TEST:UP Year 4 Fall Site Visit Summary
External Evaluator: Shannon K. Gilmartin, Ph.D.

Overview

This short evaluation brief summarizes findings and takeaways from my one-day TEST:UP site visit in late October 2011. During this visit, I met with:

- Mark Filowitz, P.I., California State University, Fullerton (CSUF)
- Rochelle Woods, Co-P.I., CSUF
- Martin Bonsangue, Co-P.I., CSUF
- Sean Walker, Associate Professor of Biology, CSUF
- Cathy Fernandez-Weston, Coordinator, STEM Transfer Student Services, CSUF, Mt. San Antonio College (MtSAC), Santa Ana College (SAC)
- Karen Kim, Co-Director, Center for Educational Access and Leadership, CSUF

The major goal of this visit was to learn more about the grant's research and assessment activities to date. Conversations also touched on related grant activity at CSUF, future NSF proposals, and university- and state-level supports and barriers to TEST:UP work. In preparation for the visit, I reviewed a series of presentation slides prepared by TEST:UP team members for conference sessions around the U.S. Following the visit, I had phone conversations with Iraj Nejad, TEST-UP faculty lead at MtSAC, and Carol Comeau, TEST:UP Co-P.I. at SAC, to discuss details of research and assessment at the two TEST:UP community colleges.

Findings

For the purpose of this brief, findings are focused on TEST:UP's research and internal assessment efforts. I also report on other aspects of TEST:UP that are useful to document at the beginning of Year 4.[1]

TEST:UP Research and Assessment

TEST:UP is connecting with education scholars at CSUF's Center for Educational Access and Leadership to consider new ways to examine and report their research data. Of particular interest to team members is the transcript dataset that former TEST:UP analyst Ricardo Lopez assembled in 2010-11. During my site visit, conversation centered on the representativeness of this dataset (relative to the 2005-2010 STEM transfer population at CSUF), the possibility of pulling more transcripts to "round out" the sample, and the need to disaggregate data by annual cohort to construct trend lines and analyze cohort differences.

Analyses of these transcript data will be an essential supplement to the core metrics reported as part of the grant, i.e., these analyses can help to address such questions as:

[1]This brief excludes discussion of the teacher intern program, TEST:UP progress at CSUF's College of Engineering and Computer Science, and details of STSS advising/counseling at each campus. However, evaluation of each of these components is an essential part of final TEST:UP reporting in Years 4-5.

- To what extent is there a change in the academic preparedness of incoming STEM transfer students in the years before and during TEST:UP? To what extent is change observed among transfer students from the two TEST:UP community colleges in particular?
- To what extent have STEM transfer students' course-taking patterns at CSUF changed over the six-year period before and during TEST:UP? How do these patterns vary by major?

These questions assume that the period "before" TEST:UP denotes 2005-2007, and the period "during" TEST:UP denotes 2008-2010. Note that it will be too soon to assess how students' preparedness or performance looks "after" TEST:UP given that this research will be conducted in the final months of the grant using the existing transcript database. However, this does not render these analyses any less important. The transcript data have immediate implications for advising, planning, and policymaking at all three TEST:UP institutions. Findings from additional work with this dataset should be shared with MtSAC and SAC as this work evolves.

In conversation with P.I. Mark Filowitz and others, **we also agreed that more work can be conducted with the pre- and post-transfer survey data collected in 2010-11**. The analyses conducted by Ricardo Lopez are a good starting point; it is advised that additional analysts work with these data in order to triangulate his findings, disseminate findings, and prepare manuscripts for peer review. A few technical questions surround the results to date—presentations of these results that include errors should be taken off the TEST:UP website and "scrubbed" before re-posting (this includes notes to the slides that are confusing or incomplete). I should note that some of my own questions relate to findings from the multivariate models. As a technical reader, I would like to see parameter coefficients, p-values, more information about control variables, and so on. All of these details would be customarily included in manuscripts that explain findings in full and are submitted for peer review.

