

National Girls Collaborative Project Extension Grant Narrative

April 24, 2006



Numerous programs and initiatives to create gender equity in the areas of Science, Technology, Engineering, and Mathematics (STEM) have been implemented only to lose effectiveness or fade away. Had these programs had the benefit of collaboration with other girl-serving projects, organizations and institutions, their capacity for continuation and/or broader impact could have been substantially increased. Collaboration, as an interactive process, enables professionals across projects and communities to generate and carry out creative solutions and strategies that maximize benefit beyond that which one project or community could accomplish alone.

The Northwest Girls Collaborative (NWGCP) experienced tremendous success during the 18 months of funding from the National Science Foundation. It provided many opportunities for representatives from various organizations, businesses and education in the region to come together at events, through mini-grant projects, and virtually through the Web site and listserv to work together to better serve girls and young women in STEM. In 2004, NSF funded the National Girls Collaborative Project (NGCP) with the purpose of extending the capacity, impact, and sustainability of existing and evolving girl-serving STEM programs by replication of the NWGCP Model in five regions across the United States. This current proposal describes a process for **extending and focusing** of the National Girls Collaborative Project model.

It is the intent of the expanded National Girls Collaborative Project to disseminate research-based best practices in informal learning environments (led by the Educational Development Center) and assessments and evaluation (through the Assessing Women in Engineering) that would further advance the work of existing and evolving girl-serving projects and provide a forum to share results. The goals of this extension project are to:

- 1. Maximize access to shared resources within projects and with public and private sector organizations and institutions interested in expanding girls' participation in STEM.**
- 2. Strengthen capacity of existing and evolving projects by sharing best practice research and program models, outcomes and products.**
- 3. Use the leverage of a network or collaboration of individual girl-serving STEM programs to create the tipping point for gender equity in STEM.**

This collaborative model includes a number of strategic activities including: implementation of collaborative model, dissemination and outreach, collaboration support, and research evaluation. Services will be delivered nationally via the American Association of University Women's (AAUW) regions. AAUW has a well-established track record of developing and supporting community-based programs. Their membership base and grassroots leadership structure provides a broad geographical reach to provide technical assistance and oversight to the expanded National Girls Collaborative Project.

The intellectual merit of this proposal lies in the use of the collaborative model to deliver research-based best practices to practitioners as well as the creation of a system for communicating implementation data to create a dialogue between practitioners and between researchers and practitioners.

The broader impact of this proposal is demonstrated by the combination of networks, organizations, educational institutions and community-based organizations engaging in structured activities designed to increase organizational capacity. Although there have been hundreds of girl-serving STEM projects and targeted strategies to close the gender gap in STEM, we may have not yet reached the tipping point that transforms these individual efforts into systemic, nation-wide change.

NATIONAL GIRLS COLLABORATIVE PROJECT: *Advancing the Agenda in Gender Equity for Science, Technology, Engineering, and Mathematics*

PROJECT OVERVIEW: Numerous programs and initiatives to create gender equity in the areas of Science, Technology, Engineering, and Mathematics (STEM) have been implemented only to lose effectiveness or fade away. Often these projects did not address sustainability as resources declined, personnel changed, or priorities shifted when original objectives were achieved. In other cases, STEM-related projects have had limited impact due to factors such as size, location and mission. Had these programs had the benefit of collaboration with other girl-serving projects, organizations and institutions, and tools to assess and evaluate the impact of their efforts, their capacity for continuation and/or broader impact could have been substantially increased.

In 2002, the Puget Sound Center for Teaching, Learning and Technology (PSCTLT) implemented the Northwest Girls Collaborative Project (NWGCP) in Washington and Oregon to address the complex issue of gender equity in STEM fields. The primary goals of the NWGCP were: 1) to identify leaders of existing organizations which involve and encourage girls in STEM-related activities and careers, and 2) to provide opportunities and incentives for collaboration. The NWGCP also established a resource exchange system to make more efficient use of existing educational and corporate resources.

The NWGCP experienced tremendous success during 18 months of funding from the National Science Foundation (NSF) and it has continued operating. The project provides many opportunities for representatives from various organizations, business, and education to come together at events, through mini-grant projects and virtually through the NWGCP Web site and listserv to better serve girls in STEM. At the 2003 NSF annual grantee meeting, a number of other grantees approached NWGCP Principal Investigators requesting implementation information to develop similar collaborations in their local regions, inspiring project leaders to consider replicating and expanding the program.

Collaboration, as an interactive process, enables professionals across projects and communities to generate and carry out creative solutions and strategies that maximize benefit beyond that which one project or community could accomplish. In 2004, NSF funded the National Girls Collaborative Project (NGCP) (HRD-0436264). The purpose of the NGCP is to extend the capacity, impact, and sustainability of existing and evolving girl-serving STEM projects and programs by replication of the Northwest Girls Collaborative Project Model in three states (California, Massachusetts, Wisconsin). The NGCP has been structured to bring organizations together to compare needs and resources, share information and plan strategically to expand STEM-related opportunities for girls. (Additionally, NSF has separately funded two projects using the NGCP model which operate as part of the current National project. The SouthCentral Girls Collaborative Project (HRD-0507881) is led by the Texas Center for Educational Technology at North Texas University and the Midwest Rural Urban Collaborative (HRD-0533581) is managed by Missouri State University and Drury University.)

This current proposal describes a process for **extending and focusing** of the NGCP model. Using the American Association of University Women (AAUW) regional framework to organize oversight and support, this project will implement and disseminate the strategies from the successful collaboration structure previously developed via the NWGCP and NGCP. The expanded National Girls Collaborative Project will utilize the leadership and expertise of additional partners: AAUW, Assessing Women in Engineering (AWE), and the Educational

Development Center (EDC) to disseminate research-based best practices in assessment and evaluation and informal education to further advance the work of existing and evolving girl-serving projects and also provide a forum to share results among practitioners and researchers. The goals of this extension project are to:

- 1. Maximize access to shared resources within projects and with public and private sector organizations and institutions interested in expanding girls' participation in STEM.**
- 2. Strengthen capacity of existing and evolving projects by sharing best practice research and program models, outcomes and products.**
- 3. Use the leverage of a network or collaboration of individual girl-serving STEM programs to create the tipping point for gender equity in STEM.**

UNIFIED PROGRAM OF CHANGE: There is a startling lack of women in STEM professions, beginning as early as eighth grade when twice as many boys than girls show an interest in STEM careers (Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development, 2005) and continuing to college, where women received only 21% of Bachelor's degrees awarded in engineering, 27% in computer sciences, and 43% in physical sciences (National Science Board, 2006). Factors such as perceptions of careers, confidence, role models, and career advice have been noted in the literature as contributing to the lack of females in Information Technology (Bartol & Aspray, 2006). Women constitute 45% of the workforce in the U.S., but hold 25% of science and engineering jobs and 29% of computer and mathematical occupations (US Census, 2000).

