This unique book provides important guidelines and examples of ways STEM (e.g., science, technology, engineering, and mathematics) faculty and administration can collaborate towards goals of recruiting, mentoring, and promoting leadership to academic women faculty. Based on the experiences of faculty across five Florida universities, including one national laboratory, each chapter highlights one aspect of a multi-institutional collaboration on an NSF ADVANCE-PAID grant dedicated to achieving these three goals. Highlighting the importance of coordination, integration, and flexibility, each chapter details strategies and challenges of establishing a multi-site collaboration, assessing climate in STEM departments, addressing differential institutional readiness and infrastructure, and implementing change. The authors suggest ways to build on intrainstitutional strengths through interinstitutional activities, including shared workshops, research, and materials. Separate chapters focus on recruiting women into STEM departments, mentoring women faculty, and providing leadership opportunities to women. A theoretical chapter includes Cultural historical activity theory as a lens for examining the alliances’ activities and evaluation data. Other chapters present research on women STEM faculty, contributing insights about STEM women’s sense of isolation. Chapters include a reflective metatologue written by a social scientist. The book closes with lessons learned from this collaboration.
Alliances for Advancing Academic Women
Bold Visions in Educational Research
Volume 39

Series Editors:

Kenneth Tobin, The Graduate Center, City University of New York, USA
Carolyne Ali-Khan, College of Education & Human Services, University of North Florida, USA

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Stephen Ritchie, School of Education, Murdoch University, Australia

Scope:

*Bold Visions in Educational Research* is international in scope and includes books from two areas: *teaching and learning to teach* and *research methods in education*. Each area contains multi-authored handbooks of approximately 200,000 words and monographs (authored and edited collections) of approximately 130,000 words. All books are scholarly, written to engage specified readers and catalyze changes in policies and practices. Defining characteristics of books in the series are their explicit uses of theory and associated methodologies to address important problems. We invite books from across a theoretical and methodological spectrum from scholars employing quantitative, statistical, experimental, ethnographic, semiotic, hermeneutic, historical, ethnomethodological, phenomenological, case studies, action, cultural studies, content analysis, rhetorical, deconstructive, critical, literary, aesthetic and other research methods.

Books on *teaching and learning to teach* focus on any of the curriculum areas (e.g., literacy, science, mathematics, social science), in and out of school settings, and points along the age continuum (pre K to adult). The purpose of books on *research methods in education* is not to present generalized and abstract procedures but to show how research is undertaken, highlighting the particulars that pertain to a study. Each book brings to the foreground those details that must be considered at every step on the way to doing a good study. The goal is not to show how generalizable methods are but to present rich descriptions to show how research is enacted. The books focus on methodology, within a context of substantive results so that methods, theory, and the processes leading to empirical analyses and outcomes are juxtaposed. In this way method is not reified, but is explored within well-described contexts and the emergent research outcomes. Three illustrative examples of books are those that allow proponents of particular perspectives to interact and debate, comprehensive handbooks where leading scholars explore particular genres of inquiry in detail, and introductory texts to particular educational research methods/issues of interest to novice researchers.
Alliances for Advancing Academic Women

Guidelines for Collaborating in STEM Fields

Edited by
Penny J. Gilmer
Florida State University
Berrin Tansel
Florida International University
and
Michelle Hughes Miller
University of South Florida

SENSE PUBLISHERS
ROTTERDAM/BOSTON/TAIPEI
To Kathryn Borman, our friend and colleague, whose boundless imagination and enthusiasm was instrumental in creating our collaboration
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<td>Word</td>
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<td></td>
</tr>
<tr>
<td>AAFAWCE</td>
<td>Alliance for the Advancement of Florida’s Academic Women in Chemistry and Engineering</td>
<td></td>
</tr>
<tr>
<td>ADVANCE</td>
<td>Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers</td>
<td></td>
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<tr>
<td>ADVANCE-PAID</td>
<td>Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers-Partnerships for Adaptation, Implementation and Dissemination</td>
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<td>CHAT</td>
<td>Cultural Historical Activity Theory</td>
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<td>COACH</td>
<td>COACH: Assisting in the Success and Impact of Women Scientists and Engineers</td>
<td></td>
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<tr>
<td>COE</td>
<td>College of Engineering</td>
<td></td>
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<tr>
<td>Co-PI</td>
<td>Co-Principal Investigator</td>
<td></td>
</tr>
<tr>
<td>FAMU</td>
<td>Florida Agricultural and Mechanical University</td>
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<tr>
<td>FIU</td>
<td>Florida International University</td>
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<td>FRED</td>
<td>Faculty Recruitment for Excellence and Diversity</td>
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<tr>
<td>FSU</td>
<td>Florida State University</td>
<td></td>
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<tr>
<td>GEOSET</td>
<td>Global Education Outreach: Science, Engineering, Technology</td>
<td></td>
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<tr>
<td>IOM</td>
<td>Institute of Medicine</td>
<td></td>
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<tr>
<td>NHMFL</td>
<td>National High Magnetic Field Laboratory</td>
<td></td>
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<tr>
<td>NAE</td>
<td>National Academy of Engineering</td>
<td></td>
</tr>
<tr>
<td>NAS</td>
<td>National Academy of Sciences</td>
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<tr>
<td>NSF</td>
<td>National Science Foundation</td>
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<tr>
<td>PI</td>
<td>Principal Investigator</td>
<td></td>
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<tr>
<td>STEM</td>
<td>Science, Technology, Engineering, and Mathematics</td>
<td></td>
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<tr>
<td>STRIDE</td>
<td>Strategies and Tactics for Recruitment to Improve Diversity and Excellence</td>
<td></td>
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<tr>
<td>UF</td>
<td>University of Florida</td>
<td></td>
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<tr>
<td>USF</td>
<td>University of South Florida</td>
<td></td>
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<tr>
<td>UTEP</td>
<td>University of Texas-El Paso</td>
<td></td>
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<tr>
<td>WISELI</td>
<td>Women in Science &amp; Engineering Leadership Institute</td>
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</tbody>
</table>
PENNY J. GILMER

PREFACE

Alliances for Advancing Academic Women

This book is the culminating activity of a National Science Foundation (NSF)-funded grant by the ADVANCE program. The goal of the ADVANCE grants is to increase the participation and advancement of women in academic science and engineering careers (NSF, 2012). Women faculty in STEM fields in higher education are sorely underrepresented both in terms of new hires and their advancement to full professor, both in the US and worldwide, so the NSF ADVANCE program seeks faculty and universities willing to address this issue.

ADVANCE-PAID ALLIANCE IN FLORIDA

Our ADVANCE-PAID grant, the Alliance for the Advancement of Florida’s Academic Women in Chemistry and Engineering (AAFAWCE, 2013), was a collaborative, three-year grant, which we continued into the fourth year with a no-cost extension. Our collaboration comprised five public universities in the state of Florida: University of South Florida (USF) as the lead institution, Florida State University (FSU), University of Florida (UF), Florida International University (FIU), and Florida Agricultural and Mechanical University (FAMU). We adapted successful programs from earlier ADVANCE grants, and implemented and disseminated them to academic women in science, technology, engineering, and mathematics (STEM) fields at our five universities.

LAYOUT OF BOOK

This book has nine chapters; the last one is the lessons learned from our collaboration. There are seven themes that cut across the first eight chapters of the book. Each chapter has its own list of references. Since some readers may only read one or two chapters, we identify all universities in the collaborative in each chapter. We include a list of abbreviations, figures, tables, and appendices for all chapters in the front of the book.

Our first and second editors (Penny J. Gilmer, PI at FSU, and Berrin Tansel, PI at FIU) were part of the AAFAWCE project since its inception. Our third editor, Michelle Hughes Miller, a USF faculty member in the Department of Women’s and Gender Studies, was not involved in the grant until midway into the fourth year but agreed to be a co-editor of this book. She not only reviewed every chapter and gave
excellent advice on ways to improve them but she also wrote a metalogue to follow
the first eight chapters, focusing directly on each chapter. Therefore, we have critical
elements of the book, cutting across themes (in Chapter 9), and embedded in each
chapter (as metalogues to each chapter).

Bateson (1972) is the first to use the term, metalogue:

A metalogue is a conversation about some problematic subject. This
conversation should be such that not only do the participants discuss the
problem but [also] the structure of the conversation as a whole is also relevant
to the same subject. (p. 1)

I have successfully used metalogues in two prior books (Gilmer, 2010; Taylor,
Gilmer, & Tobin, 2002) and thought the metalogues would bring out the issues from
an inductive approach, while the lessons learned chapter (#9) used an approach that
searches for crosscutting themes. The three editors thought both approaches might
be helpful to the readers.

On the next page is a table (Table P-1), allowing the reader to see in a glance the
features of each chapter. I indicate key features that would interest readers for each
chapter.

AUTHORS & LEADERSHIP TEAM

We have 12 authors, eight from USF, three from FSU, and one from FIU. At the
close of the book are brief biographical sketches for each author. Some chapters
include activities at or sponsored by UF and FAMU.

Our three editors are from three different universities: FSU (Gilmer), FIU
(Tansel), and USF (Hughes Miller). Not only do we represent different universities
but also different fields of expertise: biochemistry and science education (Gilmer),
civil and environmental engineering (Tansel), and women’s and gender studies
(Hughes Miller), with different theoretical frameworks.

Since we were a collaboration of five universities, with individual budgets from
the NSF, each university had a leadership team. The USF team did double-duty since
they were the lead institution, managing, and leading their individual university
activities as well as for the entire collaborative. In Appendix 3-B, we listed all
principal and co-principal investigators, senior personnel, and others.
### Table P-1. Summary of nine chapters in book, including key features

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Shortened title of chapter</th>
<th>Key features of chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collaborating and selecting our STEM project</td>
<td>Overview of NSF ADVANCE-PAID grant and this book; critical need for academic women in STEM, both nationally and internationally; table of all the AAFAWCE activities at all five universities over the four years of the grant.</td>
</tr>
<tr>
<td>2</td>
<td>Focusing on collaboration at the start</td>
<td>Initial activities of choosing logo, brochure, and branding of the AAFAWCE.</td>
</tr>
<tr>
<td>3</td>
<td>Collaborating with STEM faculty</td>
<td>Application of cultural historical activity theory, with three central components and four influential factors, to the AAFAWCE collaborative activities; table of all PI, Co-PI, senior personnel, and others involved in the grant; challenges of working collaboratively.</td>
</tr>
<tr>
<td>4</td>
<td>Assessing faculty demographics and climate survey</td>
<td>Challenges related to the collection, analysis, and dissemination of demographic and faculty climate data on men and women faculty in chemistry, physics, and engineering from five AAFAWCE institutions.</td>
</tr>
<tr>
<td>5</td>
<td>Assessing academic STEM women’s sense of isolation</td>
<td>Qualitative study of academic women in STEM from all five universities focusing on women’s sense of isolation, including ways institutions can address this issue; some evaluation data.</td>
</tr>
<tr>
<td>6</td>
<td>Recruiting women STEM faculty</td>
<td>The AAFAWCE’s integration of STRIDE &amp; WISELI programs; description of interinstitutional workshop on recruitment; institutional presentations on recruitment of women faculty while paying attention to schemas and unconscious biases; activity for recruitment workshop, using letters of reference.</td>
</tr>
<tr>
<td>7</td>
<td>Mentoring women STEM faculty</td>
<td>ADVANCE-Institutional Transformation grant from University of Texas-El Paso helps the AAFAWCE; interinstitutional workshop on mentoring; institutional presentations on leadership; models of mentoring.</td>
</tr>
<tr>
<td>8</td>
<td>Developing academic women leaders in STEM</td>
<td>Building on COACh to meet the AAFAWCE’s goals through interinstitutional workshops on leadership and institutional leadership panels; women in STEM with international and national awards; two women leaders, Holbrook &amp; Stokes, speak on views of leadership; evaluation data.</td>
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Table P-1. Continued

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Shortened title of chapter</th>
<th>Key features of chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Learning Through Collaboration: Lessons from the AAFAWCE</td>
<td>Seven themes: collaborating as an art form; developing strategies to involve women faculty; supporting women by male faculty and administrators; getting buy-in from administration; learning by being part of the AAFAWCE; sustaining the learning; measuring success.</td>
</tr>
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</table>
ACKNOWLEDGMENTS

Our book authors and others associated with the AAFAWCE project want to thank the following persons for their help, support, and advice during the collaborative project (Table P-2):

<table>
<thead>
<tr>
<th>Person acknowledged</th>
<th>Institution</th>
<th>Contributions</th>
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<tr>
<td>Venkat Bhethanabotla</td>
<td>USF, Chair, Chemical Engineering</td>
<td>Served on USF AAFAWCE recruitment committee; encouraged faculty involvement in <em>Best Recruitment Practices</em> presentation</td>
</tr>
<tr>
<td>Gregory Boebinger</td>
<td>FSU, Director, National High Magnetic Field Laboratory (NHMFL)</td>
<td>Encouraged faculty involvement in Faculty Recruitment for Excellence and Diversity (FRED)</td>
</tr>
<tr>
<td>Barb Butterfield and Jane Tucker</td>
<td>COACH</td>
<td>Presented at two interinstitutional AAFAWCE workshops on leadership</td>
</tr>
<tr>
<td>Eva Fernandez</td>
<td>USF, Engineering</td>
<td>Visited USF faculty search committees and worked on <em>Best Recruitment Practices</em> presentation and <em>Recruitment Practices Booklet</em>; co-authored chapter (#6) in this book</td>
</tr>
<tr>
<td>Eve Fine</td>
<td>University of Wisconsin-Madison’s WISELI</td>
<td>Welcomed the AAFAWCE representatives to the WISELI recruitment workshop; shared the WISELI Faculty Climate Survey for the AAFAWCE to adapt</td>
</tr>
<tr>
<td>Roxanne Hughes</td>
<td>FSU, NHMFL, Director, Center for Integrating Research and Learning; Science Education</td>
<td>Served on FSU AAFAWCE Recruitment committee; wrote annotated bibliography for recruitment literature for FRED workshops</td>
</tr>
<tr>
<td>Michelle Hughes Miller</td>
<td>USF, Women’s and Gender Studies</td>
<td>Accepted invitation to be co-editor of this book and author of eight metalogues, even though she did not work on the grant; also conducted interview with Tyson on Faculty Climate Survey; coauthor of chapter #4</td>
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<tr>
<td>Harold Kroto</td>
<td>FSU, Director of GEOSET (Global Education Outreach: Science, Engineering &amp; Technology, 2013)</td>
<td>Led GEOSET team that Web cast FSU institutional mentoring and leadership events</td>
</tr>
<tr>
<td>Vanessa Martinez</td>
<td>USF, graduate assistant for four years on grant</td>
<td>Served as administrative assistant in interinstitutional collaboration and for USF AAFAWCE activities; co-developed second and third AAFAWCE newsletters; co-authored two chapters (#3 and #4) for this book; took minutes of most conference calls</td>
</tr>
<tr>
<td>Amada McManaway</td>
<td>FSU, administrative assistant for final two years; undergraduate biological sciences major</td>
<td>Organized all FSU mentoring and leadership events; co-developed second and third newsletters; helped with this book; designed this book’s cover collage</td>
</tr>
<tr>
<td>Pamela Raymond and Katherine Spindler</td>
<td>University of Michigan professors and Committee on STRIDE members</td>
<td>Presented at interinstitutional Train-the-trainer recruitment workshop to the AAFAWCE; gave us notebook of journal relevant articles</td>
</tr>
<tr>
<td>Tina Reimers</td>
<td>University of Albany, Director of Faculty and Program Development; represented University of Texas-El Paso’s mentoring program</td>
<td>Presented at interinstitutional Train-the-trainer mentoring workshop for the AAFAWCE</td>
</tr>
<tr>
<td>Bettina Roberson</td>
<td>FSU, NHMFL, Human Resources Manager</td>
<td>Served as FSU AAFAWCE recruitment committee member</td>
</tr>
<tr>
<td>Helena M. Safron</td>
<td>FSU, administrative assistant for first two years</td>
<td>Organized Web site references and two interinstitutional workshops (one on recruitment and first one on leadership); organized administrative session on recruitment; developed first AAFAWCE newsletter</td>
</tr>
</tbody>
</table>
ACKNOWLEDGMENTS

Chrystal Smith
USF, AAFAWCE Project Manager
Guided the AAFAWCE through all four interinstitutional workshops and PI meetings; led weekly conference calls; conducted qualitative research on women STEM faculty’s sense of isolation using Bourdieu’s theory of social capital; presented the AAFAWCE research at anthropology conferences, JAM, and ADVANCE PI conferences; authored and coauthored chapters (#5 and #9, respectively) in this book.

Dwayne Smith
USF, Senior Vice Provost for Faculty Affairs & Dean, Office of Graduate Studies
Supporter and contributing administrative representative at all USF AAFAWCE institutional activities; committed to institutionalize Best Recruitment Practices presentation.

Garnett Stokes
FSU, Provost and Executive Vice President for Academic Affairs
Served as Co-PI on the FSU AAFAWCE; hosted one mentoring meeting and attended all others; served as panelist at USF Celebration of STEM Women; co-authored chapter (#8) in this book.

