

Summative Report on Internal Evaluation for LEAP, Leadership Education for Advancement and Promotion

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1.0 Introduction

Leadership Education for Advancement and Promotion (LEAP) is an initiative at the University of Colorado at Boulder that was funded by the National Science Foundation's ADVANCE program from 2002 through 2008. Through ADVANCE, the National Science Foundation (NSF) has supported over two dozen US universities to undertake "institutional transformation" (IT) to enhance the representation and advancement of women in science, technology, engineering and mathematics (STEM) faculties and in university leadership roles. The term "institutional transformation" reflects both the high aims of the ADVANCE program and its understanding that underrepresentation stems from a gamut of subtle and interlinked problems (Wylie, Jakobsen & Fosado, 2007). Remedyng underrepresentation thus requires interlinked strategies to provide the opportunities, resources, and environments that enable talented women to succeed—transformation, indeed. In its own efforts to address this problem, LEAP has pursued a variety of strategies that aim to improve women's representation, advancement, and leadership in academia.

In order to assess the effectiveness of these strategies and to provide formative feedback to LEAP's implementers about how to improve their programs or make choices among strategies, Ethnography & Evaluation Research (E&ER) has provided internal evaluation for LEAP since its inception. Initially, evaluation efforts focused on providing formative feedback on particular intervention strategies, such as workshops, and on determining the outcomes of these strategies for participants. Other studies attempted to discern longer-term impacts on participants, to identify further challenges and barriers that LEAP might address, and to assess the cumulative impact of LEAP's efforts as one measure of progress on its "institutional transformation" goals. In addition, E&ER conducted research work to examine the career paths of STEM professionals in the university and to examine demographic trends over time in faculty gender composition, and, in later years, assisted with a university-wide survey of institutional climate.

This report draws on E&ER's past work as internal evaluators to offer a summative evaluation as the project reaches the end of its formal funding period. It should be viewed as complementary to independently prepared reports by the LEAP principal investigator and external evaluator.

1.1 *LEAP's Change Strategies*

Across the set of ADVANCE IT projects, a variety of intervention strategies have been applied to improve the climate, aid career advancement, and empower individuals to solve problems in their workplace (Stewart, Malley, & LaVaque-Manty, 2007; Bilimoria, Joy & Liang, 2008; Fox, 2008). Some strategies focus on individuals, providing new skills, mentors, or resources to help them advance professionally. Others focus on the institution or its subunits, through organizational efforts that seek to improve workplace climate, reduce bias in hiring, and through

policy efforts to improve hiring and review processes or address challenges that may disproportionately affect women, such as recruitment of dual-career academic couples. To varying degrees, these strategies may be targeted strictly to women in STEM, to the STEM departments and institutes that are their immediate work environment, or to colleagues and structures across the campus that is the broader context for their work.

Throughout its lifetime, LEAP has used faculty development as a central change strategy. This approach takes the premise that effective faculty members are a prerequisite to an effective institution. LEAP's programs thus sought to provide faculty with opportunities to develop professional skills and knowledge, build collegial and mentoring relationships, learn more about university systems and cultures, explore options for their professional growth, and tackle personal and institutional problems they see as important. These growth opportunities were collectively framed in terms of the development of academic leadership. Programs included intensive workshops to develop faculty leadership skills, a coaching program, small grants to individuals and departments, and many talks, workshops, and informal networking activities. These programs were not targeted only to STEM women, but to STEM and non-STEM women and men alike, in the belief that “a rising tide raises all ships.” That is, addressing the skills and attitudes of all colleagues would promote a better workplace climate and set an atmosphere of support in which all could succeed, but would particularly help to overcome certain challenges faced by academic STEM women, without singling them out as if in need of remediation.

1.2 Purpose, Scope and Sources of Evidence for this Report

This report summarizes and synthesizes evidence from past evaluation work to enumerate observed program outcomes, assess evidence of their larger impact and contributions to institutional transformation, and offer some “lessons learned” to this university, to other institutions undertaking change initiatives, and to the ADVANCE program and National Science Foundation. The report draws on several sources of evidence that provide information about LEAP’s efforts, their outcomes, and the broader context in which these have occurred:

- Surveys and focus groups completed immediately after LEAP’s early workshops, including surveys from 59 respondents and five focus groups from seven workshops.
- Follow-up interviews conducted with 51 participants in LEAP programs, and second interviews with 20 of them, collectively known as the “Change” study.
- Additional interviews with a dozen well-placed observers of and contributors to LEAP programs.
- Participatory observation of numerous LEAP events, including talks, short workshops, portions of longer workshops, and celebrations.
- Analysis of written reports from individual and departmental recipients of small grants.
- Two large-scale surveys conducted campus-wide in 2003 and 2007, which addressed various measures of campus “climate” but also included items on respondents’ awareness of LEAP, participation in it, and outcomes from participating.
- Over 100 interviews with STEM graduate students, non-tenure-track instructors and researchers, conducted as part of the “Pathways” study. While Pathways’ research questions are primarily directed toward research rather than evaluation, some relevant findings are drawn upon.

- Interaction with other ADVANCE projects through the ADVANCE listserv and PI meetings, other projects' web sites and publications, and personal communications with other projects' leaders and evaluators.

Findings from many of these sources are summarized in several formal reports from the internal evaluation team. For simplicity, we refer to these reports by nickname (underlined in the list below) and year; full citations are given in 8. These reports include:

- *Outcomes of Faculty Development Initiatives of LEAP, Leadership Education for Advancement and Promotion, an NSF ADVANCE Project at the University of Colorado at Boulder; Mid-Course Evaluation Report* (Laursen et al., 2005)
- *An Assessment of Faculty Development Needs at the University of Colorado at Boulder* (Laursen & Rocque, 2006)
- *Faculty Career Trajectories and the Institutional Factors that Shape Them: Comparative Analysis of Longitudinal Faculty Interview Data* (Rocque & Laursen, 2007)
- *Outcomes of LEAP Individual Growth and Department Enhancement Grants, FY 2007.* (Laursen, 2008)
- *Faculty Climate Survey: Climate, Collegiality, Leadership, Mentoring, Diversity and Institutional Support According to Research and Teaching Faculty, 2003-2007* (Hassi & Laursen, 2009).

Additional findings have been presented internally and presented or published externally (De Welde, 2008; De Welde & Laursen, 2007, 2008; De Welde, Laursen & Thiry, 2007; Laursen & Rocque, 2007, 2009; Pedersen-Gallegos, 2005). Some findings are incorporated into manuscripts that are in preparation, and still other findings are unpublished to date.

