Informal Learning Pathways through Mapathons for Military and Veteran Communities

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Purpose

Many military veterans who seek to transition to higher education or workforce pathways find it challenging to translate the skills they acquired during service to civilian STEM settings and the modern day workforce. Yet many returning veterans have significant experience with STEM fields, including mapping and geospatial technologies, because of their unique functions and service assignments. Such geospatial skills are useful for location-aware industries, citizen science and public services. At the same time, military and veteran families have been largely overlooked as an important public audience for focused informal STEM learning. Informal learning events called "mapathons" which enlists participants to mapping exercises and create geospatial data on open platforms that address authentic needs in their communities and the broader society at large. When seeking to further their education upon returning from service, veterans' typical options have included some form of formal higher education. Mapathons may be a feasible bridging activity that (a) recognizes veterans' unique, valuable, and in-demand STEM skills and (b) supports lifelong learning.

Approach

This pilot research seeks to understand how informal learning experiences called mapathons are viable pathways for veterans to transition to the civilian workforce. The conceptual approach pays attention to the realities of the life course of military and veteran families, especially building upon theories of change related to transitions that include a spatial component. The foundation of the project's intellectual merit is its explicit inclusion and sensitivity to place, scale, and spatial behavior, building directly from findings of prior NSF-funded projects and the evidence base for informal learning pathways.

(1) To what extent do veterans recognize that their extant skills acquired, in military settings, are translatable to civilian STEM settings?
(2) How can informal learning experiences help a diverse veteran population increase awareness of the translatability of geospatial workforce competencies, build confidence in technology skills, and motivate interest to pursue formal studies in STEM fields in general?
(3) What pathways do which veterans favor when they could pursue formal STEM higher education learning among an array of choices online or at regional sites in Texas, and why?

