

REAP Change Consultants 2872 Nicada Drive Los Angeles, CA 90077-2024 <u>http://www.reapchange.com</u> E-mail: <u>consultant@reapchange.com</u> Telephone: (310) 384-9717

# **Grant Progress Report**

East Los Angeles College NSF ATE Grant 1801188

Stephen C. Maack DRAFT December 18, 2020

REAP Change Consultants, 2872 Nicada Drive, Los Angeles, CA 90077-2024<a href="http://www.reapchange.com">http://www.reapchange.com</a>e-mail: <a href="consultant@reapchange.com">consultant@reapchange.com</a>Telephone: (310) 384-9717

#### Report Context

- 1.1. This evaluation report has been prepared by REAP Change Consultants (REAP Change) for the East Los Angeles College (ELAC) A T E grant 1801188 "Filling Skills Gap Through the Geospatial Engineering and Technology Program." The grant and its evaluation are funded by the National Science Foundation (NSF) Advanced Technological Education (ATE) grant program.
- 1.2. This progress report is being prepared at the request of the grant Principal Investigator, Dr. Humberto Gallegos, and in response to an e-mail to Dr. Gallegos dated December 1, 2020 from Virginia Celeste Carter, the NSF program liaison for this ATE grant. The e-mail was sent in response to the Annual Report for award 1801188 and indicates that Ms. Carter has approved the Annual Report for grant 1801188. The progress report is primarily directed to co-Principal Investigator (PI) Dr. Gallegos, with the realization that he may choose to share it with others, such as his Dean or Ms. Carter. In it the pronoun "I" will refer to myself, the author and project evaluator, "we" will refer to Dr. Gallegos and myself, and "you" will refer specifically to Dr. Gallegos.
- 1.3. This report will provide further information about the evaluation as well as grant progress to date. However, it will also point out certain assumptions and concerns about comments in Ms. Carter's e-mail that may need further clarification from her about NSF ATE program expectations.
- 1.4. As the Owner of REAP Change Consultants, as well as its Lead Evaluator for this grant and the writer of this Progress Report my background and experience with higher education, community colleges, and evaluation are all relevant. I will include in comments below some statements that I could document with appropriate higher education research references but will not do so because of the time it would take, the scarcity or evaluation funds and the desire to be efficient in use of NSF grant funding. My experiences and background qualify me to offer expert comments as both a higher education researcher and as a project evaluator.

#### Progress Report

#### **Evaluation Approaches**

- 2.1. This evaluation started using a well-established approach appropriate for a utilization-focused evaluation.<sup>1</sup> In such an approach an evaluator designs an evaluation to meet the intended uses of the intended users. In the case of AT E grant 1801188 the intended users include Dr. Gallegos, the Dean of his department, his co-Pl, Dr. Mora, other collaborators in a multi-pronged grant project, and the funder, NSF. REAP Change Consultants anticipated and proposed a relatively straightforward mixed-methods (quantitative and qualitative) evaluation of project outputs and outcomes in relation to grant goals.
- 2.2. It quickly became apparent during discussions with Dr. Gallegos after he received grant approval that this was not a good evaluation approach. This was his first grant funded project and his first experience with an NSF ATE grant. Although I had assisted Dr. Gallegos pro bono with writing two NSF funding proposals, including providing

<sup>&</sup>lt;sup>1</sup> Michael Quinn Patton 2008 *Utilization-Focused Evaluation*, 4<sup>th</sup> Edition, Los Angeles: Sage Publications.

additional information about the general evaluation approach in response to NSF reviewer questions, the details of the grant as funded differed from REAP Change expectations.<sup>2</sup> Not all resources needed for completing grant activities were in place before the grant was awarded. Some of the needed resources could not be obtained (including evaluation services) until expenditure of grant funds was approved by the Los Angeles Community College Board, which caused timing delays. The project activities were being developed as a specific evaluation was being designed. While this was not specifically communicated to NSF, the evaluation approach morphed to resemble more that of a developmental evaluation than a classic utilization-focused evaluation.<sup>3</sup>

2.3. The two evaluation approaches are compatible with one another. However, in a developmental evaluation approach the evaluator provides evaluation evidence in a more adaptive fashion to meet the needs of the primary stakeholder. That often includes providing evaluation information and insights into grant processes and results to date, even if those are tentative rather than end results. In evaluation jargon the evaluation is more likely to be "formative" (helping with the design and formation of grant activities) and closer to the work of a project consultant than "summative," or providing evidence of final grant outputs or outcomes after or nearly at the point that the grant is over. In this respect a developmental evaluation approach can be more responsive to the needs of those designing and running the project (co-PIs Gallegos and Mora), while also providing some evaluation information to a funder (in this case, NSF). An adaptive developmental evaluation approach including systems understandings and analyses is especially appropriate when evaluating a project that has had to undergo major changes in activities or approaches as a result of early evaluation findings and/or because of major project changes caused by events outside the control of the project itself, such as the COVID-19 pandemic discussed further below.