The NGCP collaborative model aims to efficiently decrease the gender gap in STEM opportunities and activities by effectively leveraging public and private resources, reaching girls early enough that there is time to counteract the forces which turn them off to careers in STEM. Many coalitions and collaborative projects have accomplished these types of outcomes when addressing complex societal issues (Jackson & Clark, 1996). Research suggests that coalition building assists in carrying out the educational plan: broadening the development of new audiences, reporting the results of member activities through media, and improving the educator's capacity for providing information to citizens, interest groups, and policy-makers. Furthermore, collaboration and cooperation have become vehicles for sustainable outcomes by affecting the "tipping point." Gladwell (2000) describes the tipping point concept as the point at which small, targeted strategies or activities that happen unsystematically become widespread, causing a cultural shift that drives systemic and inherent change. The key is knowing how to apply the appropriate leverage and influence to make a bigger difference. The same analysis can be applied to gender equity in STEM. Although there have been hundreds of girl-serving STEM projects and targeted strategies to close the gender gap in STEM, we may have not yet reached the tipping point that transforms these individual efforts into systemic change. For instance, in spite of many years of efforts, we remain at approximately 20% representation of women studying engineering at the undergraduate level (Engineering Workforce Commission, 2005).

The tipping point for any idea or change can be affected by numerous variables including strength of message and context (Gladwell, 2000). A goal of the NGCP is to use the leverage of a collaboration of girl-serving STEM programs to create the tipping point for gender equity in STEM. The NGCP model is a tool which provides accountability for change to occur. This collaborative model includes a number of strategic activities summarized below.

1. **Implementation of Collaborative Model:** Train and mentor regional participants in how to create STEM-related collaborations and assist these collaborative networks in creating action plans which utilize research-based best practices in the areas of informal learning and evaluation and assessment.
2. **Dissemination and Outreach:** In partnership with regional and professional organizations, document and promote coordination and collaboration among girl-serving STEM programs throughout the United States and Puerto Rico by implementing an on-going communication system linking these organizations.
3. **Collaboration Support:** Offer mini-grants to a minimum of 800 girl-serving STEM-focused programs as an incentive to collaborate and to assist in informal learning and assessment and evaluation activities and projects.
4. **Research Evaluation:** Conduct evaluation of the NGCP to determine effectiveness of collaboration and the impact of collaboration and implementation of STEM research-based best practices at national, regional, and local levels.

EFFICACY OF NATIONAL GIRLS COLLABORATIVE PROJECT MODEL: The NGCP collaborative model has shown its effectiveness through increased collaboration and mini-grant projects with sustained results. Success of the NGCP has been demonstrated via activity evaluations and collection of regional collaborative performance data. Analysis of kickoff demographic data shows that 38% of participants come from non-profit organizations, 26% are K-12 teachers, and 19% are higher education STEM faculty or program staff. Forum evaluations indicate that participants most valued the opportunities for networking and learning about girl-serving STEM programs in their region. (See www.pugetsoundcenter.org/ngcp.)

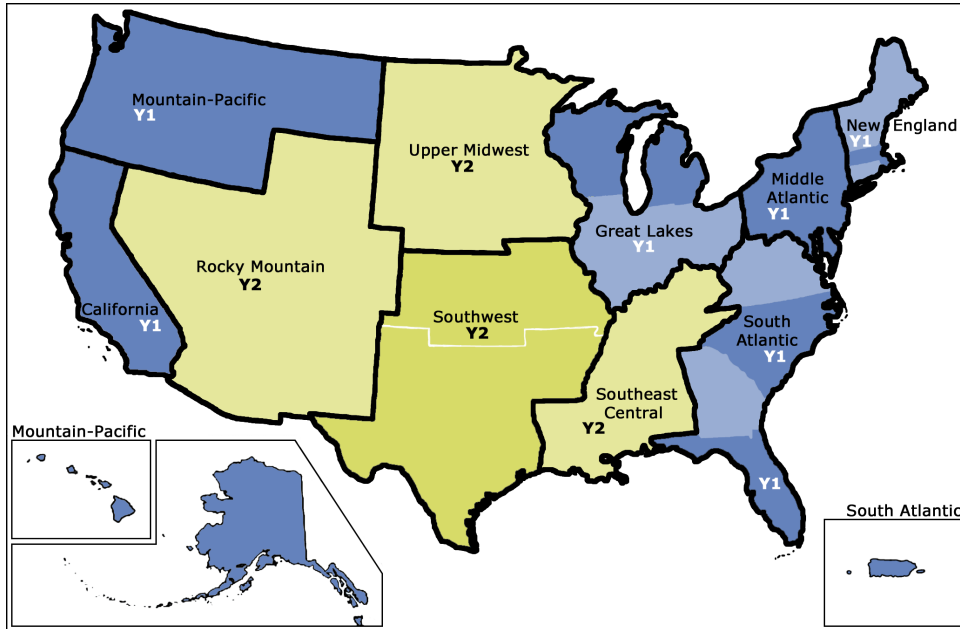
The current NGCP informs the proposed extension service. Through systemic formative assessment measures, the model has been refined and improved throughout implementation. For example, we have evidence that a regional approach makes the most sense in terms of broad impact. We have also seen that practitioners do not have access to best practices and such information needs to be provided within a structure that adds value to the work they are doing.

SCOPE OF EXTENSION SERVICE:

Community: The organizations and individuals involved in the extension service are deeply immersed in the field of gender equity and STEM and are experienced in providing services to practitioners. PSCTLT has extensive experience delivering services via the NWGCP and the NGCP in six regions. PSCTLT has developed a broad understanding of the networks serving girls and young women in the STEM field, including girl-serving organizations, K-12 education, higher education, and business and industry.