Will Tyson
USF, Sociology
Organized and analyzed the Faculty Climate Survey for all five AAFAWCE universities; co-authored chapter (#4) in this book.

This material is based upon work supported by the National Science Foundation under grant numbers: USF (#0930220), FSU (#0930164), UF (#0930237), FIU (#0930187), and FAMU (#0930172). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

We hope you find this book helpful as you move to advance women in STEM fields in universities and other venues in the US and elsewhere in the world. We have considerable work to do.

REFERENCES


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ACKNOWLEDGMENTS


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gilmer@chem.fsu.edu
SECTION I
GETTING STARTED
1. DECIDING TO COLLABORATE AND SELECTING OUR STEM PROJECT

In 2001, the National Science Foundation (NSF) established a new awards program ($19 million) to advance the status of academic women in STEM (Science, Technology, Engineering and Mathematics) fields. Open only to institutions, Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers (ADVANCE) reflected the “increasing recognition that the lack of women’s full participation at the senior level of the academe is often a systemic consequence of academic culture” (NSF Institutional Transformation Awards, 2001, ¶ 1). The percentage of women on the academic STEM faculties at universities and colleges in the U.S. was well below the rate of women graduating with doctoral degrees in those departments. Thus, our nation needed to make inroads in recruiting, retaining, and providing leadership opportunities for women faculty in STEM fields.

Efforts to create inclusive STEM disciplines have been driven by documented instances of structural and cultural gender inequities (National Academy of Sciences, 2007), significant underrepresentation of women, especially in the physical sciences, mathematics, computer sciences, and engineering (NSF, 2013a) and limited opportunities for STEM women (Bentley & Adamson, 2003). For instance, a National Academy of Sciences (2010) study comparing six STEM disciplines concluded women faculty have less access to research-related equipment than their male colleagues. These inequities may exist well beyond STEM (Britton et al., 2012). Indeed, the “accumulation of advantage” experienced by (some) men in the academe is rooted in institutionalized cultures of differential evaluation of both sexes, to the detriment of many women (Valian, 2007, p. 32). In addition, organizational work design imposes an “ideal” worker norm on all workers, ignoring the realities of contemporary academics’ lives. Solomon (2011) concluded that many faculty recognize the devaluation of personal obligations within academic culture. Those who retain their emphasis on relationship/familial engagement recognize they are choosing a “risky” strategy, yet they express concern of sacrificing their personal lives “at the altar of tenure.”

In recent remarks at the National Science Foundation’s (NSF) Family Friendly Rollout (White House, 9/26/2011), First Lady Michelle Obama praised the NSF for their efforts to enhance opportunities for scientists to balance their work and life obligations through their Career-Life Balance Initiative.
If we’re going to out-innovate and out-educate the rest of the world, we’ve got to open doors for everyone… We need all hands on deck, and that means clearing hurdles for women and girls as they navigate careers in science, technology, engineering and math. (¶ 1)

Ms. Obama’s speech acknowledged the underrepresentation of women at all academic stages in science, technology, engineering and mathematics (STEM) disciplines and the cumulative disadvantage this problem creates in terms of national prominence and potential in STEM research and innovation. Ms. Obama’s comments echoed the purpose of the NSF (2013b) ADVANCE grant program itself: “to develop systemic approaches to increase the representation and advancement of women in academic STEM careers, thereby contributing to the development of a more diverse science and engineering workforce” (¶ 1).

The United States is not alone in its concern about gender diversity of the scientific workforce. Our European counterparts are also struggling with this issue, releasing a June 2010 list of 13 recommendations to benefit European Science through integrated actions on gender (GENSET, 2011). Germany has similar issues to those in the US with underrepresentation of women in STEM fields, “Despite its best efforts, the science and technology sector is failing to attract girls, potentially undermining Germany’s strength as a global export power” (Kleinhubbert, ¶ 1, 2013).

ALLIANCE IN FLORIDA TO ADVANCE ACADEMIC WOMEN IN STEM

In 2009, the NSF awarded the Alliance for the Advancement of Florida’s Academic Women in Chemistry and Engineering (AAFAWCE) ADVANCE-PAID grant awards. The AAFAWCE is a collaboration of five Florida higher education institutions: University of South Florida (USF, the lead institution), Florida State University (FSU), University of Florida (UF), Florida International University (FIU), and Florida Agricultural and Mechanical University (FAMU). Each of the universities had an individual award number and budget.

The AAFAWCE mission was to increase the representation and promote the advancement of academic women in chemistry and engineering, thereby developing a more diverse science and engineering workforce. The AAFAWCE’s goals were to (a) increase recruitment of women faculty in chemistry and engineering, (b) enhance retention of academic women by mentoring and networking, and (c) promote leadership of women within the universities and in their scientific and engineering fields.

The roots of the AAFAWCE collaboration began over five years prior when the NSF awarded the USF team led by PI Kathryn Borman a three-year STEM Talent Enhancement Program Type II grant, which conducted research at seven higher education institutions in the state of Florida. The goal of this grant was to examine the context of women and other underrepresented minority groups as undergraduate majors in chemistry and engineering (Borman, Tyson, & Halperin, 2010). In the
process of conducting the earlier study, the USF team conducted student-focus groups and interviewed individual faculty and administrators at these campuses.

We found the key to writing the ADVANCE-PAID proposal was using the data from the earlier STEM Talent Enhancement Program Type II project. The findings increased our familiarity with the needs and issues confronting women faculty (and students) in chemistry and engineering. The data from this earlier grant helped to solidify the focus on the importance of women STEM faculty as mentors for women undergraduates in chemistry and engineering (Borman et al., 2010).

In addition, during the course of the STEM Talent Enhancement Program Type II research Borman built a network of colleagues at the five institutions involved in the ADVANCE-PAID project. We developed a Blackboard site at FSU that allowed our team leaders at each institution to collaboratively develop and write the proposal, despite the geographic distances separating our institutions. Through the site, we were able to share ideas and relevant information, such as faculty demographic data as well as review the proposal and provide feedback. In 2008, the NSF approved our first ADVANCE-PAID proposal but not highly enough to be funded, so we had to rethink our ideas in relation to the reviewers’ comments, learn from them, and submit a second time. We were successful the second time.

Our final approved ADVANCE-PAID proposal was a call to action to increase the capacity and improve the faculty recruitment practices of search committee members, administrators (including presidents, provosts, deans, and department chairs), and faculty members to recruit women into academic positions and to assure the mentoring and advancement of women faculty in chemistry and engineering departments at the AAFAWCE institutions.

PURPOSE AND LAYOUT OF THIS BOOK

This book is a primer on advancing academic women faculty in chemistry engineering, and other STEM fields. Through an NSF ADVANCE-PAID grant, our five Florida public universities collaborated with the same goals: to recruit women faculty, to mentor them, and to advance them to leadership positions in the academy and within their areas of scientific and engineering expertise.

In this first chapter we provide (a) a background that led us to apply for this collaborative grant, (b) a brief discussion of books on academic women in STEM departments that were critical in the development of our proposal and during our grant, (c) an institutional overview of the five universities involved in this collaborative grant and the critical need for the AAFAWCE, (d) the timeline of our activities, (e) a brief descriptions of the three focal areas, and (f) reflections on the AAFAWCE.

We include an Appendix 1-A of all activities for our AAFAWCE grant over the four years, organized by the acronym, -PAID, for Partnerships for Adaptation, Implementation, and Dissemination. Implementation has three subcategories: women faculty recruitment, women faculty mentorship, and women faculty leadership.
We indicate the university that took the leadership or co-leadership role, and the universities that collaborated on each activity.

To meet our goals we chose our team of academic women in STEM and social science fields, with one Principal Investigator (PI) and at least one Co-Principal Investigator (Co-PI) at each university. We had one overall Principal Investigator for the collaborative grant (Kathryn Borman for first three and a half years, followed by Sylvia Thomas for the last half a year). Team creation is essential to a successful ADVANCE grant. Two months into the grant, to organize and focus our efforts, we had a meeting with all PIs, Co-PIs, and some senior personnel in Tampa, the most central location and also home to our lead institution on the grant.

We described ways we used technology to develop a PowerPoint presentation to use during meetings with administrators and other university leaders to present effectively the goals of our grant and the plans to achieve them. We branded our Alliance with a logo that encompassed the state of Florida and developed joint press releases for each university (Tansel, 2014; chapter 2 in this book).

Since our grant was a collaborative NSF grant, which means that each university had its own budget and decision-making authority, we wanted to collaborate efficiently. We planned for some collaborative work while writing the grant, e.g., organizing for four collaborative workshops for participants from all five universities. We also had to think of ways to work together for collaborative support, including not having to “reinvent the wheel,” and in sharing resources, sharing products, and developing supportive frameworks (many were based using technology). We utilized cultural historical activity theory to frame our human activities, focused on achieving individual objects and joint outcomes, a process explicated in Chapter 3 (Gilmer & Martinez, 2014).

Data were essential to our grant development, our identification of strategies, and our assessment of progress, issues we discuss in Chapters 4 (Martinez, Hughes Miller, & Tyson, 2014) and 5 (Smith, 2014 in this book). We had gathered faculty demographics in the year before the grant started, continued annually during the four years, and designed the AAFAWCE Faculty Climate Survey (adapting one developed by the team at WISELI, 2006) and offered it on-line to faculty in chemistry, physics and engineering at all five universities. Using these data, we could focus on our joint institutional needs.

One of our principal findings from the AAFAWCE Faculty Climate Survey was the women faculty felt lonelier and not as connected to their departments as the men faculty. We heard women express this sense of loneliness directly in some comments at the first and second COACH workshops in the first and third year. Also we heard women faculty express their isolation in our mentoring programs on each university campus, in the third and fourth years of the grant.

Therefore, we expanded the original charge for our grant and conducted a qualitative study of 19 women faculty (some from each university) in the third year of the grant and got feedback from those interviewed. We present this study and its results in Chapter 5 (Smith, 2014) of this book.
We cover our three focus areas for the grant in separate chapters: recruitment (Fernandez, Popović, & Gilmer, 2014; chapter 6 in this book), mentoring and networking (Thomas, 2014; chapter 7 in this book), and leadership (Gilmer, Stokes, & Holbrook, 2014; chapter 8 in this book) of women faculty. For the two topics, recruitment and mentoring, we had an interinstitutional workshop on each topic with attendees from all five universities. For leadership, we had two interinstitutional COACh workshops.

Also we share ways we worked together on individual university campuses towards these goals. We provide more information on the workshops later in this chapter when discussing our three primary goals for the grant.

Finally we end this book by sharing lessons learned throughout our collaboration, and we make recommendations for future ADVANCE grant recipients, drawing on our collaborative experiences (Smith & Thomas, 2014; chapter 9 in this book).

Following each of the first eight chapters, Michelle Hughes Miller, our only editor who was not involved with the grant except for editing of the book, wrote a metaleologue for each chapter, indicating the lessons learned from her perspective of a sociologist and expert in gender studies, on each chapter.

KEY BOOKS ON WOMEN FACULTY IN STEM

Four books were instrumental in helping us shape our ADVANCE-PAID efforts. The National Academy of Science has two relevant books on women academic faculty in the sciences and engineering. The National Academy of Sciences’ Committee (2007) on Maximizing the Potential of Women in Academic Science and Engineering issued its first report, *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science, Engineering, and Mathematics Faculty*. This report argued that organizational structures and the rules that governed academic institutions were disadvantageous to the welfare and success of women in the ranks of the professoriate in engineering and the sciences. Not taking action was likely to be detrimental not only to the welfare of women scientists and engineers but also to the nation, now highly dependent on the full employment and inclusion of qualified women. This is particularly so in the fields of engineering and chemistry, the centerpiece of our program of work for this proposed project.

The second National Academy of Sciences book, *Gender Differences at Critical Transitions in the Careers of Science, Engineering and Mathematics Faculty* (2010) was published during the first year of funding of our AAFAWCE grant. The text provided an overview of two national surveys done in 2004 and 2005 of faculty and their academic departments, and organized the data in three domains: (a) academic hiring; (b) institutional resources and climate; and, (c) tenure and promotion.

In the proposal development stage and after funding, we were guided extensively by two additional books: (a) *Why So Slow? The Advancement of Women* (Valian, 1998), and (b) *Transforming Science and Engineering: Advancing Academic Women* (Stewart, Malley, & LaVaque-Manty, 2007a). Valian’s book is powerful in identifying
implicit biases and the literature that demonstrates these biases. The Stewart et al. edited book is valuable in that they highlight the most successful programs within the original ADVANCE-Institutional Transformation grants. We refer to these and other publications in the various chapters in this book.

INSTITUTIONAL OVERVIEWS

In this section we provide a brief overview of the five AAFAWCE institutions and the Colleges and departments that participated in our ADVANCE-PAID proposal. Founded in 1851, FSU is the oldest university in Florida; FSU is a comprehensive university with graduate, undergraduate, and professional programs, including medicine, enrolling more than 41,000 students. Founded in 1853, UF is the state’s most comprehensive university and its only public Association of American University. FAMU is a historically black college or university, founded in 1887 as the State Normal College for Colored Students. It shares its engineering programs with FSU. USF, founded in 1956, offers over 200 degree programs at the undergraduate, graduate, specialist and doctoral levels, including the doctor of medicine. Founded in 1972, FIU, the newest university within our collaborative, was Miami-Dade County’s first public, four-year university and is certified as a Hispanic-serving institution.

Despite differences among the collaborating universities, the AAFAWCE institutions shared similar problems in a number of areas:

– recruitment of female faculty in engineering and chemistry, particularly at junior and senior levels;
– retention of female faculty who depart for careers in industry or to academic settings elsewhere;
– dearth of women STEM academics in leadership positions in the academy; and
– employment of non-tenure track STEM faculty who are largely female.

Faculty Demographics Before Starting Our Grant

In Fall 2008, we collected the demographic faculty data from the chemistry departments and the colleges of engineering at all five of the AAFAWCE institutions to establish the baseline for the number of male and female tenured faculty members as the grant progressed.

Chemistry Departments

Figure 1-1 shows the actual numbers of tenured chemistry faculty by gender at the AAFAWCE institutions the year before the grant started. The highest percentage representations of female tenured faculty members of the total tenured faculty were at UF and FSU. The UF Department of Chemistry had 17 percent female, the same percent female as FSU’s Department of Chemistry and Biochemistry. The USF Department of Chemistry had 14 percent tenured women while FAMU’s Department
of Chemistry had 13 percent. FIU had the lowest representation of tenured women with only 4 percent.

**College of Engineering Departments**

Figure 1-2 shows the actual numbers of tenured engineering faculty by gender at the AAFAWCE institutions before the grant started. FAMU and FSU have a joint College of Engineering (COE) with 13% tenured faculty members of the total tenured faculty who were women (but only one was a full professor). The other three AAFAWCE institutions had representations of women tenured faculty in engineering below

![Figure 1-1. Number of tenured chemistry faculty by university and gender in Fall 2008. (before the AAFAWCE grant started): gray bars: men; black bars: women](image1)

![Figure 1-2. Number of tenured engineering faculty by university and gender in Fall 2008. (before the AAFAWCE grant started) gray bars: men; black bars: women](image2)
10%: UF COE had 6.9 percent women. FIU COE had 5 percent women. USF COE had 4 percent women.

As the data in Figures 1-1 and 1-2 indicate, we had very small numbers of tenured women faculty in both chemistry and engineering departments. We premised our collaborative proposal on the fact that we had an overwhelming need to increase the number and the percentage of women faculty across all five of the AAFAWCE institutions.

Prior Research on Faculty Issues at Two of Our Five Universities

Prior to the ADVANCE-PAID grant, only two of the AAFAWCE institutions, FSU and UF, had undertaken systematic studies of the conditions facing faculty across the colleges including engineering and the sciences.

The FSU report, *A Study of Climate and Practices Affecting Faculty at Florida State University* (FSU, 2002), yielded unsurprising results. First, the FSU COE reported the lowest percentage of female faculty at only 8 percent, and only 16 percent of Natural Sciences faculty members were women. In addition, only 31 percent of all women faculty held the rank of professor compared to 54 percent of all men faculty. Similar dismal findings characterized the condition of women in leadership positions, with women holding only 24 percent of academic leadership positions in academic units at FSU at that time. Clearly, the situation at FSU was not unique across the other AAFAWCE universities.

Beginning in 2004 and repeated in 2005 (UF, 2005) and 2007 (UF, 2007), UF had conducted a series of faculty climate surveys to assess faculty perceptions on a variety of campus issues. One question asked faculty to respond to the statement, “This University provides a working environment that is accepting of gender differences” and the percentage of favorable responses increased from 67 to 73 percent from 2004 to 2007 showing improvement in this area (UF, 2007) but leaving UF still below the 2004 national norm of 87 percent cited in the study.

Other UF survey measures on diversity showed little difference from 2004 to 2007, particularly on measures assessing support for recruiting a diverse faculty (57% positive both years) or that equal opportunity existed at UF (54% and 53% for 2007 and 2004, respectively). However, when disaggregated by gender without regard to discipline, women reported significantly more negative ratings than their male counterparts across diversity measures in 2007 (10% lower overall in 2007).