During the site visit, much discussion took place about how to tell the "impact story" of TEST:UP through research and assessment. A major concern is the challenge in identifying TEST:UP's "net", or unique, impact on transfer and degree trends at CSUF, given exogenous factors such as system-wide changes in tuition, financial aid, and enrollment policies, changes in CSUF service areas, and so on. A second, related concern is the difficulty in quantifying the net impact of STEM Transfer Student Services (STSS) in the absence of fully coordinated data systems across the three TEST:UP campuses. (Fortunately, the pre-transfer and post-transfer surveys asked respondents if they had contact with STSS, providing some data to work with even if the samples are limited.[2]) However, we talked about how (1) rigorous internal assessment of program components (including STSS and Supplemental Instruction, or SI), (2) the existing survey and transcript data, and (3) continued collection of core metrics collectively paint an informative picture of trends and practices before and during the "TEST:UP era", and allow for reasonable inference about the grant's impact and contributions. **I recommend that the P.I. and Co-P.I.s begin to enumerate the major data points from each assessment and research effort sooner rather than later, and map out how these data points work together to tell this**

[2] This shows that the pre- and post-surveys can be and have been used for both research and assessment purposes. For example, SAC reports that the pre-survey findings encouraged them to reflect on the effectiveness of their curricular and advising practices.

story. Appendix A provides a sample worksheet to get thinking started. A second benefit to this: more conversation about data can help to refine existing analyses, which in turn leads to a stronger set of results.

We talked for a short time about TEST:UP's visibility at national conferences and professional associations. It is not only research that is being presented at these meetings, but also key TEST:UP "interventions" like STSS. Where possible, STSS presentations might include relevant findings from TEST:UP's research activities to reflect a more "integrated whole", showing others how research and practice can work together (and/or the challenges to bridging these efforts, and how challenges may be overcome). Future STSS presentations also might highlight broader campus trends that help to show how specific interventions interact with institutional context, and the implications for service and supports (e.g., situate the Early Warning System in broader faculty and student trends at CSUF, and demonstrate the meaning of these trends for the system's success). Presentations on STSS, SI, and all other TEST:UP programs ought to share assessment tools and materials developed as part of this grant with interested audience members. Presentations do not need to cover every aspect of a given component; rather, they might focus on a few main points, strategies, and findings in a succinct, 10-15-slide format.

Currently, it is not clear to me where the entirety of TEST:UP's research and assessment instrumentation and output are being stored. This includes all SI assessments that Martin Bonsangue, Sean Walker, Kathy Takahashi, and others have been using, and all evaluation tools that Cathy Fernandez-Weston has employed at each of the three campuses. It also is not clear where data for TEST:UP's core metrics are being stored (outside of tables in reports to the NSF)[3]—is there (or, should there be) a cross-campus datafile that has all degree and transfer information in one place? Finally, the datafiles created by Ricardo Lopez are apparently on a thumb drive at CSUF's College of Natural Sciences and Mathematics (NSM); these datasets must be transferred to a more secure location and made securely available to the next set of research analysts who will be working with the data.

The balance of this brief reports on other findings of interest for TEST:UP's Years 4-5.

Supplemental Instruction (SI)

CSUF's NSM is funding SI sessions this year, indicating progress towards institutionalization of this aspect of TEST:UP. Moreover, NSM SI faculty leaders have collaborated with SI practitioners elsewhere at CSUF to develop and coordinate assessment practices. This may form the basis for one of TEST:UP's "broad impacts": improving the state of

[3] These core metrics are (1) *number of STEM majors at the community colleges*, (2) *number of STEM associate's degrees/transfers at the community colleges*, (3) *number of transfer students who earn bachelor's degrees in STEM fields at CSUF*, and (4) *total number of STEM bachelor's degrees at CSUF*. These metrics were identified in the original NSF proposal as the primary outcome measures of TEST:UP. See the proposal for specific projections for each metric.

peer-based teaching and learning campus-wide, at CSUF and regional community colleges. Is there sufficient evidence to make the case for this broad impact?[4]

Analyzing the links between (1) TEST:UP's active SI efforts, (2) STEM transfer student success, and (3) STEM student persistence is in progress. Thus far, SI data analyses have examined relationships between SI and course grades with break-outs for underrepresented racial/ethnic minority (URM) students and transfer students (among other sets of analyses of SI data). This research is moving in the right direction. Keeping in mind the point that the P.I. and Co-P.I.s must start to think about how all of TEST:UP data work together in light of grant goals and core metrics, it is now time to bring SI data even deeper into the TEST:UP fold, highlighting longitudinal impact on transfer students and the association between SI participation and STEM degree completion.