#### **Program and Project Perspective Differences**

- 3.1. NSF runs federal programs across the United States, of which the ATE program is one, and award grants under those programs for projects, of which grant 1801188 awarded to East Los Angeles College is one. It is understandable that a national program perspective or lens might differ from an individual project perspective or lens. As the project changes and adapts to local circumstances, a developmental evaluation should take account of the local circumstance changes. Ms. Carter expresses the national program perspective when she writes to Dr. Gallegos that "Your evaluator needs to be providing you with a single annual evaluation report that gives you data and suggestions as to how or where you are on completing the overall project objectives." This statement is written after she agrees with my contention, written into several of my evaluation reports, that evaluating single courses or events is not helpful to understanding the overall impact of the project.
- 3.2. My evaluative critique of Ms. Carter's comment has two points. First, my contract is with East Los Angeles College, not directly with NSF, and so takes a project more than a program perspective. Second, the REAP Change scope of work requires evaluation instrument design, evaluative data collection, and

<sup>&</sup>lt;sup>2</sup> Dr. Maack first became aware of the specific of grant goals and targets from a PowerPoint summary of the grant prepared by Dr. Gallegos, dated April 30, 2019 and presented to a group of grant stakeholders, including the evaluator, shortly after that. See Appendix One.

<sup>&</sup>lt;sup>3</sup> Michael Quinn Patton 2011 *Developmental Evaluation: Applying Complexity Concepts to Enhance Innovation and Use*. New York: The Guilford Press.

REAP Change Consultants, 2872 Nicada Drive, Los Angeles, CA 90077-2024<a href="http://www.reapchange.com">http://www.reapchange.com</a>Page 2e-mail: <a href="http://consultant@reapchange.com">consultant@reapchange.com</a>Telephone: (310) 384-9717

communication of results "by way of presentations and written reports." There are many ways to communicate evaluation results. Following discussion and agreement with Dr. Gallegos, his preference and need is for evaluation of individual courses and events, including ones that he is developing, offering, and modifying for the first time. He and I have agreed that the evaluation reports should comment on grant goals and each one has included discussion of implications of that course or event toward meeting grant goals. In periodic conference calls we have discussed such implications and findings. We have perhaps made a tactical error by not communicating clearly to NSF that such evaluative discussions are taking place orally and throughout the project period rather than in the form of a single annual evaluation report. During periodic virtual Zoom meetings that I have participated in with Evaluate, the evaluation at the 2020 ATE PI conference such an expectation of a specific annual evaluation reporting approach has never been made. I recommend that you (Dr. Gallegos) ask Ms. Carter if an annual evaluator report is an NSF mandated reporting requirement for evaluators or simply a suggestion based on her experience.

- 3.3. The statement that an annual evaluation report, especially a quantitative one, is valuable may have an underlying assumption that linear progress can and should be made toward meeting grant goals. I seriously question such an assumption for this project, especially for the period since March 2020, when the worldwide COVID-19 pandemic resulted in complete disruption of the plans for ATE grant 1801188, including complete cancellation of several grant year two activities scheduled for Summer 2020 and all ELAC classes going virtual. Important evaluation questions always include what are project goals, what are the standards for success and ways to measure achievement of those goals (in other words, how and in what ways using what evidence does one know when one has reached those goals?).
- 3.4. It would be very helpful for grant project activity and implementation planning and essential for evaluation measurement of goal and objective output and outcome "success" to know if the NSF ATE program still expects grantees to meet their original grant goals, as specified in their NSF ATE grant proposal. A summary of those original grant goals and objectives can be found in Dr. Gallegos PowerPoint presentation of circa April 30, 2019 (see Attachment One). Are the ones listed at the end of this report accurate? I recommend that you (Dr. Gallegos) determine from Ms. Carter if the NSF ATE program is allowing changes in project evaluation goals or objectives at this time. If they are, we need to discuss changes you propose so that I can modify the standards for "success" in the evaluation.
- 3.5. To clarify for myself and better acquaint you with the value of evaluation, we worked on creating a logic model for the project, with the last draft done on June 24, 2019. This was never completed, but the draft (without arrows showing relations among resources, activities, outputs, and short, medium and long-term outcomes) is provided as Attachment Two. During the work on creating a logic model we discussed several aspects of your project that were not completely clear, such as whether the ELAC students participating in the community college portion of the grant were expected to come from those who had participated in the K-12 (Middle School/high school) land surveying courses or not. That led to further consideration of the flow of students into and out of various parts of the NSF grant project. And we discussed but did not completely settle on specific outputs and outcomes for the project. We may need to

revisit, review and revise the logic model or create a somewhat different "theory of change" in order to better communicate to NSF and Ms. Carter how this project addresses the NSF ATE program.