1.3 Acknowledgments

Many individuals contributed to E&ER's work over time. Kristine De Welde developed and analyzed the immediate post-workshop surveys and contributed substantially to our literature base. She also conducted and coded interviews with graduate students as part of the Pathways study. Liane Pedersen-Gallegos conducted focus group interviews with workshop participants; she also interviewed research associates and research professors for the Pathways study. Bill Rocque coded first- and second-round interviews with LEAP participants in the Change study and summarized the first-round interviews as input to second-round protocols. Richard Donohue coded interviews with instructors for the Pathways study. Elaine Seymour led the initial development of the study design and has provided helpful advice at several points. Robyn Marschke conducted the "mapping" study that identified gender representation in different disciplines and job tracks among the CU faculty, and their evolution over time. Robyn, with Elizabeth Sheff and Joyce Nielsen, developed and administered the climate survey in 2003; this survey was re-administered by Sandra Laursen in 2007. Marja-Liisa Hassi analyzed the climate survey data for 2003 and 2007. Becky Gallegos supervised an army of student and external transcribers and smoothed many administrative matters. Sandra Laursen participated in the LEAP evaluation from its inception; she interviewed faculty for the Change study and instructors for the Pathways studies, analyzed evaluation data from multiple sources, and wrote or co-wrote several evaluation reports. In the LEAP office, Carole Capsalis and Patricia Rankin provided information, insight, and guidance throughout the project.

With this impressive roster of contributors, it may appear strange that this report is sole-authored. This choice is partly due to simple endurance, as graduate students have completed degrees and pursued careers of their own, and others colleagues have changed careers or retired. I have drawn on many lines of evidence gathered by my colleagues and on valuable insights they have offered, but because I can uniquely offer a continuous view, from the evaluation team, of the project over its lifetime, I take sole responsibility for the synthesis of findings and the additional interpretations offered here.

2.0 LEAP Activities

In this section we summarize and update evaluation findings on the outcomes of particular LEAP programs. The programs themselves are only briefly described; more detail about LEAP's activities can be found in the PI's report and past project reports. More synthetic perspectives on the findings are offered in later sections.

2.1 *Leadership Workshops*

LEAP offered intensive, multi-day leadership workshops at the introductory and advanced level from 2002 through 2008. Advanced workshops were re-targeted to focus on associate professors' needs starting in 2007, while some aspects of the earlier advanced workshops were incorporated into chairs' training under development. Through presentations, activities, and panels, the workshops addressed topics such as communication skills, conflict management, styles of interpersonal interaction and leadership, and provided opportunities for self-assessment, team-building, collaborative problem-solving, and reflection. Guest presenters addressed topics such as the tenure process (in the introductory workshops) and the job of department chair (in the advanced workshops). While men and non-STEM faculty were invited to participate as well as STEM women, female participants outnumbered male participants in nearly all the workshop cohorts.

The leadership workshops were evaluated using immediate post-workshop surveys and focus groups, for formative feedback. Data on longer-term workshop outcomes was gathered in interviews with participants in five early workshops (2002-2004). Findings from all these sources of evidence indicate that participants were drawn into workshops by the skills that were offered and by their framing as leadership skills. Particularly useful, and not available elsewhere, were sessions to improve time management and to develop communication/conflict management skills. The workshops delivered—gains in skills were one of the most frequently mentioned benefits—but also provided other, less anticipated benefits. In turn, the concerns and interests expressed by faculty attending the workshops became sources of ideas for other programming (see *Outcomes 2005*, pp. 24-25, 71-75; and *Needs 2006*).

Faculty noted benefits of several types as a result of their participation in LEAP workshops (*Outcomes 2005*). Thirty-five interviewees made a total of 228 statements about benefits they had received from the workshops. The four major categories of benefits were:

- Gains in skills, especially time management and interpersonal skills (communication, conflict management).
- Improved networking, especially:
 - Making connections with peers that were professionally and personally supportive; and

- Meeting senior colleagues and administrators who helped participants feel more informed about and connected to the university as a whole.
- Gains in understanding and perspectives, including
 - appreciation of differences in the faculty experience for colleagues in other departments, and for women;
 - greater understanding of how the university works outside one's own department; and
 - better understanding of the tenure process.
- Personal gains, especially confidence and a sense of collegial support.

Smaller number of interviewees mentioned benefits from opportunities to reflect on and plan their career choices; the stipend (including both concrete financial benefit and its symbolic impact in communicating that the university valued their participation); and a few miscellaneous benefits.

These positive outcomes from the leadership workshops have also helped to sustain the workshop program. In interviews, early-career faculty reported attending the workshops due to good recommendations from other young colleagues or encouragement by their department chair or mentor. Results from the 2007 survey confirm the importance of word-of-mouth as a means for drawing in faculty. As of 2009, the introductory workshops are offered two or three times per year and continue to fill readily.

Findings from the 2007 survey (*Climate 2009*) provide a second line of evidence about the outcomes of LEAP workshops. First, participation in these workshops was high: “multi-day workshop” was the second most frequently identified LEAP activity, with fully 46% of respondents who participated at all indicating they had participated in a multi-day workshop. This is impressive given the time commitment required.

Second, survey respondents who participated in LEAP activities were asked to indicate the benefits to them of participating, choosing from a list derived from the interview data. These reported benefits were not directly mapped to specific activities; indeed, most survey respondents who participated in LEAP at all reported participating in multiple activities. However, because the intensive workshops were among the most common activities reported and because they were also the highest-impact activities in terms of time commitment and value-added, we may assume that many of the reported benefits were derived from the leadership workshops. Most respondents cited multiple gains, with the greatest numbers (over 40% of those citing any gains) citing gains in:

- Developing and using new skills;
- Gathering ideas or solving problems with others;
- Networking with peers in a similar career stage;
- Learning about leadership and (separately) how the campus works;
- Reflecting on their own career interests and aptitudes.

These survey-reported gains align very well with the gains reported in interviews from the leadership workshops, and thus corroborate interviewees' reports with data from a wider sample of participants.

In sum, leadership workshops have been a signature activity throughout the project, and a reason for LEAP's identification as a faculty development program. They have had substantial impact through their overall reach (to hundreds of faculty), visibility, and positive outcomes for individuals. They will also continue to have that impact: the success of the introductory workshops has led to their institutionalization under the university's Faculty Affairs office. The advanced leadership workshops are not being continued in the same form, but portions of them survive in the form of ongoing experiments with chairs training. In providing useful skills, knowledge, and support, the workshops directly addressed ADVANCE's aim to foster the professional success of academic women as faculty and future leaders, without presenting this as remediation directed solely to women.

2.2 Coaching Program

LEAP conducted its coaching program from 2002 through 2005. The program trained experienced faculty as coaches and matched them for one-on-one coaching with early-career partners, most often from another department. The coaching program was discontinued due to low participation of assistant professors, but its outcomes were nonetheless positive for those who did participate. Immediate post-workshop surveys from the coach training program provided formative feedback that was used to adjust this training the second time it was offered.

Twelve participants in this program were interviewed and provided 31 observations about the benefits to them (*Outcomes 2005*). These benefits were narrower in range and fewer in number than the leadership workshops, consistent with the program's more specific aims and lower intensity of experience. One set of benefits, mainly reported by the untenured partners, focused on the value of a connection with an experienced colleague who was interested in them personally but had some distance from the immediate issues. This "reality check" gave assistant professors ideas for how to manage difficulties but also placed them in perspective. Both coaches and partners reported a second type of benefit, the growth of personal networks. Partners benefited from their coach's established networks in solving problems and making professional connections, and coaches reported positive relationships established with others in their coach training cohorts whom they saw as caring about the same issues.