Cross-campus coordination and collaboration

There has been increased cross-campus discussion on the core degree and transfer metrics that are reported to the NSF as part of the TEST:UP grant, resulting in a recent two-campus (CSUF and MtSAC) phone conversation with the NSF to review data processes (this conversation suggested that transfer-tracking is still an imperfect system for all community colleges). Improvements are being made to data collection at each campus. However, the TEST:UP community colleges do not yet have systematic provision of transfer information from CSUF admissions/institutional research. SI assessment at CSUF remains somewhat independent of SI assessment at both Mt SAC and SAC. TEST:UP's three major research projects from 2010-11 are based primarily at CSUF. Presentations on TEST:UP practices have thus far included team members from CSUF and SAC, but not from Mt SAC (although team members at all campuses have been encouraged to present). Looking ahead, it is not clear how the proposed slate of papers and presentations, and the continued assessments of SI and STSS, will engage team members across all three campuses.

A major push in the last two years of this grant might be given to more collaborative research and assessment activities among the cross-campus TEST:UP team. Each campus should have a presence in the data analysis, writing, and presentation components of TEST:UP. During my conversations, it was recommended that the campuses meet 1-2 times per semester to discuss assessment and data issues specifically (these meetings would include the analysts at each campus who are actually running the numbers). The objective would be not to "match" analyses, but to compare and contrast approaches, coordinate writing, and think through how future versions of TEST:UP might have improved data capacity and flow.[5] At this stage of the grant, it

[4] "Broad impact" is one of NSF's two major criteria for evaluating grant proposals: What is the *intellectual merit* of the work? What is the *broad impact*? I trust that TEST:UP's team is keeping an eye on both elements, and is prepared to elaborate on each for summative reporting.

[5] One example of how analyses across campuses cannot be "matched" is in SI assessment. CSUF analyses may be focused on high school GPA as a control variable—this makes sense for the CSUF first-time (non-transfer) student population. However, at the community colleges, students may have several years of remediation before they are in a class with SI, such that high school GPA is no longer such a relevant control (MtSAC is testing this hypothesis in the months to come). These kinds of insights strengthen TEST:UP assessment activities and can be leveraged in dissemination of results (e.g., "TEST:UP shows that there cannot be a one-size-fits-all assessment strategy for SI given differences between students at 2- and 4-year institutions"). In terms of the relationship to core metrics (see

is important to continue to "do", but also to analyze, summarize, and disseminate, a responsibility of all five P.I./Co-P.I.s (Mark Filowitz, Rochelle Woods, Martin Bonsangue, Larry Redinger, Carol Comeau).

Ideas for next proposals

During my visit, we had lively conversation about future grant proposals at CSUF and partner institutions that build from TEST:UP's body of work. Ideas included:

1. Creating a position for a "student advising specialist" at CSUF's Colleges of Natural Science/Mathematics and Engineering/Computer Science (ECS).
2. Developing and testing technology/technology-based tools for STEM advising and STEM education at community colleges.
3. Hosting regional SI symposia.
4. Studying the "climate" for transfer students in STEM departments (Biology, Chemistry, and so on). ("Departmental climate" is a broad measure of the real or perceived environment and sets of interactions within this environment. Climates can be welcoming, receptive, and inclusive, or "chilly" and isolating. Much higher education literature explores how climate promotes or stands in the way of diversity.)
5. Providing and studying internship opportunities and experiences for STEM transfer students before they enter and during their time at CSUF.