3.6. In her e-mail Ms. Carter states that "...ATE focuses on students being highly skilled and able to enter the workforce with a 2-yr. degree or some set of credentials." While this is undoubtedly true at the national NSF grant program level it leaves me wondering why NSF approved your NSF ATE grant 180188 whose primary features included the following:

1.) Providing land surveying instruction at the K-12 level in order to provide a pipeline of students, especially females and LatinXs, into ELAC or another community college with a pre-existing interest in land surveying. This includes creation of strong relationships of the project with four K-12 schools.

2.) Improving and expanding an existing, small land surveying academic program at ELAC so that it can award more land surveying certificates and two-year degrees to students with skills that would allow them to enter the land surveying workforce. (This is directly relevant to the NSF ATE program goals.)

3.) Increasing the number of articulation agreements with multiple four year universities so that ELAC students with or without ELAC land surveying certificates can proceed to 4-year universities offering additional skilled training and baccalaureate degrees related to land surveying.

4.) Providing community college courses to working adults already working in land surveying related positions so that they can increase their skills and knowledge and two nationally recognized licensing tests and one state of California test to enter the land surveying workforce first with the title of "Land Surveyor in Training" and later with the title "licensed Land Surveyor."

That is the project that REAP Change Consultants was hired to evaluate. It incorporates and takes advantage of all of the functions and responsibilities of well-established public community colleges in California, i.e. 1) offer higher education courses to students still in high school to let them explore and obtain community college credit so that they can complete higher education degrees and certificates more quickly; 2) provide two-year degrees and certificates both to students entering higher education from high school and older adults; 3) provide a transfer function to four-year colleges (notably publicly funded 4-year colleges in the California State University system, such as California State Polytechnic University, Pomona and the University of California universities such as UCLA); and 4) provide continuing education for Ms. Carter to criticize reporting on progress toward articulation with four-year universities because it is not a primary focus of the overall federal ATE grant program but is a specified focus of the NSF ATE funded grant 1801188 and a key responsibility of grant co-PI Dr. Mora.

3.7. While I appreciate and concur with Ms. Carter's comment "How are you going to recruit more women and LatinX students into the program," this matter has been raised in multiple evaluation reports and discussed with Dr. Gallegos as an identified concern and the comment is only partially accurate. There is in fact no demonstrable problem with LatinX recruitment, since LatinX students have been in the majority in course and activity specific evaluations at both the K-12 and the community college levels. As we have

discussed, this may not be a specific result of project efforts, but rather an artifact of ELAC being an officially recognized "Hispanic Serving Institution" in one of the most LatinX neighborhoods of Los Angeles, as are the feeder schools participating in this grant project. The most likely and easiest way to increase LatinX participation would simply be to expand the ELAC Land Surveying academic program, which you are trying to do, partly thanks to the NSF ATE grant funding. That takes time.