TIMELINE FOR ACTIVITIES

One of the first steps the AAFAWCE took at the beginning stages of the grant was to evaluate the needs of each university and create a timeline with activities, initiatives, and projects to be completed before the end of the grant. We had submitted a timeline with the grant, which we modified during the course of the grant. And, in the third year of the ADVANCE-PAID grant, the NSF approved a one-year, no-cost
DECIDING TO COLLABORATE AND SELECTING OUR STEM PROJECT

extension. The timeline below this text reflects the additional year, thus making a four-year timeline.

In the first year of the grant, we decided to include faculty in physics as well as in chemistry and engineering. We conducted an AAFAWCE Faculty Climate Survey at all five universities for faculty in these areas of specialty. Our work during the remainder of the four years focused on our alliance’s goals and an ongoing assessment of our progress.

As discussed in Chapters 4 (Martinez et al., 2014) and 5 (Smith, 2014) of this volume, we used demographic, survey and qualitative interview data to help us to identify our grant activities, to understand the experiences of women STEM faculty, and to evaluate our progress toward meeting our project goals. Each year, we collected faculty demographic data during the spring semester to allow ongoing comparisons with demographics from the previous spring, using the 2008 data (Figures 1-1 and 1-2) as our baseline. The grant Project Manager, Chrystal Smith, and support staff coordinated these efforts through USF.

Led by Will Tyson, a USF sociologist and member of the AAFAWCE team, we developed an AAFAWCE Faculty Climate Survey, modeling it on the University of Wisconsin-Madison ADVANCE-Institutional Transformation’s survey (WISELI, 2006). The purpose of the survey was to determine the climate for academic women in the departments of chemistry, physics, and engineering at the AAFAWCE institutions. We administered the AAFAWCE Faculty Climate Survey on-line and analyzed the results (Martinez et al., 2014; chapter 4 in this book). We had very few women STEM faculty in chemistry, physics and engineering departments at each university so we pooled the data from all five universities to protect anonymity of the faculty respondents (Martinez et al., 2014; chapter 4 in this book).

The AAFAWCE also conducted a qualitative study of academic STEM women faculty’s sense of isolation in the STEM disciplines, developed by Chrystal Smith at USF (Smith, 2014; chapter 5 of this book). Her study involved women STEM faculty at all five universities. We conducted this study in the third year of the grant.

With our data as a backdrop, to fulfill our project objectives we modified and adapted successful programs developed in the context of other ADVANCE-Institutional Transformation projects, specifically:

- recruiting women into the academic faculty,
- mentoring and networking of academic women faculty, and
- transforming careers of academic women via leadership workshops.

The AAFAWCE hosted many events related to these activities, such as Train-the-trainer recruitment workshop, the mentoring workshop, and two COACH workshops that faculty from all five universities attended. Each university also hosted its own mentoring, networking and leadership events. Using Harold Kroto’s Global Educational Outreach portal, we Web cast the recruitment workshop presented by the Committee on STRIDE (2010) from the University of Michigan, which we were allowed to broadcast within the AAFAWCE using our Blackboard site. In addition,
we video recorded or Web cast some other events and published them on the AAFAWCE Web site, open for anyone to view (AAFAWCE-Presentations, 2013). Throughout the grant, we created brochures, newsletters, and posters to document our accomplishments and promote upcoming events.

In the third year, the AAFAWCE started the development of this book to demonstrate the power of collaboration in our ADVANCE-PAID grant. Gilmer organized the book while attending the Big Ten Writing Workshop at the University of Nebraska, sponsored by ElsevierConnect (Wonch-Hill, 2013) and organized by their NSF University of Nebraska-Lincoln’s grant, ADVANCE-Nebraska (2013), an institutional transformation grant. Even though Gilmer was the only AAFAWCE team member to attend the writing workshop in Nebraska, attending it helped actualize the writing of this book. The AAFAWCE members continued the writing through the fourth year of the grant.

We had an external evaluator, Kathryn Scantlebury, from the University of Delaware for the entire collaborative grant. We cite examples of evaluations of workshops or panel discussions in the relevant chapters.

Table 1-1, below presents a timeline of our implemented activities including the collaborative AAFAWCE activities and activities on each campus.

<table>
<thead>
<tr>
<th>Program Activities</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fa 09</td>
<td>Sp 10</td>
<td>Fa 10</td>
<td>Sp 11</td>
</tr>
<tr>
<td>Collection of faculty demographics</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AAFAWCE Faculty climate survey</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Train-the-trainer Recruitment workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Train-the-trainer Mentoring workshop</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>COACH workshops</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AAFAWCE recruitment events</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AAFAWCE mentoring and networking events</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Research study on isolation of academic women in STEM disciplines</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Web casts of workshops prepared</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Writing this book</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Evaluation/Dissemination</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 1-1. Timeline of the AAFAWCE program activities
Appendix 1-A shows the interinstitutional and institutional activities we actually accomplished during the four years of the NSF ADVANCE-PAID grant.

OBJECTIVES MET THROUGH PROGRAMS IMPLEMENTED

As previously discussed, we implemented four workshops on the three focal areas (i.e., recruitment, mentoring, and leadership) based on effective programs designed by earlier NSF ADVANCE-Institutional Transformation grants. FSU hosted the first and third workshops on recruitment and leadership, and FAMU hosted the second and fourth workshops on mentoring and leadership (Table 1-2).

Table 1-2. Interinstitutional AAFWCE workshops

<table>
<thead>
<tr>
<th>Focus</th>
<th>Workshop</th>
<th>Host University</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment</td>
<td>AAFWCE’s Train-the-trainer Recruitment</td>
<td>FSU</td>
<td>Apr 9, 2010</td>
</tr>
<tr>
<td>Mentoring</td>
<td>AAFWCE’s Train-the-trainer Faculty Mentoring</td>
<td>FAMU</td>
<td>May 12-13, 2010</td>
</tr>
<tr>
<td>Leadership</td>
<td>COACH Workshop: COACHing Strong Women in the Power of Strategic Persuasion</td>
<td>FSU</td>
<td>Oct 22, 2010</td>
</tr>
</tbody>
</table>

At least two representatives from each of the five participating institutions attended each AAFWCE workshop. Since two of our five universities were located in the same city of Tallahassee, we saved travel funds by holding all AAFWCE interinstitutional, collaborative activities in this city. We briefly discuss these collaborative interinstitutional workshops we held for each of our three objectives (see Chapters 6, 7, and 8 of this book).

Recruitment of Women STEM Faculty

Objective 1: To assure the recruitment of women faculty in the sciences and engineering by providing opportunities, best practices and strategies for hiring women faculty in these areas.

Our first AAFWCE interinstitutional, collaborative workshop focused on the recruitment of women faculty in chemistry and engineering, modeled after programs developed at the University of Michigan (with its Committee on STRIDE) and the University of Wisconsin-Madison (with its WISELI team program). We
wanted a program to target the need for diversity with excellence in the sciences and engineering. These two recruitment programs focused on preparing search committee chairs, Deans, and department chairs with strategies and a rationale for broadening the reach of search committees to include a diversity of candidates, particularly women.

We invited Drs. Pamela Raymond and Katherine Spindler from the Committee on STRIDE from the University of Michigan’s ADVANCE-Institutional Transformation grant to provide a workshop during the first year of our AAFAWCE project. The Committee on STRIDE workshop included information on the “essential elements” of a successful search:

- run an effective and efficient search committee;
- actively recruit an excellent and diverse pool of candidates;
- raise awareness of unconscious biases and their influence on evaluation of candidates;
- ensure a fair and thorough review of candidates; and
- develop and implement an effective interview process.

The one-day workshop had two components, with the first half on the research studies that the Committee on STRIDE had developed for their approach, and the second half on ways they implemented their program effectively. The University of Michigan team had successfully recruited women STEM faculty over their five-year ADVANCE-Institutional Transformation grant (Stewart et al., 2007b).

The AAFAWCE team came away from the Committee on STRIDE workshop with the information and techniques required to successfully inform and persuade search committee members and administrators about the importance of diversifying faculty recruitment. The AAFAWCE team formed committees on their respective campuses (Fernandez et al., 2014; chapter 6 in this book) to tailor the Committee on STRIDE workshop to meet the needs of the senior faculty and administrators from their campuses. After piloting and revising the Committee on STRIDE workshop, we presented the AAFAWCE-sponsored workshops to senior faculty and administrators involved in the hiring of faculty in the STEM departments on each university campus.

The FSU team developed workshops called Faculty Recruitment for Excellence and Diversity (FRED) for the National High Magnetic Field Laboratory in Tallahassee (and later for their branch in Los Alamos) for their faculty and staff recruitment, as their employees were mainly chemists, physicists, and engineers (Fernandez et al., 2014; chapter 6 in this book).

Retention of Women Faculty by Mentoring and Networking

Objective 2: To assure the retention of women faculty in the sciences and engineering, the AAFAWCE provided opportunities, infrastructure, and resources for mentoring and networking assistant and associate women STEM professors.
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The second component of our AAFAWCE grant involved the mentoring and networking activities for the assistant and associate women professors as well as the non-tenure track women faculty in STEM departments. We chose to include associate professors, because, although they are typically tenured by that point in time, they may remain at the rank of associate professors and not advance further to become full professors and academic leaders (Buch, Huet, Rorrer, & Roberson, 2011).

To facilitate the mentoring and networking processes, we relied upon the practices established by the successful University of Texas-El Paso (UTEP, n.d.) program designed and modified by Posey, Reimers, and Andronicos (2007). As an example, the UTEP team had learned the importance that:

– protégés select their mentors;
– mentors include some faculty from outside the protégé’s academic department;
– male mentors are as effective as female mentors for women protégés; and
– mentors and protégés are effective in working in teams.

The UTEP provided mentoring and networking experiences for women as a part of their program to enhance the success of women in gaining promotion and tenure (Posey et al., 2007). The goals of the UTEP program included providing women STEM faculty with (a) resources and information promoting the academic enterprise, (b) opportunities to network, (c) guidance with work-life balance issues, and (d) ideas for new faculty women in the art of managing relationships with colleagues.

Because academic culture encourages independent research, especially during the tenure-earning years, many new women faculty feel isolated and removed from other faculty, staff, and administrators as they develop a research agenda. The UTEP plan encourages breaking patterns of academic isolation by including both a period of advising/coaching/ and mentoring over the course of 18 months and the opportunity for mentors and their protégés to meet for lunches and seminars to discuss on-going research activities.

The AAFAWCE representatives came away from the UTEP training ready to form faculty committees on their individual campuses to develop a mentoring and networking program tailored to the needs of their women faculty. At FSU this committee presented topics chosen with the guidance of survey results at mentorship workshops held twice a semester during the academic years.

Subsequently in years three through four, we invited tenure-earning and tenured associate professor women faculty and non-tenure track women faculty to participate in the program as protégés, and both male and female senior, full professor faculty members to serve as mentors. Mentoring and advising of the participants over years three and four of the program occurred through a variety of the AAFAWCE-sponsored events including workshops, presentations, discussion panels, team mentoring, speed mentoring, and luncheons.

Donna Dean, Past President of the Association for Women in Science, presided at our kickoff mentoring and networking workshops at both USF and FSU. The ideas presented in Dean’s book, Getting the Most out of Your Mentoring Relationships:
A Handbook for Women in STEM (Dean, 2009) guided our workshops. At FSU, all attendees received a copy of the book, and the FSU AAFAWCE team invited tenure-track assistant professors, non-tenure track faculty, and tenured associate professor female faculty as protégés to join the AAFAWCE mentoring network.

We found that many of our protégés had not been either formally or informally mentored—they were left in the margins of male-dominated STEM departments. Our goal over the third and fourth years of the ADVANCE-PAID grant was to involve 20-30 protégés on each university campus in our mentoring work. Thomas (2014; chapter 7 in this book) shares the details on the mentoring and networking program.

Our grant started right near the end of the recession, but state funding for public universities only started to increase right at the end of our four years with the grant. During our grant we had fewer new assistant professors starting than usual for the four years of our grant. Only now at the end of the four years is the hiring getting back on track.

Promotion of Leadership Among Women STEM Faculty

Objective 3: To increase the number of academic women in chemistry, physics, and engineering, capitalizing on their skills for career advancement and the attainment of leadership positions.

The AAFAWCE provided an outlet for COACH (2013) to disseminate their model for transforming the careers of chemists, physicists, and engineers for the women faculty of all five of the AAFAWCE universities. FSU and FAMU hosted the complementary COACH workshops in the fall of 2010 and spring of 2012, respectively. COACH provided professional workshops to sharpen skills in managing academic careers and served as a complement to UTEP’s mentoring program. Chemistry, physics, engineering, and other interested women STEM faculty members from each institution attended the workshops. The workshops provided attendees with the negotiating and leadership skills important for career advancement and effective social networking.

In years three and four of the grant, the AAFAWCE inserted COACH leadership concepts into the mentoring programs for women in chemistry, physics, engineering and in other STEM disciplines, particularly for those women who were motivated and interested in advancing into academic leadership positions or into scientific or engineering leadership positions.

We included faculty in all the sciences and engineering in our program of activities, when possible. We were pleased to note that some eligible women faculty became promoted and some undertook leadership positions in research or in the academy following COACH and mentoring activities. We prepared assistant professor protégés to transition into the promotion and tenure processes, and we worked with associate and full professors for advancement and into academic leadership roles at their respective universities and in their science and engineering.
disciplines. We also facilitated the advancement of non-tenure track women faculty. Our goal in promoting leadership was originally to realize the appointment of at least three women into academic leadership positions on each participating campus (Gilmer et al., 2014; chapter 8 in this book). Chapters 6-8 discuss in more detail our grant activities in each of these project areas. In the implementation section of Appendix 1-A are the details of the activities we enacted.

**REFLECTIONS ON THE AAFWCE**

Not only did we study women but also we lived the lives of women academics. We collaborated and understood each other’s issues in life and jobs, and we shared certain sensitivities to these issues. Prompted by USF Vice President for Global Affairs Karen Holbrook and FSU Provost and Executive Vice President for Academic Affairs Garnett Stokes’ ideas in the panel presentations at the *Celebration of STEM Women* at USF, our themes for the women and their lives included raising children, caring for aging parents, attending to one’s health, and encouraging each other’s careers.

We also learned considerably from the mentoring and networking programs and leadership programs at USF, FSU and UF on the meaning of being an academic woman in STEM fields and the challenges women face both inside and outside of their departments and colleges.

One goal we had was not to lose a single woman faculty member during the entire project, although some women full professors did retire. We did not reach that goal, but we did see new women in leadership roles, promotions of women assistant professors to associate professors, and women associate professors to full professors. We also experienced leadership development for academic women in their fields of science and engineering and for women into academic leadership positions.
APPENDIX

Appendix I-A. List of the AAFAWCE activities for the four years of the ADVANCE-PAID grant (September 2009-August 2013). Dark grey shading indicates interinstitutional AAFAWCE programs with all five institutions while light grey shading indicates programs and activities at individual universities. Abbreviations: C = collaborator; Lead = leader; Co-lead = co-leader; on activities.