Geography: The expanded NGCP is designed to reach girl-serving STEM organizations across the United States and Puerto Rico. The AAUW regional framework will be used to organize oversight and support. Each of their 10 regions will manage between 1 and 3 collaboratives. Collaboratives consist of one or more sponsoring organizations (non-profit, community-based organization, higher education institution, industry partner). The geographical boundaries of the collaboratives within each AAUW region are created by the collaborative partners. In Figure 1 below, AAUW regions are identified with Year 1 implementations in blue and Year 2 implementations in yellow. Table 1 lists the sponsoring organizations which have been chosen via the RFP process described in this proposal.

Figure 1: Map of Year 1 and Year 2 Collaboratives



Regional Coordination and Technical Support: Since 1881, the AAUW has been the nation's leading voice promoting education and equity for women and girls. Through the decades, AAUW has prospered by focusing on this simple message—educating girls and women helps individuals, families and society. With more than 100,000 members, 1,300 branches, and 500 college and university partners, AAUW provides a powerful voice for women and girls across the nation. AAUW offers programs and scholarships with a special emphasis on the pioneers seeking to establish a place for girls and women in non-traditional fields. In 2004, AAUW produced *Under the Microscope: A Decade of Gender Equity Projects in the Sciences*, which examines over 400 gender equity projects funded by AAUW and/or NSF and extrapolates lessons for future efforts to promote STEM to girls and young women.

AAUW's membership base and grassroots leadership structure provides a broad geographical reach to provide technical assistance and oversight to the expanded NGCP. Moreover, research and program staff are well positioned to reach out to a diverse community of educators and students through its national networks of educators, college and university members, equity activists and student leaders. AAUW also has the capacity to reach beyond those directly linked to the organization. It is this intimate knowledge of the dynamics of community programs that informs and guides AAUW and places AAUW at a unique vantage point in the execution of this project.

RATIONALE FOR A NATIONAL SCOPE: After piloting the regional collaborative model in the Northwest and expanding to five regions in the United States, implementation of a fully nationwide project is the next natural step for the National Girls Collaborative Project. The regional collaborative model has demonstrated effectiveness in building regional networks of practitioners, educators, and business. The more organizations that are involved in collaboratives, the greater the potential for creating widespread change for girls in STEM. To date, the NGCP has engaged over 300 organizations and individuals through kickoff events and forums and

distributed 40 mini-grants to encourage collaboration. Currently there are over 250 organizations registered in the NGCP program directory.

Several improvements have been made from the current NGCP model: 1) to utilize regional liaisons who reside in the region they serve, instead of members of the national leadership team filling this role, and 2) increased application processes for local host organizations. The host organizations are critical to the success of the NGCP extension. It can be most effective if it fits with work the host organization is already conducting and aligns with their overall mission and goals. The local collaboratives selected for this proposal fit this description and have a wealth of experience working with girls and women and/or in STEM and will bring their own expertise and networks to the NGCP, significantly adding to the efforts of the national project.

Table 1: Oversight Regions and Local Collaboratives

AAUW Region/States	Local Collaboratives	Year
California	• CALGirls Collaborative: UC-Davis, Edward Teller Education Center, UC-Riverside, Lawrence Livermore Laboratory	Y1
Great Lakes: IL, IN, MI, OH, WI	• Great Lakes Collaborative: Wisconsin Department of Public Instruction, U. of Michigan	Y1
New England: CT, ME, MA, NH, RI, VT	• Girls Get Connected Collaborative: Simmons College, Wentworth Institute of Technology	Y1
	• The Maine Girls Collaborative (MeG): Univ. of Maine	Y2
Middle Atlantic: DC, DE, MD, NJ, NY, PA	• Middle Atlantic Initiative for Girls: U. of Maryland, Center for Women in Technology	Y1
	• The Ophelia Project	Y1
South Atlantic: FL, GA, NC, SC, VA, PR, WV	• Florida Girls Get IT Initiative: Florida Distance Learning Consortium, Tallahassee Community College, Cisco	Y1
	• Science House Girls Collaborative: N. Carolina State	Y1
	• Puerto Rico: U. of Puerto Rico	Y2
Mountain-Pacific: AK, HI, ID, MT, OR, WA	• Pacific Northwest Girls Collaborative: Diversity in Technology Group	Y1
Upper Midwest: IA, MN, NE, ND, SD		Y2
Rocky Mountain: CO, UT, WY, NM, AZ, NV		Y2
Southeast Central: MS, AL, KY, LA, TN		Y2
Southwest: MO, KS, AR, OK, TX	• SouthCentral Girls Collaborative: U. of North Texas	Y2
	• Midwest Rural Urban Collaborative: Missouri State, Drury University, Kansas State University	Y2

INTELLECTUAL SPECIALIZATIONS: The NGCP will disseminate research-based best practices and resources in **two** areas: **Informal Learning Environments** and **Evaluation and Assessment**, both identified as areas of high need by the NWGCP and NGCP. The intellectual specializations will build the capacity of girl-serving organizations, education, and businesses to provide high-quality informal learning environments for girls in STEM and to effectively evaluate and assess their efforts. Using the regional collaborative model and training, technical assistance, and mini-grants, we will disseminate best practices and resources and provide each of the local collaboratives with mini-grants to ensure successful implementation. Michael Patton

(2001) describes best practices as lessons learned from local knowledge about successful and measurable practices that is converted to universal knowledge about what works.

The intellectual specialization areas were chosen based on lessons learned from practitioners in the field via NWGCP and NGCP as well as current research. While high-quality research and development has been accomplished in these areas, it is not effective in reaching the field of practitioners and a clear feedback loop has not been developed (Kennedy, 1997). In order to accomplish this, a broad dissemination plan which includes follow-up assistance and support and reaches a large number of organizations and individuals will provide the greatest impact. A select group of content providers will participate in the Collaborative Project Institutes, individual collaborative activities, and provide ongoing resources and technical assistance to all participants.

Informal Learning Environments Specialization: Informal learning approaches include structured and unstructured activities housed in schools, community centers, universities, business offices, and museums. The NSF Directorate for Education and Human Resources (2005) describes informal learning as “self-directed, voluntary, and motivated mainly by intrinsic interests, curiosity, exploration, and social interaction.”