- 3.8. The grant evaluation surveys and observations undertaken to date have consistently sought to identify female participation in the project. The number of females participating at the middle school/high school level of project activities has been high. Dr. Gallegos works closely with K-12 counselors and teachers and has clearly communicated the project goal of encouraging more girls to become interested in land surveying. The recruitment problem is with encouraging young women of traditional college-going age to become interested in ELAC land surveying courses and land surveying as a profession. The land surveying profession itself is heavily male oriented, as evidenced by the few females who have participated in the ELAC test preparation courses. These ELAC courses prepare students to pass the national Fundamentals of Surveying (FS) exam that allows successful exam takers to be hired as skilled "Land Surveyors in Training" and the later national "Professional Surveyor" (PS) and California specific licensure exam that allows successful exam takers to become licensed, fully professional Land Surveyors in the land survey related professional workforce. Recognizing profession recruitment issues, Dr. Gallegos invited one of the few female licensed Land Surveyors in the area to speak with ELAC land survey students. She offered a paid internship with her at her workplace, specifically seeking a woman for the position. Information from male students during a March 6, 2020 evaluation focus group indicate that one of their few female student peers obtained the internship offered. During the focus group one of the male students indicated that it was apparent that the female Land Surveyor was seeking a female student for the internship, which he and other male students in that focus group seemed to accept as okay, although when asked most desired paid or even unpaid internships themselves.
- 3.9. Although the numbers are usually too small for valid and reliable statistical testing, as detailed in my course and activity evaluation reports, I have consistently engaged in analysis of the evaluation surveys to see if there are any demonstrable differences in the survey responses of females and LatinX students to the grant funded efforts. Ms. Carter is referred to the course and activity evaluation reports for details, but typically LatinX students do not differ in important ways from non-LatinX students in their responses to grant activities. Surveys of some of the high school oriented activities have included enough students of both genders to do non-parametric statistical testing of differences between females and males. Several findings have emerged, detailed in the written reports and discussed with Dr. Gallegos. For example, and somewhat surprisingly (because of other K-12 research) upper grade female high school students were generally better prepared than male students in mathematics backgrounds, including having already taken trigonometry (essential for skilled land surveying). However, there were also some differences in male and female reactions to land surveying as a profession and to other professions that they might undertake. It may be relevant to the overall NSF ATE grant program to look beyond recruitment and further explore whether the same young women looking into Land Surveying may have mathematical ability and interests in other fields as well, including Civil Engineering. The one female in the March 6 focus group was taking Land Survey courses to make her a better construction manager, her career goal. Students might take some Land Surveying courses but not feel it worth their while to obtain a certificate or Associate

degree in Land Surveying. This raises a question for the NSF ATE program about whether and why "success" should be defined primarily oriented toward granting of community college Land Surveying degrees or certificates. Taking land surveying courses that could lead to eventual licensure in the workforce but the number of students simply taking land survey courses could also be an indicator of success and put more people skilled (although not always licensed) in land surveying into the workforce.

### **Time and Project Timing Factors**

- 4.1. One of the matters that came up in discussion of the project logic model was the issue of time how long it takes for something to happen. Another was how to count and who to count when "cohorts" were referenced. One of our early conclusions from this discussion is that it would be impossible to provide measurable quantitative evidence of meeting some of the goals originally stated in the grant proposal during the time frame of a three-year grant. Also, while the grant activities could make some progress toward broadly stated project goals, such as increasing the number of women and LatinXs engaged in land surveying, the numeric increase would not be large. This is partly because Dr. Gallegos is still developing the land surveying academic program at ELAC, which is not numerically large at this time, and is still seeking and gaining administrative approval for some of the courses to be offered in that academic program and working with his Dean and the ELAC administration to obtain sufficient funding to hire more faculty. Without ELAC administrative signoff on and approval of additional college resources to the Land Surveying academic program, it is doubtful that the supplement of ATE project funds will grow the academic program large enough quickly enough to provide many LatinX and females with Land Surveying skills, certificates, or Associate degrees entering the workforce. However, the NSF ATE grant is helping better establish the Land Surveying academic program at ELAC and so laying the groundwork or planting the seeds for future post-grant contributions, at least of LatinX people, to the Land Surveying workforce. I will provide evidence later in this report of such progress.
- 4.2 Overlapping timeframes. The NSF ATE program awarded grant 1801188 on May 30, 2018 with a start date of September 1, 2018 and an estimated end date of August 31, 2021.<sup>4</sup> This is approximately (although not exactly) equivalent to the East Los Angeles College 2018-2019 academic year plus summer 2019. Grant year two is approximately the 2019-20 ELAC academic year plus summer 2020, and grant year three the ELAC 2020-2021 ELAC academic year plus summer 2021. The last annual grant report sent to NSF and reviewed by Ms. Carter concerned the second grant year, running through August 31, 2020. The ELAC fiscal year runs from July 1 of one year through June 30 of the next. This impacts billing and invoice payments. In addition, Dr. Gallegos could not encumber already approved NSF grant funds until after their actual arrival at ELAC and then approval by the Los Angeles Community College Board (since ELAC is part of the ELAC system). These overlapping timeframes and additional delays for funding approval by the Los Angeles Community College Board of a staff person to administer this and two other grant operations led to important delays in start-up of this NSF project.<sup>5</sup>
- 4.3. Dr. Gallegos' summary of anticipated grant project activities by grant year looks like this:

<sup>&</sup>lt;sup>4</sup> <u>https://www.nsf.gov/awardsearch/showAward?AWD\_ID=1801188&HistoricalAwards=false</u>

<sup>&</sup>lt;sup>5</sup> For example, the Board did not approve the hiring of REAP Change Consultants as a grant evaluator until its meeting on January 9, 2019.