<table>
<thead>
<tr>
<th>Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida</th>
<th>External Partner</th>
<th>USF</th>
<th>FSU</th>
<th>FAMU</th>
<th>FIU</th>
<th>UF</th>
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</thead>
<tbody>
<tr>
<td>1. Adaptation</td>
<td>ADVANCE-PAID NSF Grant Preparation &amp; Submission (Spring 2009)</td>
<td>U Michigan’s Committee on STRIDE, ADVANCE-Institutional Transformation Grant WISELI team UW-Madison</td>
<td>Lead</td>
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<td>1. Development of survey (Fall 2009)</td>
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<td>2. Distribution of survey (Spring 2010)</td>
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<td>3. Analysis of survey (Summer 2010)</td>
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<td>Interviews of STEM Women on Isolation</td>
<td>AAFAWCE PI Meetings</td>
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<td>1. AAFAWCE PI meeting in Tampa (Dec 2009)</td>
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<td>2. AAFAWCE PI meeting before Recruitment Practices Workshop (Apr 2010)</td>
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<tr>
<td>3. AAFAWCE PI meeting before Mentoring Workshop (May 2010)</td>
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<tr>
<td>4. AAFAWCE PI meeting in Tallahassee before 1st COACH Workshop (Oct 2010)</td>
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### Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida

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<tr>
<th>Event Description</th>
<th>Lead</th>
<th>Co-Lead</th>
<th>C-C</th>
<th>C-C</th>
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<tbody>
<tr>
<td>5. AAFAWCE PI meeting at FSU, on ADVANCE-INSTITUTIONAL TRANSFORMATION proposal (Sep 2011)</td>
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<td>C-C</td>
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<tr>
<td>6. AAFAWCE PI meeting before 2nd COACH Workshop (Feb 2012)</td>
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#### II. Implementation

**A. Women Faculty Recruitment**

1. University of Wisconsin-Madison, WISELI team workshop on recruitment of academic STEM women and meet their leadership team University of Wisconsin-Madison WISELI Lead

2. University of Michigan’s Committee on STRIDE, “Train-the-trainer Faculty Recruitment workshop” at FSU (Apr 2010) Pamela Raymond & Katherine Spindler University of Wisconsin-Madison WISELI Lead

3. Reports for Project Background & Development University of Wisconsin-Madison WISELI Lead

4. Posting resources on BlackBoard U Michigan Committee on STRIDE’s list of references on STEM women Lead

(Continued)
### Appendix 1-A. Continued

<table>
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<th>Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida</th>
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<tr>
<td>5. Attend AAAS annual meeting presentation on this report</td>
<td>Dual-Career Academic Couples: Need to Know</td>
<td>Lead</td>
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<td>6. Share report with department chairs &amp; Provost</td>
<td>Lead</td>
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<tr>
<td>AFAWCE Recruitment PowerPoint presentation</td>
<td>Adapted from University of Michigan’s Committee on STRIDE</td>
<td>Co-Lead</td>
<td>Co-Lead</td>
<td>C</td>
<td>Lead</td>
<td>C</td>
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<tr>
<td>1. Presented to department chairs, deans &amp; provosts (2010)</td>
<td>Lead</td>
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<td>3. Presented at faculty meeting in Chemistry &amp; Biochemistry (Oct 2012)</td>
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<td>USF Recruitment Practices Booklet</td>
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<td>1. Campus-wide Information Sessions</td>
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<td>2. Train-the-trainer at individual institutions</td>
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<td>3. Administrators</td>
<td>Co-Lead</td>
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<td>4. Human Resources</td>
<td>Co-Lead</td>
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<td>5. College of Arts &amp; Sciences</td>
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<td>6. Title IX Committee</td>
<td>Lead</td>
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<td>7. Search Committee Members</td>
<td>Co-Lead</td>
<td>Lead</td>
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<tr>
<td>8. Faculty Search Committee Meetings</td>
<td>Co-Lead</td>
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DECIDING TO COLLABORATE AND SELECTING OUR STEM PROJECT

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<tr>
<td><strong>9. Faculty Recruitment Processes Study</strong></td>
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<td>10. Presentation to Society for Applied Anthropology, Seattle, WA</td>
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<tr>
<td>Faculty Recruitment for Excellence and Diversity (FRED) Workshops at National High Magnetic Field Laboratory (NHMFL)</td>
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<tr>
<td><strong>1. FRED at NHMFL in Tallahassee (May 2011)</strong></td>
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<td><strong>2. FRED at NHMFL in Tallahassee (Jul 2011)</strong></td>
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<td><strong>3. FRED at NHMFL in Tallahassee (Mar 2012)</strong></td>
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<tr>
<td><strong>4. FRED at NHMFL in Tallahassee (Nov 2012)</strong></td>
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<tr>
<td><strong>5. FRED at NHMFL at Los Alamos National Laboratory (Mar 2013)</strong></td>
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<td>FSU Recruitment &amp; Retention Subcommittee of Diversity &amp; Inclusion Initiative</td>
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<tr>
<td><strong>UF Tool Kit</strong></td>
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<tr>
<td><strong>1. Development of UF Toolkit</strong></td>
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<td><strong>2. Use of UF Toolkit as model to develop on-going program at FSU</strong></td>
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<tr>
<td>FSU Recruitment &amp; Retention Subcommittee of Diversity &amp; Inclusion Initiative</td>
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<td><strong>B. Women Faculty Mentorship</strong></td>
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### Appendix 1-A. Continued

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<td><strong>AAFAWCE Networking</strong></td>
<td>Tine Reimers, University of Texas-El Paso</td>
<td>Lead</td>
<td>Lead</td>
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<td>AAFAWCE’s Train-the-trainer Faculty Mentoring workshop at FAMU (UTEP’s program) (May 2010)</td>
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<td>1. UTEP practices &amp; findings</td>
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<td>2. Mentees select mentors</td>
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<td>3. Mentors outside mentee’s department</td>
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<td>4. Train-the-trainer</td>
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<td>5. Tenure-earning female faculty as protégés</td>
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<td>6. Tenured associate professor faculty as protégés</td>
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<td>7. Full professors as mentors</td>
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<td>8. Women administrators and leaders</td>
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<tr>
<th>USF Mentoring Events</th>
<th>Dwayne Smith</th>
<th>Howard Adams</th>
<th>Kelly Ward</th>
<th>Donna Dean</th>
<th>Garnett Stokes (FSU); Jacqueline Dixon, Karen Holbrook, &amp; Karen Liller (USF)</th>
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<tbody>
<tr>
<td>1. USF Paid Parental Leave presentation (Apr 2011)</td>
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<td>2. USF Mentoring &amp; Professionalism Within Professoriate (Nov 2011)</td>
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<td>3. USF Academic Careers &amp; Motherhood: A Negotiable Road (Nov 2011)</td>
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<td>4. USF Mentoring and Networking Women STEM Faculty (Feb 2012)</td>
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<td>5. USF Speed Mentoring (Apr 2012)</td>
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<td>6. USF Academic Women Leadership Discussion Panel (Oct 2012)</td>
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<td>Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida</td>
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7. **USF ADVANCE-PAID**

Celebration of STEM Women with lunch (Apr 2013)  Lead

**FSU Mentoring Events**

1. FSU Mentoring & Networking Women STEM Faculty with Donna Dean (Feb 2012)  Donna Dean  Lead

2. FSU Mentoring & Networking with Women STEM Faculty (April 2012)  Garnett Stokes  Lead

3. FSU Mentoring & Networking Women STEM Faculty with Luncheon at Seminole Golf (June 2012)  Lead

4. FSU Mentoring & Networking Women STEM Faculty with Panel on Leadership by Women Full Professors (Aug 2012)  Hong Li, Laura Reina, & Lisa Spainhour  Lead

5. FSU Speed Mentoring Women STEM Faculty (Oct 2012)  Lead

6. & 7. FSU Mentoring & Networking Women STEM Faculty with Two Panels on Advancement & Promotion of Academic Women (Feb 2013)  Rufina Alamo, Bill Cooper, & Anke Meyer-Baese; Lisa Spainhour, Joseph Schlenoff, & Garnett Stokes  Lead

8. **FSU ADVANCE-PAID**

Celebrates Mentors and Protégés with panel on “Lessons Learned” and lunch (Apr 2013)  Yan Li, Laura Reina, & Penny J. Gilmer  Lead

**FIU Mentoring Events**

1. FIU College-wide initiative for mentoring & collaborative work (2013)  Lead

(Continued)
**Appendix 1-A. Continued**

**Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida**

<table>
<thead>
<tr>
<th>Event Description</th>
<th>External Partner</th>
<th>USF</th>
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<tr>
<td>2. FIU formed a team for Women in Transportation Practice &amp; Research in University</td>
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<td>Transportation Center</td>
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<td>3. FIU participated in discussions on Women in Practice: Environment and Water Resources with American Society of Civil Engineering, Environment &amp; Water Resources</td>
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**UF Mentoring Events**

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<tr>
<td>1. UF Mentor-Mentee Panel &amp; Luncheon (Sept 2011)</td>
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<td>2. UF Mentor-Mentee Panel &amp; Luncheon (Apr 2012)</td>
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<td>3. UF Mentor-Mentee Panel &amp; Luncheon (Nov 2012)</td>
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<td>4. UF Mentor-Mentee Panel &amp; Luncheon (Mar 2013)</td>
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<td>5. UF Literature Review: Adopting a Mentoring Program (July 2013)</td>
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**C. Women Faculty Leadership**

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<tbody>
<tr>
<td>1. AAFAWCE COACH workshop, ”COACHing Strong Women in the Power of Strategic Persuasion” at FSU (Oct 2010)</td>
<td>Jane Tucker &amp; Barbara Butterfield</td>
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<tr>
<td>2. Meet-and-Greet (faculty + grad students &amp; postdocs)</td>
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(Continued)
### Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida

| 3. Two Women STEM Leadership Panels | Cammy Abernathy (UF), Susan Blessing (FSU), Penny J. Gilmer (FSU), Simone Peterson Hruda (FAMU), Lisa McElwee-White (UF), Suzanna Rose (FIU), Sylvia Thomas (USF), & Lisa Spainhour (FSU) | Co-Lead | Co-Lead | Co-Lead | Co-Lead |
| 4. FSU Marie Curie Centennial Celebration (Nov 2011) | Julie Des Jardins | Lead |
| 5. AAFAWCE COACH workshop, "Uses of Influence, Power and Conflict Resolution in Negotiation" at FAMU (Feb 2012) | Barbara Butterfield & Jane Tucker | C | C | Lead | C | C |
| 6. UF Webinar of NSF Grant Writing Workshop (May 2013) | Tanya Pietrass, NSF Deputy Division Director | Lead |
| 7. FIU formed a team for Women in Transportation Practice and Research in University Transportation Center | Lead |

### III. Dissemination

#### GEOSET or Vimeo

- 1. GEOSET Webcast on AAFAWCE project (Mar 2010) | Lead | (Continued)
## Appendix 1-A. Continued

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<th>Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida</th>
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<tr>
<td>2. GEOSET Web cast Faculty Recruitment Workshop (Apr 2010)</td>
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<tr>
<td>3, 4, &amp; 5. GEOSET Web cast on research of three FSU Women STEM Faculty (2010)</td>
<td>Penny Gilmer, Susan Latt Turner, &amp; Amy Sang (all FSU)</td>
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<td>Lead</td>
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<tr>
<td>8. Vimeo Web cast on Mentoring &amp; Professionalism within the Professoriate (Nov 2011)</td>
<td>Howard Adams</td>
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<td>Lead</td>
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<td>10. GEOSET Web cast on Mentoring &amp; Networking Women STEM Faculty with Panel on Career Development Workshop by Full Professors (Aug 2012)</td>
<td>Hong Li, Laura Reina, &amp; Lisa Spainhour (all FSU)</td>
<td></td>
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<tr>
<td>12. GEOSET Web cast FSU Mentoring &amp; Networking Women STEM Faculty with Panel on Advancement &amp; Promotion of Academic Women (Feb 2013)</td>
<td>Rufina Alamo, William Cooper, III, &amp; Anke Meyer-Baese</td>
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### Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida

13. GEOSET Web cast FSU
Mentoring & Networking
Women STEM Faculty with
Panel on Advancement &
Promotion of Academic Women
(Feb 2013)

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<th>External Partner</th>
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<th>FAMU</th>
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<td>Joseph Schlenoff, Lisa Spainhour, &amp; Garnett Stokes</td>
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<td>Tanya Pietrass, NSF</td>
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14. UF Web cast of NSF Grant Writing Workshop (May 2013)
Deputy Division Director

| Lead |

#### AAFAWCE Web site

1. USF AAFAWCE Web site for entire grant

| Lead | C | C | C | C |

2. FAMU AAFAWCE Web site for FAMU

| Lead |

#### AAFAWCE advertised on campuses

1. AAFAWCE Project Presentations (Spring and Fall 2010)

| C | C | Lead | C |

#### Newsletters & other print products

1. AAFAWCE three newsletters

| Co-Lead | Co-Lead | C | C | C |

2. AAFAWCE Project Brochure

| Lead | Co-Lead | C | C | C |

3. AAFAWCE Project Posters

| Lead | Co-Lead | C | C |

#### Conference attendance, posters, & presentations


| Lead | C | C | C | C |

2. NSF Joint Annual Meeting (Jun 2010)

| Lead | C |

3. NSF Joint Annual Meeting (Jun 2011)

| Lead | C |

4. NSF Joint Annual Meeting (Jun 2012)

| Co-Lead | Lead | C |

(Continued)
### Partnerships for Adaptation, Implementation, and Dissemination (PAID) in Florida

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<td>Book: Alliances for Advancing Academic Women</td>
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<td>1. Senior editor visiting with authors (Jun 2012)</td>
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<td>2. AAFAWCE Writing Retreat (Dec 2012)</td>
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<td>5. Editing book</td>
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<td>8. Constructing photo collage &amp; book cover</td>
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<td>9. Final editing</td>
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<td>Writing NSF annual reports (2010-2013)</td>
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Sacrificing at the altar of tenure: Assistant professors’ work/life management. The Social Science Journal, 48(2), 335–344.


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1. MÉTALOGUE

Deciding To Collaborate and Selecting Our Project

In this descriptive chapter, Gilmer and Borman (2014) detail the foundations of the ADVANCE-PAID activities. Reflecting on this chapter as someone who was not part of the grant work I can identify three separate lessons learned that I will take with me into future grant collaborations.

FOUNDATIONS

The collaboration was successful in part because it began well before the work of the grant started. Prior research activities, existing relationships, and research on best practices used by other ADVANCE initiatives all were foundational to your efforts.

COMMONALITIES VS. DIFFERENCES

Recognizing commonalities among institutions in terms of low numbers of female science, technology, engineering, and mathematics (STEM) faculty or administrators does not preclude also recognizing the differences in institutional culture, knowledge and support among members of the collaboration. Institutions did not start at the same stage of readiness, despite common issues. For instance, two of the five institutions had already begun identifying faculty climate issues, leaving them free to use those data to target their interventions at the start of the grant.

INTERINSTITUTIONAL AND INTRAINSTITUTIONAL COLLABORATIONS

While each institution established its own team structure, initiatives and timelines, it was imperative that each campus team also commit to working collaboratively with the whole to ensure the AAFAWCE’s efficiency. Scheduling the Year One activity as shared training on recruitment and on mentoring from which you could then build your independent efforts reflected this emphasis on efficiency and solidified the collaboration. Year Two activities included shared training on leadership. Year Three had the second shared leadership workshop. Any modifications you made independently to reflect your institution’s specific needs could then easily be shared with others using the Web platform and frequent communications. This process allowed each partner to learn from the others as you developed, implemented, and assessed your own activities.
M. HUGHES MILLER

Not only did we study women but also we lived the lives of women academics. (Gilmer & Borman, 2014; chapter 1 in this book, p. 17).

Feminism has long struggled with questions of commonality and difference, with scholars debating whether shared power and knowledge comes from common experiences, or whether our differences strengthen our capacity for change through our diversity. Gilmer and Borman broach that same subject in this chapter, encouraging us to consider strength as emanating from both sources: common concerns about the dearth of women in STEM at their institutions and yet clear differences in the campuses’ resources, experience, and institutional readiness to embrace social change. Here, each campus had its own challenges meeting the collective goals, but within the collaboration this diversity allowed innovation and shared learning. Most poignantly, the authors acknowledge that their lived experiences as women in STEM-- as diverse as those experiences were-- provided insight and incentive that facilitated their shared efforts to meet the project’s goals.

REFERENCE


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2. FOCUSING COLLABORATIVE ACTIVITIES FOR WOMEN STEM FACULTY

The Alliance for the Advancement of Florida’s Academic Women in Chemistry and Engineering (AAFAWCE) includes faculty from the Colleges of Engineering and Departments of Chemistry at five participating institutions: the University of South Florida (USF), Florida State University (FSU), Florida Agricultural and Mechanical University (FAMU), the University of Florida (UF), and Florida International University (FIU). Most face similar problems in a number of areas in recruiting, retaining and promoting women faculty. These problems include:

– inadequate recruitment of women faculty candidates in engineering and chemistry, at both junior and senior levels,
– overrepresentation of women faculty in non-tenure track positions, and
– failure to retain and advance academic women faculty.

To address these concerns, team members developed initial strategies to construct the mission statement, identify the focus areas, and define the specific goals for each focus area. The initial strategies included identification of the common as well as institution-specific challenges and areas to address, including when shared activities and learning from each other could be utilized. The result was shared products that established the AAFAWCE as a collaborative entity working within and across university campuses on behalf of women faculty in chemistry and engineering.

IDENTIFYING INITIAL TASKS AND COMMUNICATION FORMAT

Immediately after the initiation of the project, the AAFAWCE team began to hold weekly conference calls with the representatives from the five collaborating Florida universities to maintain an on-going active discussion forum, to exchange ideas, and to discuss and plan project activities. These weekly meetings were an essential element in developing and strengthening the partnership and coordinating the collaborative efforts (Gilmer & Martinez, 2014; chapter 3 in this book). The telephone meetings served as a forum to discuss existing and potential challenges at each campus, provide ideas for successfully completing the necessary tasks, sharing experiences, and planning for future activities.
Also, within two months of the grant starting, the AAFAWCE decided to hold a face-to-face meeting to facilitate interaction and bonding between team members. During this first face-to-face meeting we established essential components of the program and developed a roadmap.

**DEFINING OUR PROJECT**

*Defining the Mission*

The AAFAWCE had as its primary goals and objectives the recruitment of women faculty, mentoring and networking of academic women at the assistant and associate professor levels, and the promotion of leadership among academic women. Based on these primary goals, the AAFAWCE developed a mission statement to guide the project activities at the participating institutions. At our first face-to-face meeting of the representatives from each institution, we refined our mission statement for the AAFAWCE from that originally submitted with the grant proposal, as follows:

The mission of the AAFAWCE is to increase the representation and promote the advancement of academic women in chemistry and engineering, thereby developing a more diverse science and engineering workforce.

