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Award Abstract #1036269

Research and Evaluation of Scientific Literacy for Pre and Early Freshmen STEM Majors

NSF Org: [HRD](#)
[Division of Human Resource Development](#)

Initial Amendment Date: August 6, 2010

Latest Amendment Date: August 6, 2010

Award Number: 1036269

Award Instrument: Standard Grant

Program Manager: Claudia M. Rankins
HRD Division of Human Resource Development
EHR Directorate for Education & Human Resources

Start Date: September 1, 2010

Expires: August 31, 2013 (Estimated)

Awarded Amount to Date: \$499828

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Sponsor: Morehouse College
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NSF Program(s): HIST BLACK COLLEGES AND UNIV

Field Application(s):

Program Reference Code(s): 9178

Program Element Code(s): 1594

ABSTRACT

The project proposes a definition of scientific literacy as: an understanding of the nature and development of scientific research and knowledge; knowledge of the interdisciplinary nature of STEM; possessing the ability to evaluate scientific evidence and explanations; having the ability to participate productively in scientific discourse; demonstrating an aptitude for quantitative literacy/reasoning, scientific reasoning and critical thinking; possessing a relevant knowledge of career opportunities in STEM;

possessing a scientist identity and STEM self-efficacy, as well as other relevant attitudes and behaviors for success in STEM; and finally, the ability to participate in team learning and discovery.

To assess for a students' critical scientific thinking and understanding, such as a student's ability to participate effectively in scientific discourse requires development of better assessment tools. This proposed project has two major research questions: 1) What is the level of scientific literacy of pre and early freshmen STEM majors as it relates to individual STEM competencies, and what is the relationship between the level of scientific literacy and student success, gender and ethnicity? And 2) What are the most effective educational/pedagogical methods for students to learn scientific literacy?

The study will be conducted at different types of institutions of higher education, and research will be conducted to develop an appropriate scientific literacy assessment tool that specifically assesses STEM competencies (e.g, conceptual knowledge, abilities, aptitudes, behaviors and STEM self-efficacy) that facilitate completion of a STEM major. Data will be collected over a network of 15 higher education institutions representing a broad range of race and ethnicities, especially African American male students.

The development of an inclusive, nationally recognized assessment tool, in addition to the proposed tested educational strategies for the instruction of scientific literacy concepts, has the potential to improve the success and graduate rate of students from both majority and minority populations interested in STEM careers.

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Last Updated:
April 2, 2007
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