Strive for STEM

STEM for THEM, STEM with THEM, THEM in STEM

Parama Chaudhuri | chaudhpx@jmu.edu

Andrew Jackson | jacksoas@jmu.edu

Contributors: Amy Sabarre | asabarre@harrisonburg.k12.va.us, Tammy Stone | tstone@rockingham.k12.va.us, Laurie Biser | lbiser@augusta.k12.va.us

Project Budget: $21,000

Abstract:

This project will bring people together who have an interest in developing and implementing meaningful STEM lessons at the 5th and 6th grade level. The idea is that three minds are better than one. This grant will bring together practicing teachers who teach science or technology to 5th and 6th graders with pre-service teachers and STEM majors at JMU.

Project:

"***STEM Education*** *is an interdisciplinary approach to learning and teaching practices, where students have opportunities to practice the integration of the knowledge and skills of science, engineering, mathematics, and technology and apply that integration to a challenge, problem, or project representing how we address real-world problems".*

Science, Technology, Engineering and Mathematics have been taught in schools and higher education institutions for centuries now, so why this new approach? Simply put, educators have realized the importance of teaching these subjects in an interdisciplinary manner, in a way that students can apply those learnings. The Virginia Department of Education has refocused STEM learning for K-12 is to develop STEM-literate students who have critical knowledge and skills for success in any 21st century profession. STEM literacy has been defined as "the ability to

identify and acknowledge science, technology, engineering and mathematics concepts and processes in everyday life."

One of the key challenges in STEM education is learning equity. There is a dearth of representation of certain ethnic and gender minorities in STEM careers. The intent of equity is to ensure that all students have the basic knowledge that will allow them to productively participate in the world and make well informed decisions about their lives and not just prepare them to pursue STEM or STEM related careers. Equity is not limited to whether STEM classes are available, but also includes how classes are taught, how students are recruited for classes or activities, and how the classroom culture supports diverse learners and promotes the retention of students and also most importantly how learners are represented. In that respect, the proposers of this project contacted K-12 teachers and discussed with them their specific needs for teaching STEM and related courses successfully.

This project will bring people together who have an interest in developing and implementing meaningful STEM lessons at the 5th and 6th grade level. The idea is that three minds are better than one. This project will bring together (1) practicing teachers who teach science or technology to 5th and 6th graders with (2) pre-service teachers and (3) STEM majors at JMU. This team of future and veteran teachers with STEM majors will create STEM lessons that target 5th grade and 6th grade Standards of Learning in science, mathematics, language arts, and computer science. The project will empower these teams to create the lessons that meet the needs as outlined by the practicing teacher and their district science coordinator.

We also contacted student organizations in the College of Integrated Science and Engineering at James Madison University to understand how they could work with these K-12 teachers in

contributing to developing and designing STEM lessons. One example of these student organizations is the Engineering Ambassadors and this group represents a wide demographic of students. These students also participate in Peer Assisted Study Sessions (PASS) which are a student-facilitated academic support programs designed to help improve performance and retention in specific courses. PASS is a based on the Supplemental Instruction (SI) academic support model from the International Center for Supplemental Instruction. PASS focuses on utilizing evidence-based approaches to support student learning and success in traditionally difficult courses. Experience in this learning model will help break down barriers and provide tangible examples. The Ambassador's contributory work with K-12 teachers could potentially create pathways for learning difficult subjects and attract more students into K-12 STEM programs. Meeting these students would also allow K-12 students to see representation of ethnic and gender minorities in STEM majors and greatly encourage them to participate in STEM and related courses in their schools. In addition to generating good, and needed lessons, this project will introduce 5th and 6th grade students to university students striving to become scientists, engineers, computer scientists, and teachers, with the goal of allowing young middle school students to "see themselves" in the role of university student and aspiring professionals in STEM areas.

Budget

Project Budget Amount:	$21,000
Personnel: (Teacher/Staff/Student Stipends)	$12,000
Travel:	$2000
Equipment/Supplies:	$7000