We gained some clues about possible reasons for the undersubscription of the coaching program, but did not resolve this puzzle to our full satisfaction. The program was voluntary on the part of the assistant professor partners, and clearly one reason that some potential partners did not enroll was a lack of immediacy in their felt need for coaching. They perceived coaching as useful but it seemed less urgent than other priorities. Others felt they received sufficient mentoring in their own departments.¹ Some suggested that stigma might be attached to the notion of coaching or to the term itself. If so, this perception was not one grounded in impressions of the actual program participants: most early-career coaching partners were not struggling faculty in need of remediation but proactive young faculty who appeared to be doing very well in their careers,. They saw coaching as a benefit and took advantage of the offered chance to gain additional sources of advice and build their personal networks.

It is ironic that LEAP has often received the suggestion to start a cross-departmental mentoring program, when it stopped offering just such a program for lack of demand. LEAP did not abandon mentoring as an issue, but focused instead on informal networking activities. Likewise,

¹ From other data, the level and quality of departmental mentoring appeared to vary notably.

as evaluators we do not take the lack of demand for the coaching program to mean that the need for mentoring is fully met. We do extract some lessons for future efforts:

- It is important to remove stigma and communicate that coaching is a worthwhile priority for faculty time. Campus coaching/mentoring models should consider the benefits of “automatic” assignment—an “opt-out” program rather than an “opt-in” program—at least for early-career faculty.
- Activities that foster faculty interaction also offer the potential for less formal and more naturalistic development of coaching relationships. For example, faculty development activities that mix early-career and experienced faculty across departments may enable pairs to form. Coaching pairs who wish to self-identify could be offered additional faculty development resources as pairs or as a group.
- Coaching should augment, not replace in-department mentoring. More could be done to identify both good and poor mentoring practices within departments, and to share good practices as models for departments whose practices need to improve.
- Those who volunteered to serve as coaches were a highly engaged group of faculty, committed to faculty development and mentoring, and interested in the broader issues of faculty empowerment and campus climate that they saw LEAP as raising (*Outcomes 2005*). They saw the training itself as a valuable opportunity to meet like-minded people with whom to discuss issues they thought were important. This interest and commitment was not fully exploited; LEAP might have drawn more heavily upon this group as resource people or leaders for workshops and other initiatives. To take advantage of this engagement, it may be beneficial to continue to offer coach training (even if a formal program is not in place) and instead to encourage trainees to deploy these skills in their own contexts. Such a program has the potential to build mentoring skills, communicate the value and raise the visibility of mentoring within and across departments, and develop a safety net of mentors who have developed expertise and who see mentoring as a personal and institutional responsibility.

In sum, LEAP’s coaching program was a worthwhile experiment that benefited its participants. Both its successes and its challenges offer some useful lessons for future mentoring activities at the university and elsewhere. The program was consistent with the aim of ADVANCE to foster the professional success of STEM women early in their career, while also making similar opportunities available to men and to women outside STEM.

2.3 Short Workshops, Talks, and Networking Events

Many “one-off” events were held throughout LEAP’s tenure. These included talks by visiting and internal scholars on gender and science, shorter workshops 1-4 hours in length on leadership and diversity topics, and networking activities such as luncheons for women department chairs and a book group on leadership. Talks and short workshops were widely advertised; luncheons and book groups were by invitation. One or two public events per month were hosted throughout most of LEAP’s NSF-funded life span, based on our records of campus-wide announcements.

We did not gather evaluation data at these events, but evidence about their impact emerged from a variety of sources, including interviews, observations, and the 2007 survey. These activities maintained LEAP’s visibility to the campus at large (see also Section 3.1) and were viewed by

participants as important elements of LEAP's program. In large part, these events were well attended, presented by well-prepared presenters, and yielded active audience participation. The book group and the women chairs' lunches were distinctive activities that were mentioned positively in several of our interviews.

In the 2007 survey (*Climate 2009*), participants reported on their participation in these activities. "Seminar or talk" and "short workshop" were two of the top three LEAP activities reported: 56% of respondents who indicated any participation in LEAP reported attending a seminar or talk, and 33% had attended a short leadership workshop. Many respondents reported attending these events in addition to the multi-day workshops, and interview data indicate that participants often saw these as useful follow-up or extensions of the longer workshops.

We did not attempt to ask survey respondents to link their reported benefits to specific activities, so we cannot distinguish benefits that resulted from the one-off events from those due to other activities. However, because of the high participation in the one-off events, at least some of the reported benefits must be due to such participation. From the nature of the events and from the discussions that we observed, the gains from seminars and talks were likely to be primarily gains in understanding, and from the short workshops, gains in skills. LEAP's speaker series on diversity in science was likely responsible for most reports of gains in understanding about issues for women in science, because it was a major, high-profile activity focused on this topic and the main vehicle by which LEAP addressed these issues. Because of the convivial nature of these events, gains in networking likely derived from all types of events.

In sum, "one-off" activities contributed to LEAP's visibility across campus and engaged significant numbers of faculty in at least small ways. Collectively, they appear to have an impact that is disproportionate to the time commitment they require (to attend, not to organize!). They thus have value as part of the mix in any ADVANCE project and should also be considered as a low-cost way to continue to extend LEAP's impact and draw in faculty. These activities were not targeted to women in STEM, but by enhancing information, skills, and connections among all faculty and by drawing attention to LEAP's work, they were consistent with the ADVANCE goal to improve the workplace climate for women.

2.4 Individual and Departmental Growth Grants

In 2007, LEAP established two new small grant programs. Individual Growth (IG) grants were aimed at tenured faculty members seeking to expand their career horizons, change research directions, strengthen diversity or enhance work/life balance. They particularly targeted faculty who were making career transitions, beginning new scholarly or creative activities, or restarting scholarly work after a period of substantial university service. Department Enhancement (DE) grants were offered to improve departmental life, by enhancing collegiality and communication or improving the physical environment for faculty, staff, and students. Both programs drew many applications and the review committee increased the number of both grants and dollars awarded compared to its plans. Evaluation findings on this program are derived from an analysis of the reports submitted by both Individual Growth (IG) and Department Enhancement (DE) grant recipients in 2007 (*Grants 2008*). The program continued in 2008, but reports from this round were due after the grant period ended and were not analyzed. It is unclear whether this program can be continued in the present financial climate.

Both Individual Growth and Department Enhancement grants addressed faculty needs identified in previous analyses (*Needs 2006*). Our analysis found that the proposed activities were carried

out and, often, extended by the awardees (*Grants* 2008) and that both programs yielded a high level of activity for a small investment of funds.

Most of the IG grants focused on scholarly and creative work. Over 70% of IG grants went to women, and one-third to faculty in STEM fields. The level of productivity fostered by these grants was impressive, particularly given the short time between awards and reporting, and their small size (averaging under \$6300). Two thirds of recipients reported grant proposals written or under development, and 90% reported manuscripts, multimedia products, presentations or performances completed or underway. Participants reported a wide variety of other professional benefits as well as significant positive impacts on their confidence, morale, and motivation.