REAP Change Consultants, 2872 Nicada Drive, Los Angeles, CA 90077-2024
 http://www.reapchange.com

 e-mail:
 consultant@reapchange.com

 Telephone:
 (310) 384-9717

Year One – Purchase requests, planning, strategizing Year Two – Implementation and Evaluation Year Three – Final Outcomes and Evaluation

In fact, then, no real progress toward meeting grant outcomes could be anticipated in grant year one and any NSF expectation of an annual evaluation report accounting for progress toward meeting grant outcomes at the community college level or higher doesn't even make sense. Nevertheless, Dr. Gallegos was able to get some grant activities started in summer 2019. You and I anticipated and discussed the likelihood that the greatest effort to provide quantitative measurement of meeting grant goals and objectives would take place in grant year three (the current year), not by the end of year two.

- 4.4. Nevertheless, Dr. Gallegos requested and consistent with a developmental evaluation approach REAP Change Consultants provided three evaluation reports about summer 2019 NSF ATE grant activities: an official ELAC ES 100 summer course offered at a STEAM high school, participation of Land Survey students in the well-established ELAC MESA summer bridge program that helped STEM students transition from high school to community college, and a summer workshop for more than 100 Roosevelt High School students to introduce them to and give them experience with simple Land Surveying exercises such as laying our and measuring a house footprint. Some information on the quantitative output of these actions will be presented below. I presented analyses on outputs and learning and intention outcomes as well as process in the evaluation reports that Dr. Gallegos has read and found useful for confirming or rejecting some of his project assumptions and helped him with activity processes and planning for future grant funded activities.
- 4.5. These kinds of evaluation findings would likely not have been uncovered by focusing solely on the type of output and outcome evaluation originally envisioned from a linear utilization focused evaluation approach, and possibly expected by the NSF ATE program in grant years one and two. As we have already discussed and agreed at the project level, the grant year three evaluation will pay greater attention to NSF ATE program concerns with quantitative outputs and outcomes expressed by Ms. Carter.
- 4.6. The impact of COVID-19 social distancing rules seriously disrupted the planned grant activities in grant year two. The last in-person evaluation activity that I was able to undertake took place as a focus group held at ELAC on March 6, 2020, only about a week before the Los Angeles Community College Board ordered all classes to pivot to virtual instruction. That is the only kind of instruction Dr. Gallegos has been allowed to provide since then, including as this progress report is being written. He had to cancel three planned in-person workshops or events with middle school/high school students that had been scheduled for summer 2020 (grant year two) and the ELAC MESA boot camp for incoming STEM students (including new land survey students) was also cancelled. He was able to set up a Zoom class in Fall 2020 (grant year three) that combined middle school/high school, community college/four-year college students and working adults in one class to introduce them to Bentley computer software related to land surveying work. Evaluation of two surveys of that class is underway now but the numbers of class members are too small to provide statistically valid and reliable analysis of the different reactions of middle school/high school, community college/four year college and working adults to the class and their interest in land surveying degrees, certificates and entry or advance in the land survey workforce. It is possible from the surveys to identify some age-related differences in responses that will potentially be useful to year three

grant activities and approaches.

- 4.7. However, from the project and NSF ATE program perspective the COVID-19 social distancing impact also means that the number of community college land surveying certificates and degrees, whether to LatinX or female persons or anyone, is liable to decrease this academic year, the third grant year. This is because the Land Survey certificates require two courses each and it may not even be possible to offer enough courses for students to qualify for certificates. Obtaining the Associate degree in Land Surveying would require at last two years of study, and given a three year grant, only the cohort of students entering in Fall 2019 might be eligible by the end of the grant to have enough courses to qualify. In practice, multiple higher education research studies show that for various reasons community college students who do graduate with Associate degrees (in any field) take three or more years to do so.
- 4.8. As a former Director of Institutional Research my expectation is that the impact of COVID-19 on community colleges will increase time to degrees despite it having given professors and students more experience with online instruction (which may continue trending). It is, however, too soon to be able to research that. Also, the NSF ATE program stress on certificate and degree awards fails to take account of multiple higher education research studies that show many students leaving community colleges without certificates or degrees because their educational goals are not to stop at the community college level but to go on for baccalaureate and higher degrees.<sup>6</sup> While Advanced Technological Education programs, such as in Land Surveying, can yield certificates and Associates degrees of value in the workforce, course and event surveys for this project indicate more interest in Civil Engineering or Geospatial Engineering degrees. It is true that land surveying skills are useful for Civil Engineers or Architects and some other professionals to have, and the same person can be licensed both as a Land Surveyor and a Civil Engineer. The NSF ATE program stress on community college certificates and degrees as a measure of grant project "success" may be inappropriate or insufficient for measurement of increases of skilled individuals in Land Surveying in the workforce.
- 4.9. A better skills indicator might be the number and percentage of ELAC land survey students taking and passing the national FS exam or even the PS (Professional Surveyor) and a separate state specific exam. These are difficult exams that large proportions of people often do not pass on first try. Passing the PS exams requires college education (or the equivalent) and several years of experience in land surveying work that would take more than the three-year grant period for current community college students to qualify. Another issue for academic program evaluation specifying the year and term that a certificate or degree recipient started. It may not be able to assert that a grant led to or caused the success of a graduating student if the student did most of her course work before a grant project even started or had let contact with grant funded activities or events. Considering the timing of the NSF ATE Grant project 1801188 implementation one might look at the Fall 2018 entering ELAC cohort that took the ES 121 course and track their progress, even though the grant activities were not reallyfully funded in grant year one until the end of that academic year. Or one might start with the Fall 2019 land survey students (entering at the start of grant year two), but their education and ELAC course offerings began to be interrupted by COVID-19