The majority of NGCP collaborative participants have been involved, either directly or indirectly, in informal learning efforts. Informal learning has the potential to significantly impact girls in STEM, but increased access to best practices and resources is needed. Informal learning environments offer a unique and exciting opportunity to pique students’ interest in a STEM field and to provide hands-on, collaborative experiences that have been shown to be especially effective with female students. These environments are also an opportunity to tailor the learning environment for girls, including exploration of new ideas, active, intelligent engagement with concerned adults and other students, and consciousness-raising about gender, race, and class issues (Fancsali, 2002).

Research on informal learning programs shows consistent participation in high-quality programs can increase engagement in learning, promote educational equity, and develop the key skills necessary for success in today's economy (Miller, 2003). Research has also demonstrated that key elements of high-quality, out-of-school time programs include caring relationships, relevant, challenging experiences, high expectations and standards, opportunities for voice, choice and contribution, and personalized, high quality instruction (Hall, Yohalem, Tolman & Wilson, 2002).

The EDC will serve as the lead for dissemination of best practices, training, and technical assistance. For more than four decades EDC has been a pioneer, building bridges among research, policy, and practice. Award-winning programs and products are developed in collaboration with partners around the globe. EDC is a recognized leader in delivering professional development, including bringing research to the field to inform practice. EDC houses the ITEST (Information Technology Experiences for Students and Teachers) Learning Resource Center, funded by NSF, which recently hosted a national Web cast on the topic of engaging girls and women in STEM education and the future scientific and technological workforce.

Evaluation and Assessment Specialization: The NWGCP and NGCP consistently found evaluation and assessment to be a significant need for girl-serving STEM programs. Programs are challenged to effectively assess impact and are in need of research-based practices to help them. To build capacity in this area, the NGCP will provide best practices to girl-serving programs to support and improve their evaluation and assessment efforts. Inverness Research Associates will assist in the dissemination of best practices, training and technical assistance related to evaluation

and assessment, bringing to the project a wealth of experience in evaluation of informal learning environments and STEM-related initiatives. Guidance will also be provided based on what research has shown to be the critical elements to evaluate in an informal learning setting, such as relationships, content quality, instructional methods, and environment (NIOST, 2005; Birmingham, Pechman, Russell & Mielke, 2005).

The Assessing Women in Engineering Project (AWE), a research-based assessment project specific to girls and women in STEM, will be included as a best practice in evaluation and assessment (HRD-0120642). The AWE Project created products that allow diversity outreach program personnel to conduct valid and reliable assessment of their typical activities (see <http://aweonline.org>). AWE used a sound process based on educational measurement theory to develop and disseminate survey instruments and data gathering, analysis and reporting tools for pre-college and undergraduate-level activities designed to recruit women into engineering. These AWE tools offer several advantages to the targeted audience of this extension proposal.

- Tools are already in use by numerous users¹ allowing for the potential of nationwide meta data that will contribute to understanding of STEM focused initiative best practices.
- Tools are available in pre- and post-test versions designed to collect data on specific activity objectives for pre-college outreach activities (e.g. educate participants on what engineers do) and are customizable to allow for assessment of unique program objectives.
- Tools are supported by data collection and analysis templates that allow users to produce reports for stakeholders and other interested personnel.
- Existing workshop materials are available to be customized for informal learning environments.

Because assessment requires users to examine the intended objectives for programs, the use of AWE products coupled with support and professional development will help program staff approach program development systemically, improve programs, make resource allocations decisions, and gain visibility via high quality data.

Further dissemination of AWE tools via the NGCP will have a positive impact on assessment capacity building. To specifically support this extension project, Co-PI Rose M. Marra (PI of AWE project) will work with local collaboratives to further identify assessment needs and objectives of the outreach activities. Based on this needs assessment, Dr. Marra will work in conjunction with consultant Barbara Bogue (CO-PI for AWE) to modify the existing AWE pre-college instruments, as well as existing AWE workshop materials. The dissemination and implementation of high quality assessment tools will provide the basis for national-level assessment of these critical issues. Further, online data collection instruments will allow for more easily collected and analyzed data further enabling this impact.

Additional resources will be selected from the fields of evaluation and assessment, informal learning evaluation (including out-of-school time program evaluation), and specific STEM content areas. We will include a research-based, self-assessment tool for girl-serving STEM programs, developed by the NWGCP, so programs can assess activities based on key components (Northwest Girls Collaborative Project, 2005). Other potential resources include the Kellogg Foundation Evaluation Handbook, OERL resources, ITEST Learning Resource Center, UPCLOSE, (www.informalscience.org), and the Harvard Family Research Project.

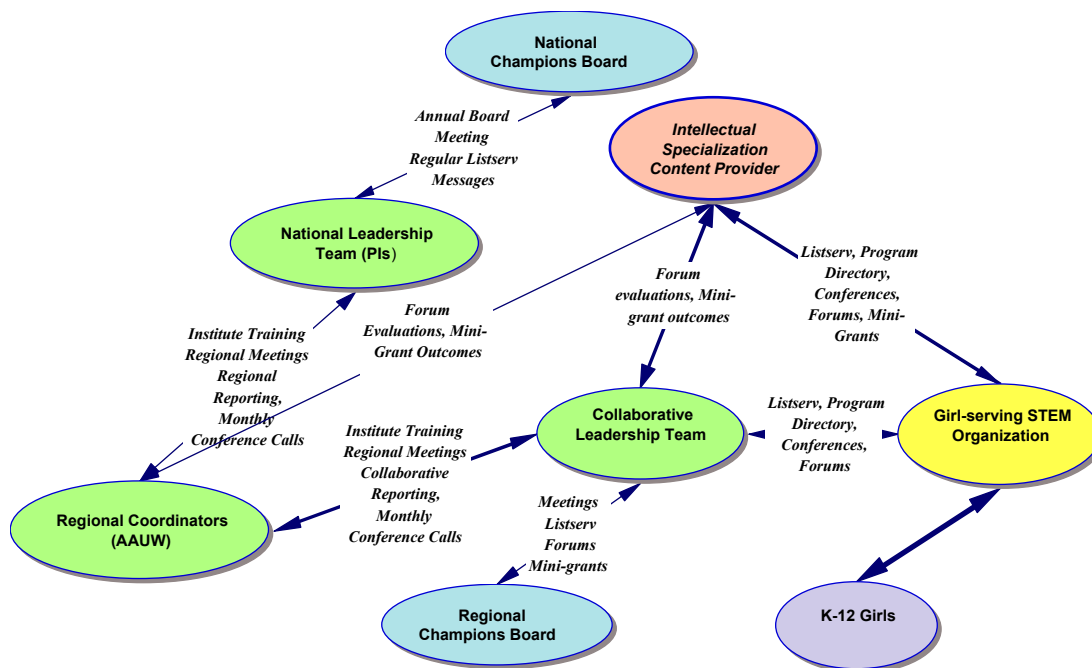
¹ In a recent data collection, the AWE project had over 200 registered users and approximately 50 users reported using the AWE tools.