*Developing the Logo and Banner*

One of the first tasks of the AAFAWCE was to develop a recognizable logo to be used in all correspondence, announcements, posters, and any other materials that would be used for dissemination purposes. It was important for the AAFAWCE to create a logo that would provide a unified connection among the five universities as well as branding of the activities. We developed several preliminary designs to initiate the discussions and ideas (Figure 2-1). Based on these preliminary designs and discussions, the representatives from each institution developed the initial criteria and essential components for the logo as follows:

- logo should have a map showing the locations of the participating institutions within the state of Florida,
- logo should include the full name of the AAFAWCE, spelled out, and
- color scheme should be easily recognizable,

Based on these designs, our team members provided input for improvements and voted to approve the final design (Figure 2-2).

We also developed the AAFAWCE banner that included the map of the state of Florida from the logo and the name of our organization (Figure 2-3).

*Establishing the Project Web Site and Communication Portal*

We established a communication platform for keeping records of correspondence and documents early in the process. The AAFAWCE team used email and the FSU
Blackboard site (a common, private platform for document sharing, discussion boards, email, and evaluation surveys) to communicate, share documents, and provide history of our activities for the external evaluator and us. In addition, we developed a reference list and hyperlinks to books and research articles on women
in the sciences and engineering focused on the AAFAWCE’s goals and placed them on the Blackboard Web site for easy access by the AAFAWCE team. Team members regularly updated the reference list, adding new resources, making the AAFAWCE Web site and the Blackboard the essential information portals for the AAFAWCE collaborative team for providing updates on project activities, announcements of upcoming events, and relevant resources.

ANNOUNCING THE PROGRAM

The AAFAWCE developed the text to be used by each institution for press releases (Figure 2-4). Using the press release template, each institution developed a press release emphasizing its role in the AAFAWCE.

Figure 2-4. Sample AAFAWCE press release.
FOCUSING COLLABORATIVE ACTIVITIES FOR WOMEN STEM FACULTY

DEFINING AND REFINING THE GOALS

Identifying Major Problems to Advancement

The main obstacles for the advancement of women in science, technology, engineering and mathematics (STEM) fields included the following:

- proportionately fewer women than men in the applicant pools for tenure-track faculty positions,
- limited support for women to advance in academic careers, and
- no mechanisms to promote leadership among women faculty in chemistry and engineering.

To address the common problems at the partnering universities and to accomplish the goals of the AAFAWCE, we identified four key project focus areas (Figure 2-5), for recruitment, leadership development, mentoring and networking, and a baseline assessment of conditions at all five campuses, via the AAFAWCE Faculty Climate Survey.

Unlike research grants, the grant proposals for institutional changes are often not definitive in terms of tasks, applicability for different institutions, and implementation strategies. The team members agreed on the following overarching goals:

- implementing strategies for recruiting women in academic faculty searches,
- transforming careers via leadership workshops,
- networking and mentoring academic women faculty at the assistant and associate professor levels, and
- identifying issues related to recruitment, mentoring, the tenure process, and leadership for advancing women through the AAFAWCE Faculty Climate Survey.

Figure 2-5. The AAFAWCE project activities.
Recruitment Activities

Proportionately fewer women than men were in the applicant pools for tenure-track faculty positions. We believed that actively recruiting and working with search and screening committees could help to overcome this deficit. To assure the recruitment of women faculty in the sciences and engineering, the AAFAWCE agreed to provide each individual university campus with the opportunities, best practices and strategies it needed for the hiring of women faculty. Key participants from all of the AAFAWCE institutions would attend an initial Train-the-trainer workshop at a central location and later conduct workshops at participating campuses for search committee chairs, administrators, faculty and human resource staff to begin incorporating these practices into the framework of each institution’s practices (Fernandez, Popović, & Gilmer, 2014; chapter 6 in this book).

Best Recruitment Practices presentations would highlight proven strategies and methodologies, including running an effective and efficient search committee; actively recruiting an excellent and diverse applicant pool; and raising awareness of unconscious biases and their influence on the evaluation of candidates.

Mentoring and Networking

To assure the retention of women faculty in the sciences and engineering the AAFAWCE agreed to provide each participating campus with the opportunities, infrastructure, and resources required for the mentoring and networking opportunities to women assistant and associate professors. The AAFAWCE would accomplish this through workshops, AAFAWCE forums, and an AAFAWCE mentoring network (Thomas, 2014; chapter 7 in this book).

To facilitate the mentoring and networking processes, we would rely upon the practices established by the successful University of Texas-El Paso (UTEP, 2013) ADVANCE-Institutional Transformation program (Posey, Reimers, & Andronicos, 2007). As an example, the UTEP team learned that it is important for:

- protégés to select their mentors,
- mentors be faculty from outside the protégé’s academic department, and
- male mentors as well as female mentors should be considered, as they have been proven to be equally effective.

We agreed to promote and encourage both male and female faculty to mentor the academic women, especially those who were newer to the academic work environments. Initial implementations would begin with a Train-the-trainer workshop, in line with UTEP’s ‘breaking patterns of academic isolation’ during the first year of the grant. Subsequently, in years two through four, tenure-earning female faculty and some tenured associate professors would be invited to participate in the program, matching these women with senior faculty.
Leadership Workshops

To promote leadership among women faculty in chemistry and engineering, the AAFAWCE agreed to provide COACH leadership workshops (COACH, 2013) in grant years 2 and 3 for women in chemistry, engineering and other STEM disciplines, particularly for those women from all five institutions who were motivated and interested in advancing into academic or discipline-specific leadership positions. These workshops provided networking opportunities for participants from different institutions. The workshop also provided guidance to capitalize on the skills necessary for the management and advancement of academic careers, by cultivating the AAFAWCE participants and preparing them to transition into positions of leadership and the final phase of the tenure process at their respective universities (Gilmer, Stokes, & Holbrook, 2014; chapter 8 in this book).

AAFAWCE Faculty Climate Survey

The AAFAWCE Faculty Climate Survey was a social science research component of the project. This task would involve the use of faculty climate surveys to examine factors that influence faculty satisfaction with recruitment, mentoring and leadership advancement efforts at each institution (Martinez, Hughes Miller, & Tyson, 2014; chapter 4 in this book).

The primary goal of this research agenda was to examine ways that ethnicity, gender, and tenure status influence how faculty experienced recruitment, mentorship, and leadership. Faculty would be recruited to participate in this survey through e-mails from the project team with additional encouragement from college deans and department chairs from engineering and chemistry programs at each university.

The central research questions guided this research agenda:

- how do male and female faculty members differ in their perceptions of faculty recruitment and mentoring practices in their departments?
- how do the values of female non-tenured faculty influence overall satisfaction, as they pertain to recruitment, mentoring, and support in the tenure process?

Primary analyses of the survey responses used descriptive analyses and tests of association such as t-tests and ANOVA to determine the significant effects of gender and other potential causal factors on perceptions of faculty recruitment, mentoring and leadership advancement (Martinez et al., 2014; chapter 4 in this book).

IDENTIFYING KEY PARTICIPANTS

To assure the program activities would be conducted effectively, the AAFAWCE identified key members for execution of specific goals. These groups are included in Figure 2-5.
Search Committee Members

Recruitment of women faculty starts with faculty search committees. As a result, the team agreed to develop strategies to increase awareness among the members of search and screening committees about underrepresentation of women in chemistry and engineering disciplines (Fernandez et al., 2014; chapter 6 in this book).

Administrators

Administrators play a significant role in increasing awareness on the issue of diversity of the faculty and by providing resources for implementation of the campus-specific activities. Also administrators can set the tone for campus activities by being involved and setting an example by their actions.

The team identified the following immediate needs to be requested from the deans and administrators at each participating institution:

- recognition of faculty,
- recommendations for members of Recruitment Committee,
- recognition of faculty mentoring training and participation,
- institutional promotion and support of recruitment training activities,
- institutional promotion and support of mentoring training activities,
- institutional promotion and support of leadership training activities, and
- administration participation in (and attendance at) recruitment, mentoring, and leadership activities.

Faculty

Faculty members served as mentors and protégés during the project activities. Faculty members interviewed prospective faculty for tenure-track positions in departments. Faculty also presented at panel discussions for the mentoring program. Faculty led others within their departments and colleges. It was important to recruit both male and female faculty as mentors. There were often very few senior female or other underrepresented faculty who were willing or able to serve as mentors.

Effective forms of mentoring can include collective mentoring in which a group of faculty takes responsibility for guiding junior faculty, formal mentoring in which a senior faculty member is assigned to junior faculty member, peer mentoring in which faculty members provide guidance and feedback based on their experiences, or paper mentoring with practical how-to guidelines provided (University of Rhode Island, 2005).

Human Resources

The human resources office on each campus played a major role in recruitment and retention of women in faculty and administrative positions. The human resources
office coordinated all hiring activities, developed policies and guidelines for search and screening committees, conducted programs for new faculty orientation, and provided services related to employee-supervisor conflict resolution.

IDENTIFYING CAMPUS-SPECIFIC ACTIONS

The AAFAWCE agreed collaboratively to implement both shared and campus-specific activities. The objectives of the AAFAWCE project (Gilmer & Borman, 2014; chapter 1 in this book) would be implemented through:

- adapting strategies previously developed by the NSF ADVANCE-Institutional Transformation grant awardees to a statewide consortium of universities in Florida,
- forming collaborative networks between the five institutions to create a “critical mass” of academic women in chemistry and engineering,
- conducting campus-specific recruitment workshops with the participation of chemistry and engineering faculty alongside department chairs, deans and other administrators,
- holding campus-specific regular mentoring meetings for academic women in chemistry and engineering and their mentors, and
- providing collaboration-wide COACh career advancement workshops for academic women in chemistry and engineering while creating opportunities for growth and networking.

Due to differences between campuses and too few female faculty members at some universities, it was important to utilize shared activities for cross training. We intended to include faculty in all the sciences and engineering in our program of activities whenever possible. As a result, we expected to find by the final year of our program that women faculty would be well prepared for promotion across all ranks and for taking on leadership positions in research or in the academy. We also expected to increase attention to eligible women doctoral candidates and women postdoctoral fellows in the STEM fields, derived from meeting the AAFAWCE’s objectives.

To accomplish the objectives, we agreed that the AAFAWCE Faculty Climate Survey would provide an overall understanding of challenges faced by faculty and baseline data to identify:

- opportunities that can be explored,
- strategies to address the specific issues and concerns, and
- activities that can be implemented.

DEVELOPING COLLABORATIVE MATERIALS BASED ON A COMMON ROADMAP AND TIMELINE

Based on the initial discussions on different aspects of the project and the mission of the AAFAWCE, the team developed a roadmap and timeline for focus areas and
identified the specific tasks to be undertaken in each focus area. It was important to identify specific activities for each year of the project in each focus area to maintain continuity and measure incremental progress during each year.

During the initial stages of the project, we did not have the specific details about the ways the activities would be performed at each campus and the amount of participation that would be achieved. Hence, the activities for the first year would focus on establishing the baseline conditions at each institution, increasing awareness, getting support from administrators, and developing the multi-institutional network among the faculty. At this stage, we identified the activities in general terms for the second through third year (and later extended to the fourth year) to provide flexibility in the planning process. For the grant activities timeline, see Table 1-1 in Chapter 1 in this book (Gilmer & Borman, 2014).

The AAFAWCE PowerPoint Presentation

After the establishment of the roadmap and timeline, the team developed a PowerPoint presentation, which we used at each university campus during meetings with administrators and faculty. The PowerPoint presentation included the mission of the AAFAWCE, disciplinary focus for the planned activities, and ways that deans and faculty could participate in the activities. The integrated nature of the material on the PowerPoint presentation reasserted the strength of the collaboration as a support for each campus’ independent activities.

Developing the AAFAWCE Program Brochure

To increase awareness of the program activities, the AAFAWCE developed a brochure for dissemination purposes. We designed the brochure to emphasize the facts, planned activities, and contact information for team members at all five campuses (Figure 2-6 and Figure 2-7). We disseminated the program brochures both
What can you do to support ADVANCE PAID Initiatives?

- Identify senior faculty and administrators to participate in recruitment practices and mentorship training workshops
- Become a mentor to junior women faculty
- Promote, support, and encourage ADVANCE-PAID activities
- Recognize the contributions of faculty and administrators to ADVANCE-PAID workshops

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- Dr. Sylvia Thomas (Co-PI)
- Dr. Cristian Smith (Project Manager)
- Dr. Wei Yuan
- Dr. Jennifer Lewis
- Dr. Despina Rizos
- Dr. Angela Martinez

University of Florida
- Dr. Angela Blackwell (PI)
- Dr. Carmen Inman (Co-PI)
- Dr. Debra Dietz (Co-PI)
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Florida State University
- Dr. Penny Jelonek (PI)
- Dr. Jeffery Alles (Co-PI)
- Dr. Harold Knolle
- Dr. Jeffery Chau

Florida Agricultural and Mechanical University
- Dr. Simone Harris (PI)
- Dr. Margaret Lyles
- Dr. Edra Byrd

Florida International University
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- Dr. June M. Cross (Co-PI)
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- Dr. Margaret Lyles
- Dr. Edra Byrd

Florida International University
- Dr. Bevins Talcott (PI)
- Dr. June M. Cross (Co-PI)
- Dr. Gilbert Rojas

For more information please contact Alliance for the Advancement of Florida’s Academic Women in Chemistry and Engineering (AAFWCE)

Introduction
The Alliance for the Advancement of Florida’s Academic Women in Chemistry and Engineering (AAFWCE) has been established to provide opportunities for women in chemistry and engineering.

Institutional Overview

Three Major Project Objectives:

- Recruitment of Women Faculty
- Retention of Women Faculty through Mentoring and Advising
- Promotion of Leadership Among Women Faculty

These Florida state universities face similar problems:
- Inadequate recruitment of women candidates
- Overrepresentation of women faculty in non-tenure track positions
- Failure to retain and advance women faculty in academic leadership positions

Figure 2-7. The AAFWCE brochure. Front and back.
digitally via e-mail and as hard copy to campus administrators, deans, department chairs, and faculty in Chemistry and Physics Departments and Engineering Colleges, informing them of the AAFAWCE mission, goals, and activities.

CONCLUSIONS

We worked together to organize and focus our collaborative mission, activities, timeline, modus operandi, and public presentation of our activities as members of the AAFAWCE for our NSF ADVANCE-PAID grant.

The main obstacles for advancement of women we sought to address were the following:

– proportionately fewer women than men in the applicant pools for tenure-track faculty positions,
– limited support for women to advance in academic careers, and
– no mechanisms to promote leadership among women faculty in chemistry and engineering.

Our integrated materials, generated through intensive and ongoing interactions between the AAFAWCE members, provided a unified foundation for this project. In the rest of this book, we describe the ways we implemented our activities to address these obstacles, with evaluation and dissemination of our activities in the relevant chapters.

REFERENCES


FOCUSING COLLABORATIVE ACTIVITIES FOR WOMEN STEM FACULTY


University of Rhode Island. (2005). Faculty mentoring handbook. Best practices compiled by the NSF ADVANCE program at the University of Rhode Island. Retrieved from http://www.uri.edu/advance/faculty_development/mentor_training_program.html


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2. METALOGUE

Focusing Collaborative Activities for Women STEM Faculty

We worked together to organize and focus our collaborative mission, activities, timeline, modus operandi, and public presentation of our activities as members of the AAFAWCE for our NSF ADVANCE-PAID grant. Our integrated materials, generated through intensive and ongoing interactions between the AAFAWCE members, provided a unified foundation for this project. (Tansel, 2014, chapter 2 in this book, p. 44).

In Chapter 2 Tansel discusses the origins of the AAFAWCE’s collaborative identity, cogently arguing that the mutually derived products served to enhance the collaboration’s efforts collectively, and on individual campuses. Her lessons learned include the following:

SHARE IDENTITY

Creating a shared identity through integrated materials such as a mission statement, a logo, press releases, and brochures both interpersonally strengthened the collaboration and symbolically served to brand the shared and campus-based interventions for constituents and administrators.

SHARE GOALS AND OBJECTIVES

ADVANCE grants tend to be less specific about tasks to be performed than research grants. Negotiating shared goals and objectives upfront along with common strategies and targets can facilitate community and help individual team members to identify their own responsibilities and campus-specific priorities and activities.

COMMON COLLABORATIVE ACTIVITIES

Initially identifying and implementing common collaborative activities, like Train-the-trainer workshops on mentoring, leadership, or recruitment, can build collaborative relationships, save collaborations resources, and jumpstart campus-specific activities.

P. J. Gilmer et al., (Eds.), Alliances for Advancing Academic Women, 47–48. © 2014 Sense Publishers. All rights reserved.
Intuitively, and as a sociologist and gender scholar, I understand the need for collective identity in such projects, but I was always skeptical about taking the time to achieve these ends during those crucial early days of a grant. Creating a brochure? A logo? These seemed like picayune activities that would drain time away from the more important work of setting up on-campus teams to do the work of the grant. Now, having read Tansel’s chapter, I appreciate that this work, though time-consuming, was imperative to the long-term success of the project because it established relationships among the university campuses in ways that would have been neglected if each collaborator had only focused on their own institution. To benefit from collaboration, one must build that collaboration.