I am pleased by the synaptic, ambitious thinking of the TEST:UP team in terms of future grants, and strongly encourage additional thought into each of these ideas and more. This type of activity serves not only TEST:UP, but also individual faculty and staff, institutional visibility, and calls for reform in STEM education. TEST:UP team members have developed deeper knowledge of STEM student achievement and transfer student achievement since 2008—the team now needs to definitively state what they have learned, amass and refine the evidence that shows what they now know, and use these data as a platform for future work. At SAC, MtSAC, and CSUF, a flurry of TEST:UP-related grant activity is already underway, allowing for examination of how TEST:UP practices are adapted to new initiatives.[6]

In terms of strengthening TEST:UP's ties to the educational research community, I see great promise in Alicia Dowd joining the TEST:UP advisory committee, and in potential collaboration with CSUF's Center for Educational Access and Leadership. Continuing to build a presence in this community may lead to future collaborations that allow the TEST:UP team to leverage their developing expertise. Supporting community college students in science and engineering pathways is a national imperative, and the TEST:UP team can help to lead this

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Appendix A), it suggests that the relationship between SI and STEM majors at community colleges might be modeled differently than is the relationship between SI and STEM degree completion at CSUF, i.e., there are at least two different stories to tell depending on the metric, campus, and intervention.

[6] It is up to TEST:UP leaders to make connections between TEST:UP and initiatives underway. For example: SAC might apply TEST:UP lessons learned in STEM advising to their new Adalante grant. MtSAC might consider how TEST:UP could inform cohort-based scholarship grants such as the one Iraj Nejad currently oversees. CSUF might take the "best of" TEST:UP and use this to improve operations of the recently awarded HSI grant. These applications and adaptations are arguably just as important as are new grant-seeking activities.

imperative. If TEST:UP team members had to set the national agenda for research on STEM transfer student achievement, what would be their top three research questions?

Contextual notes that will frame transfer-related initiatives going forward

I learned of at least two contextual dynamics at play that will bear on future directions:

- Implementing the necessary changes for the new "transfer degree" in the California community college system (see http://www.calstate.edu/transfer/degrees/AssociateDegreesForTransfer.shtml) has been slow state-wide; how this "slowness"—and the transfer degree itself—will interact with the transfer pathway into CSUF is not yet clear.

- California State University, East Bay has been piloting a new data management system to follow transfer students from two- to four-year institutions. Funding as part of CSUF's recently commenced HSI grant may help to bring this system to CSUF.

It would be worthwhile to put to paper and/or a chart a full list of contextual factors that have been shaping and will shape the work of TEST:UP, in a succinct form that could be used as material for case studies. P.I. Mark Filowitz provides comprehensive updates of state and local politics that interact with TEST:UP during my site visits and at advisory board meetings—I believe that these updates are an essential part of TEST:UP's story that need to be consolidated and relayed to students and scholars in STEM and education fields around the country. Secondarily, these details often have been added to NSF reports as reasons why TEST:UP is constrained in impact. I think there is much more to tell here, e.g., how TEST:UP has worked with and in spite of contextual challenges (particularly given positive trends that qualify such constraints). I encourage the P.I. and Co-P.I.s to write up the gamut of TEST:UP contextual supports and barriers in a broad educational format, i.e., in other channels besides annual NSF reporting. The TEST:UP advisory boards could provide feedback and input to make this type of piece have maximum relevance to practitioners at different types of institutions.

Future Evaluation Activity

Going forward, it will be critical to identify how TEST:UP has influenced—and refined—theory and practice at NSM/ECS, CSUF, SAC, and MtSAC. As noted above, quantifying unique impact may be impossible in a precise statistical sense. But coordinated assessment and research analyses across the grant will go a long way towards reasonable inferences about impact (see Appendix A), and will help to set the stage for hypotheses that can drive future work.