Intellectual Specialization Implementation Process: The NGCP is using previous NSF grantee work, paying particular attention to practices documented in *New Formulas for America's Workforce: Girls in Science and Engineering* (2003), as part of our dissemination of resources. We will consider best practices resulting from work of collaborative partners along with work reviewed and endorsed by others, such as the National Academies and the Association of Science-Technology Centers (ASTC). Best practices must be research-based, pilot-tested, and include evaluation data.

A panel of expert researchers and practitioners from the NGCP team, advisors, and the National Champions Board will be convened to review and make decisions on the final selection of research-based best practices. Upon implementation, the model provides a structure for a continuous feedback loop (iterative process) as collaboratives and programs use practices and resources selected for the project. As a result, the NGCP is in a perfect position to serve as a link to provide best practices to practitioners and, equally important, feedback to researchers from the field.

Inclusion of content provider organizations adds a deep layer of support for local collaboratives. Experts in the field will assist in the dissemination of best practices and will increase capacity for dissemination and technical assistance. Exposing practitioners to best practice models is a critical first step, but follow-up assistance will increase the chances of the best practices being used effectively. Equally important is the feedback the practitioners will provide to content providers and researchers regarding the best practices they implement. Opportunities to do this through in-person events, mini-grant evaluations, and the Web site will be crucial to the advancement of knowledge in the field.

Figure 2: National Girls Collaborative Project Framework



Training/Presentation/Dissemination at Collaborative Project Institute: Intellectual specialization content providers will present at the Collaborative Project Institute to familiarize local collaborative staff with research-based tools and practices in the specialization areas.

Dissemination via Collaborative Events, Activities, and Publications: Locally, each collaborative will disseminate research-based best practices at regional events and activities. To support, expand, and disseminate the work of the NGCP, EDC will host three Web casts per year that showcase the work of NGCP participants and provide resources from other related initiatives and organizations. The Web casts will enable participants from across the country to connect, collaborate and learn, and will also disseminate the work of NGCP. The Web casts will be archived on the Internet and linked to and from the NGCP Web site.

AAUW, EDC, and PSCTLT will create publications to be disseminated in print and online format. We have found that creation and promotion of follow-up publications from an event are an important element of developing and expanding a community of practice and of reaching a wide audience. Publications will include three per year, one based on each Web cast, and a summary guidebook publication of success strategies and practices in the third year of the program. AAUW will produce a special edition of its monthly publication, Outlook, focusing on the work of the NGCP. In addition to EDC and AWE, the project team has identified the following partner organizations to assist with dissemination. Support letters from many of these organizations are provided.

- American Association for the Advancement of Science (AAAS)
- American Indian Science and Engineering Society
- The Exploratorium
- Girl Scouts of the USA
- NASA/Space Science and Engineering Center at UW-Madison
- National Council of Teachers of Mathematics
- National Science Teachers Association (NSTA)
- National Society of Black Engineers
- Society of Chicanos and Native Americans in Science
- Society of Hispanic Engineers
- Society of Women Engineers (SWE)
- Women in Engineering Programs and Advocates Network, Inc.

Mini-Grant Partnerships: Mini-grant recipients in each collaborative region will partner to implement best practices either in evaluation and assessment or informal learning. A sample of mini-grants will be chosen to be studied in-depth, including interviews with project coordinators, observation of project activities, and follow-up regarding implementation and outcomes of best practices. The implementation process and outcomes will be evaluated to further advance knowledge in the field. Integrated in the mini-grant process will be the opportunity for practitioners to provide feedback regarding the best practices they use. The feedback process will occur through the evaluation of the mini-grants as well as through the NGCP Web site and events.

SAMPLE MINI-GRANT SCENARIO:
An after-school science club for middle and high school girls is looking for methods to effectively assess the impact on participants. After attending a collaborative 'best practices' forum, the club staff chooses to implement two practices: 1) administer the middle and high school AWE student survey and 2) conduct focus groups with participants. The club enlists the help of a local graduate student with evaluation knowledge. Mini-grant funds are used to pay the student a small stipend for her time to conduct focus groups, train the club staff to conduct focus groups and to cover the costs of printing participant surveys. The after-school club now has data to use to improve their program.

Ongoing Best Practice Distribution via Collaborative Communication Network: Each regional collaborative will continually disseminate best practices through their regional networks, at events, through the listserv, Web site, and mini-grants.

Program Directory and Web site: The NGCP will expand the current Program Directory to house the best practices and resources approved by the expert panel. Collaborative participants will have access to the practices as well as additional information provided by the content providers and researchers involved in the development and dissemination of the best practices. This section of the Web site will provide a feature soliciting feedback from practitioners on the implementation of the practices in their communities.

These implementation activities will strengthen the development of a community of practice that truly existing best practices, identifies rich resources for girls in STEM across the nation, and builds regional and national leadership collaboratives.

EXTENSION METHODS, ACTIVITIES, AND PRODUCTS

Institutes, Conferences, and Forums: Regional collaborative leadership teams will attend a three day Collaborative Project Institute at a central location in Year 1 or Year 2. Leadership teams from ten collaboratives will be trained each year for a total of 20 collaborative teams. Workshops and activities will be focused on delivery structure and best practice implementation. Staff will introduce the mission and timeline for the national project and showcase programs representing best practices. Locally, each region will conduct two conferences and three forums. Forums and conferences will be linked interactively with remote sites in each region through video conferencing and Web site tools.