DE grants addressed a wide range of strategies to build community and advance departmental goals. Six of nine DE grants were awarded to STEM departments. The reported gains emphasized collegiality, communication, and pursuit of shared goals that helped to enhance department function and engaged both early-career and senior faculty. Because evidence from the literature indicates that collegiality and climate are particularly important to women and minority faculty, these initiatives may help to retain a diverse faculty. Both IG and DE recipients noted the novelty of this program on campus and its importance as a symbol of university support to mid-career faculty and to efforts to improve climate and function at the department level. Annual celebrations honoring the grant recipients further amplified the symbolic impact of these grants and communicated a sense of shared pleasure in others' successes.

Overall, these programs were an innovative and relatively low-cost means of investing in faculty development for both individuals and organizations. They addressed identified needs of associate professors and departments (*Needs* 2006); they required no elaborate infrastructure and worked through a structure consistent with faculty culture, that of competitive grants.

Celebrations honoring the grant recipients were a positive addition that further added to the grants' symbolic importance. While the grants were not limited to women in STEM, the majority of individual awards went to women, many of whose careers had been directly affected by family and institutional service responsibilities. A majority of department awards went to STEM departments to directly address issues of collegiality, mentoring, and effective departmental function. Thus both types of grants directly addressed issues that are known to disproportionately influence women's advancement.

2.5 LEAP Associate Vice Chancellor Position

LEAP funded a one-year fellowship for senior faculty to try out the role of academic administrator. The program targeted tenured women faculty who expressed interest in academic leadership roles. Fellows were placed in half-time positions in a particular administrative office where they participated in that office's work and also worked on an individual project of interest to LEAP and of utility to the university. The fellowship met a demonstrated need among established faculty for opportunities to test their interest and aptitude in administration without the multi-year commitment required to take on a regular administrative position. Six women held this position between 2002 and the end of 2008.

In interviews, most of the AVC fellows reported that their experience in this position was beneficial to them (*Needs* 2006, pp. 27-28). They gained greater understanding of the structure and function of the university as a whole, developed greater appreciation of excellence in areas of the university they had not encountered before, and built broader professional networks. Early AVC fellows met with some challenges, however, in understanding what was expected of them,

obtaining sufficient support to learn the ropes and meet others, and balancing work in their administrative office with that on their own projects. Some were drawn into difficult issues in the office, while others largely worked on their own and had little interaction with the office.

Based on this feedback (*Needs* 2006), the fellowship model was adapted for the last AVC fellow so that she had a personal project but also shadowed an administrator and had regular, structured interactions with him and other administrators. Interview data indicates that this model helped to avoid or resolve challenges noted by previous fellows. In fact, this fellow cited the shadow experience as the most beneficial element of the fellowship, in providing insight into the administrative role, broadening personal networks, and enabling her to make clear choices about her personal preferences for future leadership roles. In sum, the LEAP AVC position was a positive experience for most of the fellows, with benefits that directly address the ADVANCE program's goal of fostering future women leaders in academe. The last iteration provides a model that can be used again in the future, here or elsewhere.

2.6 Research and Professional Contributions

LEAP's work has resulted in substantial contributions to the literature informing women's advancement in the academy. Scholarly products include two doctoral dissertations and several articles and book chapters. The PI has contributed a chapter to an edited volume on ADVANCE projects (Stewart, Malley, & LaVaque-Manty, 2007) and has widely presented talks on women's representation in STEM that are particularly well received by fellow scientists. Journal publications include articles on the challenges to feminists of measuring and interpreting campus climate (Nielsen, Marschke, Sheff & Rankin, 2005); demographic inertia in academe, modeling the pace of change of gender representation under various faculty turnover scenarios (Marschke, Laursen, Nielsen & Rankin, 2007); STEM graduate students' interactions with their advisors (De Welde & Laursen, 2008); and the role of faculty development in institutional change (Laursen & Rocque, 2009). Several of these articles have appeared in high-profile journals including *Signs*, the *Journal of Higher Education*, and *Change*. A research brief summarizing the state of women in STEM was commissioned and published by SWS, Sociologists for Women in Society (De Welde, Laursen & Thiry, 2007). Manuscripts currently underway describe the "glass obstacle course" for STEM women Ph.D. students, illuminate the interaction of multiple work and life factors that affect the success of early-career women faculty, and compare the academic work lives of tenure-track and non-tenure-track STEM Ph.D.-holders. We plan to pursue dissemination funding to write a monograph on findings from the Pathways study.

Section 3.4 discusses the professional advancement of participants in LEAP's faculty development programs, but LEAP's research and evaluation activities have also offered substantial opportunity for professional growth to those involved. Three past Ph.D. students have moved into tenure-track faculty positions, a fourth has become a director of institutional research, and one professional research assistant has entered a STEM Ph.D. program. This author has obtained NSF funding for a study that grew in part out of LEAP-funded research work and has become co-director of a research unit. In each case, skills, expertise and publication records developed through work on this project have played a positive role.

3.0 Indicators of Institutional Transformation

Having reviewed the outcomes of specific LEAP activities, we now examine their cumulative impact. What signs may indicate that, through its activities, LEAP has achieved the "institutional transformation" that is the ultimate goal of ADVANCE IT projects? Several types

of indicators that suggest progress toward this broader goal are discussed here. Because LEAP’s faculty development approach was primarily “bottom-up,” several of these indicators are measures of LEAP’s reach and impact at the grassroots, faculty level. Others reflect aspects of institutional leadership and policy that link “bottom-up” and “top-down” change.

3.1 *Visibility and Participation*

LEAP achieved high visibility and penetration throughout the campus, particularly among tenure-track faculty to whom most programs were targeted. Our best measures of LEAP’s “reach” to the campus community come from the 2003 and 2007 surveys. The surveys were sent to all tenure-track (pre-tenure and tenured) and non-tenure-track research and teaching faculty. In the spring of 2003, 35% of all respondents had heard of LEAP (about 16 months after the start of funding) and by the fall of 2007, 64% of respondents had heard of LEAP. Awareness levels differed by group: 91% of tenure-track faculty, 75% of teaching faculty, and 55% of research faculty respondents (in 2007) had heard of LEAP. This is consistent with differences in these groups’ access to LEAP events: one-off events were offered to all faculty, but leadership workshops, coaching, grants and the AVC fellowship were largely restricted to tenure-track faculty. Research faculty are also more likely to work off of the main campus, where most activities were held.

In 2003, only 7% of all survey respondents reported having participated in any LEAP activities; this proportion had climbed to 20% by 2007. Again, participation was weighted toward tenure-track faculty: in 2007, 38% of tenure-track respondents had participated (vs. 22% of teaching and 6% of research faculty respondents); and tenure-track respondents also indicated participating in a larger number of distinct LEAP activities. Interestingly, although LEAP’s introductory leadership workshops targeting assistant professors were regularly offered and filled, associate professors and full professors accounted for the largest proportions of respondents who indicated that they had participated in LEAP activities. Perhaps these groups were particularly drawn to the other types of events sponsored by LEAP. While a higher fraction of women respondents reported participating (up to 32% of the women responding), a substantial fraction of men also participated (up to 19% of male respondents). The possibility for high visibility and widespread participation are two strengths of a faculty development approach.

