

Scaling up or expanding an ITEST project is *not*   
a linear process; it is emergent, a spiraling process that demands hard-to-predict, intensive effort.

**New Challenges & Next Steps**

A challenge – and opportunity – is teachers moving to new schools and wanting to bring the project with them! This has engaged us with not just on-boarding new teachers but on-boarding new schools.

A next step is to develop strategies for integrating more direct instruction and scaffolding around spatial thinking & workforce development.

**Equity**

Our collaborators include two special education teachers; their participation has allowed us to examine how geospatial instruction can best meet their students’ needs and how our instructional models might be adapted. Additionally, we have engaged all of our collaborating teachers more deeply in our research activities: data collection and analysis, presenting, publishing. This new level of partnership is energizing and has already yielded improvements, such as a revised data collection routine to better capture the linguistic diversity among the participating students.

**Lessons Learned & Insights Gained**

During our SEI project, sustainability has emerged as the most important goal—to be successful, our collaborating teachers must be able to continue their new geospatial teaching practices beyond the timespan of the funding. To prepare teachers for the independent work of collaborating, developing curriculum-aligned materials, and administering their GIS server, we focused on two necessary preconditions: (1) strong rapport and reciprocal learning with both university personnel and peers, and (2) infrastructure—in terms of both tools and workflow—to support communication and collaboration.

**Collaborative Research: Expanding Socio-Environmental Science Investigations with Geospatial Technologies in High Schools**Thomas C. Hammond, Kate L. Popejoy, Judy Morrison, Jonah Firestone, & Curby Alexander

NSF Award Number​s: 1949400, 1949393, & 1949388 Dates: 2020-2024

Project type:​ Scaling, Expanding, and Iterating Innovations (SEI)

Project URL: https://sites.google.com/lehigh.edu/sesi-expand

Project Overview: This project expands from a single site into a multi-university, multi-school teacher professional development and curriculum development initiative for geospatial integration into science, social studies, and STEM courses. Student outcomes addressed include spatial thinking and reasoning and STEM college and career interests.

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