Regional Technical Support: AAUW Regional Coordinators will provide technical expertise to assist collaboratives in planning and implementing the conferences and forums used to deliver research-based best practices. A position description is provided in the supplementary documents for this proposal.

Program Directory: The online Program Directory serves as a vehicle for facilitating communication between organization, promoting opportunities for collaboration and providing information about relevant research and opportunities.

Mini-Grants: The mini-grants are incentives for projects to collaborate and engage in training and implementation of best practices in one of the intellectual specialization areas. The NGCP will award mini-grant funds to 20 girl-serving STEM programs within each region (**for a total of 400 individual projects**) using the process developed in the NWGCP and NGCP with modification for focus on informal learning environments or evaluation and assessment best practices. Mini-grant applicants may include: STEM partnership programs, tribal schools, and public and private schools with high underserved populations, community and not-for-profit organizations serving girls in after school and summer enrichment programs. Each applicant will submit a three page project proposal, including project description and roles, intellectual specialization area, goals and objectives, and assessment strategy. Screenshots from the current mini-grant application tool, application rubric, and sample mini-grant project descriptions are included in the supplementary materials.

Recruitment of Local Collaboratives: An intense recruitment and selection process began Fall 2005 to identify sponsoring organizations to lead the local collaboratives. The complete Request for Proposal is included in the supplementary documents. This same process will be used to identify the remaining Year 2 local collaborative leads.

Year One Local Collaboratives: The organizations selected to host local collaboratives (see Table 1) are impressive in their knowledge, experience, and diversity. They vary in focus areas and populations served, and share a common goal of increasing gender equity in STEM fields.

As a group, the local collaboratives have an extensive network of organizations and individuals engaged in pursuing this goal and the opportunity to share with and learn from each other. Three of the Year 1 local collaboratives are described below; a complete set of local collaborative organization descriptions and can be found in the supporting materials.

Middle Atlantic Initiative for Girls: *The Center for Women and Informational Technology (CWIT), Claudia Morrell, Executive Director.* CWIT is dedicated to providing global leadership in achieving women's full participation in all aspects of information technology. Claudia Morrell has experience serving as a Co-PI on several NSF projects, including the ESTEEM grant (ESI-0422703). Ms. Morrell provided leadership in the development of the Women and IT Video project (HRD-0404813) which led to the creation of the video *You Can Be Anything*, awarded the prestigious Gold World Medal for 2004, Best Original Music/Lyrics and a Silver World Medal for Motivation by the New York Festivals, and disseminated internationally to thousands of users. Ms. Morrell is co-PI on a Gender in Science and Engineering (HRD-0429084) proposal supporting the research of UMBC faculty investigating the relationship between technology use, gender, self-efficacy and career choice.

The Science House Girls Collaborative: *North Carolina State University, Dr. Sharon Schulz, Associate Director.* The Science House is the K-12 outreach arm for the College of Physical and Mathematical Sciences at North Carolina State University. For the past 15 years the Science House has worked to increase the number of students entering STEM fields by helping teachers become more knowledgeable in mathematics and science, offering programs that support students directly, and by focusing attention on rural areas and minority students. All outreach personnel have degrees in science as well as K-12 teaching experience, and are focused on building bridges between teachers, students, and scientists.

Florida Girls Get IT Initiative: *The Florida Distance Learning Consortium, Dr. John Opper, Executive Director.* The Florida Distance Learning Consortium is working in collaboration with the Cisco Systems, Inc. and the Cisco Learning Institute on an international gender initiative. This partnership developed the Gender Initiative project which seeks to increase females' access to IT training and career opportunities. The Florida Distance Learning Consortium and Cisco Systems, Inc. have partnered with four regional pilot sites to launch the *Girls Get IT!* Initiative in their service areas.

ADVISORY GROUP: NATIONAL CHAMPIONS BOARD: An early grant activity will be to convene the National Champions Board. Board members were selected to give the project a balance of desirable expertise and regional representation, including industry representatives, informal learning educators, gender equity experts, science and mathematics education representatives, and educational policy experts. Champions Board member support letters are included in the supporting documentation section of this proposal. Board members are:

- *Celeste Baine, Director, Engineering Education Service Center*
- *Laurie Benson, CEO, Inacom Information*
- *Bonnie Dunbar, CEO, Museum of Flight*
- *Mary Darcy, Producer/Host "51%", WAMC National Productions*
- *Ruthe Farmer, Project Manager, Fair Play, Girl Scouts of the USA*
- *Barbara Gault, Ph.D., Vice President/Director of Research, Institute for Women's Policy Research*
- *Sherry Hsi, Ph.D., Director of Research and Evaluation, Exploratorium Center for Learning and Teaching*
- *Eric Iversen, Manager for Outreach, American Society for Engineering Education*

National Girls Collaborative Project

- Lisa A. McNew, CEO, Alliance of Technology and Women
- Mylene Padolina, Senior Diversity Consultant, Microsoft Corporation
- Rosalyn Pertzborn, Director, Office of Space Science Education, UW-Madison
- Donna Gerardi Riordan, Director of Projects, California Council on Science and Technology
- Stacey Roberts-Ohr, National Coordinator, Expanding Your Horizons
- Betty Shanahan, CEO, Society of Women Engineers
- Candace Williams, Student, Claremont-McKenna College

Timeline of Major Activities: Implementation timelines are outlined below for regional collaboratives and the national extension team (including NGCP staff, regional liaisons and content providers). The timeline for Year 1 collaboratives is provided. Year 2 collaboratives follow the same schedule, beginning in 2007.