Mapping a New Path
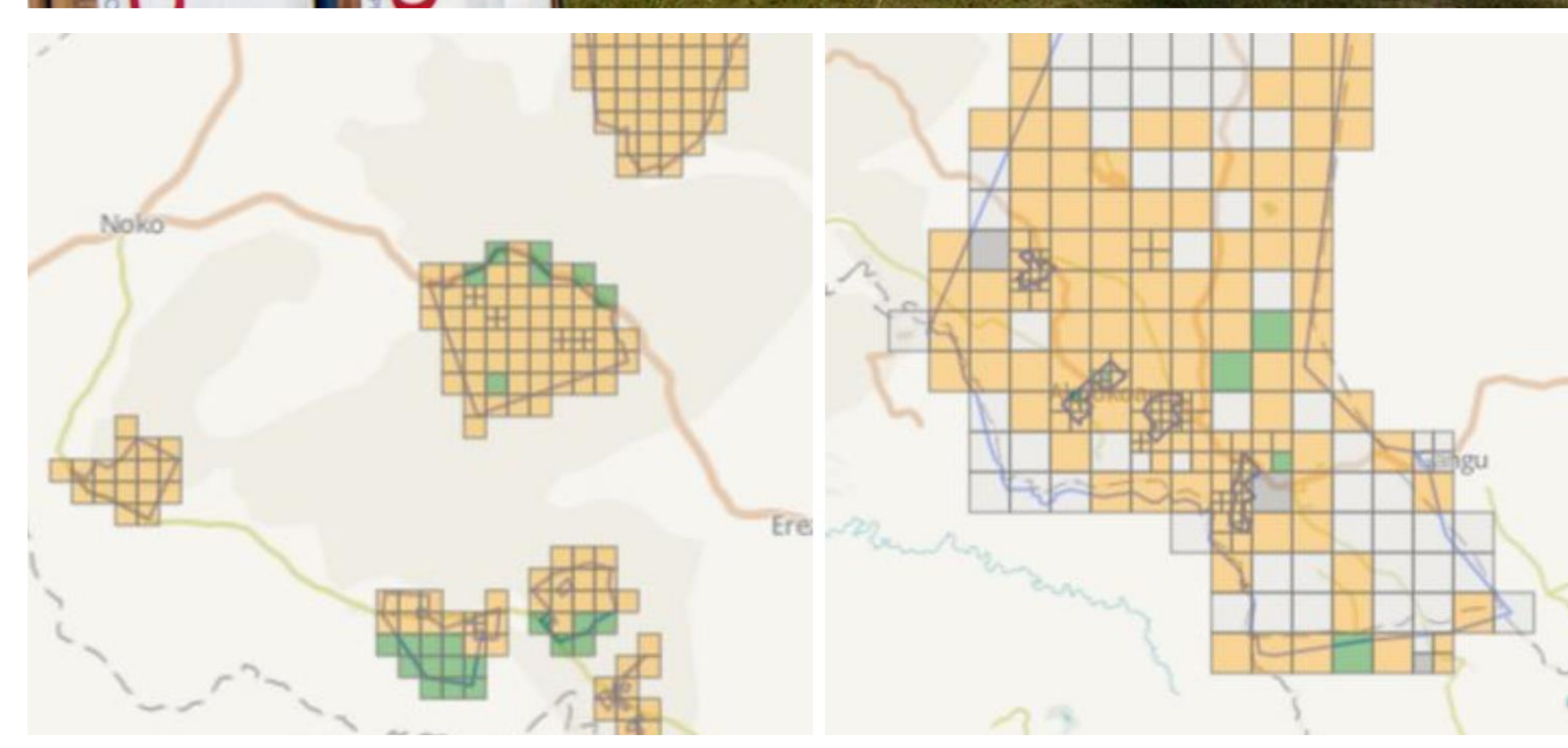
Mapathons are informal mapping events that expose attendees to authentic needs in vulnerable communities and provide them with new, easily acquired technical skills to be able to contribute to open geospatial data platforms through YouthMappers, a network of student clubs who informally learn and contribute to open mapping for humanitarian needs through remote and local mapping events. YouthMappers are now on 145 campuses in 41 countries. Campaigns consist of reading high-resolution satellite imagery to identify roads, buildings, water bodies, or other features that are missing from the map, but critical for situational knowledge of the humanitarian context. Prior volunteer mapping projects have included charting the location of sleeping residences in rural Mozambique for malaria prevention programming, identifying fish ponds for food security strategies in Bangladesh, drawing roads and settlements in cities threatened by volcanic eruption in Ecuador to serve as a basis for evacuation route identification, and digitizing building footprints before and after Hurricanes Irma and Maria hit Puerto Rico to aid damage assessments and prioritize aid to the hardest hit areas.