3.2 *High Impacts at the Grassroots Level*

The program-by-program analysis presented in Section 2 shows that, across programs, LEAP participants derived substantial benefits that were meaningful to them and addressed their professional and personal needs. Interviewees frequently pointed out that programs offering these types of faculty development were not otherwise available on campus. The uniqueness at CU of LEAP’s programs may explain the surprising extent to which interviewees remembered specific aspects of the LEAP leadership workshops and could attribute specific personal outcomes to the workshops, even when they were interviewed over a year later.

Evidence of faculty impact also came from a second round of interviews conducted up to three years after their participation. Of 20 interviewees, 65% mentioned lasting gains that they had made from participating in LEAP workshops or coaching. Their comments emphasized strategies or skills that continued to be useful, and personal or professional relationships that continued to be important. Again, this appears to be a high degree of recall and attribution of outcomes well after the actual event.

We also noted, across several types of data, many faculty responses that emphasized affective or emotional benefits of their participation: growth in confidence in their ability to succeed and in their own career choices, a sense of validation or support from the institution, the feeling that someone cared about their troubles and was rooting for them to succeed. As faculty tend to operate mostly in the rational rather than emotional realm, these responses are noteworthy. They are due in part to positive personal interactions with fellow workshop participants and with LEAP personnel. They also signify the symbolic importance of faculty development, in addition to the practical benefits to faculty of participation. Again, a small investment in faculty can have an impact well beyond the apparent value of the dollars invested. Further dividends of this approach may yet be realized within individual careers and for the institution.

The 2007 survey data include other measures of grassroots impact. A total of 123 respondents reported 601 distinct gains as a result of participating in LEAP activities, an average of nearly 5 gains per person. Participating men reported as many gains as did women, and STEM and non-STEM participants reported similar levels of gain. While non-tenure-track research and teaching faculty participated less often than did tenure-track faculty, they still reported gains, albeit at slightly lower levels (4.1 and 3.3 gains per person, respectively). The nature of the reported gains is consistent with the qualitative findings (*Outcomes 2005*) that collegial problem-solving and sharing, and the resultant building of networks, were among the most positive outcomes at the faculty level.

As another possible measure of LEAP's impact, we analyzed survey data for evidence that LEAP participants were different in some way from non-participants.² LEAP participants differed from non-participants as a group on several general measures in the 2007 survey. They showed higher interest and awareness of diversity issues, expressed stronger personal commitment to improving diversity and thought it more important for the institution, and more often had concerns about the degree to which their department would welcome a non-majority colleague. They gave lower ratings on some of the climate indicators, including general climate and collegiality. In responding to open-ended survey questions, they made more negative observations but also more positive observations. Taken together, these results indicate that LEAP participants were, as a group, highly engaged in institutional life, concerned about diversity, and attentive to environmental factors, especially those that may influence the climate for women and minority faculty. We cannot determine whether these characteristics pre-dated or post-dated respondents' participation on LEAP, but, based on interviews, we believe that many faculty drawn to LEAP activities had these propensities already.

However, some differences in participants' vs. non-participants' survey responses on specific items may be more attributable to LEAP participation. Although, overall, LEAP participants rated their experience of collegiality lower than did non-participants, they rated their degree of networking with colleagues *outside* their own unit higher than did non-participants. We suggest that this greater level of networking may be an outcome of participation in LEAP, rather than a pre-existing condition. Networking was targeted by LEAP and was a commonly reported benefit in the interviews (*Outcomes 2005*) and surveys (*Climate 2009*). Moreover, the desire for more connection with colleagues was a commonly expressed but generally unmet faculty need (*Needs 2006*) that thus contrasts with the positive reports of LEAP participants.

² Because we cannot identify participants prior to their participation, we cannot determine whether participants and non-participants have *changed* in different ways; we can only examine differences in their end states.

LEAP participants were also more likely than non-participants to report that their chair articulated clear criteria for promotion and advancement, and that their primary mentor advised them about preparing for advancement. They more often reported that their primary unit supported tenure-clock adjustments. Again, these areas align with topics emphasized by LEAP: knowledge about the advancement process was directly shared in the workshops, and participants were encouraged to have conversations with their chairs and mentors about their own situation. LEAP participants were in general more, not less, critical of their departments, so these positive views stand out as a possible result of participation in LEAP. It may reflect an increase in participants' awareness of procedures and policies related to advancement, and in their sense of comfort that they could get information and make adjustments when needed. All the differences discussed are statistically significant; they are also consistent with interview data with LEAP participants. We do not have any evidence that can enable more direct attribution.

3.3 Institutionalization of LEAP Activities

Introductory leadership workshops for all early-career faculty (1-4 years after hiring) are already being supported by the university and will continue into the future. Carole Capsalis, who has been a linchpin of the program since 2003, will continue her work to coordinate the workshops and other faculty development initiatives, under the Faculty Affairs office. We cannot overstate the significance of this budgetary and staffing commitment by this institution, a state university in a state that ranks 49th in public support of higher education.

We also suggest that incorporation of LEAP into the Faculty Affairs office, along with the language with which LEAP's programs are now described, signals a sea change in this campus' view of faculty development. Previously faculty development has been viewed as restricted to development of teaching. The inclusion of leadership training, early-career support, chairs training, and other such efforts as necessary and valued support for faculty is a move toward a more holistic view of faculty development that responds appropriately to modern challenges within academe and addresses a wider range of faculty needs.

3.4 Leadership Contributions to the Institution

Several LEAP-trained and -supported faculty participated in gathering data from stakeholders statewide as input to the Flagship 2030 strategic planning process. We do not have evaluation data directly addressing this activity, but second-hand reports suggest that this was a positive experience for the participants that provided useful input to the Flagship 2030 planning efforts. We cite it as an example of how faculty development provided by LEAP was leveraged to benefit the institution more widely. Another example of a LEAP impact on existing institutional processes is the PI's movement into upper administration, thus leveraging skills and expertise gained through her work on LEAP. In addition, several LEAP-trained, tenured women faculty have moved into leadership roles including a center director, an associate dean of advising, and several department chairs.

3.5 Indicators of Campus-Scale Changes in Workplace Climate

The most general source of evidence for any campus-scale changes in workplace climate is the data gathered in two campus-wide climate surveys (*Climate* 2009). Comparison of the 2003 and 2007 survey results shows some positive changes in several climate indicators. These coincide in time with the bulk of LEAP's activities and with increases in LEAP's visibility and in the involvement of faculty. Several of these changes address issues that may plausibly have been

influenced by LEAP's work, although we can make no causal attributions from the data. However, the observed changes are statistically significant. They include:

- An increase in awareness among women (but not among men, whose awareness was higher than women's in both years) that they could negotiate aspects of their job. Negotiation was an important topic in LEAP workshops.
- Overall increases in reported personal commitment to increasing gender and racial/ethnic diversity in their unit, both overall and among men in particular.
- Increases in faculty views of the importance to the institution of increasing diversity. For men, this increase was for both gender and racial/ethnic diversity; for women, it was for racial/ethnic diversity only.
- An increase among STEM respondents, and separately, among men, in the frequency with which they discuss diversity issues at work, perhaps signaling an increase in awareness or interest. To place this observation in context, there was no increase in this frequency among respondents overall. In both surveys, STEM respondents and men generally discussed diversity less often both at work and in their personal life than did non-STEM respondents and women, respectively; thus an increase in this frequency may be meaningful.
- An overall increase in faculty's positive views of the workplace climate at CU Boulder, including an overall increase in perceived support from their main unit. These changes held among respondents as a whole and for tenure-track faculty as a group (who, as noted, were most likely to be affected by LEAP). In comparison, non-tenure-track teaching faculty assessed the climate as less positive in 2007 than 2003, and research faculty reported declines for some climate indicators and increases for others.

