neutral agree strongly agree

I am well equipped in using STEM and understand how to integrate it into the classroom

Strongly disagree disagree neutral agree strongly agree

I am confident in my ability to instill innovation skills in my students

Strongly disagree disagree neutral agree strongly agree

I plan on bringing more STEM, innovation, and collaborative work into my classroom

Strongly disagree disagree neutral agree strongly agree

Tentative Schedule:

1. Introduction to the Professional Development session (3 minutes)
2. Pretest Survey (7 minutes)
3. Mini lesson presented and conducted (30 minutes)
4. Research time for educators to use resources, such as NASA, to develop their own lesson involving innovative thinking and STEM (10 minutes)
5. Posttest Survey (7 minutes)
6. Closing thoughts and discussion (3 minutes)

Resources used:

Common Core: State Standard Initiative. (2019). "Middle School Standards". Received from:
<http://www.corestandards.org/ELA-Literacy/WHST/6-8/>

NASA. (2019). "NASA Invites Students to Name Next Mars Rover". National Aeronautics and Space Administration. Received from:
<https://www.nasa.gov/press-release/nasa-invites-students-to-name-next-mars-rover>

Next Generation Science Standards. (2019). "Read the Standards". Received from:
<https://www.nextgenscience.org/search-standards>