- Texas is home to 1.5 million veterans, fully 8.2 percent of our state population in 2014; Yet 100,000 vets live below the poverty line, and 400,000 are disabled. 17.3% are Hispanic, and 13.0% African American.
- Texas is first in the nation in numbers of veterans under age 25, and is expecting the largest increase over the next decade of increased numbers of returning veterans (NCVAS 2017).
- Texas Tech University was rated the #7 College in the "Top 10 Colleges in the U.S. for Veterans."
- Texas Tech has been recognized as the 1st Purple Heart University in Texas.
- Texas Tech has a specialized and award-winning Military and Veteran's program MVP available as an institutional support for this pilot/feasibility study.
- Texas Tech's nationally-recognized eLearning program has identified main target audience segments that define the various communities of interest for marketing, recruiting, and enrolling new prospective students for online programs, including Active Military and Returning Students.
- Only 14.5% of degrees earned by student veterans since 2001 have been in STEM-related fields while 1.2% of these are in science technologies like geospatial fields.
- Evidence of the educational benefits of engaging the public in scientific research through citizen science projects is growing, and shows that it can contribute to awareness, knowledge, and/or understanding; engagement or interest; skills; attitudes and behaviors.
- The geospatial services industry employs more than 500,000 people, generates $75 billion in annual revenues, and has an overall economic impact of $1.6 trillion. Annual job growth rate will reach 20% by 2024, at a high median salary of $60,000 with Bachelors Degrees.
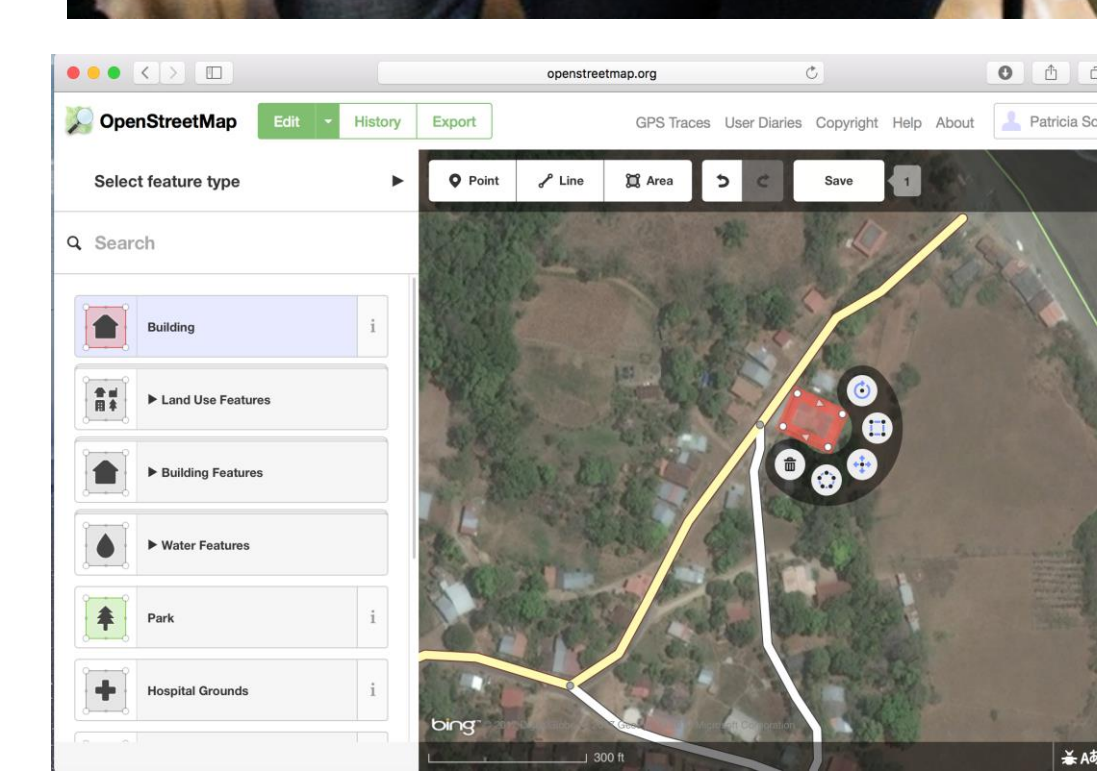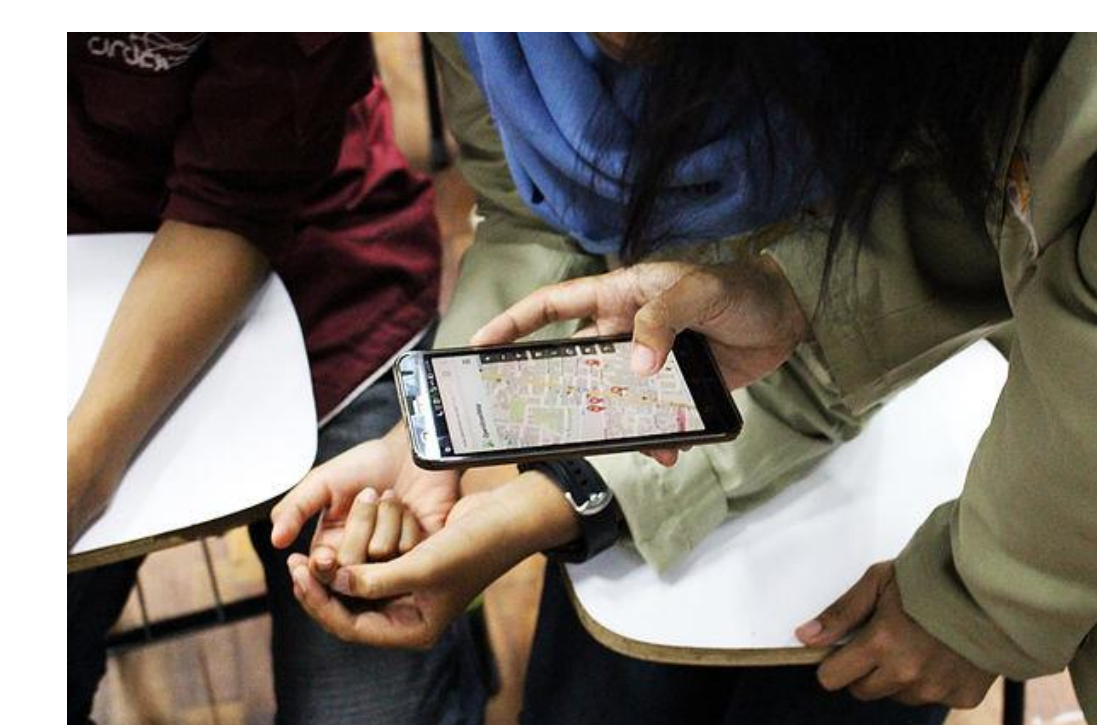