We must offer some caveats in interpreting these data. The use of these broad climate indicators to evaluate specific efforts toward institutional change is problematic. As has been noted by other ADVANCE projects, it is very difficult to operationally define institutional climate for quantitative measurement, and to detect changes on this short time scale. It is also problematic to use aggregated data on individuals to determine change in an essentially collective variable such as "climate" or "culture." A confounding factor is the fact that the 2003 survey was conducted amidst several leadership changes and public scandals involving the university. Interview data from 2003-2004 suggests that this period marked a low in the general mood of the faculty. It is thus possible that the survey is detecting changes due simply to a general improvement in morale and sense of optimism.

A second source of information on change in overall climate—of whether the workplace "tide" is "rising"—is found in the interview data. In addition to initial interviews focusing on program outcomes (Sections 2.1, 2.2) our study design included second interviews with 20 LEAP participants, mostly women, 2.5 to 3 years after their participation in a leadership workshop and/or coaching. We theorized that we might detect changes in participants' personal confidence, morale, optimism, and career progress, that might signal a positive impact of LEAP on individual careers, and/or changes in their perceptions of the climate and mood of their department or the campus at large. These in turn might indicate the beginnings of the campus-wide changes in climate and support that LEAP sought. We compared the early and later

interviews to look for evidence of such personal and campus-wide change and to determine whether any such changes might be due to the cumulative impact of LEAP (*Trajectories* 2007).

In that longitudinal analysis, the career trends for individual faculty members were more often positive than negative, particularly for assistant professors. However, without a comparison group,³ we could not determine whether this pattern was typical, unusual, or at all due to their involvement with LEAP. It is possible, for example, that faculty who chose to participate in LEAP programs were already proactive about their careers and likely to succeed. Three interviewees directly attributed positive changes in their career trajectories to their involvement in LEAP, and one attributed a negative change in part to her involvement in LEAP; most did not link the overall changes they described directly to LEAP (although, as noted above, over half did cite particular benefits of their participation).

We also looked for signs of broader changes in climate. More interviewees reported positive or improving workplace climates than reported negative climates, but we could not generalize this to the campus as a whole or attribute it to LEAP's work. We thus conclude that there was as yet no evidence for changes of this type, due both to the difficulty of detecting such changes and to the short time frame of the study, relative to the time scale on which the hoped-for changes would likely emerge.

4.0 Lessons Learned: LEAP's Theory of Change and its Implications

In Section 2, we described the outcomes of specific LEAP programs; in Section 3, we then stepped back to identify and discuss some markers of institution-wide impact from these programs and the project as a whole. Both of these sections are based on empirical data that was collected for the project. In this section, we step back even further to consider LEAP's theory of change from a more conceptual perspective that leads us to propose some other indicators of change resulting from this theory of change. These arguments are conceptual or theoretical rather than empirical; we hope they offer some "lessons learned" about the process of change that are useful to other projects.

For any project, defining a theory of change is a challenging but crucial action. According to Connolly and Seymour (2008),

A theory of change is a predictive assumption about the relationship between desired changes and the actions that may produce those changes. Putting it another way, 'If I do x, then I expect y to occur, and for these reasons.' (p. 1)

A project's theory of change thus articulates a line of reasoning from its overall goals (what do we wish to change?) to the interventions or strategies it has chosen to bring about those goals (how will we go about making the change?) to the short- and longer-term outcomes it seeks (how will we know change is happening?). Importantly, this line of reasoning is supported by a set of working assumptions that explain the linkages between goals, strategies and outcomes (what is the problem we are solving, how do we understand its sources, and why do we expect that doing this will solve the problem?). If those assumptions are supported by research, the case is stronger for the plausibility of the theory and the likelihood that the project will accomplish its goals (ActKnowledge, n.d.).

³ We considered interviewing a comparison sample but could not identify sufficient numbers of early-career women interviewees to form a sample that was both comparable and untouched by LEAP.

Articulating its theory of change and the underlying assumptions has been a challenge for LEAP as for other ADVANCE IT projects. Indeed, this is true for change initiatives of many types; creative and energetic people of good will tend to spring into action to solve a problem that concerns them. For a problem such as women's representation in academe, identifying a theory of change is also inherently difficult: the desired change is large and difficult, the context is complex, and the root causes are multiple and interconnected (Section 1.0). Yet this makes it all the more important for a project to be clear about what it will tackle and how.

To take LEAP as an example, the initial theory of change articulated in the LEAP proposal to NSF ADVANCE was a "rising tide" theory: improving the leadership skills, institutional knowledge, and knowledge and attitudes about diversity of faculty all across campus would lead to a better workplace climate that supported all faculty to succeed, thus overcoming some of the particular challenges faced by STEM women faculty. While this idea was present in the original proposal, it was stated in a less definite and more diffuse manner there (indeed, we surmise that few of the early ADVANCE IT proposals offered strong and clear statements of their theories of change). From the proposal alone, it was hard to identify just *how* institutional transformation, especially with respect to STEM women's representation, would come about through LEAP's proposed activities.

In the early years, the absence of an explicit mechanism for this change was also apparent to participants, who were supportive and interested but perceived a lack of clarity in LEAP's goals and assumptions, and offered their own theories of how it might work or what LEAP should do instead (*Outcomes* 2005). Both participants and evaluators inferred a theory of change from the actions taken. As the project proceeded, several kinds of more theoretical language were introduced: the PI referred to Meyerson's notion of "tempered radicals" (2001), Katzenstein's "unobtrusive mobilization" approach (1990), and Austin's "levels and levers" of systemic change (1998), and internal evaluation reports described a faculty development theory of change (*Outcomes* 2005). These ideas reference several different elements of a change theory; their use did not necessarily conflict, but these ideas were not explicitly linked or cross-referenced to form an overarching, holistic and consistently articulated theory of change.

In re-examining this history, we see it as very important for a project to articulate explicitly and revisit periodically its theory of change; the project might have found its groove sooner and been able to redirect some resources in ways that further advanced its particular change agenda. However, we do not have good advice to projects or their evaluators about just how to go about clarifying a theory of change. The ADVANCE program may be able to assist projects by articulating its own theory of change more explicitly, by programming sessions at the ADVANCE PI meeting that focuses on theories of change, and by commissioning synthetic studies or writings on theories of change.