<sup>&</sup>lt;sup>6</sup> When REAP Change Consultants evaluated the earlier NSF ASSIST grant to ELAC in support of its MESA office and STEM education in general, the Chemistry professor PI stressed transfer and doctoral level research in STEM fields and the evaluation results using a pre-test/post-test design consistently showed increasing numbers of students setting goals toward higher and higher degrees.

in spring term, 2020, and they might not even have enough courses offered by the college by the end of this academic year (2020-2021, the third grant year) to complete an Associate degree in Land Surveying or prepare for the FS exam. These questions need further discussion and clarification and will impact what can be reported to NSF about grant progress toward project objectives.

4.9. As an evaluator trained in systems evaluation, I expect that the lag effects on publicly funded colleges and universities of COVID-19 economic impacts are liable to decrease funding available to colleges and universities even as student demand might increase. State and federal resources based on last years tax revenues affecting the next year's budget has a lag effect on public community colleges. Public college funding (especially heavily state revenue dependent California community college funding) may decline over the next year or two even as the economy starts to recover post-COVID-19. Paradoxically, student demand for higher education often increases during or just after recessions when people are laid offer and seek to obtain additional degrees or certificates of value in the workplace. While this might create an opportunity for the ELAC Land Survey academic program to attract more land survey students, the NSF ATE grant third year will be over before one can evaluate or measure student course, certificate, or degree demand changes, and ability of ELAC and the ELAC Land Surveying leaders to obtain enough paid teachers to offer the courses.

## Quantitative Measures of Grant Progress Through Grant Year Two and Evaluation Comments

- 5.1. This section needs improvement and that will be addressed by the end of grant year 3. Even though the evaluation work done to date has been of courses and events, I have not had direct access to class enrollment figures and in some instances the official class role has not taken (e.g., the FS and PS exam preparation classes held on September 21, 2019). The best sources for such figures should be the offices of the ELAC Registrar or Institutional Research for official ELAC courses with course numbers, or the counselors or administrators of high schools bringing students to grant funded events. Counts based on potential interest in a course are insufficient evidence for evaluation purposes, and despite my high survey response rates, counts based on survey respondents will underestimate progress toward meeting grant targets. In some cases Middle School students have been included in grant courses (such as the current ES 385). Some grant targets only include high school students. The figures reported to NSF for grant progress in relation to grant targets should be adjusted to remove any Middle School students, or else the grant targets should be changed in consultation with Ms. Carter or other NSF ATE administrators so as to include such students in target and achieved counts.
- 5.2. Reporting quantitative results related to this grant should include consideration that the project grant year includes the summer while typical academic year reporting would not include the summer but start at the start of the beginning of the fall semester (which at ELAC starts even before the grant year starts) and end at the end of the spring semester. This will be important when requesting data from the ELAC Institutional Research offices or high school offices, counselors, or other administrators. Even if a fall semester course starts before September 1 it should be counted in the grant year that starts on September 1 for simplicity of calculation and because the course will, in fact, end during the NSF ATE grant year.
- 5.3. The original grant numeric goals and objectives need clarification as to which are annual goals and which are cumulative goals to be achieved over the entire three-year grant period. The table included in the July 24, 2019 PowerPoint appears to be annual and we attempted some clarification of that during discussion

of the draft logic model. This also needs to be discussed and negotiated with Ms. Carter so that NSF, the co-PIs and the evaluator all have the same understanding of what original and modified goals mean. Otherwise it is simply not possible to use quantification or quantitative goals to measure progress toward project success in a valid and reliable way with valid and reliable evidence.