REFERENCE


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The Alliance for the Advancement of Florida’s Academic Women in Chemistry and Engineering (AAFAWCE, 2013), a joint collaborative ADVANCE-PAID (Partnerships for Adaptation, Implementation, and Dissemination) grant from the National Science Foundation (NSF, 2012), involved five public Florida universities: University of South Florida (USF, lead institution), Florida State University (FSU), University of Florida (UF), Florida International University (FIU), and Florida Agricultural and Mechanical University (FAMU). We decided to work together to apply for the NSF ADVANCE-PAID grant as a collaborative, with each university getting its own funds, but sharing a common mission and objectives.

The goal of ADVANCE grants is to increase “the participation and advancement of women in academic science and engineering careers” (NSF, 2012). NSF required that ADVANCE-PAID grants adapt successful programs from earlier ADVANCE-PAID and ADVANCE-Institutional Transformation grants. Therefore, the AAFAWCE’s goal was to implement these programs at our five universities, through various mechanisms. The concepts and ideas presented in this book are a culmination of these efforts.

The AAFAWCE included women and men working together to advance the status of academic women in chemistry and engineering. More specifically, our mission was “to increase the representation and promote the advancement of academic women in chemistry and engineering, thereby developing a more diverse science and engineering workforce” (AAFAWCE-about, ¶ 1). FSU, USF and UF expanded the AAFAWCE mission to include academic women in physics as well as other science, technology, engineering and mathematics (STEM) disciplines.

Collaboration is critical to the undertaking and solving of 21st century problems (Colorado Libraries, n.d.). In collaboration, team members need to work together toward the solution of a common problem. In a productive collaboration, people with different expertises and cultural backgrounds work together towards common goals, and they share successful methods for achieving those goals. Other advantages to collaboration include budgetary savings for the granting organization, learning from each other’s contributions, and a shared foundation of knowledge for problem solving.

In this chapter, first, we provide a theoretical framework for collaboration, cultural historical activity theory (CHAT) (Learning-Theories.com, 2013). CHAT is a theory developed initially by Vygotsky (1986), but Engeström (1999) is one who
has published widely in this area. CHAT allows one to examine the entire system of collaboration while also having the ability to focus on the individual components that influence the outcomes of human activity. Various components can either enhance or contradict the efforts of people in reaching their objects and desired outcomes of the team. After outlining the theory, we provide examples of collaboration used in our joint project to advance academic women in chemistry, physics, and engineering, and examples of the ways in which the components of the system influence the outcomes.

Second, we explore the supportive functions of the collaborative system, using the framework of cultural historical activity theory to frame each one. Finally, we discuss the challenges of working in collaboration, and explore our approach to addressing difficulties.

THEORETICAL PERSPECTIVE ON COLLABORATION

Cultural Historical Activity Theory

The AAFAWCE involved individuals from diverse disciplines working together to achieve coordinated action. Having a theoretical perspective in mind helped us to establish and familiarize ourselves with the components of our system that either facilitated or hindered the collaborative mission. Being aware of these factors and their interactions may improve the likelihood for success.

CHAT is a powerful theory of human interactions taking into account not only the culture and history of prior events, but also the communities in which actions take place (Engeström & Miettinen, 1999). Culture influences actions taken by communities involved in activities, the tools or artifacts available and used, the division of labor typically employed, and the rules or schemas that can interfere or make likely progress towards the objects.

As the Committee on Maximizing the Potential of Women in Academic Science and Engineering notes (National Academy of Sciences, 2007, p. 241), the goal of ADVANCE grants is to create a “new normal”- an externalization of the grant’s goals by institutionalizing them. In cultural historical activity theory, human actions can reproduce culture (called internalization or cultural reproduction) or transform culture (called externalization) by creating new “artifacts.”

First we focus on three central components: the subjects, the objects, and the outcomes of the activities in the AAFAWCE grant. Second we focus on the four influential factors, tools or artifacts, rules or schemas, the communities, and the division of labor that influence the flow of the subjects to their objects and on to their outcomes.

Three Central Components of CHAT

Figure 3-1 shows the critical components of cultural historical activity theory. In this section we describe the interconnections between the subjects, the objects and the outcomes.
Subjects. The “subjects” can be one or more persons involved in the activity. In one case, we, the principal investigators and other key personnel, are the subjects, as we organized and implemented the grant activities. The theory is flexible, and instead we could also look at the CHAT diagram with the academic faculty participants in the program as the subjects, as they are involved in the activities that we developed for them.

Objects. Engeström (1999) states that the “central issues of activity theory remain the object – that is what connects my individual activity to the collective activity” (p. 31). Therefore, any one individual’s activities influence the collective activities as they occur. Learning-Theories.com (2013) defines objects in this sense: “In order to reach an outcome it is necessary to produce certain objects (e.g., experiences, knowledge, and physical products)” (¶ 6).

Examples of objects in the AAFAWCE included providing experiences: (a) for a tenure-track woman protégé to learn the “ropes” from a senior mentor and share those ideas with other academic women in her department, or (b) for a senior faculty member to mentor a protégé, thereby providing an opportunity to help the protégé to move forward in her career. Another object would be for us to meet with a faculty search committee and provide knowledge on gender schemas and ways unconscious bias could influence the search committee’s decisions on faculty candidates to interview and hire.

Outcomes. Carpay and van Oers (1999) state that the “outcomes of a learning task depend not only on the individual but also on interindividual interactions” (p. 306). In other words, through our activities and interactions with each other, we learn other’s perspectives, which influence the objects we choose and the outcomes we attain. The
hope is that through our outcomes, it is “no longer momentary and situational; rather, it consists of societally important new, objectified meanings and relatively lasting new patterns of interaction” (Engeström, 1999, p. 31).

The outcomes in our grant activities included:

– learning the institutional and departmental climates for faculty, for each of our five universities and in all departments examined,
– developing a new infrastructure for recruiting academic women faculty for diversity and excellence,
– establishing mentoring and networking programs for women academics already at our institutions,
– involving both women and men full professors as mentors, and
– providing leadership opportunities for women faculty.

As we changed the infrastructure within each university, we changed its culture by interacting with faculty and administrators who were immersed in their departmental, college, and university cultures. Therefore, our outcomes depended on our interactions with individuals and the interactions of these individuals with others and us.

Hence, the value of collaboration is to learn from each other, influence each other’s chosen objects, and the outcomes that emerge from our human activities in collaboration with each other.

Four Influential Factors of CHAT

Figure 3-1 displays the four factors (tools or artifacts; rules or schemas; the communities; and the division of labor) in the CHAT diagram that influence not only the subjects and their objects but also interact with each other, as indicated by the double-headed arrows.

For instance, the communities can influence the division of labor (among individuals) and the rules or schemas (by making others aware of constraints or of new possibilities on human activity). For us to get the job done, we need to work collaboratively with others and execute the division of labor among the subjects.

Now we describe the four influential factors: tools or artifacts; communities; division of labor; and rules or schemas.

**Tools or artifacts.** A tool or an artifact is “a material object that has been modified by human beings as a means of regulating their interactions with the world and each other” (Cole, 1999, p. 99). In other words, artifacts are the tools that we develop and may use to accomplish our objects and to move toward our joint outcomes.

Six examples of tools or artifacts that we used from the time we started our NSF grant application to its full execution include (a) the Internet, (b) Blackboard, (c) telephone conferencing, (d) products we developed, (e) programs designed by other ADVANCE grants that we implemented, and (f) the relevant literature.
We used the Internet to research the goals and activities of other ADVANCE grants, to advertise our collaborative events, to find publications and ideas on women in STEM for our grant and book, and to survey participants for evaluation purposes. Posting our grant files on Blackboard enabled all of the AAFAWCE collaborators to have access and use them at their convenience, and weekly conference calls provided a regular forum for discussion, sharing of ideas, and collaborative support. Journal articles and books on women in STEM informed our project continuously. Without these tools or artifacts we would have been unlikely to collaborate productively on this project.

Communities. Communities are those with whom we interact in our activities. We are members of a community of learners that help each other develop strategies effectively to implement our ADVANCE activities. We support each other; we network, and share budgets. For example, we learn from the literature, activities, and approaches of other ADVANCE grants, like the team approaches of the University of Michigan’s Committee on Strategies and Tactics for Recruiting to Improve Diversity and Excellence (STRIDE, 2010) and the University of Wisconsin’s Women in Science & Engineering Leadership Institute (WISELI, 2009) to enhance the hiring of women faculty.

The ADVANCE Implementation Mentors Network, founded in 2011 to mentor and support ADVANCE project managers across the country, was an important member of our community. Its members primarily communicated through email. As a member of this network, our AAFAWCE project manager Smith often relied on other members’ extensive knowledge and experiences. A network member highly recommended Dr. Donna Dean as a mentorship workshop facilitator.

In our AAFAWCE grant, we spanned five university campuses, each with different historical and cultural roots. We also bridged a variety of communities in the disciplines of engineering, chemistry, physics and other STEM fields with their individual histories and cultures.

Division of labor. Division of labor refers to the ways people in communities contribute to labor to start and complete tasks. Tolman (1999) says about division of labor:

The collective nature of the activity is manifested in a division of labor. No single individual carries out the activity required to satisfy his or her needs. Rather, the activity is divided into separate actions, each of which is then assumed by a particular individual in coordination with the others. (p. 72)

The AAFAWCE had interinstitutional collaborators across the five universities and intrainstitutional collaborators within each university. All collaborations involved individuals from different academic cultures, as we represent different departments, backgrounds, ethnicities, gender, research areas, and approaches to working together and getting things done.
Rules or schemas. Rules or schemas encompass the history of the culture in which human activity takes place. Rules or schemas embodied in policies and practices are often a controlling issue in human activities and influence people’s actions and decisions.

“Schemas organize knowledge about specific stimulus domains and guide both the processing of new information and the retrieval of stored information. They can be viewed as structured expectations about people, situations, and events” (The University of Rhode Island, 2002). Schemas allow us to efficiently, perhaps inaccurately, process information, and they often conflict with consciously held “explicit” attitudes, but can change, based on people’s experiences or exposure to ideas and knowledge (Fiske, Cuddy, Glick, & Xu, 2002; Nosek, Banaji, & Greenwald, 2002).

Valian (1998, p. 14), a noted author on academic women in STEM fields, writes about schemas:

I know that being a scientist is a social activity, as well as an analytic activity, as well as an aesthetic activity. Indeed, what I find wonderful about science is how many different parts of myself are satisfied in the doing of it… I did not see a way [in science] to be nurturant and agentic. The either-or implication of gender schemas rules out the self I wanted to be.

Gender schemas affect both men and women, as evidenced by Moss-Racusin, Dovidio, Brescoll, Graham, and Handelsman’s (2012) study of identical resumes labeled with either a male or a female STEM undergraduate’s name. Both men and women faculty rated the male student higher than the female student for a laboratory manager position. This was true in all categories (e.g., competence, hireability, and mentoring), and the faculty would offer more pay to hire the male manager vs. the female manager, even though the resumes were otherwise identical. This demonstrates the power of schemas and their ability to hold back people’s lives and societal progress.

Coherences and Contradictions in Human Activities

The history and culture of each university presents various coherences and contradictions towards achieving diversity in its faculty. By coherences, we mean that the tools or artifacts, the divisions of labor, the communities, and the rules or schemas may work together to add coherence to meeting the subject’s objects and the team’s outcomes. By contradictions, we mean that these factors may not work together toward achieving the desired objects and joint outcomes.

The power of using CHAT as a theoretical framework is learning to focus on both the contradictions and the coherences in the movement of the subjects to their objects, and from their objects to the joint outcomes. Peal and Wilson (2001) discuss the importance of addressing the contradictions in the human activity system under study:
activity systems are not normative, and the “natural” way of learning is not necessarily the best. Instead, the concept of activity system helps the designer identify the elements and dynamics of often undesigned systems, which can be rife with contradictions—differences, for example, among participants about purpose, division of labor, and tool selection and use. By analyzing the troubles of current activity systems, designers can help emerging ones develop successfully.

Focusing on the contradictions rather than on the coherences in human activity helps one learn aspects to modulate and, once done, the situation can change to exhibit more flow in activity from subjects to objects to joint outcomes.

An example of a contradiction in our collaboration was that by including both postdoctoral women and women faculty in our mentoring program at FSU in the first mentoring sessions, we were not meeting the needs of either group. When we faced the contradiction, the university took charge of organizing and managing the group of postdoctoral fellows so the AAFAWCE could focus on the women STEM faculty. Therefore, the leaders of the AAFAWCE identified the needs for the postdoctoral group so we could focus on the women faculty.

Gilmer used the CHAT theoretical perspective (focusing on the contradictions) with the other principal investigators at FSU and the other four universities (USF, UF, FAMU and FIU) during the course of the AAFAWCE grant.

Communities Involved

Florida has 12 universities or colleges in the state university system with a common Board of Governors for the entire system (State University System of Florida, 2012) (Appendix 3-A). Of the 12 universities in the State of Florida system, the AAFAWCE grant involved five of these universities: USF, FSU, UF, FIU, and FAMU. These five universities had worked together with two other universities on a previous NSF STEM Talent Enhancement Program Type II grant, led by Professor Kathryn Borman (Borman, Tyson, & Halperin, 2010).

Of our five AAFAWCE universities, three were large major research universities of over 40,000 students each: FSU, UF, and USF. The two other AAFAWCE universities were FAMU, one of the historically black colleges and universities, with 12,000 students, and Hispanic-serving FIU with 48,000 students. As individual institutions had independent cultures and missions, each university had a different starting point in terms of diversity of their faculty. Therefore, each university approached its objects somewhat differently.

We spanned the north-south extent of the state of Florida, including two universities (FAMU and FSU) in Tallahassee in the central portion of the northern panhandle, one university in the central region (UF) in Gainesville, one on the western shore on the Gulf of Mexico (USF) in Tampa, and one in the southeastern region (FIU) in Miami near the Atlantic Ocean. Our AAFAWCE logo signified the locations of our five universities with stars (Tansel, 2014; chapter 2 in this book; see Figure 2-2).
Since we wanted to advance academic women in STEM fields, especially chemistry and engineering, we needed collaborators in these STEM fields who knew the culture and worked directly in these academic departments. Furthermore, we needed to collaborate and learn from social scientists that study and understand the dynamics of culture, and the influence of university and departmental cultures on faculty climate, including the decision-making environment of these departments. We did this collaboratively with social scientists, in part through our AAFAWCE Faculty Climate Survey at the start of the grant (Martinez, Hughes Miller, & Tyson, 2014; chapter 4 in this book) and our interviews of women STEM faculty related to academic women’s sense of isolation (Smith, 2014; chapter 5 in this book).

Each of our five universities in the AAFAWCE had a principal investigator (PI) and at least one co-principal investigator (Co-PI), as well as other senior personnel. Three of the five universities (USF, FSU and UF) employed a postdoctoral fellow, graduate student, undergraduate student, and/or administrative assistant to contribute to the organization and execution of grant activities.

Appendix 3-B shows our leadership team and their areas of professional training, and their role in the project. Our team’s disciplinary areas included various forms of engineering (chemical & biomedical, civil & environmental, electrical & computing, materials science, and mechanical) to American studies, anthropology, biological sciences, chemistry & biochemistry, education, history, history of science, physics, industrial psychology, science education, sociology, and women’s and gender studies.

Each person involved in the grant has his/her own CHAT diagram, and he/she is the subject of his/her activities (Figure 3-1). He/she interacts with the communities within the collaborative grant when interacting with the others, (a) on the collaborative leadership team and as part of interinstitutional workshops, (b) in activities at his/her own academic institution, and (c) at NSF PI and Joint Annual Meeting conferences and workshops.

The outcomes result from the objects being reached by a number of the subjects, working together towards common goals.

These multiple CHAT diagrams influence each other when we (a) interact together in our weekly conference calls, (b) work together on joint projects, including collaborative interinstitutional workshops, (c) attend an AAFAWCE writing retreat for this book, and write and edit its chapters, (d) create newsletters and posters, (e) sponsor events at our institutions, and (f) disseminate our programs and products.

COLLABORATIVE SUPPORT

We collaborated in four major ways: (a) not having to “reinvent the wheel,” (b) sharing resources, (c) sharing products, and (d) developing supportive frameworks – which allowed us to build on our strengths (a shared State of Florida higher educational system, similar professional interests in STEM fields, and common experiences in which each of us felt outnumbered by men in our chosen fields).
These four categories are not mutually exclusive but convenient for this discussion. These strengths, in turn, allowed us to face our challenges (i.e., geographic distances, disciplinary differences, and different university missions and stages of development) while we worked together towards common goals and outcomes.

To understand the power of CHAT in providing us a theoretical framework to examine the coherences and address the contradictions in our human activities in the AAFAWCE, refer to Table 3-1, with each CHAT component discussed in this section.