Timeline for Year 1 Regional Collaboratives (6-month time periods for 3 years)

Activity	8/06-1/07	2/07-7/07	8/07-1/08	2/08-7/08	8/08-1/09	2/09-7/09
Project funding begins	X					
Project Institute	X					
Leadership Team Meetings	Ongoing					
Champions Board Meetings	X	X	X	X	X	X
Kick-off conference		X				
Topic Forums			X	X	X	
Mini-grants			X	X		
Evaluation activities	Ongoing					
Culminating event						X

Timeline for National Support Team (Year 1 in two 6-month time periods, followed by years)

Activity	8/06-1/07	2/07-7/07	Y2	Y3	Y4	Y5
Project funding begins	X					
Leadership Team Meetings	Ongoing					
Conduct Project Institute	X		X			
Regional program directories created	X		X			
Champions Board Meeting		X	X	X	X	X
Expert Panel meeting	X		X			
Technical assistance to collaboratives	Ongoing					
Web casts and web cast publications		X	X	X	X	X
Evaluation activities	Ongoing					
Mini-grant case studies				X	X	X
Final Report Due						X

LEADERSHIP TEAM: Principal Investigators include two members from the current NGCP, Karen Peterson and Brenda Britsch. Rose Marra, University of Missouri and Elena Silva, Director of Research, AAUW Educational Foundation will also be on the leadership team. Management of this project will be collaborative. Members of the leadership team will collectively make policy and logistical decisions affecting the entire project and consult the Champions Board as needed. This group has already worked together on smaller projects and is an effective virtual team.

Karen Peterson has been PI on both the NWGCP and the NGCP. She is Executive Director of the Puget Sound Center, Director of TechREACH, an after-school program in STEM for girls funded by the Bill and Melinda Gates Foundation, manager of two Department of Education grants, and Board member of SMARTgirls, a non-profit, all volunteer, Seattle-based organization which develops and administers programs designed to increase girls' interests in mathematics, science and technology. Additionally, she was part of the management team for the NSF-funded Washington State Gender Equity project, which created a program designed to institutionalize gender equity practice in the teacher education programs in the State of Washington. Ms. Peterson has played a leadership role in developing the PSCTLT diversity initiatives.

Brenda Britsch is a Senior Program Advisor at the Northwest Regional Educational Laboratory. Her work focuses on research, evaluation and program development for community-based organizations and educational institutions, with particular focus on out-of-school time learning and gender equity. She is a part of the National Partnership for Quality Afterschool Learning, a national initiative funded by the U.S. Department of Education aimed at integrating informal learning experiences into afterschool programming, specifically math, science and technology. Dr. Britsch received a PhD from the UC-Santa Barbara, with an emphasis in Human Development, focusing on gender issues. She is active in research and advocacy relating to Title IX legislation.

Rose Marra, Assistant Professor, School of Information Science and Learning Technologies, University of Missouri. Dr. Marra's primary teaching areas include assessment and evaluation of instructional innovations, instructional design and effective uses of technology for K-12 teachers. Prior to joining the faculty at the University of Missouri, she was the Director of Engineering Instructional Services in Penn State University's College of Engineering. Dr. Marra worked with college faculty to develop curricula, introduce effective uses of technology into engineering classrooms, and assess the effects of these educational changes on student performance. In 1998, Dr. Marra was a member of the Penn State team awarded the Boeing Outstanding Engineering Educator award for the nation's best example of an engineering curriculum responding to the needs of the 21st century. Dr. Marra has done significant work in the areas of developing effective and accessible learning environments for women, minorities and other underrepresented groups. With colleagues from Penn State University, she has authored and developed an internationally distributed video (*In Their Own Words*) and workshop for helping faculty to become aware of learning environment issues (<http://www.engr.psu.edu/ITOW>).

Elena Silva, Director of Research, AAUW Educational Foundation. For the past 10 years, Silva has researched, taught, and developed educational programs and curriculum for universities, community colleges, and national and community-based nonprofits. Previously, she directed a national youth leadership program for the ASPIRA Association in Washington, D.C., as a board member for the National and Community Service Coalition and as a representative for the U.S. Senate Task Force on Hispanic Education. Dr. Silva has authored and presented research papers for numerous national and local forums, including the Coalition for Essential Schools and the American Educational Research Association. She is editor of the 2003 book *Critical Voices in School Reform: Students Living Through Change* and contributing author to a forthcoming book on educational politics and reform. Dr. Silva holds a doctorate in education from University of California, Berkeley, where she specialized in socio-cultural studies and school policy reform.

EVALUATION PLAN: The project evaluation will focus on the effectiveness of the NGCP model implementation on two levels 1) the national collaboration network, and 2) regional collaboration networks. To measure the impact of the NGCP model, to improve project activities and to report to NSF, we will investigate the following questions:

Goal #1: Maximize access to shared resources within projects and with public and private sector organizations and institutions interested in expanding girls' participation in STEM.

- a. How effectively are local collaboratives using communication system resources provided by the NGCP?
- b. How do communication system resources impact collaboration at the national and regional levels?
- c. Is training from the national level effective in helping local collaboratives successfully implement the NGCP model?

Goal #2: Strengthen capacity of existing and evolving projects by sharing best practice research and program models, outcomes and products.

- a. How is information on effective practice and research affecting program capacity?
- b. How are national and local collaboratives providing access to shared resources, and do these practices effectively reach those who need the resources?
- c. How effective is the NGCP model at creating dialog between researchers and practitioners?

Goal #3: Use the leverage of a network or collaboration of individual girl-serving STEM programs to create the tipping point for gender equity in STEM.

- a. How does implementation of the NGCP model impact collaboration for girl serving STEM programs?
- b. Are current STEM programs strengthened by an infusion of shared best practices by the collaborative?

Evaluation activities will include a review of local collaborative monthly reports, surveys, and site observations. Regional collaboratives will evaluate events and the national team will synthesize this data across regions. Mini-grantees will complete a project evaluation focused on best practices implementation and a sample of mini-grant projects will participate in an in-depth case study. Formative information will be collected continuously as site liaisons have ongoing communication with their collaboratives and provide feedback to the national team. Implementation of best practices will be monitored closely by regional collaboratives and practitioners will contribute feedback on the implementation in-person at regional events and online in the Program Directory. A project logic model is provided on the next page.

POTENTIAL IMPACT: The proposed work will increase the capacity of the organizations involved to provide higher quality services to girls and young women in STEM. Individuals and organizations will benefit from the knowledge, resources, and expertise provided by participants, including girl-serving organizations, K-12 education, higher education, informal education, and professional organizations, leading to a stronger link between research and practice, greater implementation of best practices, and more effective services overall. Preliminary contacts suggest the following participant numbers: 400 mini-grants x 2 organizations = 800 girls serving organizations + their clients, 20 local collaboratives of two or three managing organizations, girl-serving STEM organizations participating in regional activities, Regional and National Champions Board, Institute trainers, AAUW Regional Coordinators and staff, AAUW Chapters and members, over 20 professional organizations such as AAUW, SWE, and others.