Another important method to bring influence to light is to ask TEST:UP team members to reflect on the grant at the end of five years. External evaluation activities for the final 1.5 years of the TEST:UP grant might focus on soliciting feedback from every team member since TEST:UP began, in the following areas:

1. Highlights of TEST:UP work

2. Barriers to TEST:UP work/how TEST:UP overcame barriers
3. Supports to TEST:UP work/how TEST:UP leveraged supports
4. Efforts to institutionalize TEST:UP components, progress to date
5. Assessment methods and results, how TEST:UP has used assessment to improve practice
6. Top lessons learned from TEST:UP ("what do you know now that you did not know before?")
7. Directions for research and practice in the future, based on lessons learned

This could be used to inform the final TEST:UP report to the NSF and to its many stakeholders. This may work best as an online survey administered in Summer 2012, with a summary of results due December 2012. Of course, these evaluation activities should support what the grant needs most as it reaches Year 5; additional discussion is anticipated to determine what is helpful.

Appendix A. Sample Worksheet for Integration of Core Metrics, Activities, and Findings

1.0. TOP LEVEL

Core Metric		Observed Trend to Date *(since 2005?)*	Inferences About Trend	Inferences About TEST:UP's Link to Trend	Questions About Data/Trend	Relevant Tables, Charts: Yes/No, Location?
1: STEM majors at community colleges	MtSAC					
	SAC					
2: STEM associate's degrees/transfers at community colleges	MtSAC					
	SAC					
3: Transfer students who eventually complete STEM degrees at CSUF						
4: Total STEM degrees at CSUF						

[Describe: how core metrics were operationalized and data were collected at each campus; challenges to methodology and ways that challenges were overcome; questions that the core metric methodology raises. Develop trend lines/charts for select data, store in secure and centralized location.]

2.0. TEST:UP INTERVENTION, RESEARCH, ASSESSMENT ACTIVITIES*: CSUF

*Note: These activities roughly correspond to the "strategies" mapped out in the grant proposal. May need discussion of how those "strategies" evolved into TEST:UP's actual activities (as enumerated below) over the five-year grant period.

2.1. Supplemental Instruction (SI)

- [Description of SI at CSUF: what it is, who is involved, overview of program expansion since 2008, how TEST:UP funds are used in SI, general notes about intellectual merit and broad impact of this component]
- [Description of SI assessment methodology; "full report/data can be found in xx"]

Key Finding	Inferences About Finding	How Finding Links to Core Metric 1**	How Finding Links to Core Metric 2	How Finding Links to Core Metric 3	How Finding Links to Core Metric 4	Outstanding Questions About Finding
Key finding 1: xx						
Key finding 2: xx						
Key finding 3: xx						
Key finding 4: xx						
Key finding 5: xx						

Note: Throughout these tables, not all key findings link to or have implications for each and every core metric (or trend in core metric). The goal of this exercise is to identify where the links are, of those that exist (i.e., **"does this finding shed any light on core metric 1, 2, 3, or 4?"). Links can be relatively straightforward (e.g., "variable x has a positive effect on one-year persistence in the major among STEM transfer students; we hypothesize that this, in turn, may increase the number of degrees awarded to transfer students, i.e., core metric 3, and are awaiting additional data to support or refute this hypothesis") or more suggestive (e.g., "the positive effect of this variable on course grade is stronger for URM students than for non-URM students; it is not clear how this might link to core metric 4, but generally speaking, we know that higher grades lead to greater likelihood of degree attainment, as reported in *cite1 cite2 cite3*, and this provides a possible window into degree completion of URM students"). Moreover, links can be about TEST:UP practices per se (e.g., assessing effect of SI on STEM degree attainment, core metric 4) or about the knowledge base surrounding the core metric (e.g., "this research finding from the pre-transfer survey links to core metric 2 by increasing our knowledge of how certain types of course-taking behaviors affect transfer readiness"). Both types (assessment and research) lay the groundwork for identifying the nature of TEST:UP impact.

"Five key findings per activity" is somewhat arbitrary—there may be only two key findings, or there may be 10.