Table 3-1. Contributions of the four influential factors to collaborative support

<table>
<thead>
<tr>
<th>Types of collaborative support</th>
<th>Involvement of influential CHAT factors</th>
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<tbody>
<tr>
<td></td>
<td>Tools/Artifacts</td>
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<tr>
<td>Not having to “reinvent the wheel”</td>
<td></td>
</tr>
<tr>
<td>Earlier ADVANCE grants</td>
<td>+</td>
</tr>
<tr>
<td>Ideas from our collaborative team members</td>
<td>+</td>
</tr>
<tr>
<td>Helpful research literature</td>
<td>+</td>
</tr>
<tr>
<td>Sharing resources</td>
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<tr>
<td>Budget sharing</td>
<td>+</td>
</tr>
<tr>
<td>Maintaining library of articles and books on academic women in STEM fields</td>
<td>+</td>
</tr>
<tr>
<td>Sharing products</td>
<td></td>
</tr>
<tr>
<td>UF faculty on-line training module and toolkit</td>
<td>+</td>
</tr>
<tr>
<td>USF Recruitment Practices Booklet</td>
<td>+</td>
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<tr>
<td>Developing supportive frameworks</td>
<td></td>
</tr>
<tr>
<td>Supporting each other in tough times</td>
<td>+</td>
</tr>
<tr>
<td>Networking</td>
<td>+</td>
</tr>
<tr>
<td>Using common Blackboard site for communication</td>
<td>+</td>
</tr>
<tr>
<td>Creating and maintaining a common AAFAWCE Web site</td>
<td>+</td>
</tr>
<tr>
<td>Participating in weekly conference calls</td>
<td>+</td>
</tr>
<tr>
<td>Participating in the AAFAWCE writing retreat and in writing this book</td>
<td>+</td>
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The CHAT theoretical perspective could easily be adapted to other human activities, including other ADVANCE initiatives in the US and other European and worldwide efforts to advance women in STEM fields.

**Not Having to “Reinvent the Wheel”**

This section has three types of collaborative support related to not having to reinvent the wheel: (a) earlier ADVANCE grants, (b) ideas from our collaborative team members, and (c) helpful research literature.

**Earlier ADVANCE grants.** We were able to accomplish our objectives because we got critical assistance from earlier ADVANCE grants. We gathered this information for our grant proposal through the ADVANCE Portal, an online archive (ADVANCE Portal, 2013) as well as the edited book, *Advancing Academic Women*, edited by Stewart, Malley, and LaVaque-Manty (2007) from the Committee on STRIDE. Both resources were helpful throughout all four years of our activities and in the writing of this book in the final year of our grant.

The WISELI team from the ADVANCE-Institutional Transformation grant at University of Wisconsin-Madison (WISELI, 2009) developed a national edition to their workbook, *Searching for Excellence & Diversity: A Guide for Search Committees* (Fine & Handelsman, 2012). This is an excellent source of information and contains helpful advice for creating and maintaining faculty diversity.

With the permission of the WISELI team, we modified the WISELI Faculty Climate Survey (2006). We administered the modified AAFAWCE Faculty Climate Survey online in the first year of our grant in order to learn about the issues impacting women (and minority) STEM faculty at our universities (Martinez et al., 2014; chapter 4 in this book). The WISELI team also invited FSU PI Gilmer to their campus in Madison, WI to attend one of their faculty recruitment workshops and to meet their leadership team, allowing Gilmer to become part of their community.

To mentor women faculty we utilized aspects of the program from the University of Texas at El Paso (Posey, Reimers, & Andronicos, 2007), presented by Dr. Tine Reimers (now at the University of Albany), and ideas presented in Dr. Donna Dean’s mentoring book (Dean, 2009) as well as Dean’s presentations on mentoring at USF and FSU (AAFAWCE-presentations, 2013).

For leadership, we invited Drs. Jane Tucker and Barbara Butterfield of the COACh (2012) team, based at the University of Oregon, for two collaborative-wide workshops, one in the second year and the other in the third year of the grant (Gilmer, Stokes, & Holbrook, 2014; chapter 8 in this book).

Using the CHAT theoretical perspective, the earlier ADVANCE grants, the ADVANCE Portal, and the Stewart et al. (2007) book describing those grants became tools or artifacts to help us reach our objects and jointly reach our outcomes.
Rules or schemas are normative structures and expectations created by the team. Using the earlier ADVANCE grants we learn from the rules or schemas created by others, thus transforming our own.

Ideas from our collaborative team members. Our community met weekly for conference calls in which one PI or Co-PI would report on a campus activity, providing ideas for the other four universities. For example, UF Co-PI Anne Donnelly mentioned that she had a COACH protégé explain to others attending a UF mentoring workshop the ideas she had learned at one of our COACH workshops. Gilmer picked up this idea and asked two COACH attendees, one a protégé and the other a mentor, to report at the next FSU mentoring workshop on ideas they had learned at the COACH workshop. This provided the participants an opportunity to contribute their voices and learning to the group and also gave us new rules or schemas at FSU.

In order to develop the foundation for mentoring networks at USF and FSU, the AAFAWCE team members collaborated to host speed mentoring events. USF was the first to host this mentoring activity. Speed mentoring provided mentors and protégés with an opportunity to engage in time-efficient mentoring, with each protégée having the chance to pose important questions about her research and career to several mentors, and to quickly identify a good mentoring match. By USF sharing its experiences, methods, and resources with all AAFAWCE members through Blackboard, email, and conference calls, USF facilitated and supported the coordination of a second speed mentoring activity at FSU. In post-evaluation surveys, participants expressed satisfaction with their speed mentoring experience.

At the AAFAWCE’s Train-the-trainer Recruitment Workshop delivered by the Committee on STRIDE, Gilmer met Dr. Dragana Popović (staff physicist) and Bettina Roberson (Human Resources), both from the National High Magnetic Field Laboratory (NHMFL, a national laboratory, a collaborative of FSU, UF, and Los Alamos National Laboratory). Popović and Roberson were members of the NHMFL Diversity Advisory Committee and asked Gilmer to serve on the committee with them. The three recommended that FSU AAFAWCE offer a diversity workshop to NHMFL faculty and staff who were primarily in the chemistry, physics and engineering disciplines. We titled our workshop that included a slide presentation, Faculty Recruitment for Excellence and Diversity (FRED) (NHMFL, 2013). We used the Committee on STRIDE’s workshop as a template to develop the FRED workshop. NHMFL funded Gilmer to lead four FRED workshops at the Tallahassee facility of the NHMFL and one for NHMFL faculty and staff at the Los Alamos National Laboratory. Therefore, we worked across institutional departments and organizational units (Six, 2012) to deliver this tool, using productive schemas from earlier ADVANCE grants and from journal articles and books focused on women STEM faculty.

In the final semester of the last year of the grant, USF decided to have a final event, Celebration of STEM Women, to recognize all mentors, protégés along with senior faculty and administrators who contributed to the AAFAWCE’s success. USF
created certificates of recognition, which were signed by the Provost and presented to each individual who attended the celebration luncheon. FSU adapted the idea for their community and had a panel discussion with one protégé, one mentor, and Gilmer as the PI presenting on ideas learned, followed by breakout groups, with discussion looking forward to plans for the future. Afterwards all received a certificate of participation with the Provost’s signature.

The influential factors for learning and spreading ideas to each other within the collaborative include tools or artifacts, rules or schemas, and communities, in the CHAT framework.

Helpful research literature. *Why So Slow? The Advancement of Women* (Valian, 1998) was a valuable resource as we developed our proposal, and remained so throughout the grant as well as in the process of writing this book.

Three other books on professional women were helpful at the stage of writing this book. The first is by Christine Grant from North Carolina State University who met Gilmer at the March 2013 ADVANCE PI Workshop. Grant sent Gilmer a copy of a book she is revising with the original editor: *Success Strategies for Women in Science: A Portable Mentor* (Pritchard, 2006) with chapters on mentoring (Grant, 2006) and networking (Rankin & Nielsen, 2006). The second and the third books focus on women and leadership: *The Breakthrough Model for Work and Life: How Remarkable Women Lead* (Barsh & Cranston, 2009), and *Through the Labyrinth: The Truth About How Women Become Leaders* (Eagly & Carli, 2007).

These books contributed tools or artifacts and rules/schemas to help us in the AAFAWCE grant move towards our objects and joint outcomes, using the CHAT theoretical framework.

Sharing Resources

In this section we highlight two resources that we shared: (a) budget sharing, and (b) maintaining an on-line library of articles and books on women STEM faculty.

Using CHAT as the theoretical perspective, the communities, the tools or artifacts, and the division of labor add coherence to the resources outlines below. We highlight the relevant influential factors as they relate to each specific human activity.

*Budget sharing.* Although the NSF awarded us slightly more than a typical ADVANCE-PAID grant award for a single institution, we shared our funds among the five universities.

As the lead institution on the collaborative grant, USF received more of the grant funds than the other four universities. The USF budget included funds for collaborative activities including the Train-the-trainer and COACH workshops, costs associated with the AAFAWCE PI/Co-PI meetings and professional conferences, and the external evaluator. Therefore, we had one PI, Kathryn Borman, and she was responsible until 2012, prior to her retirement in May 2013. At that point, Dr. Sylvia
Thomas, who had been Co-PI of the USF part of the collaborative, became the PI at USF and the PI overall in 2013. USF also hired (a) for the entire grant our AAFAWCE project manager, Dr. Chrystal Smith, who organized not only events at USF but was in charge of overall grant administration including the budget, IRB review, our conference calls and interinstitutional PI meetings, and (b) one graduate assistant, Vanessa Martinez, who recorded meeting notes, conducted literature searches, collected and wrote reports on the faculty demographics across all five universities, and assisted in implementing USF AAFAWCE activities.

Each of the five universities had a PI who was responsible for at least her own university’s programs (Appendix 3-B lists all collaborators at the five universities). FSU also had a part-time administrative assistant, Helena Safron for the first two years and Amanda McManaway for the final two years. These administrative assistants helped organize FSU activities, but also worked with Ms. Martinez to develop and edit the interinstitutional AAFAWCE newsletters and recorded the minutes from the weekly conference calls, which were posted on the BlackBoard site.

Another way we saved travel funds was by having all four interinstitutional workshops in Tallahassee, the city where two of the five universities are situated. Participants from all five universities could attend. FSU was responsible for two workshops, and FAMU for the other two. FSU and FAMU had additional funding in their budgets to support the costs for these workshops.

To save time and travel costs, we had collaborative PI meetings at these interinstitutional collaborative workshops. USF, UF, and FIU had extra travel funds to support their trips for faculty and PIs to attend the interinstitutional workshops and for the PI and Co-PI to attend the PI meetings, held in Tallahassee.

Several team members attended the NSF Joint Annual Meeting (JAM), held each year in Washington, DC, and the ADVANCE PI conferences and workshops held in Arlington, VA, organized by Association for Women in Science. We each used our institution’s NSF travel funds to attend, sometimes sharing hotel rooms, not only to save on costs but also to have more time to collaborate and network.

In addition, we saved funds by using Global Education Outreach: Science, Engineering, Technology (GEOSET), developed by Nobel Laureate of Chemistry Harold Kroto, to Web cast parts of two of our four interinstitutional workshops and a number of mentoring panel discussions held at FSU. USF video-recorded their panel presentations and workshops. These Web casts and video-recordings and workshops are available on our AAFAWCE Web site (AAFAWCE-presentations, 2013) for list of presentations, see Table 3-2).

The ability to Web cast and to post the panel discussions and workshops online was a tool or artifact to disseminate our events to women STEM faculty who were unable to attend, thus giving our protégés new rules or schemas for advancing in their careers.

Our AAFAWCE project manager, Smith and Dr. Sylvia Thomas, USF Co-PI (at that time) contacted Dr. Donna Dean by email to arrange a mentoring workshop for USF women. At the ADVANCE-PI conference in Alexandria, VA in 2011, the FSU
PI Gilmer met Dr. Donna Dean and after discussing the goals of the AAFAWCE with her, decided to invite Dean to both our universities to initiate our faculty mentoring programs in February 2012.

Sharing the cost of Dean’s travel to Florida, she got to see and interact with our AAFAWCE team members at both USF and FSU. Dean also agreed to meet with the graduate students and postdoctoral fellows, some of whom were Association for Women in Science members.

All budget saving activities fit within all four of the influential CHAT factors, division of labor, tools or artifacts, rules or schemas, and communities.

Maintaining a library of articles and books on academic women in STEM fields. Since we had five universities and team members in many departments, we decided we could share publications by placing all pdf documents on-line on our Blackboard site and a bibliography of these references along with books and other related reported were uploaded and stored on the AAFAWCE Web site (AAFAWCE-library, 2013). We included annotated lists of pertinent references and a notebook of journal articles related to research on academic faculty recruitment

Table 3-2. Online oral presentations available from panels and individual speakers at USF, FSU, or UF

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Panelists</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 2011</td>
<td>Paid Parental Leave</td>
<td>Dwayne Smith</td>
<td>USF</td>
</tr>
<tr>
<td>Oct 2011</td>
<td>Academic Careers &amp; Motherhood</td>
<td>Kelly Ward</td>
<td>USF</td>
</tr>
<tr>
<td>Nov 2011</td>
<td>Mentoring &amp; Professionalism Within the Professoriate</td>
<td>Howard Adams</td>
<td>USF</td>
</tr>
<tr>
<td>Feb 2012</td>
<td>Mentoring and Networking to Develop Leadership Skills</td>
<td>Donna Dean</td>
<td>USF</td>
</tr>
<tr>
<td>Aug 2012</td>
<td>Mentoring &amp; Networking Women STEM Faculty</td>
<td>Hong Li, Laura Reina, &amp; Lisa Spainhour</td>
<td>FSU</td>
</tr>
<tr>
<td>Feb 2013</td>
<td>Advancement and Promotion of Academic Women</td>
<td>Rufina Alamo, William Cooper, III, &amp; Anke Meyer-Baese</td>
<td>FSU</td>
</tr>
<tr>
<td>Feb 2013</td>
<td>Advancement and Promotion of Academic Women</td>
<td>Joseph Schlenoff, Lisa Spainhour, &amp; Garnett Stokes</td>
<td>FSU</td>
</tr>
<tr>
<td>May 2013</td>
<td>NSF Grant Writing Workshop</td>
<td>Tanya Pietrass</td>
<td>UF</td>
</tr>
</tbody>
</table>
obtained from the Committee on STRIDE and the WISELI team. McIntosh (2013) of UF developed an annotated list of references on mentoring women faculty. With respect to CHAT, this resource of articles and books was a tool for everyone on the AAFAWCE team.

Sharing Products

For this section on sharing products, we include two examples: the UF faculty toolkit and the USF Recruitment Practices Booklet (Fernandez, Popović, & Gilmer, 2014; chapter 6 in this book) to address gender schemas and unconscious biases.

**UF faculty on-line training module and toolkit.** In 2006, UF designed an online training module for faculty search committees. All members of UF faculty search committees must take the online training and be certified in order to serve on a search committee. UF periodically updates an accompanying Faculty Recruitment Toolkit on an open Web site, available to the university community (University of Florida, n.d.). Early in 2012, UF was ready to share this product with the rest of the collaborative.

During 2012-13 academic year FSU drafted its own report for the Recruitment & Retention Subcommittee to the Diversity & Inclusion Initiative, which utilized the UF toolkit (Fernandez, et al., 2014; chapter 6 in this book). The UF Faculty Toolkit gave FSU new rules or schemas to address gender inequity in hiring and promoting academic women in STEM.

In CHAT, the toolkit was a tool for communities in our human activities.

**USF recruitment practices booklet.** The USF Recruitment Practices Committee developed and designed its own Recruitment Practices Booklet based on information it learned during the interinstitutional activities with the University of Michigan’s Committee on STRIDE. The booklet includes the university’s diversity statement, information on schemas and unconscious biases, appropriate interview questions, and a candidate evaluation tool. USF disseminated this booklet to USF faculty and administrators during STEM faculty search committee meetings. USF made its Recruitment Practices Booklet available to all AAFAWCE institutions via Blackboard (Fernandez et al., 2014; chapter 6 in this book).

This resource was a tool for new rules or schemas for communities in CHAT. Sharing products creates new rules or schemas.

Developing Supportive Frameworks

For our supportive frameworks, we include (a) helping each other in difficult times, (b) networking, (c) using a common Blackboard site for communication, (d) creating and maintaining a common AAFAWCE Web site, and (e) participating in weekly conference calls.
These frameworks work within our communities, using tools or artifacts and division of labor, while addressing some of the rules or schemas that hold science and engineering back from realizing their full potential of diversity in people, ideas, and approaches to solving problems in the real world.

Supporting each other in tough times. Through the two cycles of applying for the grant and the four years of the AAFAWCE grant, a number of PI, Co-PI and senior personnel have had personal crises in terms of health, family issues, and accidents. We were there for each other; helping in ways with division of labor so that we could keep the collaboration productive using the tool of conference call or the Internet, so as not to lose our grant’s momentum, and to help our colleagues through difficult times. Here we acted as a community—helping each other, as subjects, reach our objects and joint outcomes.