5.4. Before the end of grant Year there similarly needs to be a clear understanding between Ms. Carter/NSF, the co-PIs, and me about what the term "cohort" means and how it will be determined. In particular does the "first cohort" refer to a cohort that starts in grant year one (2018-2019), when the project was still being planned and resources acquired, or in grant year two (2019-2020)? Does it mean a cohort or group of students who started as new students at ELAC in the fall, or took ES 221 (the first course in a sequence or series of land survey courses at ELAC leading to the first certificate and eventually to an Associate degree) or something else? In a recent telephone conversation you noted that the same students took several of the ES classes together in sequence through ES 224 (then most have nnt followed through yet with the FS exam) this year. You have been considering using a cohort model to encourage students to get the two ELAC land surveying certificates, take the FS exam, and perhaps obtain an ELAC Land Survey Associate degree or transfer to a four-year university or college. It would be important to both your project and ELAC academic program interests and NSF ATE program to ask the ELAC Institutional Research office if they will help us track the same students across a sequence of ELAC courses. The same is true of tracking students across high school land survey courses (ES 100 and ES 101) and any high school students taking those courses if they come to ELAC on high school graduation (n.b., not all will and even if they do not all will take ELAC Land Survey courses leading to community college certificates, degrees, or transfer to a four-year institutional with a geospatial engineering or Land Surveying baccalaureate program. Gaining a better understanding of project participation attrition, when and why it occurs would be important for contributing to the long-term goals of the ATE grant, including those that will take longer than the grant period to achieve or mesure.

Objective	Description	Enrollment per Grant		
		2018- 2019 (Year 1)	2019- 2020 (Year 2)	2020- 2021 (Year 3)
1 Target	Train 100 land surveying and/or goespatial enginering technicians on how to pass the State of CA PLS and FS examinations	60	80	100
	ELAC course ES 224 (September 21, 2019)**'		42	
	ELAC course ES 225 (September 21, 2019)**		34	
	Course not specified (September 21, 2019)**		12	
	Unduplicated Student Count Total (9/21/2019)** ** counts are of student interest. Class roll calls were not		62	
	taken. Class enrollments to be sought from ELAC Institutional Research.			
	July 13-20, 2020 ES 224 Summer Online Course *** *** count based on survey population per e-mail count		21	
			D	10

#### 5.5. Objective Details and Quantitative Progress

Class enrollment to be sought from ELAC Institutional Research to verify survey population count.

Evaluation comments: Year 1 target was not met but original target failed to take account of grant year 1 being a planning year. Any enrollments in academic year 2018-2019 and Summer 2019 in ES 224 or ES 225 will be sought from ELAC Institutional Research office. Grant year 2 target may have been exceeded but that should be verified based on class enrollment in the Fall 2019 ES 224 and ES 225 classes.

	Enrollment per Grant Year		
	2018- 2019 (Year 1)	2019- 2020 (Year 2)	2020- 2021 (Year 3)
2—Target Graduate 50% of the first high school cohort of students			
enrolled in GSET with skill certificates in Geospatial Engineering	15	30	45
<ul> <li>Evaluation comments: Unable to calculate progress to date.</li> <li>Year 1target failed to take account of grant year 1 being a planning year. Were any high school courses offered in 2018-2019?</li> <li>Year 2 meeting with K-12 school counselors in Fall 2019 to recruit students. Need to gather ES 100 and ES 101 enrollments for 2018-2019, 2019-2020, and 2020-2021 academic years and ELAC Certificate</li> <li>counts for those academic years in order to define "first high school court" (for high schools ONLY), determine 50% and then decide if skills certificates need to be completed in one year or more</li> </ul>			

#### **Transfer 25% of ELAC's first cohort of GSET students to a college** 3--Target or university program with an emphasis in geospatial engineering.

10 20 30

Evaluation comments: Unable to calculate progress to date. Year 1 target failed to take account of grant year 1 being a planning year. Year and term of "first ELAC cohort of GSET students" is underfined. To meet first and/or second year targets would students have to start at ELAC before the ATE grant went into effect? Should one count any GSET student transfer to an appropriate program as an ATE grant project success if it took place during the grant period, regardless of how many ELAC GSET course units the students completed before transferring? Including ELAC units earned in high school? Targets are numbers of transfers but assume 25% of starting cohorts and increase. Monotonically. Does the ELAC GSET program need to increase new new students each year (e.g., 40, 80, and 120) to meet the targets? success. Given enrollments in ES 121, the first course in the GSET sequence, this target is unlikely to have been met or to be met by year 3. To evaluate a way needs to be found to track ELAC GSET transfers.