2.2. STEM Student Transfer Services (STSS)

- [Description of STSS at CSUF: what it is, who is involved, overview of program expansion since 2008, how TEST:UP funds are used in STSS, general notes about intellectual merit and broad impact of this component]
- [Description of STSS assessment methodology; "full report/data can be found in xx"]

Key Finding	Inferences About Finding	How Finding Links to Core Metric 1	How Finding Links to Core Metric 2	How Finding Links to Core Metric 3	How Finding Links to Core Metric 4	Outstanding Questions About Finding
Key finding 1: xx						

Key finding 2: xx						
Key finding 3: xx						
Key finding 4: xx						
Key finding 5: xx						

2.3. Research: Pre-Transfer Survey (although this is based at CSUF, it was conducted among STEM students at SAC and MtSAC, and owes heavily to the TEST:UP team at these two campuses)

- [Description of survey and methodology, general notes about intellectual merit and broad impact of this component; "full report/data can be found in xx"]

Key Finding	Inferences About Finding	How Finding Links to Core Metric 1	How Finding Links to Core Metric 2	How Finding Links to Core Metric 3	How Finding Links to Core Metric 4	Outstanding Questions About Finding
Key finding 1: xx						
Key finding 2: xx						
Key finding 3: xx						
Key finding 4: xx						
Key finding 5: xx						

2.4. Research: Post-Transfer Survey

- [Description of survey and methodology, general notes about intellectual merit and broad impact of this component; "full report/data can be found in xx"]

Key Finding	Inferences About Finding	How Finding Links to Core Metric 1	How Finding Links to Core Metric 2	How Finding Links to Core Metric 3	How Finding Links to Core Metric 4	Outstanding Questions About Finding
Key finding 1: xx						
Key finding 2: xx						
Key finding 3: xx						
Key finding						

4: xx						
Key finding 5: xx						

2.5. Research: Transcript Data***

***Note: Transcript data are particularly well suited to help to explain trends in core metrics, especially if the sample of transcripts is representative of the population. For instance: are MtSAC and SAC transfers to CSUF in 2008-10 more academically prepared than are MTSAC/SAC transfers from 2005-07? This might help to explain the increase in raw numbers of transfers (core metric 2)—and if this key finding is concentrated at these two schools relative to other community colleges, could help to build the case for TEST:UP's unique impact.

- [Description of transcript data and methodology, general notes about intellectual merit and broad impact of this component; "full report/data can be found in xx"]

Key Finding	Inferences About Finding	How Finding Links to Core Metric 1	How Finding Links to Core Metric 2	How Finding Links to Core Metric 3	How Finding Links to Core Metric 4	Outstanding Questions About Finding
Key finding 1: xx						
Key finding 2: xx						
Key finding 3: xx						
Key finding 4: xx						
Key finding 5: xx						

2.6. Teaching Intern Program

May not need full table.

THEN REPEAT SAME SEQUENCE FOR MT SAC (3.0-3.x) AND SAC (4.0-4.x) (MAKING SURE TO INCLUDE THEIR STSS AND SI ACTIVITIES IN THE LIST). (In conversations for this evaluation brief, I learned about the Early Decision program at SAC and actionable assessment findings for this program; this would be something that SAC outlines in this worksheet as long as TEST:UP funds were involved. At MtSAC, Iraj Nejad shared the possibility of developing lab writing workshops for STEM students; this program, and related assessment, would be something that MtSAC includes on this worksheet as long as, again, TEST:UP funds are involved.)

At conclusion of this exercise: which key findings across all activities and campuses link to core metric 1? Which link to core metric 2? Which link to core metric 3? Which link to core metric 4? Thus, which kinds of inferences about TEST:UP impact can be reasonably made? Put in a different

way, how has TEST:UP contributed to knowledge about the core metrics? Which questions emerge/are left to answer?

Potential accompaniments to this worksheet:

1. **The contextual support and barrier piece discussed on page six. TEST:UP did not happen "in a vacuum"!**
2. **A running list of evidence for TEST:UP's a) intellectual merit and b) broad impact (NSF's framework for evaluation of proposals). Ultimately, this list needs to be pared and focused in order to inform related grant activity at TEST:UP institutions.**