Networking. We realized the need for networking early on when our AAFAWCE Faculty Climate Survey found that women STEM faculty felt more isolated than men at the same rank (Martinez et al., 2014; chapter 4 in this book). Therefore, our AAFAWCE activities encouraged networking. For example, one COACH workshop had a specific emphasis on networking, which included a social networking gathering the evening before each of the two leadership panels with women from all five institutions (for list of panelists, see Table 8-3, Gilmer et al., 2014; chapter 8 in this book). At the second COACH workshop, a junior FIU woman chemistry faculty member mentioned that she found it refreshing to meet other Florida woman chemistry faculty member because she often felt very isolated in her department.

Another example of our AAFAWCE networking was the 2012 USF Leadership Discussion Panel (AAFAWCE-presentations, 2013). The panel had three USF women STEM leaders and FSU’s Provost and Executive Vice President for Academic Affairs, Garnett Stokes. If it were not for the collaborative, the USF team might not have considered inviting an administrator from another AAFAWCE university to participate on the panel. Having the USF panel on leadership opened up new rules or schemas for those in attendance (or those who listen to the presentations on-line).

Rankin and Nielsen (2006) mention that some women think that networking may seem wasteful of time, especially in their early professional years, but “often just talking about what you are doing can help to clarify your thoughts; other times, it can lead to a new breakthrough” (p. 115). They encourage women to take the time to interact, stay connected to others, and experience reciprocity with their STEM colleagues (Gouldner, 1960; Rankin & Nielsen, 2006).

Despite all of the positives of our collaboration, some protégés were hesitant to attend networking or mentoring events or to participate as a panelist for the AAFAWCE grant. The reluctant protégés may have not wanted to appear weak or display any uncertainties as they were trying to advance their career. Because of the collaboration, however, we expanded networking opportunities for some protégés. Using CHAT (Figure 3-1), communities and division of labor are part
of networking, and the networking helps women overcome negative rules and schemas that tend to hold women back in STEM fields. The protégés can learn from each other too.

*Using common Blackboard site for communication.* The AAFAWCE utilized a FSU Blackboard site to store files, photographs, references, and information for all AAFAWCE members. This virtual space served to organize the AAFAWCE resources, improving accessibility to and dissemination of supportive materials. In the ‘Documents’ folder, for example, the AAFAWCE collaborators could access meeting agendas and minutes, demographic data and evaluation results, relevant literature and resources, grant related documents, information and files on the AAFAWCE workshops, links to Web casts of the AAFAWCE mentoring panels and speakers, and dissemination materials such as the AAFAWCE brochure and logo.

Also on the Blackboard ‘Discussion Board,’ collaborators exchanged ideas for posters, presentations, the AAFAWCE newsletter, and this book. Materials created by one institution could therefore be accessed through Blackboard and tailored to fit the needs of another institution – saving collaborators time and energy.

The Blackboard site was a tool, and we contributed to it as a community through a shared division of labor in which we got ideas from each other, thereby allowing new rules and schemas to operate, in the CHAT framework.

*Creating and maintaining a common AAFAWCE Web site.* Similarly, the USF team developed the AAFAWCE Web site tool in collaboration with the rest of the team, our community. The AAFAWCE team members provided images, initial and updated content, and suggested Web site layout and color themes. Once the Web site was live, the AAFAWCE team collaborated to expand the content, which included the AAFAWCE newsletters and brochures, NSF annual reports, literature and resources on women in STEM, conference posters, book chapters, and links to Web casts of AAFACWE presentations and workshops.

Our AAFAWCE project manager Smith, with division of labor, updated the Web site with upcoming project activities and related project news. The USF Anthropology Department hosted the Web site initially but later the USF College of Engineering did so.

*Participating in weekly conference calls.* To maintain consistent communication among PIs, Co-PIs, and senior personnel, the AAFAWCE held weekly conference calls as a tool for community interaction. These calls served to keep members abreast of the AAFAWCE activities and upcoming events, either of the collaborative as a whole or of the individual institutions, but also to coordinate the AAFAWCE collaborative activities.

Team members who participated in conference calls finalized the AAFAWCE projects and assisted one another in the completion of the AAFAWCE-related tasks,
such as annual reports, presentations, demographic data collection, and this book. Communicating with each other and hearing about events at the other AAFAWCE universities let us get beyond the rules or schemas at our own institution so we could move forward.

While each campus participated in the conference calls, the division of labor called for the administrative assistant at USF or FSU to keep the minutes for the conference calls, post them on Blackboard, and send them by e-mail to all personnel on the grant.

Participating in the AAFAWCE writing retreat and in writing this book. In 2012 Gilmer attended the Big 10 Writing Workshop organized by the ADVANCE-Institutional Transformation team of University of Nebraska (Wonch-Hill, 2013). At the Nebraska workshop, Gilmer organized the framework for this book and set the guidelines for writing chapters, invited authors to contribute, and set deadlines for writing and editing the chapters.

In December 2012, the AAFAWCE team members met at USF in Tampa, to work on this book. The Writing Retreat served to motivate authors and editors, and to bring us together. During the retreat, authors and editors collaborated to organize and contribute to the book by sharing their ideas and resources. Gilmer brought ideas that she learned at the University of Nebraska Writing workshop to our own AAFAWCE Writing Retreat to help us get the book written.

Here in the CHAT framework, we acted as a community and divided the tasks of writing the book with division of labor. The guidelines that Gilmer wrote for the authors were tools or artifacts for the authors in writing their chapter. By working together on this grant, we got beyond rules or schemas that may have held us back because we communicated with each other through our writing and discussions on the chapters by e-mail and conference calls. In the end, most PIs, some Co-PIs, and senior personnel were able to contribute to the book, so we had a good representation of our team’s collaborative efforts through the four-year grant.

CHALLENGES OF WORKING COLLABORATIVELY

Our greatest challenges in collaboration were the (a) geographic distances among the five universities, (b) differences in disciplinary and academic roles, (c) different university missions and stages of development, and (d) differences in work styles.

Geographic Distances

Despite the 500 miles (Miami to Tallahassee, with Tampa and Gainesville between them) between our institutions, we communicated weekly by conference calls and by using a common Blackboard site for communication and posting of information on the grant. We also had the AAFAWCE PI/Co-PI meetings, NSF Joint Annual
Collaborating with STEM Faculty Across the Team

Meetings, NSF ADVANCE PI conferences and workshops, and our AAFAWCE Writing Retreat. Still, not working closely together on day-to-day events was difficult. Of course, the day-to-day events were mostly with the colleagues at our own universities, while planning, providing, and evaluating events for the people we were serving at individual AAFAWCE institutions. Consequently, our communities were more local and less with the entire AAFAWCE team across the state.

Differences in Disciplinary and Academic Roles

As Appendix 3-B shows we come from diverse disciplines, each with its own culture and history, communities, rules or schemas, tools or artifacts, and division of labor. Professionally we served in a variety of roles in our jobs from (a) a senior vice president or provost of a university, (b) a department chair, (c) academic faculty in various departments, as PI, Co-PI, or senior personnel on the AAFAWCE, (d) university staff personnel, (e) a postdoctoral scholar as project manager, to (f) graduate or undergraduate students as administrative assistants. The rules or schemas in the various professions and roles in which we serve influence the actions we take.

We have all contributed in a variety of ways towards accomplishing our goals. Mostly, we have learned from each other—by approaching problems differently because we come from different positionalities, i.e., different professional disciplines, different campuses, different ranks, and different experiences.

Different University Missions and Stages of Development

The differences in the amount of teaching required varied tremendously among the PI and Co-PI from the various institutions. Team members who had fewer teaching demands had more time for research and could dedicate more time and effort to the grant.

The rules or schemas are different for the institutions in the collaborative grant. In some, policies such as requiring all faculty search committee members to have taken an on-line test in gender schemas before serving on the search committee helped propel that university forward. Therefore, paying attention to advancing policies or rules within institutions could help move institutions forward.

Differences in Work Styles

However, we also had differences in work styles, which became more accentuated with time, especially after we started our no-cost extension into the fourth year of the grant. Keeping the motivation and accountability to complete the project was more difficult near the end. The fourth year was also the time to write and edit this book, which added a new responsibility so writing at that point was difficult to accomplish but rewarding to finish.
SUMMARY

CHAT provides a lens through which to examine the factors that contributed to or detracted from our collaboration on a multi-university grant to reach our joint outcomes to advance academic women in chemistry, physics, and engineering. Despite the challenges of working across disciplinary, role, and geographic boundaries, we made headway in advancing academic women in STEM fields.

Both forming communities with appropriate division of labor and using tools and artifacts that allow communication, despite the distances, facilitated the processes. Having rules in terms of university policies in place helped the execution of the goals. Putting appropriate policies in place is one of the keys to advancing our goals. Learning rules or schemas from our collaborators helped propel us forward. The grant helped us get beyond rules or schemas that contradicted our progress towards gender equity.

Having administrators who helped to drive the processes forward can make a powerful difference, as evidenced at UF and USF, with administrators supporting this project from the start of the grant. At FSU we were fortunate to get a new President, Eric Barron, in February 2010 and our new Provost, Garnett Stokes, in August 2011. Provost Stokes’ agreeing to be one of the AAFAWCE Co-PI at FSU helped FSU considerably towards reaching our team’s outcomes.

We found that we needed to be assertive to set goals in motion and completed. Our AAFAWCE project manager Smith kept us in the communication loop and other institutional PI members contributed as well. Having administrative assistants on the grant at USF, FSU, and UF made a powerful difference to progress, and the experiences of these assistants were important for them as well. Yet collaborating with five universities proved to be challenging, yet a positive experience for our AAFAWCE members.

ACKNOWLEDGMENTS

The authors acknowledge Amanda McManaway, Biological Sciences major and Administrative Assistant at FSU, for contributions to ideas presented in this chapter.
APPENDICES

Appendix 3-A. Higher education institutions as part of State University System of Florida

<table>
<thead>
<tr>
<th>Florida University in State System</th>
<th>Collaborators with AAFWCE</th>
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<tbody>
<tr>
<td>Florida Agricultural and Mechanical University</td>
<td>Yes</td>
</tr>
<tr>
<td>Florida Atlantic University</td>
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<tr>
<td>Florida Gulf Coast University</td>
<td>No</td>
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<tr>
<td>Florida International University</td>
<td>Yes</td>
</tr>
<tr>
<td>Florida Polytechnic University</td>
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</tr>
<tr>
<td>Florida State University</td>
<td>Yes</td>
</tr>
<tr>
<td>New College of Florida</td>
<td>No</td>
</tr>
<tr>
<td>University of Central Florida</td>
<td>No</td>
</tr>
<tr>
<td>University of Florida</td>
<td>Yes</td>
</tr>
<tr>
<td>University of North Florida</td>
<td>No</td>
</tr>
<tr>
<td>University of South Florida</td>
<td>Yes</td>
</tr>
<tr>
<td>University of West Florida</td>
<td>No</td>
</tr>
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</table>

Appendix 3-B. Collaborators on the AAFWCE Team

<table>
<thead>
<tr>
<th>University</th>
<th>Name of collaborator</th>
<th>Collaborative role</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMU</td>
<td>Simone Peterson Hruda PI at FAMU</td>
<td>Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ngozi Ugochukwu Co-PI at FAMU &amp; Chair</td>
<td>Chemistry</td>
<td></td>
</tr>
<tr>
<td>FIU</td>
<td>Berrin Tansel PI at FIU &amp; Co-editor, this book</td>
<td>Civil &amp; Environmental Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jarka Miksovska Co-PI at FIU</td>
<td>Chemistry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gus Roig Co-PI at FIU &amp; Associate Dean of Engineering</td>
<td>Electrical &amp; Computing Engineering</td>
<td></td>
</tr>
<tr>
<td>FSU</td>
<td>Penny J. Gilmer PI at FSU &amp; Co-editor, this book</td>
<td>Chemistry &amp; Biochemistry/ Science Education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rufina Alamo Co-PI at FSU</td>
<td>Chemical &amp; Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Garnett Stokes Co-PI at FSU &amp; Provost (2011-13)</td>
<td>Industrial Psychology</td>
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</tr>
</tbody>
</table>

(Continued)
P. J. GILMER & V. MARTINEZ

Appendix 3-B. Continued

<table>
<thead>
<tr>
<th>University</th>
<th>Name of collaborator</th>
<th>Collaborative role</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dragana Popović</td>
<td>Co-PI at FSU (2011-13)</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>Harold Kroto</td>
<td>Senior Personnel</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td></td>
<td>Helena Safron</td>
<td>Administrative Assistant (2009-11)</td>
<td>History of Science/American Studies</td>
</tr>
<tr>
<td></td>
<td>Amanda McManaway</td>
<td>Administrative Assistant (2011-13)</td>
<td>Biological Sciences</td>
</tr>
<tr>
<td>UF</td>
<td>Angel Kwolek-Folland</td>
<td>PI at UF &amp; Associate Provost</td>
<td>History/Women’s Studies</td>
</tr>
<tr>
<td></td>
<td>Anne Donnelly</td>
<td>Co-PI at UF</td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td>Cammy Abernathy</td>
<td>Co-PI at UF &amp; Dean of Engineering</td>
<td>Materials Science &amp; Engineering</td>
</tr>
<tr>
<td></td>
<td>Lisa McElwee-White</td>
<td>Co-PI at UF</td>
<td>Chemistry</td>
</tr>
<tr>
<td></td>
<td>Samesha Barnes</td>
<td>Postdoctoral Fellow</td>
<td>Materials Science &amp; Engineering</td>
</tr>
<tr>
<td>USF</td>
<td>Kathryn Borman</td>
<td>PI at USF, and PI overall (2009-2013)</td>
<td>Anthropology</td>
</tr>
<tr>
<td></td>
<td>Sylvia W. Thomas</td>
<td>Co-PI at USF (2009-12), and PI at USF and overall (2013)</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td></td>
<td>Chrystal A. S. Smith</td>
<td>Project Manager</td>
<td>Anthropology/Sociology</td>
</tr>
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<td>Will Tyson</td>
<td>Senior Personnel</td>
<td>Sociology</td>
</tr>
<tr>
<td></td>
<td>Eva Fernandez</td>
<td>Senior Personnel</td>
<td>Engineering</td>
</tr>
<tr>
<td></td>
<td>Michelle Hughes Miller</td>
<td>Coeditor, this book (2012-13)</td>
<td>Women’s &amp; Gender Studies</td>
</tr>
<tr>
<td></td>
<td>Vanessa Martinez</td>
<td>Graduate Assistant</td>
<td>Anthropology</td>
</tr>
</tbody>
</table>

NOTE

1 Personnel were for 2009-13, unless indicated otherwise.

REFERENCES


COLLABORATING WITH STEM FACULTY ACROSS THE TEAM

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3. METALOGUE

Collaborating With STEM Faculty Across The Team

Collaboration is critical to undertaking and solving 21st century problems (Colorado Libraries, n.d.). In collaboration, team members need to work together toward the solution to a common problem. In a productive collaboration, people with different expertise and cultural backgrounds work together towards common goals, and they share successful methods for achieving those goals. (Gilmer & Martinez, 2014; chapter 3 in this book, p. 49)

Gilmer and Martinez convincingly argue in this chapter that having a theory of interaction that acknowledges diverse experiences, needs, goals, and strategies enhances the ability of collaboratives to achieve their individual and collective objectives. For the AAFAWCE, CHAT (Cultural Historical Activity Theory) provides a framework for thinking about shared objects while acknowledging the cultural and institutional differences of the campuses, particularly in terms of existing rules and schemas. CHAT’s focus on the coherences and contradictions within each model highlight sites of opportunity for targeted intervention.

I consider these the most important take-aways from the chapter:

ENHANCED COMMUNITY OF COLLABORATORS

CHAT encouraged the collaborators to recognize that their community was larger than their working team. Part of their community included those who had worked on ADVANCE grants before, allowing the collective to tap into the extant collective wisdom of best practices and scholarly work as they designed and implemented their shared and independent programs.

SHARING IN THE COLLABORATIVE

Collaboratives created opportunities for supporting their members, specifically in terms of resource sharing. The AAFAWCE learned the value of sharing both tangible resources – budget, materials, and products – and intangible resources – knowledge, experience, and interpersonal encouragement. Such sharing was cost-effective and time-efficient, with the added benefit that it strengthens the collaborative in the process.

P. J. Gilmer et al., (Eds.), Alliances for Advancing Academic Women, 73–76. 
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M. HUGHES MILLER

COMMUNICATION WITHIN THE COLLABORATIVE

Technology, particularly online networking platforms, was a valuable tool for the collaborative community because of the geographical distance between the universities, the differences among team members and institutional culture and readiness, and the shared grant objectives. Yet this technology facilitated, but did not replace, the need for frequent, regular interactions between members of the collaborative managed by an established division of labor. Those personal interactions as subjects were key to achieving the grant’s outcomes.

While CHAT is a complex model for understanding human interaction and invoking social change, the elements of CHAT remind us that our influences are mutually constituted. That is, as we utilize the tools and access the communities that are around us, we similarly affect, expand, and transform those same tools and communities. To me, that is the fundamental value of working in collaboratives: the opportunity to be affected by and to affect others, hopefully toward a positive outcome for us all.

REFERENCE


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