		Enrollment per Grant Vear		
	—	2018- 2019	2019- 2020	2020- 2021
		(Year	(Year	(Year
		1)	2)	3)
	Place 25% of ELAC's first cohort of GSET students in entry level			
4—	land surveying &/or geospatial engineering technician			
Target	jobs.	10	20	30
Evaluation comments. See Goal 3 comments above about Year 1 and				
detern	nining which is the "first cohort of GSET students? Also see			
comm	ents under Goal 3 about monotonic increases. If the "first cohort"			
is students who started in Fall 2019 (grant year 2), then the first target is				
irrelev	ant and we need to determine the best way to track placeemnt in			
approj	priate jobs for that cohort and the one that started at ELAC in			
Fall 2	Fall 2020. How has COVID-19 affected Fall 2020 enrollments at			
ELAC	in general and in the GSET academic program courses? With			
COVI	D-19 ecoomic impacts liable to impact both layoffs and hires in			
the ne	xt year or two this target is unlikely to be met by the end of			
grant	year three at this level.			

#### 5 ---Deliver four land surveying and computer aided design (CAD) bash 5 10 15 events at secondary school institutions. 0 Target 0

Evaluation comments: At the end of year 1 the project more than met its goal but held a CAD bash event at ELAC for only one school, Roosevelt High School (RHS), Math, Science and Technology Magnet Academy Summer Magnet, between August 12 and 14, 2019. Between 101 and 105 students students entering ninth grade attended. About 89% of 77 beginning-of-event survey respondents self-identified as LatinX, as did 83% of 88 end-of-event survey respondents. Also, 59% of the total population, including 58% of the LatinX population identified themselves as females. While only reaching one school the

first

year the project doubled its expected high school student impact and reached its target populations of LatinX and females very successfully. There were no CAD bash events in the second year because these were to be held in the summer and COVID-19 shut down all in-person events at local high schools and at ELAC. In lieu of CAD bash events in year 3 Dr. Gallegos established an online GE 385 "self-study" course that had similar, although virtual, experiences for at least 31 grades 8 to 12 students, including 16 females and 29 LatinX students who selfidentified

themselves in a beginning of the course survey. The continuing impact of

COVID-19 on high schools and ELAC in-person events may make it difficult to reach the original target of 150 high school students in grant year 3 unless such events are allowed in Summer 2021 following vaccine distribution and a decrease in COVID-19 infections. That is outside the control of Dr. Gallegos and his grant team. The impact on target populations at the Middle School and High School levels in familiarizing them with Land Surveying is a bright spot in this ATE grant

and should help in developing a pipeline of students into ELAC provided Land Survey courses at the high school and community college

levels after the grant is over. Survey results indicate that most of these students have not yet decided what they want to do for academic degrees or certificates or careers, but most had not previously been exposed to Land Surveying and student reactions to the events have been favorable.

#### 6--Target Train 80 students from 4 different high schools in geospatial engineering field activities

8 8 Ν Δ 0 0 0

REAP Change Consultants, 2872 Nicada Drive, Los Angeles, CA 90077-2024 http://www.reapchange.com Page 13 e-mail: consultant@reapchange.com Telephone: (310) 384-9717

ELAC offered an ES 100 course at a local STEAM high school, and I evaluated it using a mid-course "pre-test" and an end-of-the-course suvrey approach with the students as well as participant-observation as three professional land surveyors demonstrated some of their field equipment and let students (including a girl) use it. The 17 students were

given classroom instruction and a field assignment to measure an area on

the school grounds. In the mid-class ("pre-test") survey all but one of the respondents identified as LatinX and six (35%) of the students identified themselves as females. In the end of class ("post-test") survey, included four females (24%) and 10 males (59%) as well as 15 LatinX people. This class reached intended grant target populations. The number of ELAC ES 100 and/or ES 101 students classes taught at the high school level between Fall 2019 or Spring 2020 and planned for the rest of the third grant year has not yet been determined by the evaluator. Only virtual classes will have been or will be taught between Spring term 2020 and Spring term 2021, which also mean that the field experiences for the students will only be virtual. The students will not have full exposure to field surveying using actual Land Surveying instruments. This is through no fault of the ATE grant project or its co-PIs,

Attachment 1. PowerPoint Grant Summary, April 30, 2019

Attachment 2. NSFATE Grant1801188 Logic Model June 24, 2019