A second challenge for ADVANCE IT projects is the diverse and demanding skill set required of the PI team. Many of the needed skills are similar to those that faculty and administrators who are typically involved in ADVANCE leadership teams have already developed and used in their scholarly, teaching, and departmental work. But the broad reach of ADVANCE IT efforts also requires particular strengths in reaching out to diverse constituencies on campus, building coalitions, and recruiting and empowering colleagues to take on specific responsibilities that keep the project moving forward simultaneously on multiple fronts. In any project that emphasizes faculty development or other grassroots-based change strategies, such functions are

especially crucial. Projects should pay particular attention to including and further cultivating multiple sources of these strengths within their leadership team.

In her recent writings about ADVANCE IT projects, Susan Sturm (2006, 2007a, 2007b) describes a role she calls the “organizational catalyst,” someone who is in a position to enlist others to act as change agents. Organizational catalysts are influential senior faculty who are situated at points of intersection within the university and who hold legitimacy and power from their distinguish record of scholarship and from a track record of advancing women and people of color in the academy. Sturm (2007b) defines three key functions for organizational catalysts:

- 1) use data to mobilize action—by feeding information to decision-makers in the right form and at the right time, and providing information in a language that each constituency understands;
- 2) diffuse and coordinate leadership—by identifying and empowering formal and informal leaders who can solve problems in their own contexts. These may include “unlikely allies among people in positions of power who are persuaded by the data and willing to harness their intellectual and social capital to the effort” (p. 10).
- 3) develop and sustain collaborative networks—by building communities of practice from people who share common interests and concerns but lack opportunities to work together. In Sturm’s view, this involves framing issues in a way that shows how they overlap with those of interest to different individuals or constituencies, bolstering “everyday leadership at key pivot points defining access and participation” (e.g., search processes), and thus redefining the everyday ways in which the institution operates (p. 10).

The LEAP PI took on many aspects of this role initially and throughout the project. The project coordinator also took on some aspects of these roles, to the extent possible given her non-faculty status. But given the magnitude of the job, LEAP would have benefited from the involvement of others who could have helped to generate new ideas, solve problems, mobilize others, follow through and build on LEAP’s accomplishments. Co-PIs did not function to a significant extent as organizational catalysts.

The role of organizational catalyst becomes prominent in an additional, interesting way when a project adopts a grassroots-oriented theory of change that emphasizes faculty development as a change strategy. For a “rising tide” theory of change to work, the new skills, knowledge and awareness that result from faculty development must spread to others in widening circles, as participating faculty invite others to join, deploy their new skills and take responsibility to initiate actions of everyday leadership in their own settings. Some engage in the project to the extent that they become organizational catalysts themselves. Indeed, evidence of these widening circles or “ripples on the pond” might be taken as signs that the tide is indeed rising. That is, we argue that the role of organizational catalyst is not only important for moving an ADVANCE project forward, as Sturm notes, but that the emergence of new organizational catalysts is one sign that the “rising tide” change strategy is working.

From the outset, LEAP’s faculty development-centered approach and portfolio of activities have been distinctive among the early ADVANCE IT projects. Thus we have long seen this project as providing an opportunity to test this particular theory of change. Here, we argue that a “rising tide” theory of change presumes that the influence of faculty development will expand in widening circles. As new skills, knowledge and awareness spread, we would thus expect to

detect that expanding influence on the faculty: new participants will become engaged through invitations from others, engaged participants will initiate actions of everyday leadership in their own departments or committees, and some will become organizational catalysts. In this project, we did observe the first; word of mouth was and remains LEAP's most effective recruitment tool. However, we did not observe a pattern of grassroots growth of initiatives that were aligned with LEAP and that arose in response to problems and concerns that participants identified in workshops or other venues. While the PI took on many aspects of the organizational catalyst role herself, we did not identify other individuals—ideally, including both women and supportive male allies—who, benefiting from their LEAP involvement, became organizational catalysts in their own right and took a leadership role on campus diversity issues that in turn furthered the project's goals. In interviews, some LEAP participants expressed their willingness to play a larger role if so engaged, but we did not see their later emergence as organizational catalysts. Counter-examples may exist, and stronger signs of the widening impact may yet emerge; but at this time we do not believe that this theory of change has been tested to its full capacity.

5.0 Lessons Learned: Opportunities for Ongoing Impact

Another type of “lesson learned” is offered as logical next steps for the university. We identify several points of opportunity for future expansion of LEAP’s impact on the institution, especially now that some of its elements are institutionalized. As faculty development has been a primary change strategy for LEAP and its main legacy, this section offers advice to those who will continue to pursue these strategies through Faculty Affairs and elsewhere. This section draws heavily on our earlier report (*Needs*, 2006; see also Laursen & Rocque, 2009), but adds an assessment of where needs are being addressed and where others remain unmet.

5.1 Needs Specific to Faculty Career Stage

Our 2006 report (*Needs* 2006) identified some faculty development needs that differed by faculty career stage. Continuing the introductory leadership workshop and encouraging all incoming faculty to take it should address many of the needs identified by early-career faculty. Working with advisees or research group members is one topic that has not been directly addressed in the intensive workshops and thus may be particularly suitable for workshop follow-up or one-off events. As argued in Section 2.2, mentoring and coaching may be best addressed by evening out the quality of in-department mentoring and providing informal opportunities for early-career faculty to interact and form relationships with senior faculty outside their departments.

Needs identified by mid-career faculty are addressed by the associate professor workshops initiated by LEAP and the individual career development grants (Sections 2.1 and 2.4). These programs should be high on the priority list for future work. It is less clear how to address senior faculty needs for opportunities to explore their aptitude and interest for leadership; the AVC fellowship model (Section 2.5) is a positive but not inexpensive model. It may be possible to include opportunities for self-assessment and reflection within faculty development programs for current and future leaders that also address organizational needs, e.g. chairs training (see 5.2).

5.2 Organizational Development Needs

Two main groups of needs were identified at the unit level. One was the need for and crucial role in department function of effective, knowledgeable chairs. While LEAP has done some work in department chair training, this effort is not yet optimized or regular, and we have no good evidence of its impact to date. The second group of unit-level needs surrounds effective

department-level communication and collegiality. LEAP conducted some experiments that addressed this need, e.g. communication workshops for departments embarking on a program review. While we had some evidence of promising outcomes from these approaches, this model did not catch on among departments. Models to address this need may be worth further exploration, as departmental environments have a significant impact on faculty workplace satisfaction, particularly among women (*Needs* 2006).

5.3 *Needs of Non-Tenure-Track Research and Teaching Faculty*

Unpublished data from the Pathways research study indicates that non-tenure-track faculty have similar faculty development needs to those reported by tenure-track faculty, along with special concerns related to the nature of their positions. For example, many instructors in our interview study reported a lack of inclusion in departmental decision-making that affects them, and unclear or infrequently used processes for formal review and professional advancement.⁴ Similar issues were commonly raised by instructors on the 2007 survey, and may account for their overall lower ratings of climate at the university (*Climate* 2009). Instructors in particular often feel undervalued. Contrary to stereotype, most (in the STEM departments where we conducted interviews) are not “freeway fliers” with multiple, part-time commitments but highly committed, long-term employees who perform critical teaching and advising functions for their departments.