National Girls Collaborative Project Logic Model

Goals	Resources	Activities	Outputs	Outcomes
<p>Maximize access to shared resources within projects and with public and private sector organizations and institutions interested in expanding girls' participation in STEM.</p> <p>Strengthen capacity of existing and evolving projects by sharing best practice research and program models, and program models, outcomes and products.</p>	<ul style="list-style-type: none"> • Videoconferencing technology • Project Web site and listserv • Web-based communication system • Monthly conference calls (between site liaisons and regional coordinators and between site liaisons and national staff) • NGCP model • Research and tools on best practices in informal learning and evaluation and assessment • Research on gender equity in STEM • Replication Guide 	<p>Dissemination and Outreach:</p> <ul style="list-style-type: none"> • Establish an ongoing communication system linking organizations <p>Implementation of Collaborative Model:</p> <ul style="list-style-type: none"> • Assist participants in collaborating and developing action plans to best meet the needs of girls in STEM • Number and diversity of organizations providing resources <p>Research Evaluation:</p> <ul style="list-style-type: none"> • Determine effectiveness and impact of collaboration on STEM related activities and provide recommendations for improvement <p>Implementation of Collaborative Model:</p> <ul style="list-style-type: none"> • Train, and mentor regional participants to create STEM collaborations • Provide best practices, models, and assistance with implementation 	<ul style="list-style-type: none"> • Program Directory of girl-serving STEM programs • Communication system linking organizations • Avenues of collaboration • Organized access to resources • Library of best practices research and resources • Project evaluation results • Collaborative network of STEM-related programs and services to girls • Collaborative Project Institutes (2) • Two conferences and three forums in each region • Outputs of mini-grants • Culminating Conference • Project evaluation results • Conference presentations 	<ul style="list-style-type: none"> • Program Directory supports increased collaboration and resource sharing • Organizations have a greater number of connections to schools and businesses to promote gap-closing activities in STEM • More efficient use of existing educational and corporate resources • Increased resources support collaboration, assessment, and STEM activities • Project evaluation provides recommendations for improving collaboration and determines the impact of project efforts • Replication Program Guide supports increased development of STEM collaboration networks • Collaborative networks of girl-serving STEM programs established in the regions • Increase in knowledge and use of best practices among girl-serving STEM organizations • Organizations use communication system developed for collaboration purposes • Strategic policies and practices identified and shared • Regional collaborative organizations institutionalize project
<p>Use the leverage of a network or collaboration of individual girl-serving STEM programs to create the tipping point for gender equity in STEM.</p>	<ul style="list-style-type: none"> • 400 Mini-grants • Web-based communication system, videoconferencing • Monthly conference calls • Research on collaboration • National and regional Champions Boards • All NGCP organizations and individuals 	<p>Collaboration Support: Mini-grants to a minimum of 400 girl-serving STEM programs</p> <p>Research Evaluation</p> <p>Dissemination and Outreach: Establish ongoing communication system for collaborating organizations</p>		

References

- American Association of University Women (2004). *Under the Microscope: A Decade of Gender Equity Projects in the Science*. Washington, DC: Author.
- Bartol, K.M. & Aspray, W. (2006). The transition from the academic world to the IT workplace. In J. McGrath Cohoon & William Aspray (Eds.) *Women and information technology: Research on underrepresentation* (pp377-419). Cambridge, MA: The MIT Press.
- Birmingham, J., Pechman, E. M., Russell, C.A., Mielke, M. (2005, November). *Shared features of high-performing after-school programs: A follow-up to the TASC evaluation*. Policy Studies Associates. Retrieved on April 24, 2006, from <http://www.tascorp.org/publications/catalog/psa>
- Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development (2000, September). *Land of Plenty: Diversity as America's Competitive Edge in Science, Engineering and Technology*. Arlington, VA: National Science Foundation. Retrieved on April 19, 2006, from http://www.nsf.gov/pubs/2000/cawmset0409/cawmset_0409.pdf
- Fancsali, C. (2002). *What we know about girls, STEM, and afterschool programs: A summary*. New York City: Academy for Educational Development.
- Gladwell, M. (2000) *The Tipping Point: How Little Things Can Make a Big Difference*. New York, NY: Little Brown & Company.
- Hall, G., Yohalem, N., Tolman, J., & Wilson, A. (2002). *Promoting positive youth development as a support to academic achievement*. Boston, MA: Boston's After-School for All Partnership.
- Jackson, D. G., & Clark, R. W. (1996). Predictors of effectiveness of collaborative relationships of the USDA Youth At Risk coalitions. *Journal of Extension* [On-line], 36(6). Available at: <http://www.joe.org/joe/1996december/rb3.html>
- Kennedy, M. M. (1997). The connection between research and practice. *Educational Researcher*, 26(7), 4-12.
- Miller, B.M. (2003). *Critical hours: Afterschool programs and educational success*. Quincy, MA: Nellie Mae Education Foundation.
- National Science Board (2006). *Science and Engineering Indicators, Volume 1*. NSB 06-01. Arlington, VA: National Science Foundation. Retrieved on April 17, 2006, from <http://www.nsf.gov/statistics/seind06/>
- National Science Foundation (2003). *New Formulas for America's Workforce: Girls in Science and Engineering*. NSF 03-207. Washington DC: Author.
- National Science Foundation (2005). *Information Technology Education for Students and Teachers, Program Solicitation*. NSF (05-621). Directorate for Education and Human Resources. Washington DC: Author.

- NIOST (2005). *Pathways to success for youth: What counts in after-school: A report of the Massachusetts After-School Research Study*. Wellesley Centers for Women. Retrieved on April 24, 2006, from <http://www.wcwoonline.org/mars/index.html>
- Patton, M. Q. (2001). Evaluation, knowledge management, best practices, and high quality lessons learned. *American Journal of Evaluation*, 22(3), 329–336.
- US Census Bureau (2000). *Employed Bachelor's or Higher Degree Recipients, by Occupation, Sex, Race/Ethnicity, Country of Birth, and Disability Status: 2000*. Retrieved on October 11, 2005, from <http://www.nsf.gov/statistics/wmpd/tables/tabh-1.xls>