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Research Plans

Our core audience for this pilot study is military and veteran families in Texas, where the highest number of veterans in the U.S. under age 25 live (over 27,000 individuals) and where the largest increase in veteran population over the next ten years is expected. Our pilot research will introduce 320 participants to informal geospatial learning events in the form of mapathons held across the state. Our method will integrate a) in-depth surveys and interviews of military/veteran audiences in these informal learning settings and b) a spatial analysis of their potential pathways within the formal STEM landscape. Pre and post survey instruments will assess workforce competencies, technology confidence, and STEM interest and motivation. Qualitative interviews using Critical Incident Methodology will be used to elicit insights about how, why, and in what contexts respondents may choose particular pathways to civilian opportunities.

The theory of change driving this aspect of the pilot research centers on the intersections of Schlossberg's (1981) adult transition theory and of meaning making within motivational theories (Dik & Duffy 2009). Moreover, not only do geospatial science and technologies feature as our core STEM content area of interest, but they also inform our approach to building knowledge for informal learning. We will employ spatial analysis to juxtapose veterans' stated preferences for higher education pathways relative to the landscape of STEM formal offerings available through Texas Tech, an Hispanic serving, highest level Carnegie Research I university designated as one of the top ten colleges in the U.S. for Veterans. This spatial analysis takes seriously the underlying geographies of, contexts for, and variations across the higher education system (Solís & Miyares 2014). It is sensitive to place identities and spatial behavior, building directly from findings of our prior NSF-funded projects and the evidence base for STEM pathways. We will use these results to explore the gaps in state-wide opportunities to leverage informal experiences, literally mapped to patterns of access to eLearning and Texas Tech regional sites.
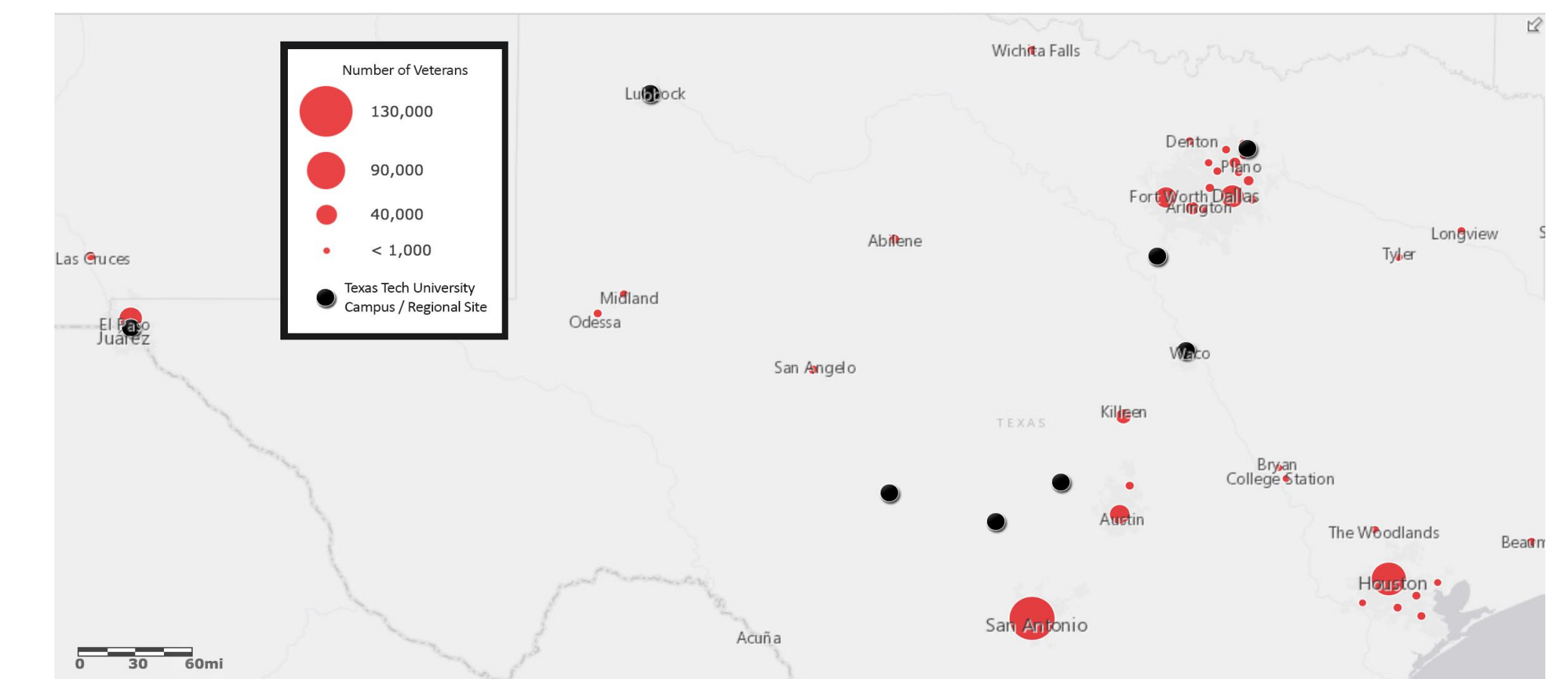
Expected Outcomes

Military and veteran families include a significant number of people from groups typically underrepresented in STEM fields. Supporting more veterans to transition successfully to higher education pathways or careers in STEM is a vital service to the nation. This study on informal to formal pathways for veterans will include an innovative understanding of the importance of place in meaning-making and in the reality of choices they consider during the transitions of their life course.

- Better understanding of how learners (veterans) can be supported to make bridges between what they learned in one setting (military) and what they learn in another setting (transition to STEM education or the civilian workforce).
- New research findings on the needs and motivations of military and veteran families regarding informal STEM interests and motivations.
- Further findings on the role of informal learning activities (mapathons) to help develop or activate geospatial technology workforce competencies.
- Tests of our innovative methodology, marrying life-course, meaning-making and spatial analysis.
- Opportunities for the public to engage in crowd-sourcing and citizen science, particularly focused on military and veteran families, including those of color or with disabilities or first generation.
- Advances in research that articulate what works, why, and in what contexts for broadening participation in STEM, on the pathway from informal activities, online learning, and enrollment in academic offerings for military and veteran families in Texas.
- Impacts on veterans themselves: from informal participation only (appreciation of acquired skills, awareness of career opportunities) to online coursework (eLearning) to academic enrollment (regional sites correspond on the map to where there is high military and veteran presence, with no need to relocate.)
- Evidence sufficient to inform national scale studies with the other 25 YouthMappers U.S. universities that replicates and expands the model developed in this NSF funded work.