

Impact of Geospatial Lessons on Student Interest in Science and Technology Careers

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OVERVIEW: Our national study assesses the impact of geospatial technology-integrated lessons on student interest in science, technology, and STEM careers. Findings highlight the importance of teacher knowledge, skills and contextual factors.

AUDIENCE: Administrators (K-12), Formal educators, Professional development providers, Researchers/Researcher supervisors, Outreach specialists, Secondary science teachers, Teacher educators, STEM educators

KEY POINTS

- The effectiveness of educational technologies to support STEM learning must be considered within differing teacher and student contexts, student populations, and pedagogical approaches.
- Teachers' technology skills, implementation of career spotlights, and gender were teacher factors positively associated with student interest in science, technology, and/or STEM careers.
- Student's previous exposure to science and technology, identity, gender, race, curiosity, perseverance, and critical thinking were related to student interest in science, technology, and STEM careers.

INTRODUCTION: We explored the connection between the engagement of students in Geospatial Inquiry lessons and its impact on students' interest in science, technology, and STEM careers. We examined relationships between student and teacher characteristics and contexts. After participation in professional learning, teachers (n=82) submitted geospatial lessons and implementation surveys. These were scored for alignment with the principles of Geospatial Inquiry. Students (n=1924) completed a post-lesson retrospective survey indicating the extent to which their attitudes and interests toward STEM changed because of the lesson(s). Data were analyzed using a generalized linear modeling approach that included hierarchical analysis allowing simultaneous investigation of relationships within and between variables at the classroom or teacher level and the student level and to account for the variance in the factors at the different levels.

FINDINGS Teachers with higher technology performance scores yielded higher student interest in science, technology and science careers. Teachers who highlighted careers as part of their lessons saw increased student interest in science and science careers. Students who were curious about STEM topics had an increased interest in science and technology. Students' science or technology identity was also associated with increased interest respectively. Students also reported greater interest in science and technology if they engaged in critical thinking and in those careers if they had increased perseverance and previous exposure to science or technology respectively. Previous exposure to

technology resulted in less interest in science careers and previous exposure to science resulted in less interest in technology and technology careers. There was a consistent impact on interest in science and technology careers for several underrepresented groups including students who identify as female, and students who identify as Black or Hispanic.

TAKEAWAYS Results underscore the importance of ensuring teachers have professional learning with the technology skills necessary to implement Geospatial Inquiry lessons. Ensuring strong skills may increase teachers' confidence to address issues as they arise. Given previous exposure to science and technology was a predictor of student interest and excitement in science and technology respectively. Providing students with exposure opportunities may increase both student interest and desire to pursue STEM careers. As such, district leaders and principals should ensure curricula address science and technology and that students have opportunities and time to pursue these subjects in K-12 classrooms. Geospatial Inquiry lessons may be a promising vehicle for engaging students in using technology, thinking critically, and collaborating to make sense of data to increase student interest in science, technology, and STEM careers. They could be a pathway to effectively engaging underrepresented groups in science and technology also. Finally, incorporating examples of underrepresented groups as career spotlights, in any course or lesson, may also be a way to increase interest in that subject and its career opportunities.

Full Title: The Impact of Geospatial Inquiry Lessons on Student Interest in Science and Technology Careers