Instructors and their departments would benefit from leadership development programs like those offered to tenure-track faculty. Moreover, supporting instructors to attend a leadership workshop would be a concrete way for a department to show that it values these colleagues.⁵ Similar arguments can be made regarding career research faculty. This investment would be positive for the institution: among non-tenure-track faculty who did attend LEAP leadership workshops, they often reconceived their roles as faculty and gained a more positive sense of their role in the institution and their commitment to it. We suggest that LEAP and its successors experiment with more open inclusion of non-tenure-track faculty in leadership workshops; the framing of these workshops in terms of “leadership” is already an inclusive framing of both groups’ career needs. In the experimental phase, costs might be covered by charging departments and research units for the actual costs (minus the stipend) of meeting additional demand for workshop places. Units could nominate and pay for the workshop as a form of recognition for the faculty member.

6.0 Lessons Learned: Advice to Future ADVANCE Projects

This section gathers some “lessons learned” from reflection and participation in the ADVANCE effort, locally and nationally, over time. We have already noted some lessons learned about theories of change and organizational catalysts. This section focuses on the roles of two groups of project allies, the advisory board and the evaluation team.

One potential source of assistance to a project is its advisory board. LEAP constituted a well-qualified advisory board whose members brought to the table a diverse set of perspectives and experiences. In early years, advisory board meetings were lively occasions for conversation, but over time board meetings declined in frequency, attendance and engagement. We suggest that it is important for an advisory group to have a specific task for each meeting, such as examining

⁴ Recent policy proposals at CU Boulder are a step forward in addressing these issues.

⁵ Feeling valued by the institution was a positive outcome reported by workshop participants (*Outcomes* 2005).

data or giving advice on a particular challenge that the project is facing. The nature of those tasks will necessarily evolve over time as the project itself evolves. Board members need to understand the project's theory of change—thus articulating this theory must be an important, early and ongoing element of board meetings. They also need to understand their role as offering advice on how best to accomplish the project's theory of change, rather than espousing different change theories of their own.⁶

The evaluation team is another important contributor to any ADVANCE project. As evaluators, we can point to several specific evaluation findings that have clearly had an impact on the project's decisions and directions. We can also spot places where our work might have been more directly useful or more effectively put to use. The lessons we draw from our own experiences and from those of other ADVANCE IT projects include pragmatic advice about establishing working processes and priorities that maximize the value of evaluators' efforts. We also offer advice to NSF ADVANCE about ways in which the program can facilitate high-quality evaluation of individual projects.

A productive and collegial working relationship between evaluators and project leaders is essential. Yet faculty often hold negative connotations of evaluation, associating it with summative judgments such as assigning student grades. Leaders need to view evaluators not as inspectors who will reveal problems but as allies who can help them solve problems. An especially useful habit is to think out loud about the project's choices, dilemmas and challenges. Leaders may not know how to find out the answers, but they can share their questions and brainstorm with evaluators some ways to gather data to answer them. Evaluators should in turn consider what data they can offer that is quick to gather and useful in decision-making, thus helping to build the PIs' understanding of how they can benefit from evaluation data and work well with their evaluator. Our faculty needs analysis (*Needs 2006*) proved useful in spurring new ideas. A needs assessment, early in the project, may be an especially good investment.

Good communication is also crucial. Qualitative data has been very powerful in this and other ADVANCE IT projects, but data transcription and analysis can be slower than the project's need to make decisions. Written evaluation reports can have more impact than verbal reports, but committing tentative findings to formal reports can seem premature. PIs and evaluators should work out early in the project how to present and communicate evaluation advice so that it is timely and neither overly formalized nor lost as part of a record that can be returned to.

An evaluation design must be specified in an ADVANCE project proposal, yet evaluation will be most informative if it can inform the project's next steps and address unanticipated needs. We suggest designing the project budget to include some evaluator time for formative evaluation work that is not pre-committed to specific activities but is instead deliberately reserved to enable rapid response to project needs. This is most useful for gathering formative data on specific initiatives to aid decisions about whether to continue, revise, or abandon them.

Often, communications from the NSF ADVANCE program seemed to emphasize accountability, "proof" of success, and production of publishable social science research. One risk of such an emphasis is a move toward summative evaluation at the expense of formative evaluation, putting pressure on reporting achievements without also building understanding why something does or does not work. This emphasis is understandable when ADVANCE is itself facing outside

⁶ I thank Jennifer Sheridan for sharing some thoughtful comments on the role of advisory boards.

challenges, but it undermines the importance of formative feedback as a tool for evidence-based decision-making. This can also induce PIs to be cautious in sharing their struggles or challenges, because of the real or perceived need to share only successes. Likewise, requiring reports at high frequency can encourage a short-term mentality rather than a long-term plan for change. We encourage projects to pursue, and NSF to promote, a balance of formative with summative evaluation work, and suggest more extensive use of simple formative evaluation methods. ADVANCE should emphasize the importance of data to drive decision-making and not just to validate success.

To link formative and summative evaluation, and to draw conclusions about “institutional transformation,” it seems critical to build in periodic snapshots of the project’s theory of change; to ask leaders to articulate explicitly from time to time how particular initiatives will carry out their theory of change. How a project’s theory of change evolves and how its initiatives are in turn adapted are themselves very useful kinds of information to inform future change efforts. As discussed, articulating theories of change is hard, and ADVANCE evaluators will need to apply their creativity to drawing out and capturing these theories. Recent typologies of change strategies used across ADVANCE IT projects, conducted by Bilimoria, Joy and Liang (2008) and Fox (2008), may be helpful frameworks to consider as starting points to organize the strategies chosen by a specific project.

Lastly, it is not clear that the strength of findings from the climate surveys conducted at Colorado merited the effort that went into them. While some of this is due to lack of continuity on the survey team, other concerns surround the constructs used to define “climate,” the lack of good, validated survey items to operationalize these constructs, and the assumption that “climate” can be measured by aggregating individual responses. As ADVANCE has now paid for several rounds of climate surveys at several institutions, it would be very worthwhile for NSF to commission a meta-analysis and literature review on institutional climate surveys related to gender and diversity, for the use of ADVANCE projects and for potential cross-project aggregation and analysis.

7.0 Conclusion

As a test of a theory of change, LEAP’s work is not yet complete. We have not yet observed the extent of “ripple effect” within the faculty that we might expect from a project based on a faculty-centered theory of change. As a particular project, LEAP has accomplished a good deal of work that has reached a sizable fraction of tenure-track faculty and has made a positive impact on those participants. Women STEM faculty received a disproportionate share of benefit from LEAP’s direct interventions; consistent with LEAP’s “rising tide” theory of change, men and non-STEM faculty were also substantially involved. Certain of LEAP’s accomplishments are noteworthy as having institutional impact, including the evolution or emergence of programs that meet identified faculty needs not previously addressed on this campus, evidence of a cultural shift in the view of faculty development on this campus from a narrow to a more holistic one, and its strenuous, successful efforts to sustain key programs after NSF funding ended. It is fair to say that LEAP has left a lasting mark on this institution.

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